THE ANALYSIS OF THE PERFORMANCE OF MEDICAL STOCKS CONTROL SYSTEM: A CASE OF DODOMA REGIONAL HOSPITAL

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION OF THE OPEN UNIVERSITY OF TANZANIA

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CERTIFICATION

I, the undersigned, certify that I have read and hereby recommend for acceptance by the Open University of Tanzania, a dissertation entitled "**The Analysis of the Performance of Medical Stocks Control System. A Case of Dodoma Regional Hospital"** in partial fulfillment of the requirements for award of the degree of Master of Business Administration of the Open University of Tanzania.

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Dr. Anna Wawa

(Supervisor)

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Date

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DECLARATION

I, **Noel Phineas Pallangyo,** do hereby declare that this dissertation is my own original work that it has not been presented and will not be presented to any other institution for a similar or any other award.

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Date

DEDICATION

To all members of the family of Phineas Jacob Pallangyo for their endurance of my absence during this study and love that God has consolidated in them.

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This dissertation is an outcome of the contributions of many people who in one way or another facilitated me to accomplish the mission of developing it. I would like to thank them all and mention their names in this paper but due to their long list it is not possible. However, I cannot avoid mentioning few of them. First, I would like to send my sincere thanks to my supervisor Dr. Anna Wawa who devoted her effort and time to encourage and advice with friendly approach throughout the process of conducting this research. May God bless her.

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ABSTRACT

This study was the analysis of performance of medical stocks control system and was designed to establish factors affecting efficiency of medicals stocks control system at Dodoma Regional Hospital (DRH). The study examined medical stocks control system, factors affecting performance and then propose ways for improvement of the performance of medical stocks control system at Dodoma Regional Hospital. In the study both primary and secondary data were collected through questionnaires, interviews and observations from 68 employees of DRH and 80 patients. Findings were analysed through qualitative techniques in which explanations were drawn, and the summary was drawn in frequency and percentage tables and figures with the use of SPSS and Excel programs. The results show that at DRH there are no fixed pre-established stock levels, order quantities, and ordering time for non-vertical programme items, and stock records are mainly kept in paper files. For non-vertical programme items, order quantities and ordering time are mainly determined basing on the available funds and stock balances while main determinant of ordering time and order quantities for items in vertical programme are stock balances and consumption rate. The results reveal that performance of medical stocks control system has been mostly affected by low information sharing among the individuals involved in the system, limited supply of items at Medical Stores Department (MSD), lack of computerised system and insufficient funds allocation. In order to improve the performance of medical stocks control system, DRH management needs to strengthen its information sharing system, undertake effective budgeting and funds allocation for medical stocks, purchase items missing at MSD from authorised suppliers of medical stocks as well as improve data management, supervisions and management follow-ups in the medical stocks control system.

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ABREVIATIONS

ALU   Artemethen Lumefantine

ARV   Anti-retroviral

CAG   Controller and Auditor General

CMS   Central Medical Stores

CTC   Care and Treatment Centre

DRH   Dodoma Regional Hospital

HIV   Human Immunodeficiency Virus

HPSS   Health Promotion and System Strengthening

MOHSW   Ministry of Health and Social Welfare

MSD   Medical Stores Department

SPSS   Statistical Programme for Social Sciences

STDs   Sexually Transmitted Diseases

TB   Tuberculosis

TGPHS   Tanzania German Programme for Health Support

US   United States

USAID   United States Agency for International Development

WHO   World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Problem

Problems in the stock control system in the health facilities in Sub-Sahara African Countries have been resonating for long time. The issue has been addressed by various perspectives including the Abuja Agreement for 2025 Millennium Development Goals in which health sector improvement is among the area of priority (WHO, 2002). A survey conducted in Kenya on 2010 and 2011 by Dejan on The Magnitude and Trend of Artementer – Lumefantrine (ALU) stock – outs at public health facilities revealed that poor stock control system had resulted to significant stock-outs for ALU. Poor stock control system was said to have caused unrealistic stock forecasting and financing and ultimately led to stock outs (Dejan, 2012).

There are also empirical evidences that, in Tanzania medical stock control system is still inefficient in health facilities due to persisting experience in stock outs and expiry of medical stocks. For instance, in March 2012 Sikika conducted a survey across mainland Tanzania in 54 Public hospitals to inquire about stock outs of essential medicines, medical supplies and available bed capacity. In that survey it was found that a majority, (94%), of hospitals reported being out of stock of one or more essential medical supplies.

The shortage attributed by, among other factors the relatively long order cycle, limited funds allocated and disbursed from the central government, difficulty in accessing alternative local funds, and stock-outs at central medical store, of which

such challenges depend on the efficiency of procurement and distribution system which comprise stock control system (Sikika, 2012). [1]Also, on April, 2012 media reported that, the government of Tanzania has suffered loss of 4.7 billion on expired drugs during the financial year 2010/2011. This suggests that, there are some hidden factors which affect the performance of the stock control system in way that it displays the questionable performance of the given stock control system.

The government of Tanzania has taken various measures to strengthen the performance of medical stock control system in health facilities. Among the attempts made, in the year 1993, the government of Tanzania established Medical Stores Department (MSD) with the aim of supplying good quality drugs and medical equipment at accessible prices, made available through approved government and non-government agencies throughout Tanzania. MSD came about after complaints that health facilities had no reliable sources of medical supplies and drugs as a result there were frequent stock outs in health facilities (Yale Global Health Leadership Institute, 2013).

Inadequate funds to finance procurement of drugs and medical supplies is also said to cause the shortage of medical stocks which retards the performance of medical stocks control system (Sikika, 2012).In dealing with such problem of financing procurement of drugs and medical supplies, the government have introduced various approaches being such as Health Insurance Schemes, cost sharing approach and involving different health stake holders like faith based organisations. Also, the government commits funds each financial year for health human resource

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[1]Daily News, 04/04/2012

development of which those in the stocks control system are included (MOHSW, 2013).

Despite the efforts made by the Tanzania government, still indicators of questionable medical stock control system prevail. For instance, a baseline survey conducted on 2012 by Swiss Agency in Dodoma region for Development and Cooperation in Health Promotion and System Strengthening (HPSS) project noted that there were shortages of drugs and medical supplies as well as mis-management of existing stocks of drugs and medical supplies in most of health facilities. It was noted that, including other factors the inefficient stock control system have impaired the provision of health services at the respective health facility (HPSS, 2012).

Dodoma Regional Hospital is among the health facility in Dodoma focused to provide high demanded health service to the population of approximately two million as far as it is a referral hospital (Census, 2012). However, concerns from general public have prevailed on questionable stock control system performance due to existence of stock outs for drugs and medical supplies. Apart from stock outs, expired medical stocks have also been noted at Dodoma Regional Hospital. For instance in the year 2012, medical stocks with the value approximately TZS 14 Million were found expiry (CAG, 2012). All these have come in place regardless of the attempts made by the government and other stakeholders to ensure efficient and effective performance of medical stocks control system. This is what triggered the need for this study that aims to explore more of factors affecting performance of medical stocks control system in order to develop strategies on improving performance.

1.2 Statement of the Problem

Provision of sufficient and adequate health services to individuals in the community continues to be essential in the present world. The efficient stock control system is expected to support such provision of health services by ensuring right quantity and quality drugs and medical supplies are available when needed at minimum costs. Despite the importance of efficient stock control system in health facilities the questionable performance of medical stocks control system has existed. Such performance is argued to cause stock outs and expiry of drugs which ultimately causes inconvenience to patients and loss of stakeholders' money and in some cases death of innocent citizen.

The government of Tanzania and non-government institutions have taken various measures to ensure there is efficient stock control system in health facilities which would reduce stock outs and expiry of medical stocks. Despite the interventions made stock outs and expiry of drugs have continued to occur simultaneously. Researcher's experience in stocks audit at Dodoma Regional Hospital and CAG report show that Dodoma regional hospital has also experienced stock outs and expiry of stocks.

The general factors which are causing stock control systems in health facilities not to perform as expected have been researched for elsewhere in the country, but the analysis was not yet done at Dodoma regional hospital. Therefore this study intended to analyse the performance of medical stock control system at Dodoma regional hospital in order to establish factors for existing state of performance and the way forward for improvement.

1.3 Study Objectives

This study aimed at achieving the following main and specific objectives.

1.3.1   Main Objective

The main objective of this study was to analyse the performance of medical stocks control system at Dodoma Regional Hospital.

1.3.2   Specific Objectives

   i. To examine the existing medical stocks control system at Dodoma Regional Hospital

   ii. To examine factors affecting performance of medical stocks control system at Dodoma Regional Hospital

   iii. To suggest the best approach for medical stocks control at Dodoma Regional Hospital.

1.3.3   Research Questions

This study was targeted to answer the following questions:

   i. How does Dodoma Regional Hospital control its medical stocks?

   ii. Which factors affect performance of medical stocks control system at Dodoma Regional Hospital?

   iii. Which is the best approach for medical stocks control at Dodoma Regional Hospital?

1.4 Significance of the Study

This study is of significant to the Health facilities, to policy makers, practitioners and

to the scholars as follows:-

i) To Health Facilities

This study was expected to come out with challenges affecting medical stock control system at Dodoma Regional Hospital as well as the way forward for improvement. Such findings may be used by the management of Dodoma Hospital in making decision on ways of ensuring constant availability of drugs and medical supplies while eliminating unnecessary costs. Also other institutions (especially health facilities) which are operating in the same modality as of Dodoma Regional Hospital facing the same challenges in the medical stocks control system may use this study findings to enhance the performance of Medical Stocks Control System.

ii) To Policy Makers

Policy makers like government through Ministry of Health in Tanzania and Non-governmental organisations may find results of this study of importance when developing policies to ensure stock control systems are efficient in Health facilities; and ultimately to ensure availability of drugs and medical supplies at minimum costs.

iii) Practitioners

This study documents Medical Stocks Control practices at Dodoma Regional Hospital in terms of its strength and weakness and suggests the best approach of Medical Stock Control. Such results may be used by stock controller (practitioners) in enhancing their day to day operations.

iv) To scholars

Study findings may be used as the reference by students and other people who may be doing the related study.

1.5 Scope of the Study

This study was the analysis of the performance of medical stocks control system at Dodoma Regional Hospital (DRH). The analysis involved employees of DRH who have direct link to medical stocks control system, namely: pharmacists, accountants, supplies officers, medical staff members and top management. Also, the study included DRH patients, the main group mostly likely to be affected by the results of the performance of medical stocks control system.

1.6 Limitations of the Study

In conducting this study researcher faced the following difficulties:-

i) Researcher faced difficulties in selecting patients who could be able to provide their views. Due to differences in extent of illness of patients not all patients were able to provide views to this study. In the wards researcher was necessitated to seek consultation from nurses and neighbours of patients to identify the patients who could be able to respond in the interview.

ii) During this study the DRH employees were much occupied in providing services to patients during the day time and some of medical staff members were in night shifts. This necessitated researcher to find some of respondents very earlier in the morning before doctors start to provide services to patients and the employees who were in nights shifts were contacted in the night.

1.7 Organisation of the Study

This study is organised in five chapters. Chapter one is an introduction of the study which consists of the background of the study, statement of the problem, objectives and research questions, significant of the study, scope of the study and organisation of the study. Chapter two presents literature review which consists of definition of terms, theoretical bases of the study, previous studies, summary of the reviewed literature and ultimately is conceptual framework. Chapter three presents research methodology which consists research design, description of study area; sample and sampling techniques, types and sources of data, data collection techniques; data processing, analysis and presentation, reliability and validity of data. Chapter four is the analysis and discussions of study findings basing on the study objectives. Chapter five gives summary, conclusion and recommendations as well as areas for further research.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1   Definitions of Terms

Stock

Stockconsists of all the goods and materials that are stored by an organization.It is a store of items that is kept for future use (Waters, 2003).

Health Facilities

Health facilities refer to places that provide health care. They include hospitals, clinics, out patients care centres, and specialised care centres such as birthing centres and psychiatric centres (US National Library of Medicine, 2008).

Medical Stocks

Medical stocks are items (goods and materials) used in health facilities. They include drugs, medical supplies and equipment (National Community Pharmacists Association, 2008).

Stock Control

[2]Stock control is the process of making sure that the correct amount of stock is maintained, to be able to meet demand while keeping the costs of holding stocks to a minimum.

Stock Control System

Stock Control systemis the set of policies and controls that monitor levels of stocks

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[2] Business Dictionary.com

and determine what levels should be maintained, when stock should be replenished, and how large orders should be (Jacob et al, 2011).

2.2. Theories and Models of Medical Stocks Control

In this study various theories relating to stock control systems and stock control models were used to analyse performance of medical stock control system at Dodoma Regional Hospital. Involved theories were the Theory of Constraints and the Theory of Contingency and the Ideal Medical Stocks Control Model. The details of the mentioned theories and model are discussed in the following sections.

2.2.1   The Theory of Constraints

Theory of constraints was first introduced by Eliyahu (1984), in his book titled "The Goal". Theory premise is that "organisations can be measured and controlled by variations on three measures: throughput, operational expense, and inventory". Throughput is the rate at which system generates money through sales, inventory (stocks) is all the money that the system has invested in purchasing things which it intends to sell. Operational expense is all the money the system spends in order to turn inventory (stocks) into throughput.

Assumptions of this theory include: the rate of goal achievement by a goal-oriented system (i.e. the system's throughput) is limited by at least one constraint; if there was nothing preventing a system from achieving higher throughput (i.e. more goal units in a unit of time) its throughput would be infinitive which is impossible in a real life system. In this theory constraints addressed are equipment, people and policy. These constraints are used as a focusing mechanism for management of the

system. The system emphasises the organisation to hold buffer stocks to ensure that the constraint is never starved. Buffer are also placed behind the constraints to prevent down stream failure from blocking the constraints output. In stock Control system, Hu (2008), states that constraints is restraints to the stock control system. Limited storage capacity and funding constraints may bind the number of stocks; there are also some strategies that allowing out of stock for some certain items. The administrative decision making can also restrain the strategy of stock control system.

In this study researcher used this theory to analyse limiting factors of medical stock control system at Dodoma Regional Hospital. Also, this theory was used to analyse the rationale of holding buffer stock in stock control system as the theorist emphasises need for placing buffer stock behind the constraints.

2.2.2 The Contingency Theory

The Contingency theory holds that "if one phenomenon exists, then a conclusion can be drawn about another phenomenon". This theory is often called the "it all depends" theory. The essence of this theory is that the best practices depend on the contingencies of the situation. Contingency theory is applied in identifying and measuring the condition under which things will likely occur in the system (Goldhaber, 1993).

The applicability of contingency theory in the medical stocks control system is that, the performance of the medical stock control system depends on different variables. Contingency theory provides variables which are likely to affect the performance of the system. Purpose of the system in organisation is considered to be the main driver

and other variables are people(managers), technology, tasks and structure. In this study contingency theory was used to identify and measure the unique variables at Dodoma Regional Hospital which the Medical Stocks Control System depends on and address the best practices in medical stocks control at Dodoma Regional Hospital.

2.2.3The Ideal Medical Stocks Control Model

This study used the ideal model of medical stocks control provided by Management Sciences for Health in the manual for Managing Drug Supply (Management Science for Health, 1989). This model is shown on figure 1. This model considers stock on hand which consists of working stock and the safety stock. Working stock varies from zero to the order quantity (Q) and represents the stock which is used to satisfy demand between deliveries. Safety stock (S), also called reserve stock, buffer stock, or fluctuation stock, exists to protect against stock outs which would otherwise occur when deliveries are delayed for any reason or the working stock is consumed at an unexpected high rate.

In the Ideal Model, medical stocks, say drugs and medical supplies are issued in response to demand and the stocks on hand steadily declines until the point at which an order must be placed. Following the lead time period, during which all the activities of the procurement cycle are performed, the quantity ordered (Q) is received and the inventory level is back to its starting maximum point (Q+S). The Ideal Medical Stocks Control Model is designed to ensure working stock is kept at the level that the holding cost is reduced and the stock outs are reduced by holding reasonable safety stock. According to this model the working stock is reduced only

by placing smaller orders more frequently and safety stock is reduced so as to reduce the average stock. However, reduction of safety stock increases the chance of stock outs. Therefore in order to estimate the optimal safety stock, it is argued that the cost of additional safety stock must be weighed against the potential health impact of stock outs.
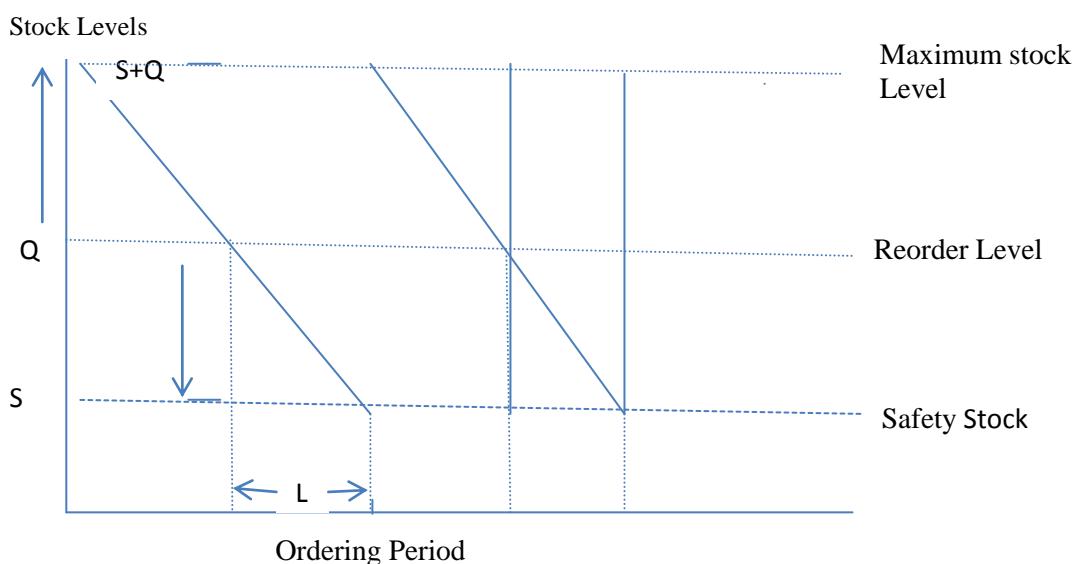
Where: Q –   Order Quantity,
            S -   Safety Stock
            L -   Lead Time

Source: Management Science for Health, 1989

Figure 2.1: Ideal stock Control Model

The Ideal Medical Stocks Control Model demands carefully kept stock records indicating stock levels, when stock outs occur, and how long they last. These records can then be used to adjust safety stocks upward or downwards. In this study the Ideal Medical Stocks Control Model was used as a base in analysing the medical stocks control approach at Dodoma Regional Hospital. Also, this model was used as a point

of initial in suggesting the best approach for medical stocks at the study area.

2.3 Stocks Control Systems

Stocks control system is the set of policies and measures that monitor levels of stocks and determines what levels should be maintained, when stock should be replenished, and how large orders should be. A stock control system provides the organizational structure and the operating policies for maintaining and controlling goods to stock. The system is responsible for ordering and receipt of goods; timing the order placement and keeping track of what has been ordered, how much, and from whom. The system also must follow up to answer such questions as: Has the supplier received the order? Has it been shipped? Are the dates correct? Are the procedures established for reordering or returning undesirable merchandise? (Berry et al, 2011). Also, stock control system keeps the organisation aware of the quantity of each kind of merchandise on hand. It provides a guide for what, when, and how much to buy of each style, colour, size price and brand (Counselors to America's Small Business, 2013).

Basically, there are two stocks control systems applicable in medical stocks control. These are Periodic Stock Control System and Perpetual Stock Control System (Inyang-Udoh, 2002). This research used these systems to analyse the system of stock control system in Dodoma Regional hospital and develop the best practice for the same.

2.3.1   Periodic Stock Control System

In this system the balance of stock at hand is checked after every issue as soon as the balance falls below the reorder level. This is the basic method of controlling stocks

by quantity by fixing for each item stock level. Stock levels are recorded in the stock records system (say computerised and/or manual) and subsequently used as a means of indicating when some action is necessary (Inyang-Udoh, 2002).The fundamental stock levels are minimum, ordering, and maximum levels. However, all these are not necessary or desirable for every item and they should be employed with discretion as the fixing of too many levels makes the work complicated (ibid).

The minimum stock level is the amount of unit which the stock of any given item should not be allowed to fall (Jessop, 1986). A minimum stock level has to be set in order to create a buffer against the various uncertainties that exist (Coyle et al., 2003). On the other hand, a maximum stock level is set to ensure that not too much stock is kept, because that would be unnecessary. Once the minimum level has been reached, items have to be reordered until the maximum is reached again. In practice however it mostly takes a while before ordered goods are actually delivered, therefore ordering level is also necessary to ensure that the stock will not fall under the minimum level.

The ordering level makes sure that goods are ordered before the minimal level is reached, in such a way that the ordered goods are delivered just in time when the stock approaches the minimum level. If the ordering level is reached, items are ordered and due to the delay they will be delivered just at the point where the stock level is at its minimum. The minimum stock is also referred to as safety stock. The safety stock forms an ultimate buffer to cope with uncertainties (e.g. in delivery times and varying demand). The more reliable the supplier and customer demands are, the lower the safety stocks can be (Coyle et al., 2003).

2.3.2   The Perpetual Review Stocks Control System

This system is useful where a range of similar commodities can be ordered at one time. The value of individual order will be much greater and possibility of lower prices more likely. In general, it involves examining either the physical stocks or the stock records for a particular class of items at regular intervals and taking simultaneous action for all items requiring replenishment (Inyang-Udoh, 2002). The stock level is reviewed continuously and whenever the stock falls below a predetermined reorder level an order is initiated. The reorder level is based on the average lead time; when the reorder level is reached there shouldbe enough stock to last until the next order arrives.

There are other stocks control systems applicable in medical stocks control which includes: Pull system, Push system and Just in time system. Pull system involves replenishment of stocks which is triggered by interpretation of the expected demand and scheduling of supply to meet that demand. This system involves reaction to demands. Unlike pull system, push replenishment is triggered by the usage or depletion of stocks. The adverse effect of push system is the existence of more stock in the system than the requirements since the consideration on the actual demand is minimal. In Just in Time system the replenishment of items is made for their immediate use. Thus order delivery is made only for the present requirement (Hunt, 2013).

The applicability of Pull system, Push system and Just in time systems in developing countries is found difficult due to their demand of developed transport and communication infrastructure as well as reliable source of supply. Also, these

systems are used in line with the former discussed Periodic and perpetual review stock control system. In addition periodic and perpetual review stock control systems are more controlled by internal organisation operations than the other systems and since this study concentrate with the analysis of system performance which is more affected by internal factors, the periodic and perpetual systems are more relevant to this study.

2.4 Role of Effective Medical Stocks Control System in the Health Sector

The stocks control process focuses attention on factors related to time utility, supply of quantity and quality materials used by the organisation (Tosdal, 2006). Thus, the objective of practicing stocks control is to ensure that the conditions mentioned are fulfilled by providing the information necessary to take appropriate action at every stage of the operation. This concept revolves on the fact that stores department, must provide the entire organization with the right materials that are delivered and issued in the right quantities and quality which must be available at the right time, right place and at the right price (Levis, 2009).

In health institutions, medical stocks control is expected to eliminate overstocking resulting to too great tie up of capital, losses due to obsolescence, expiry or depreciation. Likewise, medical stocks control eliminates under stocking which results from inadequate follow up on delivery premises. Medical stocks control ensures that each item delivered from the store is properly accounted for, and any form of pilferage or wastage, is discovered at an early stage. In essence the practice of keeping stocks must be maintained just high enough to meet demands and also a constant supply to be available as at when needed (Cooper, 2006).

Furthermore, one third of the hospital budget is spent on purchasing medical stocks. This demands medical stocks control system that ensures availability of adequate stocks of all the required items to maintain uninterrupted supply. Such system need to be effective and efficient by keeping a close supervision so as to prevent pilferages, and expiry, overstocking and under-stocking (Dehradum, 2012). Also, accurate stocks control system is essential to facilitate quantification and to control possible theft and misuse of medical stocks (US Agency for International Development, 2003).In other word, effective medical stocks control system plays a vital role in the smooth and running of health facilities establishments (Applewhite, 2004).

2.5 Factors Affecting Performance of Medical Stocks Control System

There are different requirements for effective medical stocks control system which fall on the suitability of stocks control method, strength of internal checking system, knowledge of stock controller, suppliers reliability, variation in supply and demand, effectiveness of the plan, stock records management, participation of stakeholders in the plan and budget implementation (Hamlett et al , 2012).

Strength of internal checking system of the health facility determines the performance of medical stocks control system. Health facilities which conduct internal checks frequently and work on observations made during such checks are likely to increase performance of stocks control system. The internal control mechanism assists in detecting fraud and in pinpointing where health commodities may be leaking from health system(US Agency for International Development, 2003).

Unavailability of stocks at the source of supply, say, supplier results to difficulties in maintaining the required stock levels at the health facilities. For instance, unavailability of stocks at Medical Stores Department in Tanzania is said to result to stock outs and confusion for health facilities placing orders (US Agency for International Development, 2005). Also, the professional competence of practitioners involved in stocks control system determines the efficiency of the system. It is important those who are involved in the management of medical stocks to have adequate knowledge for that work and in order to maintain the required competence trains to stocks control practitioners are needed (ibid).

[3]Stock records is very vital for effective performance of stocks control system as they provide detailed evidence of how products flow through the system and can be used to identify where problems are occurring so that corrective action can be taken. It also thought that the basic management tool for inventory control is the stock records. In some settings stock records are computerised. For effective medical stocks control, stock records must exist for each item showing stock transactions including receipts, issues, orders placed, orders received, and an indication of stock losses (Management Science for Health, 1989).

On the other hand, health services funding approaches are noted to affect the performance of medical stocks control system. Main approaches of health service provision adopted in respect of World Health Organisation (WHO) are horizontal and vertical programmes(WHO,2005). Horizontal approaches/programmes consist

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[3] Medical Stores management, Namibia.

of integrated health care for interrelated health problems for entire population and usually financed by national health system (Wison, 2009). Horizontal approach includes strengthening of health systems by addressing a broad range of needs or at least to coordinate related diseases program. Horizontal programmes are considered to be more sustainable and more integrated management of multiple determinants of health and efficient in the use of scarce resources. However, many developing countries when adopting horizontal programmes suffer from poor health care funding (MOHSW, 2008).

The vertical programmes consist of initiatives taken to deal with a specific health problem out of regular approaches. Vertical programmes are donor driven and focus on specific disease such as HIV or TB (Institute of Medicine, 2009). Adoption of vertical programmes has been criticized for its behaviour of crowding-out resources for essential drugs budget and distortion of funding priority. The relative distortion of health service funding priorities resulting from vertical programmes affects the performance of medical stocks control system by fragmenting stocks control system (MOHSW, 2008).

2.6 Experiences of Other Countries in Medical Stocks Control Systems

A study conducted in China by Jianling et al, 2010, on the Analysis of inventory Management in the China enterprises reveals that, in order organisations to maintain exuberant competitive advantages and higher profitability, they need to pay more attention on stocks control system. He adds that organisations need to adopt effective stocks control methods in their internal control system and implement scientific

stocks control ways.

In Ethiopia on 2002, an Assessment of the Pharmaceutical Sector in Ethiopia which involved7 Hospitals, 19 health centres, 85 health stations, 5 regional drugs stores, 24 private pharmacies and 490 households was conducted. That assessment had the objective of identifying strength and weaknesses in pharmaceutical sector. It was found that there was no proper stocks management in health facilities as a result there were average stock outs durations in public health facilities and regional drug stores of about 99 days. Such an assessment identifies the existence of problem of stock outs in health facilities but the exact factors emanating from stocks control system which result to stock outs were not addressed(Ethiopia Ministry of Health, 2003).

The Assessment of the Health Commodity Supply Sector in Rwanda, Lijdasman, 2003, came up with the findings that, 54% of health facilities involved in that study the final decision on procuring health commodities rests with the person in charge of the pharmacy. More than 40% reported to procure commodities as the need arose. These findings are the practices and approaches used by health facilities to ensure the availability of supplies. However this study does not show factors which were affecting stocks control system and necessitated the procuring authority for some health commodities to be centred to person in charge of the pharmacy. Also, facilities were reported to purchase commodities from both public and private sectors but it was not provided in that study on what should be done to resolve the problem if that practice fails.

[4]In Malawi, on February, 2013 the Principal Secretary of Health Ministry noted that drugs stock outs was amounting to 95%. It was noted that causes were theft, tedious and bureaucratic process of procuring drugs and parallel system to purchase medication for treatment programmes. The identified causes of stock outs in this case are within the stocks control system and they are revealing the weakness of the system. However the question of whether the same is happening in the stocks control system in Tanzania, and more specific in Dodoma Regional Hospital not yet covered.

In Namibia there is Central Medical Stores (CMS) from which health facilities are expected to order products. An assessment conducted on the CMS distribution shows that stock records were not adequately maintained and physical inventory counts did not correspond with either stock records or computerised records. It is argued the cause is that, the regional stores and health facilities had no effective systems for deciding when, what, or how much to order, most facilities ended up placing many emergency orders. Recommendations made in this assessment include: conduct of complete physical stock control counts at all levels and use the results to update or introduce stock records; develop standard operating procedures for stores management; and train staff on how to maintain stocks records and use the computerised stocks control system to their best advantage (Management Sciences for Health/Rational Pharmaceutical management Plus Program, 2008).

The reviewed experiences of other countries in medical stocks control systems show that at a certain time inefficient medical stocks control system existed. Researchers

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[4]Lameck Masina 14/02/2013. Humanitarian News and Analysis. Voice of America. Lilongwe.

provide the resulting causes of inefficient medical stocks control system and some recommendations applied for their specific studied cases. However the justification that the prevailing inefficient medical stocks control system at Dodoma regional hospital is caused by the same factors noted in studies conducted in other countries and provided recommendations will apply is not yet provided of which this study was intended to bridge that gap.

2.7   Studies in Tanzania

A study conducted by Silumbe, 2011, in Dar Es Salaam, Tanzania, shows that, despite the government efforts in ensuring availability of drugs, there is a significant stock out period due to poor pharmaceutical management of ant malarial medicines in the public health facilities. This study does not address the weakness of stocks control system and their effects on the availability of drugs and medical supplies(US Agency for International Development, 2003).

[5]The assessment conducted by The Ministry of Health in Tanzania in Collaboration with the Tanzania German Programme to Support Health (TGPSH) on 2011, in four regions of Tanzania: Mtwara, Lindi, Tanga and Mbeya shows that public health facilities (dispensaries and health centres) in four regions face severe stock outs of medicines and medical supplies. The main problem leading to stock outs noted were: incomplete requests for supply of medicines by Medical Stores department (MSD) from health facilities and health facilities had no sufficient capacity to order medicine correctly. The required capacity includes predicting medicine needs, and

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[5] Tanzania German Availability and Management of Medicines Programme to Support and Health and Medical Supplies (2011): Findings from an Assessment Health (TGPSH) of 87Health Facilities in Four Regions of Tanzania.

stocks keeping management (Ministry of Health and Social Welfare (MOHSW), Tanzania, 2011).

A study conducted by USAID, 2005, in Tanzania shows that the unavailability of stocks at MSD results to stock outs and confusion for health facilities placing orders. It was also found that the stock outs results to a loss in confidence about the supplier's, say MSD, inability to deliver priority items which can erode confidence in the medical stocks control system. It was recommended that in order to improve the performance of medical stocks control system trains are needed to practitioners and that trains should consider the compatibility of the curriculum with the skills needed (USAID Tanzania, 2005).

2.8 Knowledge Gap

The reviewed literatures show that efficient medical stocks control system is important for health facilities to achieve their establishment objectives which are provision of health services to the community. Many studies show that medical stocks control systems in health facilities have not ensured availability of stocks and reduction of stock losses. Such studies have highlighted the environment in which medical stocks control systems exist and failure occurred but the measurement of the performance of that system is not yet done, and more specifically in Tanzania. Also, the reviewed studies were conducted through survey research approach in which in-depth analysis of medical stocks controls system was not conducted in specific cases to reduce generalisation. This study was therefore focused to analyse the performance of medical stocks control system through descriptive research deign with case study approach so as to identify areas of weaknesses and the associating

factors.

2.9 Conceptual Framework

The outcomes of effective performance of medical stocks control system are support to better health service provision, and reduction of stocks control costs and losses as noted earlier (Tosdal, 2006). The intermediate results of efficient stocks control system are right and timely order replenishment, lesser physical stock losses and reduced expired stocks. But the intended performance of medical stocks control system depends on different variables such as efficiency in stocks control records, participation of key stakeholders in the stocks control decisions and accuracy in ordering decisions. Figure 2.1 shows the interdependence between such variables affecting the performance of medical stocks control system.

Stocks records are likely to affect the performance of stocks control system. It is through stock records the system can be alerted when, what and how much to order by shown stock levels at the given time. Therefore basic stock levels which include maximum level, reorder level and minimum level once are established need to be reflected in the stock records. However organisation may decide on either to handle stock records in a computerised or manual system. It is also through records the system can monitor efficiently the stocks which are nearly to expire and which loss has occurred in the system.

Key stakeholders in the stocks control system are stock controllers, financiers, stock users and organisational planners. In order for stocks control system to perform efficiently they need to be involved in decision making. Their participation is

required in establishing stock levels in the system. Also, they need to be involved in deciding what, how much and when to order so as to reduce the risks and costs associating with these decisions. The efficiency in stock ordering decisions has direct effect to the performance of stocks control system. The decisions on the quantity and time to order determine how much stocks control system will hold and when next amount will come into system. However in order such decisions to be right need information on stock levels. Also, the time for deciding order quantity and the replenishment time depend on the established time for stock level reviews.
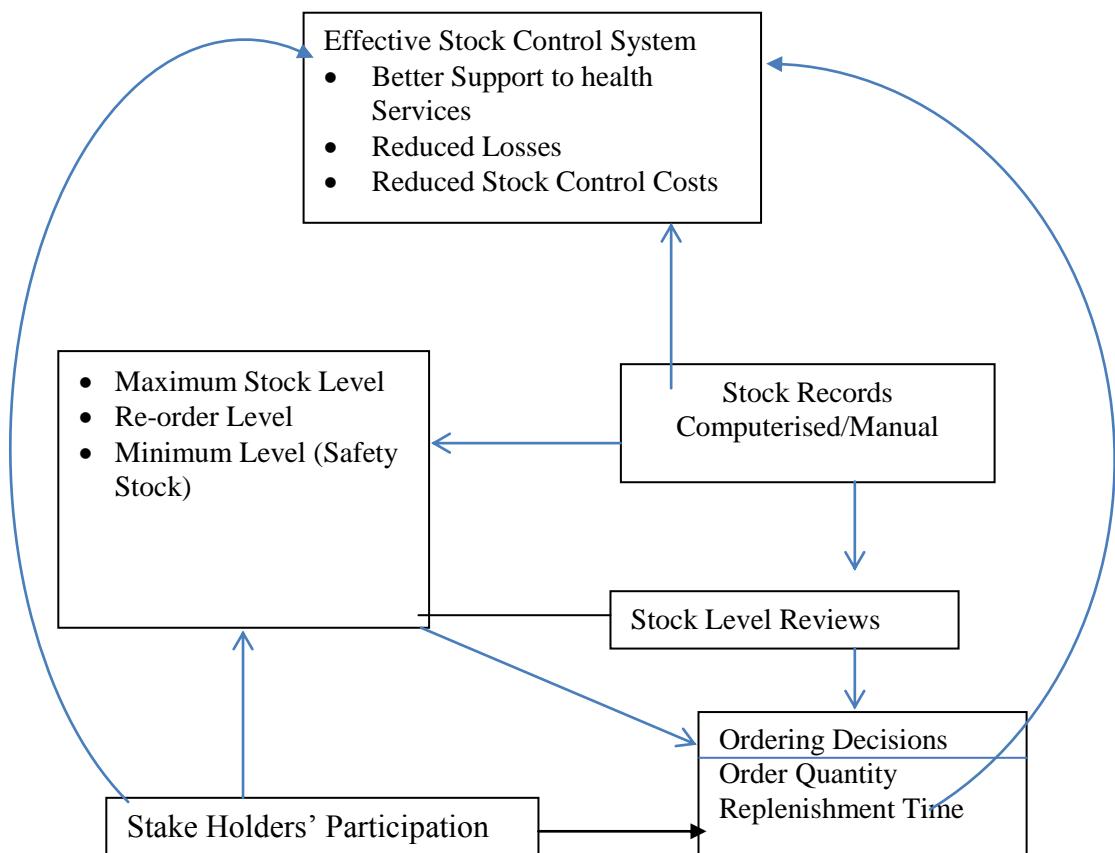
Figure 2.2: Conceptual Framework for the Performance of Medical Stock Control System

Source: Author's Conceptualisation

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study adopted descriptive research deign with case study approach as a strategy in the arrangement of conditions for collection and analysis of data. This design was adopted since the study is a qualitative in its nature and the method is economical. Kothari, (2004) defines a case study method as a very popular form of qualitative analysis and involves a careful and complete observation of a social unit, that unit bena person, family, an institution, a cultural or even the entire community. This study involved analysis of the performance of medical stocks control system and Dodoma regional hospital was selected case for analysis. The Case study approach was selected due to its flexibility in data collection that will assist the researcher to study many aspects of medical stocks system at DRH and examine them in relation to each other. Also, the selected design is thought to be economy in terms of time and funds.

3.2 Description of the Study Area

This study was conducted at Dodoma Regional Hospital (DRH) which is among the health facility in Dodoma. DRH is located in Dodoma Region which lies at 4^0 and 7^0 Latitudes South and 35^0 to 37^0 Longitudes East. It is established to provide health service to the community of about two million people. DRH keeps medical stocks of about 50 varieties and supports 3 Districts' Hospitals of Mpwapwa, Kongwa and Kondoa, and health centres in Bahi and Dodoma Municipal Council (United Republic of Tanzania, 2010).

The researcher has chosen DRH as a case study since it is one of the health facility in Tanzania in which there is medical stocks control system with high performance efficiency demand. That DRH being in the centre of Tanzania saves big number of passengers who are in need of hospital service when crossing the centre of Tanzania (Dodoma region) to other regions. Also, Dodoma Municipal at present is having a dramatic increase of population due to growth of Universities and such population is in essence demanding medical service from Dodoma Regional Hospital. Therefore due to the high level of health service demand at DRH, its medical stocks control system needs to be of high performance and researcher decided to analyse its performance and provide suggestion for improvement accordingly.

3.3 Sampling

3.3.1 Sample Frame

[6]The population in this study involved all participants in the medical stocks control system at Dodoma Regional Hospital which include 5 Pharmacists, 2 Supplies Officers, 2 Accountants, 149 Medical Staff and 3 Hospital's top management staff. Also study involved main end users, the patients, of medical stocks. [7]Both In - patients and Out – patients were 325in average per day. This makes a total of 486 individuals in the medical stocks control system.

3.3.2   Sampling Technique

This study used Judgmental or Purposive sampling and simple random sampling techniques to obtain respondents from the sample population. Purposive sampling

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[6] Number of staff members was extracted from Dodoma Regional Hospital Staff Roster
[7] Average number of patients extracted from Daily Patients Register at Dodoma Regional Hospital

was used intentionally to select Heads of sections and the top management staff of the hospital to be within the sample as is not all individuals could provide reliable data in this study especially on what is happening in the stocks control system. Patients were selected by looking at their capacity to provide views depending on their extent of illness.

3.3.3 Sample Size

In this study, researcher used a general rule of 40% of the population as proposed by Huysamen (1991) to select respondents from patients group and medical staff. Researcher used this rule since it is simple and gives a large sample size hence a high degree of reliability in generalizing the findings. However the researcher included only 80 patients in this study which equals to 25% of patients. Patton, 2002 provides the idea that with descriptive research design sample needs just to include the key informers. Therefore this sample was valid since it represents the key patients' informers who had ability to provide views by reflecting their extent of illness.

On the other hand, in view the idea of Bartlett et al (2001) that, for a population which is less than 100 units, the researchers have to include the entire population in the study, all 2 supplies officers, 5pharmacists and 2 accountants at DRH were included in the sample since their number in their respective section is less than 100. Involving the all individuals in the respective sections in the study provides the high degree of validity and reliability of findings obtained. Therefore, the sample size selected involved148 individuals from study population in the study area and their distribution with their respective groups is shown in table 1 of this study.

Table 3.1: Distribution of Individuals in the Sample Size with their Respective Sections

Sections/Group	Targeted Population	Sample Population (N=148)
Top management Staff	3	3
Accounts	2	2
Pharmacy	5	5
Supplies Officers	2	2
Medical Staff Members	149	56
Patients	325	80
TOTAL	**488**	**148**

3.4 Types and Sources of Data

In this study both primary and secondary data were collected. These data were both qualitative and quantitative in nature. Their descriptions are as provided in the following sections.

3.4.1 Primary Data

Primary data constitutes findings which were collected direct from the study area and are their first time to be collected. Such data are original in nature and were collected from all groups of respondents. These data constitute opinions of respondents on sufficiency of safety stocks, level of stakeholders' participation in medical stocks forecasting and budgeting, factors affecting performance of medical stocks control system and their views on the way for improvement of the performance of medical stocks control system at DRH.

3.4.2   Secondary Data

This includes processed data that are recorded from various sources such as financial and audit reports, journals, magazines, internet web, and various articles.In this study secondary data constitute stock levels' records and were collected from periodic medical stocks status reports.

3.5 Data Collection Techniques

The researcher collected primary data through questionnaires, interview and observation; and secondary data were collected through documentary review.

3.5.1 Interview

In this study the researcher conducted unstructured interview where the researcher collected data through face to face interaction from the top management staff, heads of sections and patients at study area. This instrument is time consuming and in some cases results to leading answers from respondents as noted by (Kothari, 2004). However this instrument facilitated researcher to explore more information from respondents by demanding clarification on responses provided by respondents.

3.5.2 Observation

The Researcher directly observed stocks arrangement and movement in the drugs and general stores at the study area. This enabled the researcher to experience the actual stocks control procedures at the study area, and assisted the researcher to reconcile data obtained through interviews and questionnaires.

3.6.3 Questionnaire

Questionnaires were distributed to staff members in the study area who were neither patients, heads of sections nor top managers. Open – ended and closed - ended questions were used in order to provide flexibility in obtaining views of respondents. Researcher used this instrument in order to reach large number of respondents in a short time even though this instrument did not provide the room to researcher to seek clarification on responses provided by respondents at the time they were responding but that problem was reduced by reconciling questionnaire responses with interview responses.

3.7 Data Processing, Analysis and Presentation

The collected data were edited, coded and entered into Statistical Package for Social Sciences (SPSS). The data were thereafter analysed and presented in tables and statistical chart of which manipulation was done by the use Microsoft Excel computer program.

3.7 Validity and Reliability of Research

This study carried out a pre testing to ensure that data are reliable and valid. The findings from pre-test helped to make changes to the research tools and sample design as well as data collection methods.

CHAPTER FOUR

4.0 FINDINGS ANALYSIS AND DISCUSSION

4.1 Introduction

In this chapter are the analysis and discussion of the study findings. Firstly, summary of questionnaires distribution plan and their fill effectiveness is presented followed by analysis and discussion of study findings basing on the study specific objectives.

4.1.1 Summary of Questionnaires Distribution Plan and Their Collection

Table 4.1 shows the summary of questionnaire's distribution plan and their collection. That, 56 questionnaires were distributed to medical staff and 50 (89%) were effectively filled and collected; 1 questionnaire was provided to supplies officer and filled effectively and collected; 5 questionnaires were distributed to pharmacists and 4 (80%) of them were effectively filled and collected; other 2 questionnaires were distributed to accountants and all of them were collected effectively filled.

On the other hand, researcher planned to interview 130 patients and managed to interview 80 (62%). During data collection the number of patients interviewed was less than the required due to presence of few patients who were able to provide their views due to their extent of illness. However, 62% respondents represent the key patients' informers by reflecting their ability to provide views and considered to be valid for this qualitative study which adopted descriptive research design (Patton, 2002). Also, researcher planned to interview 3 top management personnel and managed to interview all of them. Also the researcher planned to interview 7 respondents (heads of sections) from sections and managed to interview 8 (115%)

respondents. That, responses through interview were collected from 11 employees of DRH and 80 patients, that makes a total of 91 interviewees. The summary of interview plan and its effectiveness is shown in Table 4.2. Therefore, findings of this study are responses from 148 respondents of which 68 are employees of DRH and 80 are patients (the main service beneficiaries of DRH).

Table 4.1: Questionnaires Distribution Plan and Effective Filled Questionnaires

Type of respondents	Planned number of questionnaires	Effectively filled questionnaires	Percentages of effectively filled questionnaires (%)
Medical staff	56	50	89
Supplies Officers	1	1	100
Pharmacists	5	4	80
Accountants	2	2	100
Total	**64**	**57**	**89**

Source: Study results, 2014

Table 4.2: Summary of Interview Plan and its Effectiveness

Type of respondents	Planned number of interviewees	Effective number of interviewees	Percentages of effective number of interviewees (%)
Top Management	3	3	100
Patients	130	80	62
Heads of sections	7	8	115
Total	**140**	**91**	**65**

Source: Study results, 2014

4.2 Examination of the Existing Medical Stocks Control System at DRH

The examination of medical stocks control system at DRH was done by the use of questionnaires and interviews. The aspects targeted for examination were approaches used to establish stock levels, order quantities, determination of re-order level, stocks forecasting approaches, methods used for the issues of stocks and stocks record management system.

4.2.1   Establishment of Medical Stocks Levels

Stock levels that were assessed are those which are considered to have more relationship to stock outs and expiry of stocks as indicators of the performance of stocks control system, the selected ones were maximum level, reorder level and minimum (say safety) stock level. Initially study obtained views of pharmacists on types of stock levels established at DRH in the medical stock control system. Researcher noted that DRH has maximum, reorder level and minimum stock levels for medical stocks which are in the vertical programme as the summary of stock levels of sampled vertical programme items is shown in Appendix I. Medical stocks and other pharmaceuticals in the vertical programmes are provided freely to patients. They include drugs for tuberculosis (TB), ARVs for HIV infected people, vaccinations, drugs for neglected diseases and all drugs for sexually transmitted diseases (STDs).

It was noted that there are no pre-established levels for drugs and other pharmaceuticals which are not in the vertical programme, and one of the pharmacist said: *"Ideally even non vertical programme commodities are supposed to have maximum, re-order and minimum levels but in practice it has not being possible to*

do so". Commodities under non-vertical programme are in the horizontal programme and are delivered through public financing health system. They include commodities which are not in the selective target of specific interventions some of them are shown in Appendix II (WHO, 2008).

Through interview researcher went further to know why stock levels are established and obeyed for vertical programme stocks and not the same to other stocks. Head of Pharmacists said:

> *"Vertical programme commodities are donor funded and are provided freely to patients and therefore the essential role of DRH is logistical and not financing. For the case of other items, stock levels are not possible to establish and abide to them as they are purchased according to the funds available at a particular time".*

The absence pre-established stock level for non-vertical programme items justifies the arguments that vertical programmes distorts priorities in medical stocks control system as the large size of the vertical programmes appears to be driven by the availability of donor resources for a specific programme rather than by the health sector's priorities. That, non-donor funded medical stocks spending is crowded out as it receives proportionately inadequate attention and funding (MOHSW, 2008). Also, the absences of pre-established stock levels deduce that the Ideal Stocks Control Model is not adopted at DRH. The Ideal Stocks Control Model requires the establishment of stock levels for all items in the control. The Ideal Stocks Control Model is designed to ensure working stock is kept at the level that the holding cost is

reduced and the stock outs are reduced by holding reasonable safety stock (Management Science for Health, 1989).

Also, researcher collected views of medical staff, pharmacists, supplies officers and accountants on their participation in establishing stock levels. As shown in Table 4.3, establishment of medical stocks levels is not fully participatory as deduced by 60% of responses. The amount of medical stocks kept at a specified level in the stocks control system is supposed to reflect demands at various sections in the Hospital and therefore inputs from members of sections are important. Basing on the argument of Coyle et al, 2003that when it happens members of sections in the stocks control system are not fully involved in establishing stocks levels the established stock levels may be not reflecting the real demands in respective sections and ultimately the performance of control system is affected the precedence may be developed that the performance of medicals stocks control system at DRH is threatened by not involving members of all sections in establishing medical stocks levels.

Table 4.3: Sections Participation in Medical Stocks Levels Establishment at DRH

Responses	Frequencies of responses (N=68)	Percentages of frequencies of responses (%)
Involved	27	40
Not Involved	41	60
Total	**68**	**100**

Source: Study results, 2014.z

4.2.2   Determination of Order Quantity

In studying the procedure used to determine order quantity, initiallyall respondents except patients were asked to provide their views on the existence of pre-established order quantity. As shown in Table 4.4,facts (90%)confirm that there are no pre-established order quantities for medical stocks at DRH. On the other hand, it was confirmed through the interview with heads of sections by 10 (91%)of responsesout of 11 heads of sections that order quantity at DRH is determined in the monthly meeting held by heads of sections. It can therefore be considered at DRH the amount of stocks to be ordered at a given period of time is not known in advance and that may affect the performance of medical stocks control system by making it difficult to budget for deliveries. As provided by Berry et al, 2011 that the effective stocks control system needs to state how much to order at a specified period of time.

Table 4.4: Existence of Pre-Established Order Quantity for Medical Stocks

Responses	Frequencies (N=68)	Percentage of frequencies (%)
Existing	7	10
Not existing	61	90
Total	**68**	**100**

Source: Study results, 2014.

Also, the study through questionnaires investigated level of participation of members of sections in determining order quantities. It was revealed by 96 % of responses that the process of determining order quantities is not adequately participatory (Table 4.5). Limited participation of sections in establishing order quantities may lead to inaccurate decisions on order quantities as a result the medical stocks control system

may hold more stocks than the required or lesser of the requirement and ultimately causing the stock outs. This also agrees with idea provided in the literature that effectiveness of medical stocks control system is determined by effectiveness of the plan and participation of stakeholders in the plan and budget implementation (Hamlett, et al, 2012).

Table 4.5: Participation of Members of Sections in Determining Order Quantities for Medical Stocks

Responses	Frequencies (N=57)	Percentages of frequencies (%)
Participating	2	4
Not participating	55	96
Total	**57**	**100**

Source: Study results, 2014.

Furthermore, pharmacists, accountants, supplies officers, top management and medical staff members through questionnaires and interviews were asked to provide their views on factors that are used to determine the order quantity during ordering time. Their responses are summarised in Figure 4.1. It was revealed by 74% of responses that order quantity at DRH is mainly determined by the cash available at the time of ordering basing on budget allocation. The other factors which are found to influence the decisions on the amount to order are consumption rate (44%) and available stock balances (15%).
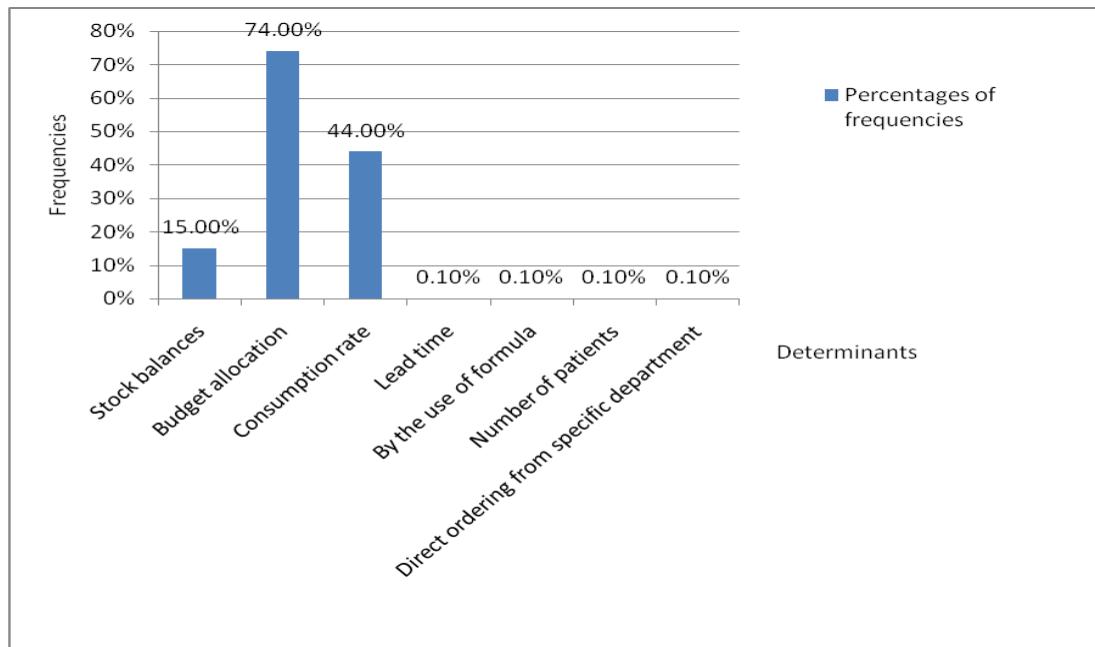
Figure 4.1: Determinants of Medical Stocks Order Quantity (N=68)
Source: Study results, 2014

In addition in the interview one pharmacist dealing with vertical programme items said ordered quantity is determined by the use of formula. The formula was described to use patient influx of which patient influx is determined by the use of historical trends of attended patients in a given time under consideration. Also, it was revealed from stock controller in the tuberculosis section that order quantity is determined basing on the number of registered patients. The facts that order quantities are determined basing on consumption rate and available stock balances agree with Ideal Stocks Control Model that the trend of consumption of stocks and the available stocks determine the amount of stocks to replenish and the lead time (Management Science for Health, 1989). However determining the order quantity basing on the amount of cash available at a given time of ordering may impair the decisions on amount to order as the available funds may be insufficient to finance the required amount.

4.2.3 Determination of Ordering Time for Medical Stocks

The study investigated the approach used to determine time to place orders for medical stocks. Responses were from 15 respondents who participate direct in the ordering process, namely, top management, heads of sections, pharmacists, supplies officers and accountants. Respondents were asked to expose ways used at DRH to determine stocks ordering time. Results are summarised in Figure 4.2.
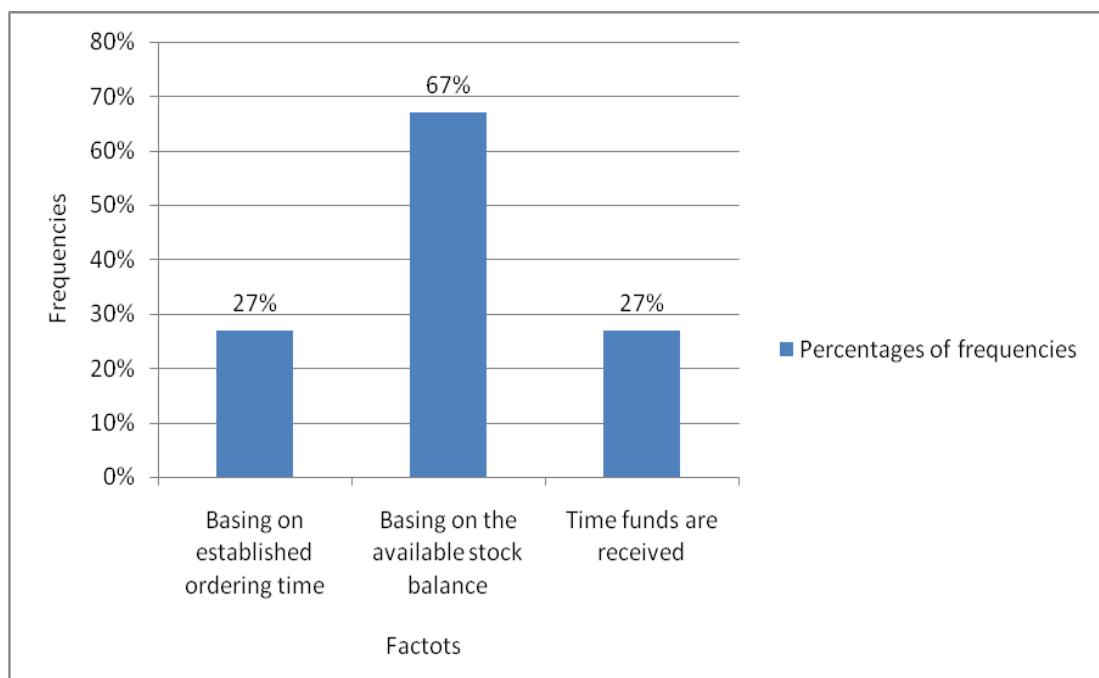
Figure 4.2: Ways of determining ordering time for medical stocks at DRH (N=15)

Source: Study results, 2014

Majority of responses (67%) revealed that ordering time is determined by looking at the stock balances. That order is placed when stock level reaches to minimum level that is perceived to be just enough to use while waiting for other deliveries. Also, it was revealed by 27% of responses that ordering time is determined by looking at the pre-established ordering time. In further investigation on the pre-established ordering

time it was revealed vertical programme items are ordered on quarterly basis, and it was confirmed there are no pre-established ordering time for non-vertical programme items. It was also noted that the ordering time at DRH is determined at the time funds for purchase of medical stocks are received (27%). That there may be requirements but ordering decisions are not made until funds are received, this was said to apply for non-essential drugs.

The facts that ordering time is determined by looking at the stock balances and looking at pre-established stock balances concur with the perpetual and periodic stock control systems discussed in the literature that ordering time is determined by reviewing the stock levels to identify stock levels and balances reached (Inyang-Udoh, 2002). The notion of using funds release as indicators of time to order may affect the performance of the stock control system especially when there are differences between funds release rate and their equivalent stocks consumption rate.

4.2.4   Methods Used to Issue Medical Stocks

The studied methods used to issue medical stocks from the store and views of respondents collected from 68 DRH employees are summarised in Table 4.6. Methods that were considered are First In-First Out (FIFO) and First Expiry-First Out (FEFO). Majority of responses 64 (94%) confirm that FEFO method is mostly used in the issue of medical stocks from the store sat DRH. This agrees with the suggestion provided in the Ideal Stocks Control Model that the ideal method for issuing medical stocks that controls the occurrence of expiry stocks in the medical stocks control system is to issue the stocks basing on the sequence of their shelf life(Management Science for Health, 1989).However, 2 % of responses (Table 4.6)

prove that FIFO method is also used and this gives the sense that not all medical stocks at DRH are only affected by expiry time but some may be affected by the time of stay in storage facilities.

Table 4.6: Methods of Issue for Medical Stocks

Method of issue	Frequencies of responses (N=68)	Percentages of frequencies (%)
First In-First Out (FIFO)	2	3
First Expiry First Out (FEFO)	60	91
I don't know	4	6
Total	**68**	100

Source: Study results, 2014

4.3 Factors Affecting Performance of Medical Stocks Control System at DRH

The study examined factors affecting medical stocks control system at DRH and the predetermined factors that were examined include: management of stocks records, stocks forecasting approach, adequacy of safety stocks and order quantity. Views were collected from all respondents except patients.

4.3.1   Medical Stocks Records Management

As summarised in Table 4.7 responses (88%) deduce that at DRH stock records are mainly kept in paper files. However, at the main pharmacy researcher observed one computer which was used by pharmacists, and that computer was expected to be used by more than four pharmacists (stock controllers) and that justifies the 3% responses that there are records kept in computer files. The practice of keeping stock records mainly in paper files is considered to be time consuming in recording and tracking transactions and not reach to access compared to computerised system

proposed by Management Science for Health, 1989.

Table 4.7: Methods of Keeping Medical Stocks Records

Methods of keeping stocks records	Frequencies of Responses (N=68)	Percentages of frequencies of responses (%)
Computer files	2	3
Paper files	60	88
Both computers and papers files	2	3
No records are kept	4	6
Total	**68**	**100**

Source: Study results, 2014

In addition, study collected views from respondents on whether medical stocks records are checked by supervisors on periodic bases. The alternative responses were "Checked" and "Not Checked". As shown in Table 4.8it was noted by 40 (59%) of responses that medical stocks records are checked periodically by supervisor. However, 28 (41%) of responses reveal stock records are not thoroughly checked by supervisors on periodic bases. Absence of thorough medical stock records checks as noted in the literature (US Agency for International Development, 2003) may affect the performance of medical stocks control system at DRH as it may lead to non-detection of irregularities.

Table 4.8 Medical stocks records checks

Responses	Frequencies of responses (N=68)	Percentages of frequencies of responses (%)
Checked	40	59
Not Checked	28	41
Total	**68**	**100**

Source: Study results, 2014

4.3.2   Adequacy of Medical Safety Stocks at DRH

In checking if medical stocks kept covering for emergence is adequate, initially it was investigated if there are medical stocks kept to cover for emergence. As summarised in Table 4.9, responses (74%) confirm there are medicals stock kept to cover for emergence at DRH. However, responses (25%) indicating there are no safety stocks kept justify that at DRH safety stocks are not kept for all medical stocks.

Table 4.9: Existence of Medical Safety Stocks

Responses	Frequencies of responses (N=68)	Percentages of frequencies of responses (%)
Existing	50	74
Not Existing	17	25
I don't know	1	1
Total	**68**	**100**

Source: Study results, 2014.

Then, as shown in Table 4.10 it was affirmed by 56 (82%) of responses that the amount of medical stocks kept for emergence is not adequate. Inadequacy of safety stocks may be counted as one of the factor affecting performance of medical stocks control system at DRH and this fact agrees with premises of the Theory of Constraints, and Contingency Theory that the system needs to hold enough buffer stocks so as to protect it from starving (Eliyahu, 1984).

Table 4.10: Adequacy of Medical Safety Stocks

Responses	Frequencies of responses (N=68)	Percentages of frequencies of responses (%)
Adequate	12	18
Not Adequate	56	82
Total	**68**	**100**

Source: Study results, 2014.

4.3.3 Medical Stocks Demand Forecasting

This study examined if medical stocks demand forecasting exercise at DRH is participatory. Through both questionnaires and interviews all respondents except patients were asked to provide views on the section they thought are involved in demand forecasting. Results were as shown in Figure 4.3.
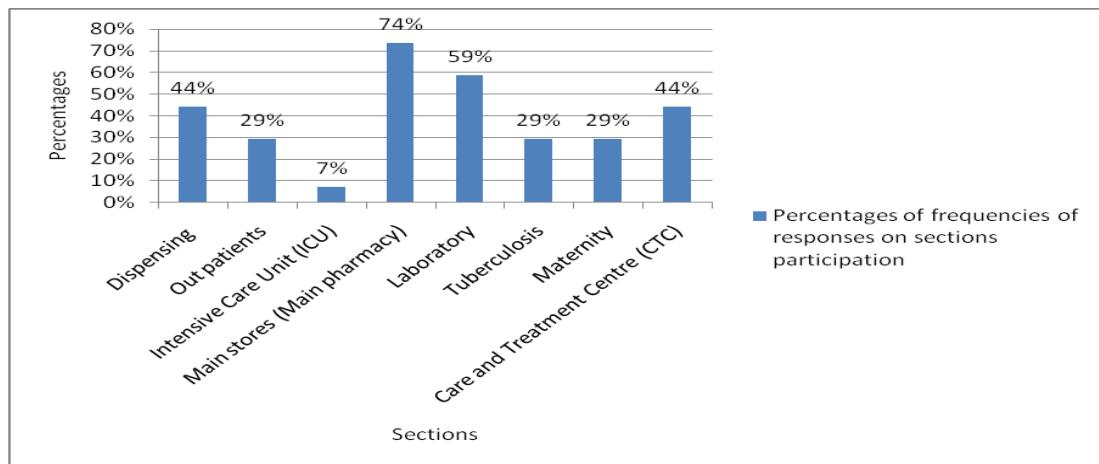
Figure 4.3: Sections Participation in Medical Stocks Demand Forecasting (N=68)

Source: Study results, 2014

As shown in Figure 4.3 results deduce that main store with 74% and laboratory section with 59% are more involved in forecasting medical stocks demand during budget preparation as they have more than 50% percent of responses compared to other sections. The results of less than 50% for Dispensing, out patients, Intensive Care Unit (ICU), tuberculosis, maternity and Care and Treatment Centre (CTC) sections lead to a conclusion that such sections are not fully involved in the forecasting medical stocks demand during budget preparation.

On the other hand, 11 heads of sections together with top management during interviews confirmed that forecasting process for medical stocks is done through

monthly meetings of heads of sections. The assumption provided is that, heads of

sections forecast demand of their sections with their subordinates in their respective

sections before taking the same to the meeting of all heads of sections. Since the

results show that not all sections at DRH are fully involved in forecasting medical

stocks demand during budget preparation the performance of medical stocks control

system may be considered to have being affected by insufficient participation of

sections in medical stocks forecasting. These results also concur with Hamlett et al,

2012 that medical stocks demand forecasting needs to be participatory.

4.3.4 Other Factors Affecting Performance of Medicals Stocks Control System at DRH

In this research expiry of medical stocks and stock outs were considered to be

indicators to measure the performance of medical stocks control system and

therefore both patients and DRH employees were asked to provide their views on the

causes of expiry of stocks and stock outs. Views of patients on the causes of expiry

of stocks and stock outs are summarised in Table 4.11 and Table 4.12respectively;

and presented in Figure 4.4.

Table 4.11: Causes of Medical Stocks Expiry (Patients' views)

Causes	Frequencies of responses (N=80)	Percentages of frequencies of responses (%)
Poor storage	69	86
Poor management follow ups	11	14
Total	**80**	**100**

Source: Study results, 2014

Out of 80 responses collected 69 (86%) were poor storage of stocks causes expiry

while 11(14%) were poor management follow ups on the control of medical stocks

causes expiry. On the other hand, as shown in Table 4.12, responses on the causes of stock outs 9(11%) were poor storage; 10(13%) were insufficient funds allocation and 61(76%) were poor management follow ups on the control of medical stocks.

Table 4.12: Causes of Medical Stock Outs (Patients' Views)

Causes	Frequencies of responses (N=80)	Percentages of frequencies of responses (%)
Poor storage	9	11
Poor management follow ups	61	76
Insufficient funds allocation	10	13
Total	**80**	**100**

Source: Study results, 2014.

As shown in Figure 4.4, it can be noted that majority of respondents (patients) view the major causes of stocks expiry and stock outs are poor storage of medical stocks and poor management follow ups in the medical stocks control respectively.

Figure 4.4: Causes of Medical Stock Outs and Expiry of Stocks (patients' views)
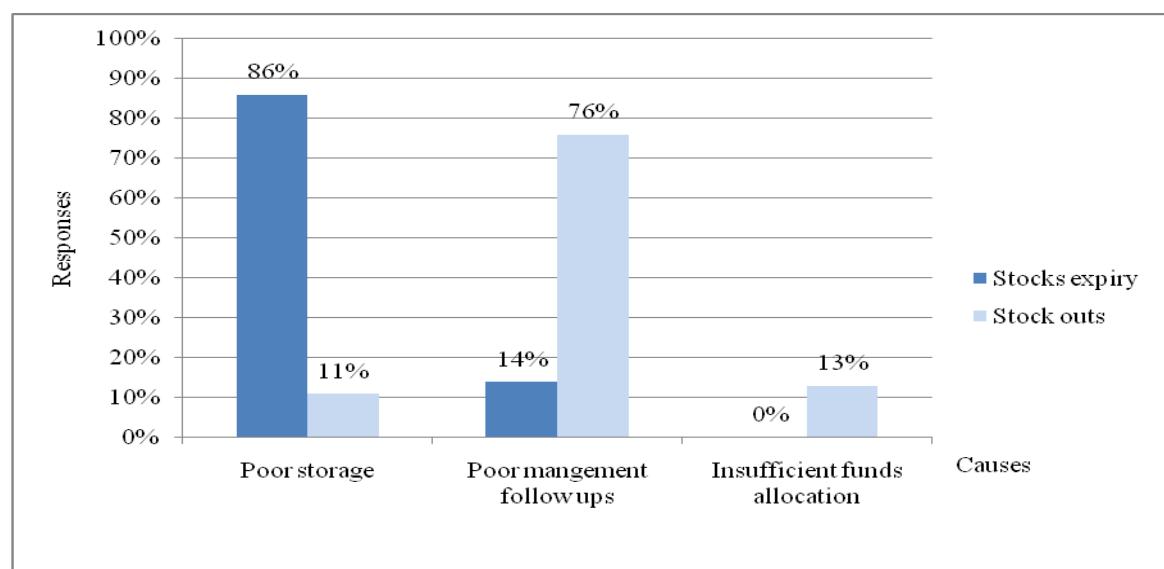
Source: Study results, 2014.

Furthermore, views of RDH employees were collected on factors affecting performance of medical stocks control system at DRH. Views collected are presented in Figure 4.5.

Figure 4.5: Factors Affecting Performance of Medical Stocks Control System at DRH (N=68)
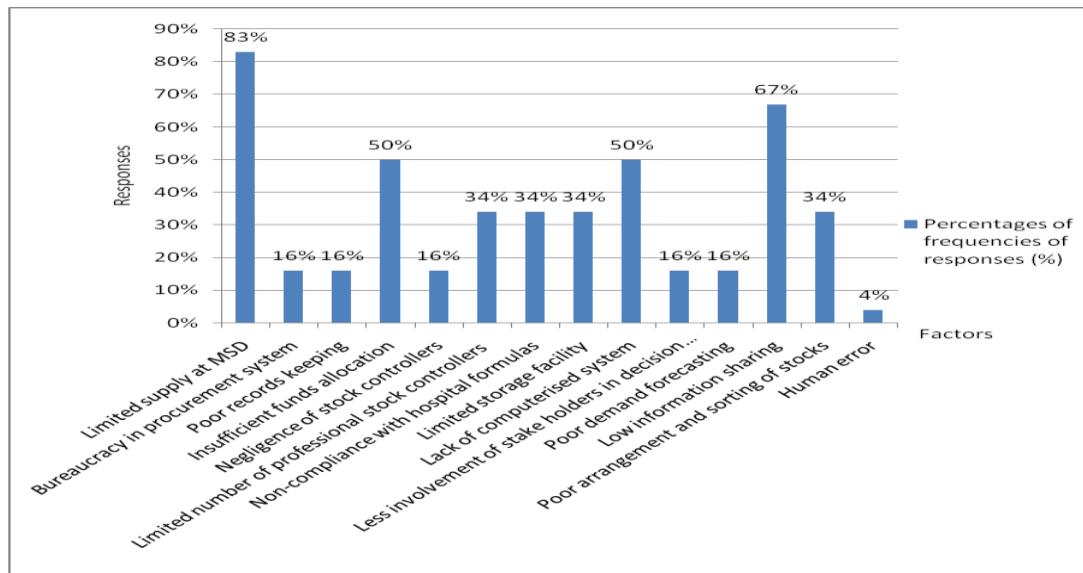
Source: Study results, 2014.

As shown in Figure 4.5 limited supply of medical stocks at MSD (83%) and low information sharing among sections (67%)on available and required medical stocks are major factors affecting performance of medical stocks control system at DRH. Limited supply of medical stocks at MSD concur the idea captured earlier in the literature that shortages at MSD result to stock outs in health facilities in Tanzania (US Agency for International Development, 2005). Low information sharing was also commented in the interview by one Head of section by saying information is not constantly shared on the available items in the main store as a result doctors prescribe to patients items which are not available of which if there could be information on available items doctors could prescribe the alternative.

Insufficient funds allocation for the purchase of medical stocks (50%) and lack of computerised system are other factors which are more considered by DRH employees to affect medical stocks control system. These factors agree with the concept provided in the literature (Hamlett, et al 2012) that efficient medical stocks control system demands effective budget implementation and better system for stock records management.

Also limited number of professional stock controllers(34%) is among the factors which seems to affect performance of medical stocks control system at DRH, and this confirm the results of study conducted by MOHSW, 2011 that stock outs in health facilities are attributed by shortage of capacity of stock controllers to implement their duties. In this study in the interview one of pharmacists said *"Because of shortages of pharmacists in some cases nurses perform duties of pharmacists"*.

4.4 Ways of Improving Medical Stocks Control System at DRH (Respondents' Views)

Third objective of this study was to propose best approach for medical stocks control at DRH. In order to accomplish that objective researcher collected views from both patients and DRH employees. Summary of ways of improving medical stocks control system as proposed by patients and DRH employees is shown in Table 4.13 and Table 4.14 respectively. As shown in Table 4.13,34% and 23 % of patients proposed that the DRH management needs to have close follow-ups on distribution and efficient dispensing of medical stocks. This proposal concur with ways recommended by Dehradum, 2012 that medical stocks control system to be effective

and efficient needs the management to keep close supervision so as to prevent pilferages, expiry and overstocking. Also, 28% proposed the government to increase amount of funds allocated for medical stocks so as to have adequate funds for the purchase of medical stocks to fulfil the demands. This proposal was also made by 13% of DRH employees (Table 4.14).

The increase in amount of funds allocated for medical stocks proposed emphasises the idea of Sikika, 2012 that availability of medical stocks in health facilities in Tanzania have been affected by limited funds allocation and in order to improve the situation there is a need to allocate enough funds for medical stocks. Furthermore, 3% of patients proposed regular inspection in the stocks control system as one of the way of improving performance of medical stocks control system. Recommendation of undertaking regular inspection in the medical stocks control system captures the idea of Hamlett *et al.*, 2012that organisations need to adopt effective internal checking in the stocks control system to assist in detecting fraud and pinpointing where medical stocks may be leaking from health system.

Also, patients (1%) and employees (14%) recommend increasing availability of stocks at MSD so as to ensure order deliveries. The increase in availability of stocks at Central Store was also recommended for the improvement of the performance of Central Medical Stores in Namibia (Management Sciences for Health/Rational Pharmaceutical management Plus Program, 2008).In addition, patients and employees propose improvement of data management and storage areas management parallel with improvement in arrangement and sorting of stocks. Improvement of storage and sorting of stocks may assist to identifying items near to expiry and

reduce contamination and deterioration of stocks as noted earlier by Ethiopia Ministry of Health, 2003. However, proper storage and sorting of stocks demand professional stock controllers and 4% of employees propose that DRH needs to increase number of professional stock controller.

Table 4.13: Ways of Improving Medical Stocks Control System at DRH (Patients' Views)

Ways of improvement	Frequency of responses (N=80)	Percentages of frequency of responses (%)
Increase of funds allocation	23	28
Efficient dispensing of medical stocks	19	23
Close management follow ups on distribution of stocks	27	34
Improvement of procurement system	1	1
Undertaking regular inspection in the stocks control system	2	3
Improvement of data management	1	1
Improvement of storage area	8	9
Increase availability at MSD	1	1
Total	**80**	**100**

Source: Study results, 2014.

On the other hand, 15% of DRH employees suggest the medical stocks control system to be computerised and that catches the idea of 13% of employees of increasing efficiency in information sharing among sections at DRH. It is considered that computerising the medical stocks control system may easier stocks tracking and calculation of stock levels as well as connection and sharing of stock updates among the sections. The idea of computerising medical stocks control system was also suggested in Namibia with the aim of increasing stock records accuracy

(Management Sciences for Health/Rational Pharmaceutical management Plus Program, 2008). Furthermore, 13% of employees recommend proper use of hospital formulas to ensure ordering of accepted medical stocks and to facilitate efficiency in prescribing drugs to patients basing on available and suggested categories.

Table 4.14: Ways of Improving Medical Stocks Control System at DRH (Employees' Views)

Ways of improvement	Frequencies of responses (N=68)	Percentages of frequencies of responses (%)
Use of computerised system	10	15
Proper records keeping	3	4
Sufficient funds allocation	9	13
Increase the number of professional stocks controller	3	4
Proper use of hospital formulas	9	13
Efficient sharing of information among the sections	9	13
Reliable availability of stocks at MSD	10	14
Provision of training to stock controllers	2	3
Improvement on the arrangement and sorting of stocks	8	11
Improvement of data management	7	10
Total	**68**	**100**

Source: Study results, 2014.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   Introduction

This chapter presents the summary and conclusion of study findings presented in chapter four, thereafter recommendations are presented.

5.1.1   Medical Stocks Control System at DRH

Study findings show that medical stock control system at DRH consists pre-established maximum; re-order level and minimum stock levels for medical stocks which are in vertical programme. Medical stocks which are not in the vertical programme practically have no established stock levels. Uncertainties in funds allocations have being major limiting factor to establishment and practice of stock levels for non-vertical programme items.

Study reveals that the establishment of the existing medical stock levels involved heads of sections and it was substantially evidenced by 60% of facts that not all members of all sections are involved in establishing medical stock levels. Also, study findings show that there are no pre-determined order quantities for non-vertical programme items at DRH. Pre-determined order quantities have been established only for vertical programme stocks. It was revealed that order quantities for non-vertical programmes are determine in the monthly meetings of heads of sections. About 74 % of facts justify that the main determinant of order quantity is amount of funds allocated for medical stocks in the given time under consideration followed by consumption rate with 44% of responses.

In addition, it was revealed that ordering time is mainly determined by available stock balance followed by time of funds received and pre-established order quantity for the case of vertical programme items. Furthermore, findings prove that DRH mainly use First Expiry First Out (FEFO) method to issues medical stocks from the main store. However, First in First Out (FIFO) method was also noted to be in use.

5.1.2 Factors Affecting Performance of Medical Stocks Control System at DRH

Study reveals that at DRH medical stocks records are kept in papers and are checked by supervisors regularly even though there was justification of 41% responses that regular checks of medical records are not undertaken as planned. Likewise, study findings show that medical safety stocks are kept and facts of about 82% confirm that the amount of medical safety stocks kept is not adequate to cover for emergences at DRH.

Also, study findings show that medical stocks demands forecasting is not fully participatory as only the main pharmacy and laboratory sections were confirmed by 50% of respondents to participate in forecasting process which involves heads of sections through their monthly meetings. Furthermore, 86% of patients involved in this study believe that poor storage of medical stocks results to expiry of stocks and 76% of patients believe that poor management follow ups on medical stocks control results to medical stock outs.

On the other hand, study reveals that limited supply of stocks at MSD and low information sharing are the main factors affecting performance of medical stocks control system at DRH followed by inefficient funds allocation together with lack of

computerised stocks control system. Other factors noted to affect performance of medical stocks control system were limited number of professional stock controllers, non-compliance with hospital formulas, limited storage facility, poor arrangement and sorting of stocks, bureaucracy in procurement system, poor records keeping, negligence of stock controllers, less involvement of stake holders in decision making and human error.

5.2 Recommendations

The study findings reveal various issues of concern in the performance of medical stocks control system which need to be addressed. Basing on study findings and recommendations provided by respondents (Table 4.13 and Table 4.14) the following are recommended:

a) Strengthening of information sharing system

The DRH is recommended to improve the information sharing system between the sections in order to assist medical prescribers to be aware of the available medical stocks in a particular time. Strengthening of information system may be done by installing computerised system for medical stocks control and that system gets linked with all sections concerned with medical stocks. This recommendation concurs with 28% (15%+13%) of respondents' suggestion (Table 4.13 and Table 4.14) to computerise medical stocks control system at DRH.

b) Effective medical stocks budgeting and its implementation

The DRH is recommended to improve its medical stocks budgeting approach by making it more participatory. Participatory budgeting approach is expected to result to realistic budget of medical stocks.

c)   **Use of alternative authorised suppliers of medical stocks**

Following the findings (Figure 4.5) that limited supply of medical stocks at MSD has affected performance of medical stocks system at DRH researcher proposes purchase of medical stocks from alternative authorised suppliers of medical stocks for items which are not available at MSD.

d) Improvement in data management

Researcher recommends the DRH to improve management of data which are used in budgeting and monitoring of stocks by ensuring data are captured accurately on daily basis and they are computerised. Data that needs more attention include periodical consumption rate, life shelf and balances of medical stocks. Proper management of data is thought to assist in making right decisions and taking the necessary actions.

e) Improvement of management follow-ups and supervision on medical stocks control system

In order to increase efficiency in the control of medical stocks system at RDH, researcher agree with 34% of patients' (Table 4.13)suggestion that hospital management through heads of sections has to improve monitoring of stocks distribution and increase efficiency in dispensing medical stocks by increasing follow-ups.

f) Sufficient funds allocation for medical stocks

In order for replenishment of medical stocks to be done on time and stock control tools get purchased, the recommendation is made to DRH and Ministry of Health and Social Welfare at large to allocate and release sufficient funds on time to finance

purchase and activities related to medical stocks control.

5.3 Areas for Further Research

This research concentrated on the analysis of the performance of medical stocks control system by establishing and analysing factors affecting its performance at Dodoma Regional Hospital. Through this study it has been noted by 83% of respondents that performance of medical stocks control system at DRH is affected by shortages (limited supply) of medical stocks at MSD. Since MSD is the main supplier of pharmaceuticals to government institution in Tanzania, there is need to establish the truth and causes of shortages at MSD and thereafter to propose the solution.

In addition, through this study it has been revealed by 86% that the main cause of medical stocks expiry at DRH is poor storage of stocks. The specific aspects of medical stocks storage that cause expiry of stocks are not yet identified. Undertaking of another study is therefore recommended to analyse medical stocks storage system at DRH so as to identify areas for improvement and propose the solution for the same.

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APPENDICES

Appendix I: Medical Stock Levels for Sampled Vertical Program Items

S/N	Name of Drugs	Re-orderlevel (Tabs)	Re-order level (Tins)	Order Quantity (Tins)
1	Atripla	68672	2289	4500
2	Combivir	121941	2032	3900
3	Duovir	83062	1384	3000
4	Afavirinze 600mg	60628	2020	4100
5	Nevirapin 200mg	-	100	400
6	Efavirinze 200mg	-	298	250
7	3TC	5019	85	410
8	Truvada	14729	490	802
9	Efavirinze 50mg	-	80	180
10	Abacavir	5211	87	350
11	Lopinavir	77765	648	850
12	Atazunavir	2699	90	350
13	TLE	14068	468	1200
14	Nevirapin syrup	-	100	400
15	DuovirPed	-	180	390
16	CombivirPed	-	120	350

Source: CTC Quarterly Report at DRH, 2014

Appendix ii: Selected Types Medical Stocks in Horizontal Program (Non-Vertical Program Items)

S/N	ITEM
1	Ether anaesthetic
2	Halothane
3	Katamine
4	Thiopental
5	Bupivacaine
6	Ligunocaine
7	Callamine
8	Neostigmine
9	Paracetamol
10	Tramadol
11	Mefenamic acid
12	Diclofenac
13	Morphine
14	Naloxone
15	Pethidine
16	Fluconazole
17	Griseofulvin
18	Nystatin

Source: WHO, 2008

Appendix iii: Questionnaires to Pharmacists and Supplies Officers

Dear Respondent,

The aim of this questionnaire is to help the researcher to get relevant information that will be used *To Analyse the Performance of Medical Stocks Control System.* Your response will be kept confidential. Therefore you are requested to respond on the questions provided by put a tick and fill the space provided.

1. Name of your section:……………………………………………………

2. Working experience

    i)   Below one year   (   )

    ii)   One year   (   )

    iii)   Above one year   (   )

3. Which stock levels are established at Dodoma Regional Hospital?

    i)   Maximum Stock level   (   )

    ii)   Re-order level   (   )

    iii)   Minimum level   (   )

    iv)   None   (   )

4. Do you participate in establishing stock levels?

    i) Yes   (   )   ii) No   (   )

5. Is there stock kept to cover for emergence at Dodoma Regional Hospital?

    i) Yes   (   )   ii)   No   (   )

6. How does the review of stock levels done at Dodoma Regional Hospital?

    i) After every transaction   (   )

    ii) After one week   (   )

    iii) After one month   (   )

    iv) After three months   ( )

    v) Others, specify   …………………………………………..

7.   How are stock records kept at Dodoma regional Hospital?

    i)   In Computer files   ( )

    ii)   In paper files   ( )

    iii)   Both computer and paper files   ( )

    iv)   No records are kept   ( )

8.   Are stock records checked by supervisors on periodic bases?

    i)   Yes ( )   ii)   No ( )

9.   Which other sections other than Accounts are involved in medical stocks demand forecasting at Dodoma Regional Hospital?

    i) Dispensing section   ( )

    ii) Outpatient section   ( )

    iii) Intensive Care Unit (ICU)   ( )

    iv) Main Stores (Main Pharmacy)   ( )

    v) Other:…………………………..

10.   Which method(s) do you use to issue drugs from main drugs store to dispensing   section?

    i) First in - First Out (FIFO)   ( )

    ii) First Expiry First Out (FEFO)   ( )

    iii) I don't know   ( )

11.   Is there established order quantity for medical stocks at Dodoma regional Hospital?

    i)   Yes ( )   ii)   No ( )

12. Do you think the established order quantity for medical stocks is sufficient at Dodoma regional Hospital? i) Yes ( ) ii) No ( )

13. How do you determine amount of medical stocks to order during ordering time?

i) …………………………………………………………………………………

ii) …………………………………………………………………………………

iii) ………………………………………………………………………………...

iv) ………………………………………………………………………………...

14. Which factors do you think affect the performance of Medical stocks control system at Dodoma Regional Hospital?

i) ………………………………………………………………………………….

ii) …………………………………………………………………………………

iii) ………………………………………………………………………………...

iv) ………………………………………………………………………………...

15. What do you think should be done to improve medical stocks control system at Dodoma Regional Hospital?

i) ………………………………………………………………………………….

ii) …………………………………………………………………………………

iii) ………………………………………………………………………………...

iv) ………………………………………………………………………………...

Thank you for your cooperation

Appendix iv: Questionnaires to Accountants

Dear Respondent,

The aim of this questionnaire is to help the researcher to get relevant information that will be used *To Analyse the Performance of Medical Stocks Control System.* Your response will be kept confidential. Therefore you are requested to respond on the questions provided by put a tick and fill the space provided.

1. Working experience

    i)   Below one year   (   )

    ii)   One year   (   )

    iii)   Above one year   (   )

2. Which stock levels are established at Dodoma regional Hospital?

    i)   Maximum Stock level   (   )

    ii) Re-order level   (   )

    iii) Minimum level   (   )

    iv) None   (   )

    v) I don't know   (   )

3. Were you involved in establishing stock levels?

    i)   Yes   (   )   ii) No   (   )

4. Is there stock kept to cover for emergence at Dodoma Regional Hospital?

    i)   Yes   (   )

    ii)   No   (   )

    iii)   I don't know   (   )

5. If yes, there is stock kept to cover for emergence, do you think the amount kept is sufficient?

    i)   Yes   (   )   ii) No   ( )

6. How are stock records kept at Dodoma regional Hospital?

    i)   In Computer files   ( )

    ii)   In paper files   ( )

    iii)   Both computer and paper files   ( )

    iv)   No records are kept   ( )

7. Are stock records checked by supervisors on periodic bases?

    i)   Yes ( )   ii)   No ( )

9. Which sections are involved in medical stocks demand forecasting at Dodoma Regional Hospital?

    i) Dispensing section   ( )

    ii) Accounting Section   ( )

    iii) Outpatient section   ( )

    iv) Intensive Care Unit (ICU)   ( )

    v) Main Stores (Main Pharmacy) ( )

10. Which method(s) do you use to issue drugs from main drugs store to dispensing section?

    i) First in - First Out (FIFO)   ( )

    ii) First Expiry First Out (FEFO) ( )

    iii) I don't know   ( )

11. Is there established order quantity for medical stocks at Dodoma regional Hospital?

    i)   Yes   ( )   ii)   No   ( )

12. Do you think the established order quantity for medical stocks is sufficient at Dodoma regional Hospital?

    i)   Yes   ( )   ii)   No   ( )

13. How do you determine amount of medical stocks to order during ordering time?

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

14. What do you think are factors affecting the performance of medical stocks control system at Dodoma regional Hospital?

i) ………………………………………………………………………………

ii) ………………………………………………………………………………

iii) ………………………………………………………………………………

iv) ………………………………………………………………………………

15. What do you think should be done to improve medical stocks control system at Dodoma Regional Hospital?

i) ………………………………………………………………………………

ii) ………………………………………………………………………………

iii) ………………………………………………………………………………

iv) ………………………………………………………………………………

Thank you for your cooperation

Appendix v: Questionnaires To Medical Staff Members

Dear Respondent,

The aim of this questionnaire is to help the researcher to get relevant information that will be used *To Analyse the Performance of Medical Stocks Control System.* Your response will be kept confidential. Therefore you are requested to respond on the questions provided by put a tick and fill the space provided.

1. Name of your section…………………………………….

2. Working experience

    i)   Below one year   (   )

    ii)   One year   (   )

    iii)   Above one year   (   )

3. Do you participate in establishing medical stock levels?

    i)   Yes   (   )   ii) No   (   )

4. Is there stock kept to cover for emergence at Dodoma Regional Hospital?

    i) Yes   (   )

    ii) No   (   )

    iii) I don't know   (   )

5. If yes, there is stock kept to cover for emergence, do you think the amount kept is sufficient?

    i) Yes   (   )   ii)   No   (   )

6. How are stock records kept at Dodoma regional Hospital?

    i)   In Computer files   ( )

    ii)   In paper files   ( )

    iii)   Both computer and paper files   ( )

    iv)   No records are kept   ( )

7. Are stock records checked by supervisors on periodic bases?

    i)   Yes   ( )   ii)   No   ( )

9. Which sections are involved in medical stocks demand forecasting at Dodoma Regional Hospital?

    i)   Dispensing section   ( )

    ii)   Accounting Section   ( )

    iii)   Outpatient section   ( )

    iv)   Intensive Care Unit (ICU)   ( )

    v)   Main Stores (Main Pharmacy)   ( )

    vi)   Others Mention………………………………..

10. Which method(s) do you use to issue drugs from main drugs store to dispensing section?

    i) First in - First Out (FIFO)   ( )

    ii) First Expiry First Out (FEFO)   ( )

    iii) I don't know   ( )

11. Is there established order quantity for medical stocks at Dodoma regional Hospital?

    i)   Yes   ( )   ii)   No   ( )

12. If yes in question 11, are members of your section involved in determining amount of medical stocks to order?

   i) Yes   (   )   ii)   No   (   )

13. Do you think the established order quantity for medical stocks is sufficient at Dodoma Regional Hospital?

14. How does Dodoma Regional Hospital determine amount of medical stocks to order during ordering time?

   …………………………………………………………………………………

   …………………………………………………………………………………

15. Which do you think are the factors affecting performance of medical stocks control system at Dodoma regional Hospital?

   i) ………………………………………………………………………………

   ii) ………………………………………………………………………………

   iii) ………………………………………………………………………………...

   iv) ………………………………………………………………………………...

16. What do you think should be done to improve medical stocks control system at Dodoma Regional Hospital?

   i) ………………………………………………………………………………

   ii) ………………………………………………………………………………

   iii) ………………………………………………………………………………...

   iv) ………………………………………………………………………………...

Thank you for your cooperation

Appendix vi: Interview Guide

Section A

1. How do you determine medical stocks order quantity?

2. How do you know the time to order medical stocks?

3. Do you have established stocks order quantity?

4. Do you have established ordering time?

5. Do you participate in deciding when to purchase medical stocks?

6. Do you participate in deciding the amount of stocks to order?

7. How does DRH control expiry of stocks?

8. How does DRH reduce/control stock outs?

Section B

9. Are stock records checked by supervisors regularly?

10. How many times are stock records checked by supervisor in a year?

11. Do you keep medical stocks record in computers and/or papers?

12. Are stock levels reviewed over period?

13. What do you think are the causes of medical stocks expiry at Dodoma regional Hospital?

14. What do you think are the causes of medical stock outs at Dodoma Regional Hospital?

15. Which factors do you think affect performance of medical stocks control system?

Section C

16. What do you think should be done to reduce medical stock outs at DRH?

17. What do you think should be done to reduce expiry of medical stock at DRH?

18. What do you think should be done to improve performance of medical stocks control system at DRH?