

UNIVERSITY OF GHANA

**ASSESSMENT OF SUPPLY CHAIN MANAGEMENT IN HOSPITALS:
A CASE STUDY OF GREATER ACCRA REGIONAL HOSPITAL –
RIDGE**

BY

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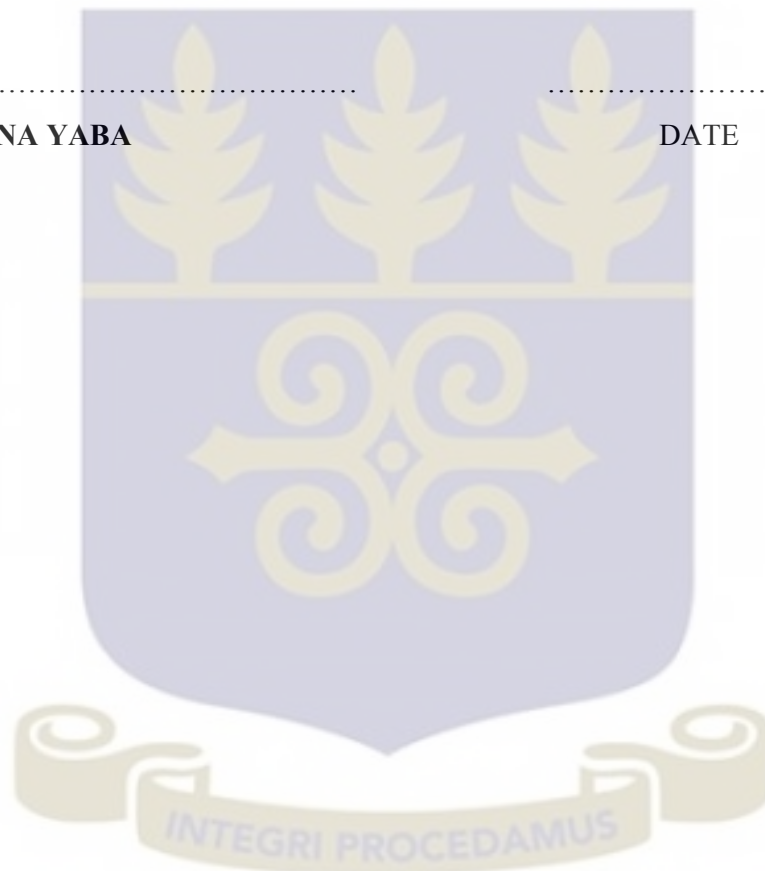
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DECLARATION

I, Christiana Yaba, do hereby declare that this work is entirely by my personal effort. I further declare that all the work that have been consulted or quoted have been duly acknowledged. I also declare that this thesis has not been presented either in part or in whole for any other degree elsewhere.

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CERTIFICATION

I do hereby certify that this thesis was supervised in accordance with the procedures laid down by the University of Ghana.

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DEDICATION

This work is dedicated to my beloved husband, Major Jerry Aglago and my children, Selorm and Selase who have tolerated me in my busy period and absence from home while pursuing my studies. Also to my late Aunt, Madam Esther Afia Mansa for her desire in educating me. I appreciate her effort.



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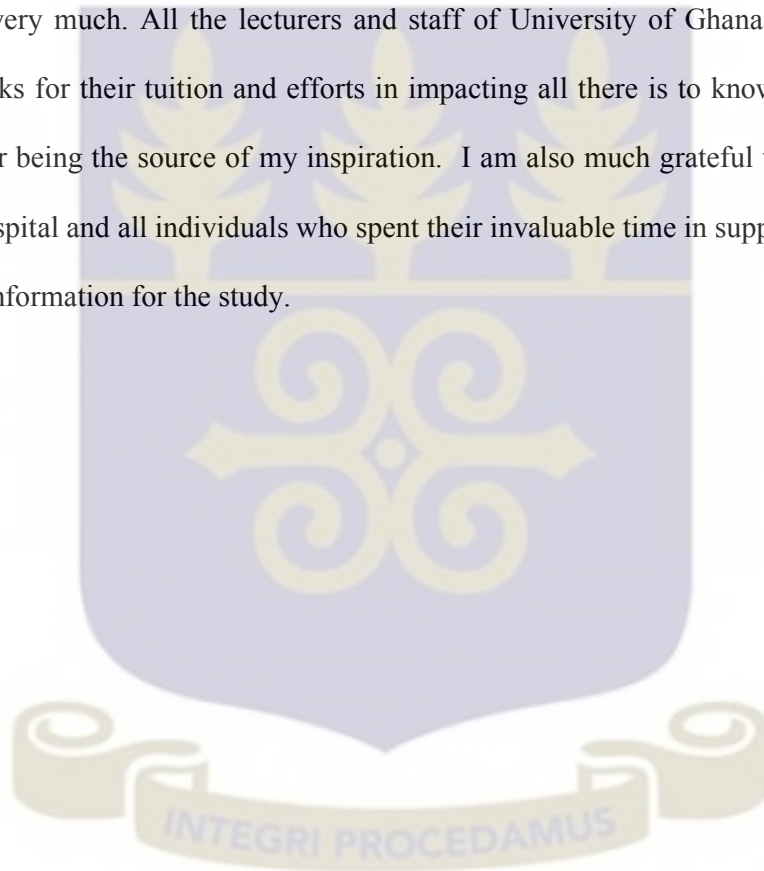


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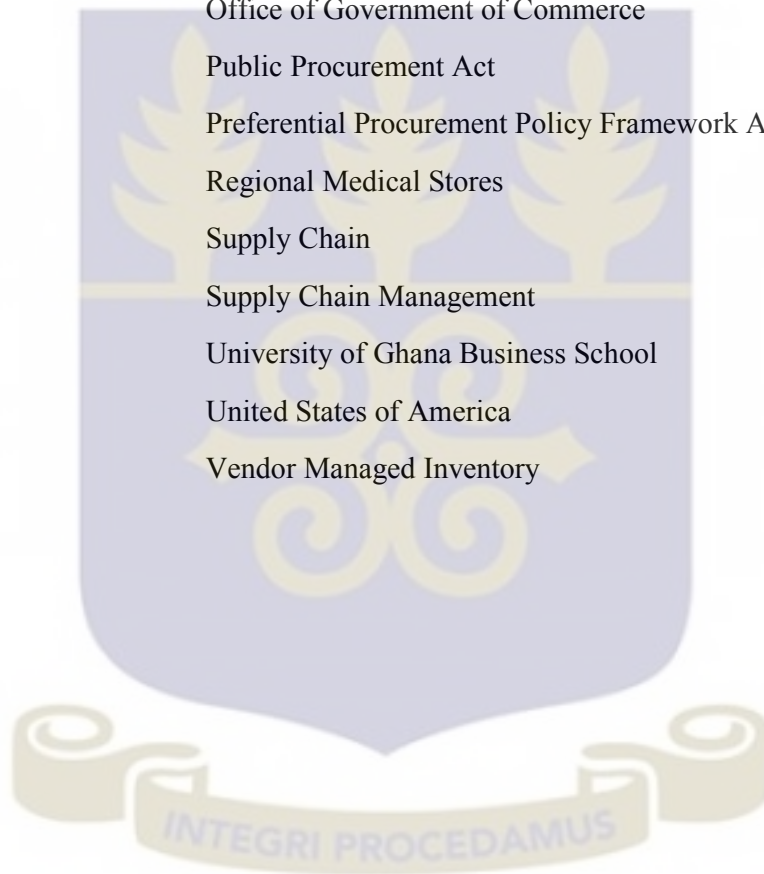
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LIST OF ACRONYMS/ABBREVIATIONS

APU	Automated Point of Use (APU)
CMS	Central Medical Stores
DOD	Department of Defence
ERP	Enterprise Resource Planning
FTE	Full Time Equivalents
ICT	Information and Communication Technology
JIT	Just In Time
OGC	Office of Government of Commerce
PPA	Public Procurement Act
PPPFA	Preferential Procurement Policy Framework Act
RMS	Regional Medical Stores
SC	Supply Chain
SCM	Supply Chain Management
UGBS	University of Ghana Business School
USA	United States of America
VMI	Vendor Managed Inventory



ABSTRACT

This research is a qualitative assessment of the Supply Chain Management of Non drug Consumables at Greater Accra Regional Hospital-Ridge. It was aimed at identifying operations of Supply Chain in Ridge Hospital, examining the effects of Supply Chain Management operations on healthcare delivery and how the flow of information can prevent stock out situations. A case study design was employed to gather in-depth data from Supply Chain Management Practitioners in the hospital. Purposive Sampling Technique was used and sixteen respondents were selected for the study. Interviews were used to gather data with an interview guide. The data collected were analysed using the objectives of the study as the main themes. In discussing the analysis, inferences were made to the literature. It was found that operational factors of SCM at Ridge Hospital include procurement process, requisitions of goods and payment of suppliers. The study also revealed that factors such as shortages, non involvement of departmental heads in the demand forecasting process, ad hoc purchases and delayed supply of goods have effects on healthcare delivery. It was also found that an integrated approach to SCM has not been adopted by the facility making documentation and other processes cumbersome. It was also found that non integration of SCM process slows down documentation process and hence delays in supplies. The findings further indicated that payment of suppliers is often delayed as a result of delays in National Health Insurance Scheme reimbursement.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study examines Supply Chain Management (SCM) in public hospitals in Ghana, using Ridge Regional hospital; also known as Ridge hospital as a case study. Specifically, the study identifies the operational factors of supply chain management of non-drug consumables in Ridge hospital. It examines the effects of supply chain management of non-drug consumables on healthcare delivery; and assesses how information flow between departments of the hospital can help prevent stock-outs. This chapter covers the study background, problem statement, the objectives of the study, research questions, relevance of the study, the organization of the study and conceptual framework.

1.1 Background to the study

Supply chain management is concerned with material and logistics planning. It uses demand forecasts from user departments to create a demand plan for a specified period of time. The concept involves series of activities a company does to plan, procure, receive and pay suppliers for delivering materials. Procurement, which is an aspect of SCM, is also called the requisition to pay. A supply chain, as opposed to supply chain management, is a set of organizations directly linked by one or more of the upstream and downstream flows of goods, services, finances, and information from a source to a customer (Mentzer *et al.*, 2001). Each stage in a supply chain is connected through the flow of products, information, and funds.

According to Lambert *et al.*, (1998) supply chain management is the integration of business processes from end user through original suppliers that provide products, services, and information that add value for customers. Management of supply chain is basically the management of relationships and activities among the members of

organisations. In the public sector, supply chain management is concerned with the organisation of all parties concerned in delivering a blend of inputs, outputs or outcomes that will meet a specified public sector requirement. These parties include external suppliers, associate organisations, and internal commercial service units both inside and outside the organisation. The supply chain in the public sector can either be inbound or outbound (Lambert *et al.*, 1998).

Interest in SCM has steadily increased since the 1980s when firms saw the benefit of collaborating relationships within and beyond their own organizations. In view of this, firms are finding that they can no longer compete effectively in isolation of their suppliers or other entities in the supply chain (Agyekum, 2012). The concept has witnessed attention amongst organisations (Burges & Singh, 2006) including the public sector (Hendricks & Singhal, 2003; Essig & Dorobek, 2006). As a result, a number of studies on supply chain management have been undertaken in many different industries and sectors and the majority of these studies found that an effectual supply chain management is a commanding tool to accomplish price lead and more beneficial results for all parties inside and beyond any organization (Zsidisin *et al.*, 2000). It is for this reason that the concept has gained interest in the public sector in recent years (Pan & Pokharel, 2007; Migiro & Ambe, 2008).

Public sector supply chain management offers a reference framework for the composition of public sector supply chains and multilevel networks (Migiro & Ambe, 2008). Actors in public sector supply chain comprise: private firms which receive orders from public sector agents, accounting officers and policy-makers. The supply chain management in the public sector not only concentrates on the question, which institutions cooperate in goods and services, but also how these enterprises are involved with enterprises operating at other

levels. Thus, analyses of intra-network relationships as well as analyses of inter-network relationship are necessary elements of the concept.

The focus of supply chain management can differ from one government sector to another. An example of a government sector is the health sector, where the focus may be more on logistics management and delivery of healthcare services. Effective public sector supply chain management has potential benefits such as inventory reduction, improved service delivery and cost reduction across the supply chain (Attaran, 2004).

Related to health service providers, supply chain management often refers to the information, supplies and finances involved with the acquisition and movement of goods and services from the supplier to the end user in order to enhance clinical outcomes while controlling costs. In doing so supply chain management puts a strong emphasis on the integration of processes. Within the healthcare sector these processes might refer to physical products like consumables, medical devices and health aids. The basic rationale of a supply chain management approach is founded in the belief that intensive co-ordination and integration between operational processes might lead to a better health supply chain performance.

Similar to the co-ordination and integration of operational processes is information technology, which is related to both physical products as well as to the flow of patients within and between health service organisations (Lowell & Celler, 1998). Examples of information technology oriented applications can be found in the area of procurement, inventory control and materials planning.

Until recently, the legal framework for public supply chain management was minimal in Ghana, (Westring, 1997; World Bank, 1996). The Ghana Supply Commission used to be the parastatal procurement agency for the procurement of all public goods. However, lack

of planning for the required goods, and lack of a proper database and late acquisition of funds led to long delivery periods. Therefore, the Ministry of Health (MOH), in partnership with some financial institutions, the private sector, and non-governmental organizations, implemented a Medium-Term Health Sector Strategy for Ghana for the period 1997 to 2001. The strategy identified that in order to address the problems of inadequate quality of life, short life expectancy, and infant and maternal mortality there is the need to provide access to essential healthcare inputs. There was the need for decentralization of administration and integration of supply systems to improve management efficiency (Anann *et al.*, 2013). The decentralization was to enable facilities act as Budget and Management Centers, where Internally Generated Funds (IGF) could be used in providing materials and logistics necessary for healthcare provision. It is against this backdrop that all public hospitals in Ghana, including Ridge Hospital started practicing SCM at the facility level.

1.2 Problem Statement

During the last two decades, a considerable amount of studies have emphasized the importance of supply chain management for companies (Croom *et al.*, 2000). Appropriate SCM practices result in competitive advantage and cost reduction. Unlike other sectors such as the manufacturing industry, where there has been a long history and experience with management of inventory, the healthcare sector appears to have fallen behind in implementing effective SCM practices (McKone-Sweet *et al.*, 2005; Baltacioglu *et al.*, 2007).

According to Schneller (2006), inventory management and distribution in the health care industry has been traditionally considered as an area of low value. However, recent studies have shown that tremendous cost savings and potential revenue can be generated with the

enhanced management of distribution and inventory. Improvements in supply chain in hospitals can lead to excellent inventory management, enhanced vendor relationships, more satisfied patients and more effective work flow for hospital employees (Burt, 2008). Many professional government organizations have indicated that SCM could hold great promise in enhancing public procurement systems.

In the view of Annan *et al.*, (2013), many developing countries, including Ghana, logistics systems for public health facilities are usually centralized. Therefore logistics planning, forecasting, procurement, storage and the distribution of goods are performed by the regional health directorates. This system has been found to be ineffective, as adequate supplies are mostly not delivered on time. The inefficiencies within the logistics management system have negative effects such as poor cost control in inventory management and poor quality of care delivered to the public (Annan *et al.*, 2013). Additionally, many public healthcare delivery institutions in developing countries face scarcity of funds and thus lack proper supply chain mechanisms which in effect compromise the quality of healthcare delivery to patients (Annan *et al.*, 2013).

In terms of cost, it is estimated that supply accounts for 25-30% of operational costs for hospitals the world over (Roark, 2005). Therefore, it is essential that this is managed effectively to ensure that both service and cost objectives are met. For instance inventory management in United States' hospitals accounts for between 17% and 35% of a hospital's total revenue (Nathan & Trinkus, 1996). According to 2013 Performance review report by Greater Accra Health Directorate, Ghana Health Service hospitals in the region spent about 45% of their IGF on procuring non-drug consumables. Again, a review of 2010 to 2012 annual reports by Ridge hospital indicated that, the facility spent an average of 43% of its IGF funds for services in procuring non-drug consumables. Research shows that a

significant portion of these costs could be reduced by implementing effective supply chain practices (Haavik, 2000). Even though, SCM of non-drug consumables account for the highest percentage of hospitals' expenses, a survey conducted in the Greater Region by Regional Medical stores in 2013, revealed that some hospitals still report shortage of stocks of some items.

It is on this basis that this study examined in-depth supply chain management of non-drug consumables of the public hospital sector in Ghana, using Ridge hospital as a case study, to assess existing operations of SCM and how those operations affect healthcare delivery.

1.3 Research Purpose

This research is aimed at assessing the operations of Supply Chain Management in Ghanaian public hospitals, using Ridge hospital as a case study.

1.4 Objectives of the Study

Specifically, the research sought to:

1. Identify the operational factors of supply chain management of non-drug consumables at Ridge Hospital in Accra.
2. Examine the effects of supply chain management of non-drug consumables on healthcare delivery at the hospital.
3. Examine how information flow between departments of the hospital can help prevent stock-outs at the hospital.

1.5 Research Questions

In order to achieve the objectives of the study, the following research questions guided the study:

1. What are the operational factors that affect supply chain management of non-drug consumables at Ridge hospital?

2. Mention some of the effects of supply chain management practices on healthcare delivery.
3. How can information flow be enhanced among supply chain practitioners in the hospitals?

1.6 Significance of the Study

The findings of the study would help healthcare institutions, particularly Ridge hospital's SCM practitioners and policy makers to improve upon efficiency and effectiveness of SCM practices. The study would also suggest ways by which information flow on material requisition, purchases, delivery and payment of suppliers can be enhanced within the various departments of the hospital. The findings of the study would help SCM policy makers revisit existing policies and possibly make amendments where appropriate.

1.7 Scope

There are three types of supply chain management in public hospitals; supply chain management of drugs (Pharmacy), SCM of contracts (Estate) and SCM of non-drug consumables. The emphasis of this study is on SCM of non-drug consumables.

1.8 Definition of Terms

Terminologies employed in the study are explained below;

Term	Meaning
Unofficial inventory	Inventory that is unaccounted for in the hospitals' accounting and inventory records.
Vendor Managed Inventory	A system whereby the supplier takes responsibility for monitoring the retailer's inventory levels and makes periodic

replenishment decisions regarding order quantities, delivery mode and timing of replenishments

Automated Point of Use (APU)

APU is a device for storing medical supplies; drugs and non-drug consumables.

Consignment

Distributor or manufacturer) owns the inventory until it is actually issued to the end user at the point of care

Stockless Inventory

Under a stockless program, the distributor delivers products in pieces rather than bulk but the facility is still in charge of placing the orders.

Standard Supply Chain

In a standard hospital supply chain, all material operations are controlled by the hospital; material personnel including purchasers, material handlers, and stockroom personnel.

Inventory management

Inventory management is the process of ensuring that a company always has the products it needs on hand while keeping cost as low as possible.

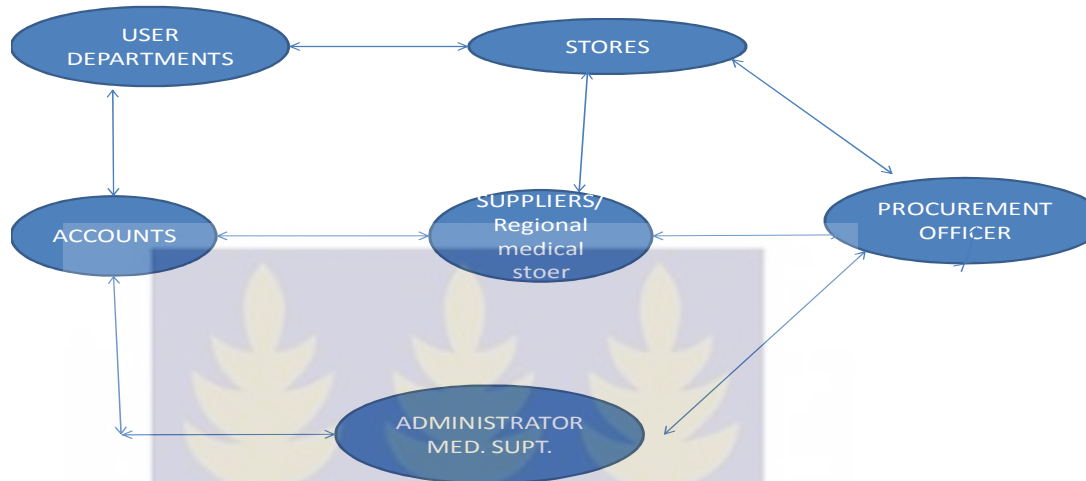
Just-in Time

Just in Time or JIT method creates the movement of material into a specific location at the required time



1.9 Conceptual Framework

A Conceptual Framework of SCM of Non-Drug Consumables in Public Hospitals



1.10 The SCM Process in Public Hospitals with Respect to Ridge Regional Hospital

The framework shows that ideally, SCM should emanate from user departments who are in direct contact with clients' healthcare service provision. The departments are supposed to make requests for non-drug consumables to the stores or the supply unit. These requests are collated and forwarded to the Procurement Officer who starts the process of getting suppliers to supply the materials required.

The procurement officer often initiates the process by sourcing for the products from the regional medical stores. Quotations are then obtained from registered suppliers when goods are not available at the medical stores. The next stage is for the Procurement Officer to give a Purchase Order for the goods to be supplied. The goods are supplied to the main stores accompanied with a waybill. Before the goods are accepted into the stores, they are verified by the Procurement Officer, the Administrator and the Internal Auditor.

Verification is done using specifications stipulated in the award notification letter. The goods are then accepted into the stores and entered in the ledgers.

After all these processes, issues can then be made to user departments upon request. After these, the bill is processed and approved by the Medical Director to enable the accountant to make payments to the suppliers.

1.11 Chapter outline

The study is organized into six chapters. Chapter one consists of the introduction, study background, statement of the problem under investigation and objectives of the study. The chapter also presents the relevant research questions that the study sought to find answers to and finally the conceptual framework.

Chapter two deals with a review of the relevant literature on the concept of SCM within and outside the health sector. It also employs the systems' theory as the theoretical underpinning of the study.

Chapter three presents a review of the profile of Ridge Hospital. The chapter also presents the methodology of the study and describes the research design, study site, population, sampling technique, and data collection methods and data analysis.

The results of the study is presented and analyzed in chapter four. Chapter five presents discussions of data collected and relates to relevant literature. Chapter six, which is the final chapter, includes the summary, conclusions and recommendations. It also establishes future research direction.

1.12 Conclusion

The introductory chapter has provided a comprehensive overview and general introduction to the whole study. It has outlined the study background, problem statement, objectives of

the study, research questions, the study purpose, the scope, the conceptual framework and finally the chapter disposition.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature on supply chain management within and outside the healthcare industry. It reviews empirical work undertaken by various scholars on supply chain management with the goal of comparing and contrasting what other researchers have done and how it relates to the study. It also reviews the Public Procurement Act, (Act 663, 2003) of Ghana. Additionally, the chapter reviews the systems' theory and how it relates to SCM practices in Ridge hospital.

2.1 What is Supply Chain Management?

The supply chain is a system of independent business entities involved through upstream and downstream links in different business processes and activities that produce physical goods or services to customers (Mentzer *et al*, 2001). It consists of a series of activities that an organisation uses to deliver value, either in the form of a product, service, or a combination of both, to its clients (Lin & Shaw, 1998). It can also be considered as an integration of materials and information flow between customers, manufacturers and suppliers.

The term is used to identify and describe the relationship a company develops with its suppliers (Hines 1996, Anderson & Narus, 1995). SCM can be seen as a business philosophy that strives to integrate the interdependent activities and resources in a chain; from a manufacturer through to the consumer. This means that SCM comprises different kinds of dependencies between and across companies in channels from suppliers to consumers.

Handfield and Nichols (2002) state that supply chain involves activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information flows. However, Mentzer *et al.*, (2001) limit their definition of a supply chain to the flow of products, services, finances, and information from a source to a customer. Lambert *et al.*, (1998) also see it as a two way flow of information; from the supplier to the customer and vice versa. Management of supply chain is basically the management of the relationships and activities among members of organisations and their suppliers. It links a firm to its customers, suppliers and other members of the supply chain system. According to Singh *et al.*, (2002), healthcare SCM processes have three types of flows: physical product flow, information flow, and financial flow. The physical flow manages products and services for the treatment of patients and their needs. Information and financial flows are related to SC design decisions for effective product flow and improved organisational performance (Singh *et al.*, 2002).

Lambert *et al.* (2000) asserted that supply chain management in a healthcare sector is branded with some distinctive characteristics, which make it complex to shift information from the business or corporate sector to a healthcare sector directly. Halldórsson (2013), added that performance measurements in a healthcare setting seems to be difficult compared to industrial companies due to the complexity of concepts like “quality of care” and some performance indicators.

However, this cannot be entirely true because existing concepts and supply chain practices suggest that supply chain management in health services is not completely different from that of industry.

2.2 Forms of Supply Chain Management

There are different forms of SCM practices the world over. The choice of a particular type depends on the policies of the country and this differs from country to country. The study reveals some of these forms in this section.

2.2.1 Stockless Inventory

In order to help hospitals reduce inventory, healthcare distributors offer stockless inventory programmes to their various customers. Under a stockless program, the distributor delivers products in pieces rather than in bulk but the facility is still in charge of placing orders. Requisitions are made by various units and the items are supplied directly to the requesting unit, without passing through the main store physically. However, documentation is done by the storekeeper to indicate the facility has received such items from a particular supplier.

Anderson *et al.*,(1999), operationally defined stockless inventory as: a programme under which the vendor takes over the hospital's central distribution function. The vendor delivers products, sorted by user departments to the hospital's receiving dock where they are transported directly to the department, usually on a daily basis.

This system prevents redundant functions from the supply chain as logistics are not received by the storekeeper, shelved before issuing to the user departments. Storage facilities and much human resources are not required for this system. An effective implementation of a stockless system requires a continuous flow of information between the point of use and the distributor (Rivard-Royer *et al.*, 2002).

The advantage to the healthcare facilities under the stockless system is that it ensures economic minimum storage, reduces labour costs, and prevents stock-outs. Rivard-Royer *et al.* (2002) reported that hospitals that used this system reduced full time equivalents

(FTE's) by 45%. Nathan and Trinkaus (1996) noted two hospitals with item fill rates of over 99%, compared with a conventional average of 92% (Rivard-Royer 2002). Another benefit of stockless replenishment is the elimination of the hospitals' central stores and its associated costs (Chow & Heaver, 1994). The absence of a main storeroom can be very useful, as some hospitals are able to convert their store rooms into patient care units, enabling the facility to provide care to higher number of clients. It also reduces administrative expenses which can enable hospitals invest in medical equipment and other logistics.

2.2.2 Vendor Managed Inventory

While stockless inventory system has clear benefits for hospitals with virtually no inventory control, the system still does not entirely reduce costs and optimize operations within the entire supply chain channel. Vendor Managed Inventory removes fiscal accountability from hospital employees placing orders with the distributors. With no cost penalty, hospitals can order small units of materials needed for everyday rather than consolidate to weekly, monthly or quarterly orders. Vendor Managed Inventory (VMI) is a system whereby the supplier takes responsibility for monitoring the retailer's inventory levels and makes periodic replenishment decisions regarding order quantities, delivery mode and timing of replenishments (Sahin & Robinson, 2002). Under Vendor Managed Inventory (VMI), the distributor hires employees to work in the hospital and assumes all material operation duties, including material handling, issuing and inventory management. Byrnes (2003) noted that VMI systems are mutually beneficial to both channel partners as they reduce costs by removing redundant functions of storekeepers.

The two essential elements for the success of a VMI arrangement are that, high levels of trust between supply chain partners participating in such an arrangement, and second, the

ability of the supplier to use data for planning purposes and aligning incentives and organisational structures appropriately to such an arrangement (Disney & Towill, 2003).

In the literature, Just in Time (JIT), stockless and VMI approaches are three strategies that have been implemented within the healthcare supply chain. A major issue with implementing JIT and stockless systems is that demand fluctuates and is hard to predict. The risk associated with a stock-out is also much higher. Therefore, for JIT to be successful, it is important that the wholesaler and clinic are located close to each other with effective transport networks between them. As these distributors have a high incentive to focus on the supply chain efficiency, they implement inventory systems within the hospital operations and focus on optimizing order sizes and inventories.

According to Brennan (1998), centralized logistics enhances healthcare supply chain operating efficiencies. This approach has gained popularity in the healthcare sector since it can reduce the time and effort needed to manage the inventory. With this new process, the warehouse monitors each product's inventory levels and usage levels at all clinics on a daily. By gaining accurate information, the wholesaler is able to make a good decision regarding which clinics to replenish and the optimal replenishment quantity of each product. The product then will be packed based on the product information and the deliveries to the clinics are made according to the routine planning process.

Strategic approaches to the management of inventory in the literature highlight the significance of the vendor managed inventory system.

Most of the empirical studies addressing the issue of VMI have focussed on manufacturing firms and retailers (Vigtil, 2007; Kauremaa et al., 2009). The literature has ignored the application of the VMI system within the healthcare domain. However, some recent studies highlight the advantages of implementing the VMI system in the healthcare setting.

Vigtil, (2007), discusses the adoption of the VMI system between the wholesaler and the hospital warehouse specifically for pharmaceutical products in South Korea.

2.2.3 Automated Point of Use Systems

Innovation in hospital supply chains in recent years has been the implementation of Automated Point of Use (APU) systems. APU is basically a device for storing medical supplies: drugs and non-drug consumables. These devices are placed in the various units throughout the hospital and only allow authorized users, usually in-charges of the various units to access inventory. Pull transactions are inputted directly on a computer or monitor or by pressing a “take” button located on the appropriate bin.

These systems keep uninterrupted inventory records and automatically place orders based on the established reorder and order up to points. APU systems apply liability to only those using the inventory, and therefore reduce shortages and increases revenue.

Although this system can be quite effective in controlling inventory, they are also quite costly and slow down inventory deployment, as medical staff is required to login before they can take any supplies.

2.2.4 Consignment

Under consignment, the vendor (i.e. distributor or manufacturer) owns the inventory until it is actually issued to the end user at the point of care. Consignment policies exist within each of the above supply chain strategies. The only real benefit of a consignment policy is that the hospital’s inventory assets decrease and the hospital can invest the cash in medical equipment and other assets.

2.2.5 Standard Supply Chain

In a standard hospital supply chain, all material operations are controlled by the hospital; material personnel including purchasers, material handlers, and stockroom personnel.

Logistics from the hospital's various suppliers is delivered in bulk to the hospitals' main storeroom. Requisitions are then made by the various unit heads for the storekeeper to issue materials to the various secondary storerooms in the units throughout the hospital as the inventory in those units diminishes. Mostly, issues are made weekly or fortnightly. However, emergency issues could be made as and when necessary.

The standard hospital supply chain is characterized as having inflated inventories and a high occurrence of stock-outs (90-95% fill rate) (Rivard-Royer, 2002). According to Rivard-Royer (2002), medical staff in the wards or units has no time to be concerned with efficient material operations as they are much more concerned with taking care of patients. In addition, inadequate inventory management system at the unit level makes it virtually impossible for the personnel to know which inventory is in excess and which quantity is unavailable. In most cases it is a usual practice for the various unit heads to take issues of items from the main stores whether or not they already have enough to last for a period.

2.3 Effects of Supply Chain Management in Hospitals.

In recent years, effective supply chain management has emerged as a significant competitive advantage for companies in different industries (Chopra, 2002). Several leading companies are differentiated from their rivals more by the way they manage their supply chains than by the particular products or services they provide. Similar to the supply chains in manufacturing and other industries, the healthcare delivery system is so large and complex that it has become impossible for any individual, or even any single organization, to understand all of the details of its operations (Annan *et al.*, 2013).

Material and logistics resources remain important and frequently used resources in healthcare delivery; therefore its management is very crucial in patients' care, (Jamaluddin & Barthwal, 2009). Most healthcare providers focus on reducing costs while delivering

high quality medical care. To achieve this objective, provider efforts have been focused primarily on eliminating waste in clinical operations. Moreover, effective supply chains ensure commodity security and determine the success or failure of any public health program (Annan *et al.*, 2013).

Some studies have measured supply chains as systems to have materials and logistics where they need to be at the right time, which is a key component of enhancing desired outcomes. For instance, the works by Zailani and Rajagopal (2005), show that there is a direct relationship between supply chain management practices and performance improvement.

Analysis of a complete healthcare system indicates that the supply management system is one of the primary areas where cost reductions are a predictable outcome (Butters & Eom, 1992). An efficient management of supply chain can reduce material and logistics costs. It is estimated that inventory management accounts for about 17% and 35% of a hospital's total revenue (Nathan & Trinkus 1996). A small reduction in inventory management expenses could have an enormous impact on the hospital's bottom-line. As noted by Ambe (2012), countries such as the United Kingdom, United States of America and Canada have long employed SCM in the management of their procurement of logistics.

Gansler *et al.* (2004) acknowledge that the Department of Defence (DOD) in the United States of America has minimised cost through lead time in the management of its logistics by employing SCM best practices. Lead time is the period within which orders are made and delivered. Also, the Office of Government of Commerce (OGC) in the United Kingdom releases yearly updates about best practices of SCM in the public sector. Some of the best practices are, determining accurate consumption levels, keeping economic minimum stock levels and establishing good relationship with suppliers among others. The relationship established with suppliers can enable firms gain competitive advantage. Some

companies have implemented several strategies favouring the exchange of knowledge with its suppliers, which has helped to improve their operations and positioned them competitively, (Dyer & Singh, 1998). However, for organisations to achieve competitive advantage within its industry, management has to plan strategically and direct resources effectively to meet the dynamic demands of the external environment, (Stonebraker & Afifi, 2004; Fawcett & Magnan, 2008).

Even though, SCM can hold great promise for organisations, it is confronted with some challenges, both in industries and hospitals. The challenges may differ from hospital to hospital, management to management and environment to environment. Andraski (1994) gives prominence to the human dimension when he notes that “80 per cent of supply chain problems occur due to the people directly or indirectly involved in the process”. Human actions and inactions could be the root of most SCM challenges. Organizational culture and structure, functional conflicts, lack of managerial commitment, non-transparent processes, policies, and procedures, performance measurement, information sharing, lack of trust, resource constraints and complexity of SC networks could pose challenges to efficient SCM (Andraski, 1994). Additionally, one of the barriers to implementation is limited education on supply chain practices (McKone-Sweet et al., 2005).

In the healthcare sector, one challenge of SCM is that hospitals operate differently from the other businesses; sometimes it becomes very difficult to predetermine the blend of patients to get at every point in time and ultimately their supply consumption (Jarrett, 1998). The inability to determine the flow of patients makes it difficult to ascertain the kind of patients that will access care in the hospital at any point in time. This has major ramifications and pushes facilities to hold high levels of safety stock creating storage and expiration of products. Furthermore, barriers like conflict of interest in the composition of

tender committees, complexity of the Public Procurement Policy (PPA 663) and its associated regulations sometimes hinder effective SCM.

Another challenge of SCM is how to manage stocks after they have been issued to the user departments. In most hospitals, no mechanism exists to monitor the usage of the supplies after they have been issued to the departments. A study by Mensah-Narh (1987) at Ridge hospital indicated that even though all requisitions are approved by the Administrator before the store keeper issues supplies, no effective measures are taken to find out how such supplies are used in the departments. Besides, Mensah-Narh (1987) revealed that Ridge Hospital had only two people for the management of stores. One person did both authorisation, issues and record keeping. The researcher admitted that this practice was not peculiar to only Ridge Hospital.

Some of these challenges can have negative impact in the system such as poor cost control and shortages, which may affect quality of care delivered to the public.

2.4 Integration of Supply Chain Management

In order to ensure regular availability of consumables in healthcare facilities, it is important to integrate all the logistical functions, since well coordinated logistical activities can create value for money, (Annan, 2013). Supply chain integration is a normal means of channeling resources towards the development of operational competencies and to reduce inefficiencies.

Healthcare organisations in all countries are finding ways to improve operational efficiencies and reduce costs without affecting patient care (Msimangira, 2010).

Recent studies reported in the developments on business processes and integration of components in supply chain environments have focused mainly on integration of components at the database level with interfaced processes within individual departments.

Business management has entered the period of inter-network competition and the ultimate success of a single business will depend on management's ability to integrate the company's network of business relationships (Handfield & Nichols 2002). As Birou et al. (1998) pointed out the opportunity to use process integration across functional boundaries is now considered a key to competitive success.

Handfield & Nichols (2002), see SCM as the integration and management of supply chain organizations and activities through cooperative organizational relationships, effective business processes, and high levels of information sharing to create high performing value systems that provide member organizations with a sustainable competitive advantage. Organisations integrate, work together, and build partnership with each other to increase the competitive advantage of the supply chain as a whole (Mentzer *et al.*, 2001).

Supply chain management literature has emphasized the importance of Supply Chain Integration in creating value and reducing costs (Lee, 2000). Some studies have already established the link between operations and supply chain management benefits (Lowson, 2001).

Vickery et al. (2003) showed that supply chain coordination and integration is facilitated by using integrated information technology, which directly impacts a financial performance of the firms. Integrated SCM aims to add value at each stage of the process from demand of goods to their acquisition, managing the logistics processes and finally, after use, to their disposal (Migiro & Ambe, 2008). Vickery *et al.* (2003) mentioned that Information and Communication Technology (ICT) is an important tool for increasing competitiveness in healthcare industry. Stefanou and Revanoglou (2006), mention that the use of large scale ICT, such as Enterprise Resource Planning (ERP) in hospitals is on the increase and it has helped to increase efficiency. Davis (1993), and Dyer, (1993) also

mentioned the importance of integrating suppliers and customers into supply chains for developing new products and processes.

However, Barki and Pinsonneault (2005) indicated that departments within most hospitals act as functional silos, but not as a unified whole. This situation does not ensure prompt information sharing among members of the SCM.

2.5 Procurement Policy in Ghana

The Public Procurement Act establishes procedures public hospitals go through in purchasing items for use in providing healthcare services. The overall objective of the public procurement system is to provide value for money to the Government by ensuring that public funds are spent in a transparent, efficient and fair manner. In Ghana, the Public Procurement Act, (PPA) was enacted to ensure value for money in the procurement of goods and services in the public sector. The procurement system aims at procuring goods, services and works of the right quality, at the right price, at the right time and at the right place through an open competitive tendering process.

The health commodity supply chain in the public sector in Ghana is managed by the Central Medical Store, and a network of Regional Medical Stores in each of the ten regions of the country. When the Ministry of Health procures medical supplies, the Central Medical Store is responsible for the receipt, storage and distribution of all the supplies. Health facilities are expected to get their supplies from the appropriate Regional Medical Stores. Each Regional Medical Store is managed by the respective Regional Health Administration, and it provides a supply service to health facilities in the region. In some instances the Teaching Hospitals and Regional Hospitals can procure their consumables directly from suppliers after obtaining approval from Ministry of Health.

All officers shall ensure they obtain, retain and maintain appropriate documentation supporting the activities for which they are responsible. Senior officers involved in approval or authorisation shall ensure that any transactions they approve or authorise are backed by appropriate supporting documentation, (Public Procurement Act, 663, 2003).

2.6 Entity Tender Committee

An Entity Tender Committee is required to be established in each Procurement Entity with a structure as defined in the Act, Public Procurement Act, 2003 (Act 663). According to the Act, an Entity Tender Committee is responsible for reviewing and approving of annual Procurement Plans, and for review and approval of quarterly updates of procurement plans. In considering submissions made by the Procurement Unit or the Tender Evaluation Panel, the Tender Committee may: approve a submission; reject a submission with reasons; or approve a submission, subject to clarifications.

Each Procurement Entity is required to appoint a Tender Evaluation Panel with the required expertise to evaluate tenders and assist the Tender Committee in its work. A Tender Evaluation Panel shall be an ad hoc body of not more than five members constituted for a specific procurement package. The panel shall include members with skills, knowledge and experience relevant to procurement requirements, which may include: relevant technical skills; end user representation; procurement and contracting skills; financial management or analysis skills; or legal expertise.

Members appointed to the Panel may be staff of the Procurement Unit but no Member of the Entity Tender Committee shall act as a member of the Tender Evaluation Panel, except in an advisory capacity. To ensure transparency, members of the Tender Evaluation Panel shall not be directly involved in the approval of any award of contract

For the procurement of drugs and non-drug medical consumables and other goods that may be determined from time to time by the Minister; Public hospitals shall first source their requirements from the Regional Medical Stores (RMS) or Central Medical Stores (CMS) as appropriate. Public hospitals may only buy the said items from the open market (i.e. outside the Medical Store System) when such items are not available at the medical store and when this is confirmed by the issuance of a “Certificate of Non-Availability” from the Medical Store.

2.7 Theoretical Framework: The Systems Theory

The Systems’ Theory originated from a renowned biologist, Ludwig Von Bertalanffy (1901-72), who defined system as a set of element standing in interaction. Webster also defines a system as a set or arrangement of things so related or connected as to form a unity or organic whole.

SCM is based on a systems approach (Mentzer *et al.*, 2001) and the essence of SCM is about solving the problems of functional divisions (silos) that occur within and between organizations and to create seamless processes. This indicates that there is a need for both functional specialization as well as process orientation in organizations. The theoretical underpinning of this work is the Systems’ Theory. The employment of this theory stems from the fact that hospitals operate like the human body with different parts standing in interaction. Clearly the various departments or units within a hospital can function effectively only when they depend on each other. For instance the work of clinicians, such as doctors and nurses, who directly provide healthcare to the patients, is largely influenced by supporting staff that provide logistics and materials, without which services cannot be provided to the clients.

Systems are grouped into closed or open. Closed systems are seen to be independent of its environment, whereas open systems have continuous interaction or contact with their

environment. From the Open systems perspective, an organisation survives and grows by drawing inputs from the environment which are processed internally to produce outputs. Ridge hospital practices an open system, since inputs in the form of drug and non- drug consumables are sourced from the external environment through suppliers. Besides, decisions in the form of policies from Government and other stakeholders influence the activities of the facility.

Operations of SCM in Ridge hospital is made up of interrelated parts or units coming together to provide materials and logistics for the facility. In the process of supply chain, all the partners, namely, the user departments, store-keeper, procurement officer, accountant, internal auditor and core management all work together to achieve a highly efficient SC benefits.

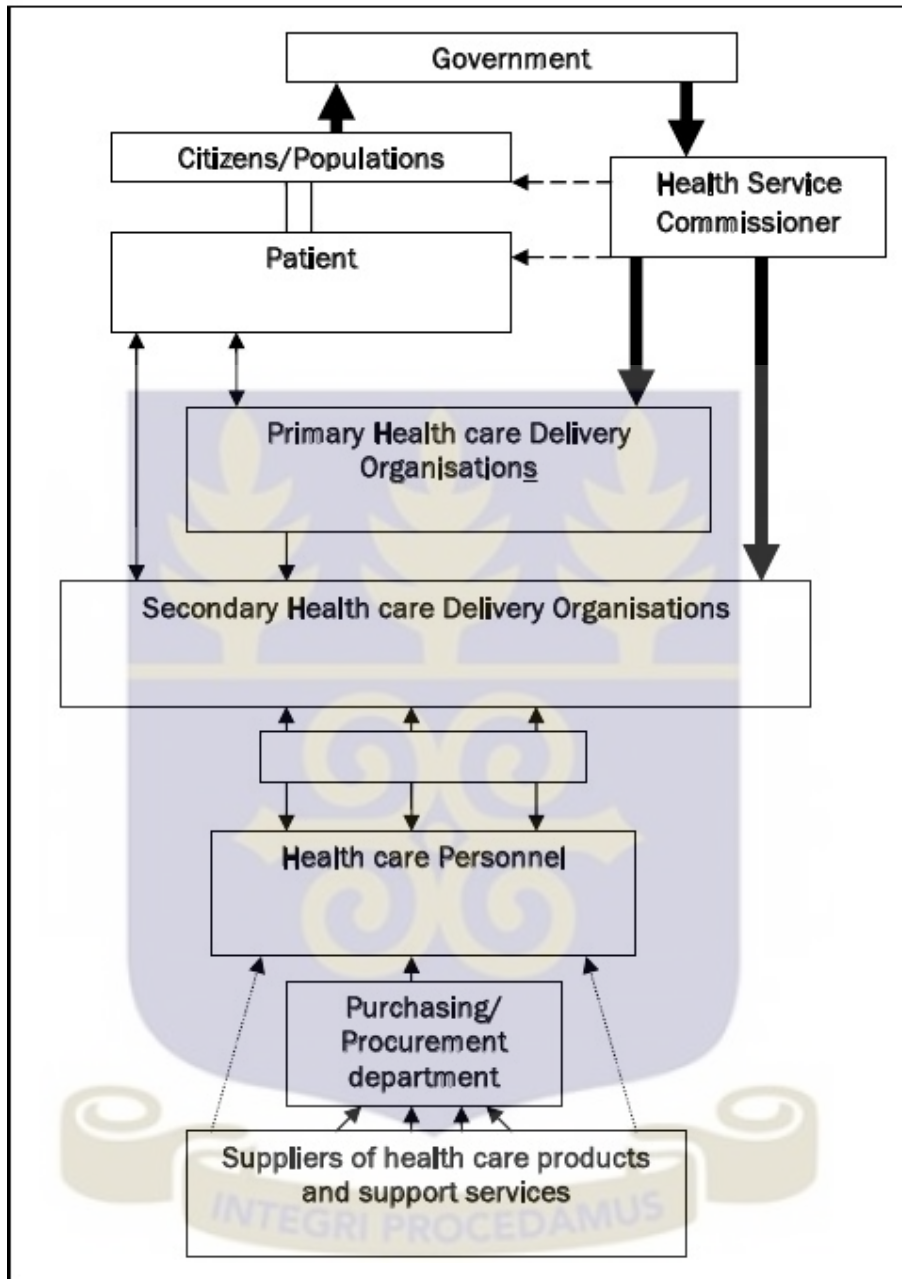
According to the systems theory, there are subsystems within every system and these subsystems are arranged in hierarchies, and integrated to accomplish the overall goal of the organisation. Ridge hospital is made up of subsystems arranged in such a way that unit depends on each other in the healthcare delivery process. Each subsystem has its own boundaries of a sort, and includes various inputs, processes, outputs and outcomes geared towards accomplishing an overall goal in providing quality healthcare. The administrative structure at Ridge hospital is arranged hierarchically with clear communication channels, from the Medical Director to the last orderly.

Figure 1 shows a system where units, structures and individuals depend on each other for survival. It is an adopted systems' model from a work done by Allen Barbara on Commercial Procurement and SCM in Hospitals, in 2004.

It shows how commissioners, citizens, patients, providers and producers interact with each other in the provision of healthcare.

Figure 2

Extended Health System Supply-Chain: Commissioners, Citizens, Patients, Providers and Producers

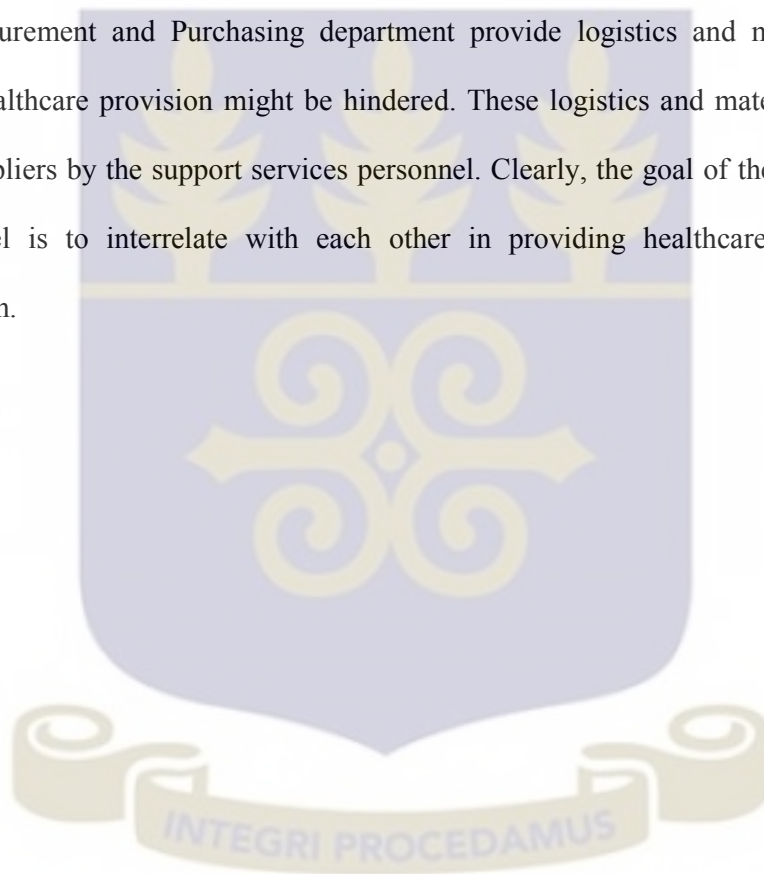


Source: Systems' theory Model - Commercial Procurement and SCM in Hospitals (Allen Barbara, 2004).

Situating the model in the context of Ridge hospital, Government regulates the activities of the facility through the enactment of health policies. Again, Government provides

infrastructure and human resources for the facility and also gives quarterly and annual subventions to the facility. All the policies and regulatory activities by Government are done through the Ministry of Health and Ghana Health Service (Healthcare commissioners). The citizens or population are also stakeholders of the facility who interact with the facility through accessing healthcare services. Ridge hospital is the only secondary facility in the Greater Accra Region, therefore patients are referred from primary or lower level facilities.

The Procurement and Purchasing department provide logistics and materials, without which healthcare provision might be hindered. These logistics and materials are sourced from suppliers by the support services personnel. Clearly, the goal of the elements within the model is to interrelate with each other in providing healthcare services to the population.



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the various methods that were employed in achieving the objectives of the study. It explains the research approach and design used. The chapter gives a brief profile of Ridge hospital and why it was chosen as the study site. It further explains the target population and the sampling technique used in selecting study participants. Data collection method and analysis have also been explained.

3.1 Research Design

To understand supply chain management phenomenon in public hospital, a case study design was employed. A case study design was chosen to enable a detailed in-depth data to be collected from respondents' frame of experience and understanding of SCM concept in its natural setting. A single case study was used since the study focused on Ridge hospital alone. Ridge hospital was considered an ideal facility for the study because it is the only Ghana Health Service secondary hospital in the region with high records of patients' attendance. This therefore means that it does a lot of purchases of non drug consumables.

3.2 Research Approach

A qualitative research approach was used for the study to assess the operations of supply chain management Ridge hospital. The rationale for this approach was to understand the context of SCM from participants' subjective and life experience of the phenomenon in a flexible manner. It helped in obtaining a richer and more complete description of SCM of non drug consumables in Ridge hospital.

3.3 Study Site

Ridge hospital is situated in the Osu Klottey Sub-Metro of the Greater Accra Region, Ghana. The Hospital is believed to have been established by the British around 1928. Ridge hospital is the only secondary health facility in the Sub Metro and the Greater Accra region. The Hospital was designated Regional Hospital in 1997. Its catchment area is the whole of the Greater Accra Region with an estimated population of 4,283,322. The immediate catchment area includes the following suburbs: Nima, Maamobi, Kanda, Accra New Town, Kotobabi, Osu, La, Adabraka, Achimota, Airport Residential Area and Central Accra.

The hospital serves as a referral point and provides a wide range of services to its clients. Services provided include but not limited to; Out Patients, Emergency, Dental, Family Planning, Paediatrics, Laboratory, X-ray, Surgery, Internal Medicine, Obstetrics and Gynaecology. Averagely, the facility records about 291,887 Out Patients Attendance annually and 17,900 In-patients with a bed compliment of 191 (Ridge Hospital Annual Report, 2011).

3.4 Target Population

The target population of the research was staff members in Ridge Hospital. The facility has a staff population of about 782, from various technical backgrounds. Since the core business of the facility is healthcare provision, the clinical staff is in the majority. They are mainly doctors, nurses and laboratory staff. There are about 131 doctors 407 nurses, and 244 supporting staff.

3.5 Sampling Technique and Size

There are eighteen departments in Ridge hospital; they are the Out Patients Department, Obstetrics and Gynaecology, Accident & Emergency, Administration, Paediatric, Dental,

Ear, Nose & Throat, Records, Surgical, Ophthalmology, Physiotherapy, Central Sterile and Supply Department, Dermatology, Internal Medicine, Laboratory, X-ray, Public Health and Mortuary. Each department is headed by a head who serves as an intermediary between staff in the department and management.

In selecting study participants, purposive sampling technique was employed to purposefully pick heads of the various departments, since they are directly involved in SCM practices in the facility. In addition to the heads, the Entity Tender Committee members, namely; the Medical Director, Head of Administration, Head of Accounts, Head of Pharmacy, Head of Nursing Administration and the Procurement Officer were sampled for the study. Essentially, the Entity Tender Committee approves or rejects reports by evaluation panel, (a panel that is set to evaluate quotations from suppliers). The decision to buy a particular item or otherwise depends largely on the Entity Tender Committee. Therefore the committee plays an indispensable role as far SCM of non drug consumables is concerned. Responses from these Tender Committee members were hence very crucial for the study.

Another officer who was considered key and therefore selected for the study is the Internal Auditor. The Supply Officer was also selected to participate in the study, since her duties are directly concerned with SCM.

Originally the study was designed to get all 18 heads of departments but 8 were interviewed because there was data saturation. It was realised that responses from the various departmental heads were almost the same. Respondents from the various units included, Heads of Medicine, Paediatrics, Records, Accident and Emergency, Public Health, Central Sterile and Supply Department, Out Patient Department, and Dental department.

In all a total sample of 16 respondents were drawn from the population to participate in the study. In addition to the interviews, secondary data (Annual reports, Procurement Plan and Stores Inventory ledger) were obtained.

3.6 Data Collection Method and Instrument

An in-depth interview was conducted to collect data from participants (see Appendix 1). An interview date was agreed on by the researcher and the participants and the interviews were conducted one-on-one basis. Most of the participants agreed for the interactions to be tape recorded on an MP3 recorder. A few however, objected to the tape recording and therefore, field notes were taken in those instances. All participants explained vividly their experiences of SCM in the facility during the interviews. The instrument used for data collection was a flexible interview guide with open-ended questions. The flexibility of this instrument allowed more relevant questions to be created during the interview process.

Due to the different roles performed by the SCM practitioners in Ridge hospital, the interview guide was divided into three categories. Respondents from the user departments were asked same questions. All entity tender committee members, except the procurement officer, also answered the same questions and different interview guide were designed for the Procurement Officer, the Store Keeper and the Internal Auditor (refer to appendix one).

3.7 Data Analysis

Recorded data were transcribed and field notes were all arranged and analyzed. Data were reviewed and categorized based on themes. The main themes were the objectives of the study and other sub themes emerged from the objectives. The sub themes that emerged included the procurement process, requests and requisitions, approvals, involvement of unit heads, availability of goods, costing of goods and inter-departmental communication.

The data were subsequently organized according to the sub themes identified. Summary of data analyzed were then provided and relevant verbatim statements were quoted in the study where necessary.

3.8 Ethical Consideration

An introductory letter from the Department of Public Administration and Health Services Management was obtained. This letter was sent to the Greater Accra Health Directorate for clearance in order to gain access to the facility. At the facility level, Head of Administration approved a covering letter from the Regional Health Directorate before data collection could begin.

3.9 Limitation of the Study

The study was a single case. Therefore results of the findings cannot be generalised to other facilities but rather limited to only Ridge hospital. Besides, accessing annual reports from Ridge hospital and the Regional Health Directorate posed a challenge. Therefore the initial plan to review a five year trend report could not materialise.

3.10 Conclusion

This chapter has discussed the methodology used for the study and outlined the research design, research approach, study site, sampling technique and size, data collection method and instrument, data analysis and ethical considerations. It has also clearly outlined a step by step approach by which the research went through in undertaking the whole exercise.

CHAPTER FOUR

RESULTS

4.0 Introduction

The chapter presents and analyzes the results of the data obtained from the participants. The focus of this chapter is to present the results generated from the interviews on the assessment of the supply chain management in Ridge hospital. The main themes developed for analyzing the findings are the objectives of the study. Sub themes are further developed under each objective.

4.1 Operational factors of supply chain management of non-drug consumables at Ridge hospital

As part of the operational factors used for supply chain management, the respondents revealed that processes such as procurement process, requisition and issues of items, approval, availability of goods, cost of goods, are used to replenish the stock in the hospital.

4.1.1 Procurement Processes

The study discovered that there are laid down processes that the facility goes through to make purchases. The first stage of the process, annual projections are done by the procurement officer using the consumption pattern in quarterly slots. The quantities and amounts of the projections are approved by the Entity Tender Committee and also the Public Procurement Authority before it could be operational.

According to the Procurement Officer,

I usually do the annual forecasts using the consumption patterns of the various departments. This is normally done at the end of the fourth quarter of the current year for

the ensuing year. The plan could only be operational after they have been approved by the entity tender committee and the public procurement authority’.

The study discovered that even though quarterly forecasts are done, purchases are usually not done quarterly, rather monthly or as and when needed. Interview with the Procurement Officer revealed that the amount to be paid for quarterly quantities could be beyond the threshold of the facility and the processes for such amounts to be approved by the regional tender review board are sometimes cumbersome. Apart from this the storage facilities within the hospital are not enough to hold large quantities of stock.

Purchases

The interview with Administrator indicated that all consumables, both drugs and non-drugs are supposed to be sourced from the Central Medical Stores through the Regional Medical Stores. It is only when a particular item is not available at the medical stores that suppliers are allowed to supply. This follows an issuance of certificate of non-availability by the Regional Medical Stores.

The Administrator stated that:

‘It is only after the issuance of certificate of non availability that the hospital can put the items required on tender for registered or prequalified suppliers to submit quotations and samples of items to be supplied. Although this system sometimes causes delays, we have no choice than to comply since it is mandated by the public procurement Act. The Act also compels every public entity to deal with only registered suppliers. However, goods can be purchased from the open market during emergency situations’.

Evaluation of Suppliers

Responses from the Medical Director indicated that an evaluation panel, which is an ad hoc committee, is set up to evaluate samples and price quotations submitted by suppliers

and choose the best supplier. This committee is usually made up an administrator and heads of user departments, who are considered technical people. The criteria for choosing a particular supplier as the one who has won the contract are (i) quality of the products, (ii) past records of the supplier (iii) payment terms and (iv) price.

According to the Medical Director,

'An Evaluation panel, made up of technical officers is set up to evaluate the samples. This committee selects suppliers who have won and recommends them to the Entity Tender Committee for approval. Their selection criterion is based on quality (examining samples provided), historical records, payment terms and price. Often times, price is the least criteria to be considered, because the least priced item(s) might not necessarily be of good quality. The payment terms of the least of the supplier with the least price might not be favourable. Besides, that supplier might not have good history or past records of supplying goods on time or supplying goods apart from what was submitted as samples'.

Responses from the Procurement Officer indicated that after evaluation and approval, award notification is given to the supplier and he is supposed to respond to indicate his acceptance or otherwise of the contract. After that a purchase order is written to the supplier. The purchase order is considered a legal contract document between the facility and the supplier. After the procurement processes have been met, the goods are supplied or delivered to the stores accompanied with a way bill, but before the goods are officially received at the stores, verification is done by the Supply Officer, Internal Auditor and the Administrator in charge of stores.

4.1.2 Requisitions and Issuing of Goods

According to the storekeeper, the store exists primarily to receive stock, store and issue them to user departments. It also does periodic stock taking and informs the procurement officer of shortages. Documents for managing inventory at the stores are mainly tally cards, ledger books, stores receive advice and waybills.

The study found out that, requests are made by user departments to the stores once a week and each request is supposed to be approved by the matron or the administrator in charge of the requesting unit before items are taken from the stores. In approving the requests, the In-charges consider the stock balances at the departmental levels and the inflow of patients. The approving officers sometimes increase or decrease the items being requested for depending on the stock balances at the department's mini store. Approvals serve as a control mechanism to check abuse of stocks issued to the departments.

The Storekeeper said that:

“Issues are made to the department upon request. Stock balances of the requesting departments are checked before issues are made. The quantity given to a particular department depends on quantity available at the stores. If the quantity is not enough, smaller quantities are issued so that every department can get some to manage before new deliveries are made. When stock of some items gets very low, only department needing them urgently are given”.

4.1.3 Costing of Goods

Interview with the store keeper and some department heads indicated that goods issued to the user departments are priced at 20% mark up. This enables both the store and the receiving department to be aware of the costs of items issued and received.

According to the Head of Finance;

“The goods are priced so that the receiving departments will acknowledge the value of the items they are working with. This measure is to prevent abuse and also to inform the departments that services provided must be commensurate to the goods received from the stores. The departments account for goods on quarterly basis through their reports”.

4.1.4 Involvement of Departmental Heads in the Procurement Process

About 90% of departmental heads who participated in the study indicated that they are not involved in the procurement process. This situation, according to the respondents creates problems. However a few unit heads get involved by serving on the evaluation committee when new items are to be procured.

The unit head of accident and emergency stated;

‘Since we are not involved in the procurement process, certain items delivered do not meet our specifications. For instance, there is a particular syringe and needle for catheterization, this product has been giving us a lot of problems but they keep giving us despite the several complaints lodged’.

According to the head of OPD;

‘The unit gets involved only when there is a new item to be purchased and during evaluations, in order to offer recommendation. We do not however get involved during the quarterly and the yearly procurement plans. The procurement officer does all the purchases using the consumption pattern. This sometimes results in getting goods that do not meet our specification’.

4.1.5 Payment of Suppliers

After the goods have been physically received and entered into the stores receipt ledgers, the Supply Officer processes documents for the supplier to be paid. Payment of suppliers can only be effected after the Supply Officer has completed and submitted the purchase

order, award letter, waybill and the Stores Receipt Advice (SRA). These documents are processed by the Supply Officer and they are signed by the Supply Officer, Internal Auditor and Head of Administration before the Medical Director, who is the spending officer gives the final approval for the supplier to be paid. It was admitted by the Supply Officer that sometimes this process delays since documents move from one officer to the other and it takes time for the various officers to finish working on their parts.

According to the findings, suppliers are supposed to be paid within 90 days after the goods have been supplied. However this rule is not strictly adhered to because the facility is mostly challenged with funds due to delays in National Health Insurance (NHIS) reimbursement. To solve this problem, certain services, especially some laboratory investigations are no more carried out in the facility.

The Medical Director emphasized:

'About 80% of the internally generated funds are from NHIS and mostly reimbursement of funds are delayed, therefore the facility is unable to honour its financial obligation to suppliers on time and this has consequences on supply chain management operations. Some suppliers are no longer willing to supply goods, especially laboratory reagents and this has caused the facility to stop certain laboratory investigations'.

4.2 Effects of Supply Chain Management of non-drug consumables on Healthcare delivery.

This theme sought to elicit views on the effect of supply chain management operations on healthcare service delivery in the hospital.

4.2.1 Shortage of Goods

Some participants revealed that the facility records shortage of certain non-drug consumables and this affects delivery of healthcare to the patients. These situations occur anytime there is an unforeseen increase in the number of patients to the hospital and also whenever payment of suppliers delays.

The In-Charge of Central Sterile Supply Department said;

'The Procurement Officer undertakes procurement by using the previous consumption, therefore any unforeseen increase in patient's attendance increases pressure on the available stock and causes shortage of items'.

The Supply Officer stated that apart from the main store, the unit heads also keep some stock levels in order to continue working whenever the main store runs out of an item. Unfortunately some of those mini stores are not properly managed and some departmental heads do not check stock levels regularly to report shortages early enough. This causes total depletion of certain goods and it subsequently affects healthcare delivery.

The study again found that, whenever there is a shortage, the procurement officer is informed, besides, a memo is sent to administration for the goods to be provided. Between the time the memo is sent and the time deliveries are made, the unit heads rely on each other for good in order to continue providing services. However, there are a few instances where patients have been asked to purchase certain items before services could commence or continue.

The Medical ward in-charge stated that:

'In shortage situations, we fall on other departments who may have enough of those goods. We do not halt the provision of our services because of shortage. We however ensure we return these materials to the department whenever materials are available at the stores'.

However, certain items are unique and cannot be borrowed from other units. For instance, the officer in charge of the records unit stated that:

'The core items used are the folders but sometimes we do get shortages. Whenever that happens patients' information is taken on a plain sheet and later transferred to a folder when the patient comes on the next visit, by which time new folders would have been received'.

4.2.2 Expiration of Goods

According to the study, in the past, purchases were done in bulk in anticipation of price increase, but sometimes close to half of the items would expire.

The Supply Officer stated:

'Prior to the emergence of supply chain management concept, we use to procure in large quantities because we perceived price increase in the near future. Certain times, close to half of the quantity would expire and go waste'.

'The Procurement Officer and the Supply Officer disclosed that there are times the Regional Medical Store compels the hospital to purchase items that are close to the expiry date from them. This situation, according to the officers is very disturbing since it causes the facility to lose revenue'.

The Supply Officer lamented that:

'Regional Medical Stores also do push goods to the facility and we have no choice than to collect them. These goods are sometimes not to our specification. This means that the products will go unused therefore their expiration'.

4.2.3 Delays in Delivery of Goods

The study revealed that, the formalities involved in supply chain management processes sometimes causes delays in the supply of goods.

According to the Paediatrics' unit head;

'The procurement process involves formalities and bureaucracies, these protocols can sometimes be too cumbersome and delay delivery of goods. Sometimes, patients are asked to buy certain items from outside in order for services to be provided'.

On the part of the procurement officer, the delays in reporting stock levels and stock outs by the Supply Officer and user departments causes delay in the supply of goods. Moreover, the Head of Finance revealed that there are delays in the supply of goods due to delayed payment of suppliers which was attributed to the delays in reimbursement of NHIS claims.

The Procurement Officer stated that

'Delay in paying suppliers as a result of late reimbursement of NHIS claims can cause delay in supplies. Some suppliers, especially the monopolistic ones can withhold goods from the facility until they are dully paid. Delays in supply can have serious consequences on service delivery. A case in point was when four babies lost their lives because the supplier (a sole supplier of reagents), refused to sell to the facility on cash basis, reagents that would aid in investigating the conditions of the babies. The supplier insisted the hospital paid all amount owed before selling to them'.

Another factor that causes delay is supply of inferior goods by suppliers. The Procurement Officer explained that anytime suppliers supply goods rather than what was specified in the award letter, the goods are returned to the supplier and this causes delays.

4.2.4 Ad hoc or Emergency Purchase

The study showed that Ridge hospital does a lot of ad hoc purchases, which is also termed emergency purchases. Ad hoc purchase can result in high cost of items which defeats the principle of value for money. It was further explained that suppliers can take advantage of the hospital's need for the goods to increase the price. This situation arises as a result of improper forecasting and unforeseen increase in the number of patients' attendance.

According to the Medical Director:

'The facility does several emergency purchases due to poor forecasts and late reporting of stock outs. On the average, the hospital does an emergency purchase once every fortnight. The good thing is, even though there are a lot of emergency purchases, the Procurement Officer always ratifies or regularises those purchases.'

4.3 Information flow between departments of the hospital

Communication among departments remains a very significant tool to help curb the phenomenon of stock out in the hospital. The study uncovered that, interdepartmental coordination and information flow enhances performance in the facility.

4.3.1 Communication

The study found that information flow affects stock levels in the hospital. The main form of communication is through telephone calls, notice boards and memos. Mostly departmental heads call the Supply Officer to inquire whether there is enough stock for the item being requested for. In this case, the Supply Officer is able to make timely provision of the goods for the department.

According to the Supply Officer:

'We receive calls from various departments inquiring the availability of items. When they are assured that there is enough stock available, a requisition is then sent by the requesting department. For the stores, this enables us to respond to the needs of the departments promptly. Certain times information flow enables us to predict the future needs of other departments'.

The Procurement Officer said:

'Information flow among the departments in the organization helps prevent stock out situations. Most of the time, our purchases are based on predictions, therefore information from these departments will enable us to reliably determine the quantity of items to procure and the specifications needed'.

On the part of user departments when a particular item runs out and there is the need to borrow from other department, calls are made to each other. The study found out that, information flow ensures inter-departmental reliance in times of need.

The Public Health Officer In-charge said that:

'Information flow among departments enables us to borrow from other departments in times of shortages. Most of the time, I call my colleagues in other departments to find out if they have enough stock and I can borrow from them. I enjoy the information flow in the organization since it facilitates smooth performance in terms of service delivery'.

The study found that the media for information sharing within the facility are through meetings, phone calls and memos and newsletters posted on the hospital's notice boards. The study however revealed that non-existence of computerized system for sharing information among departments on stock levels is a major constraint.

According to the Head of Finance:

'Most of the information communication systems in this hospital are through phone calls and sometimes people will have to walk from one department to the other. This tends to create inconvenience in the system and when the requesting department has no credit to call they tend to suffer shortages'.

The Medical Director stated that:

'Computerization of the stores, suppliers and administration including accounts would have made the processes much easier. However inadequate financial resource is hindering the establishment of this system. Going forward, the facility will computerize its activities to enhance smooth operations of supply chain management'.

4.4 Conclusion

The chapter focused on the analysis of responses from interviews with study participants. The chapter brought out the important themes that satisfy the study objectives and uses relevant verbatim statements from respondents to explain them.



CHAPTER FIVE

DISCUSSION OF RESULTS

5.0 Introduction

The chapter discusses the findings of the study and explains the results using existing literature and other scholarly work on supply chain management of non-drugs consumables within and outside the healthcare industry.

5.1 The Procurement Process

The first objective was to identify the operational factors of supply chain management of non-drug consumables in Ghana's public hospitals. It was found that the procurement process at Ridge hospital begins with the planning of annual forecasts by the Procurement Officer using the consumption pattern. This finding seems inconsistent with Harland's, (1996), assertion that SCM is concerned with material and logistics planning and it uses demand forecast from user departments to create the plan for a specified period. Demand forecasts from user departments are used in creating annual procurement plans and this practice creates problems in the facility. About 90% of departmental heads interviewed, stated that this practice sometimes result in stock-outs and undesired goods, which compromises on quality healthcare delivery.

The quantities for the annual forecasts are divided into quarters and purchases are supposed to be done quarterly but this is not the case; instead, purchases are done in monthly slots or as and when required. In the literature, this system works very well under Vendor Managed Inventory (VMI) or Just-In-Time (JIT) systems. As Sahin and Robinson (2002), posited, under VMI, the supplier has the duty of monitoring the retailer's stock levels and makes periodic replenishments decisions regarding stock levels. VMI system, according to Mustaffa and Potter, (2009), leads to higher customer service levels and

improvements in key supply chain variables such as decreasing stock-outs. Since Ridge Hospital does not practice VMI in principle, suppliers are not informed of the dates and times for replenishments in order to supply accordingly. Rather suppliers are called as and when goods run out. The challenge with this system is that suppliers also need time to make the goods available from their source before being able to supply. This eventually prolongs or delays the procurement processes and causes shortages. It is also a deviation from the PPA, which mandates health facilities to purchase goods to last for a quarter.

Again, it was discovered that the first point of call for Ridge hospital in terms of acquiring supplies is the Central Medical Store through the Regional Medical Store. In order to make the procurement process less cumbersome, the medical stores are supposed to stock enough consumables to enable all public health facilities to conveniently procure various consumables under one roof. As espoused by Brennan (1998), centralised logistics is a key towards enhancing healthcare supply chain operating efficiencies. He further explained that the approach has gained popularity in the healthcare sector since it has the potential of reducing the time and effort needed to manage inventory. However the study revealed that, this approach rather slows down supply chain processes in Ridge hospital. Mostly, the items the facility requires are not readily available in the medical stores. Therefore a certificate of non availability would have to be issued before suppliers can be called to supply. The formalities involved slow down the process.

To ensure that suppliers do not supply goods other than what has been specified in the award letter, goods are verified by the Administrator in charge of stores, the Internal Auditor and the Supply Officer before receiving the goods into the store. This practice serves as a control mechanism to ensure that suppliers supply the exact goods specified in the award letter.

5.2 Requisition and Issues

The main duties of the Supply Officer are to receive goods, store them, issue them to user department and take periodic stocks. The study revealed that requisitions are submitted to the stores from the user departments on weekly basis and the departments keep mini stores at their various departments. However, emergency issues are done as and when necessary. As part of the requisition and issue process, issues are given out after they have been approved by the Deputy Directors of Nursing Service (DDNS) in charge of the departments. Approvals are given after the DDNS has checked the stock balances and patients inflow. Although this system controls abuses and wastages, it may cause shortages, since it is difficult to predict the exact patient mix and inflow. This system has the potential of prolonging the processes if not managed well. The Procurement Officer asserted that there are abuses in the system and the only way to check this is to scrutinize the stock balances of the requesting unit and demand justification for the emergency replenishment. This sometimes results in direct confrontation between either the procurement officer and the requesting officer or Supply Officer and the requesting officer. The research found two implications of this practice at the Ridge hospital. This helps to check abuses and ensure value for money. However, it has the potential of impeding efficient service delivery because those departments that do not want to engage in confrontation will rather sit unconcerned, since the effect will be on the patients.

The research revealed that the Supply Officer does due diligence in issuing goods out. The officer indicated that quantities of goods are issued to departments depending on the quantities available at the stores. This means that the departments are supposed to manage the few quantities given until goods are delivered to the stores again. This may affect quality of service provided because healthcare delivery is considered a prompt service and every minute counts. It also means sharing a few goods to many patients which might

affect service quality. As indicated by some respondents, this situation compels patients to purchase the items on their own in order for treatment to continue.

5.3 Payment of Suppliers

The study revealed that suppliers are paid only after all the necessary documents have been completed, endorsed and verified by the Supply Officer, Internal Auditor and the Head of Administration. This system serves as checks and balances for all SCM practitioners in the facility. As explained in sub section 1.9 of the Public Procurement Act,(Act,2003), authorizing officers shall ensure any transactions they approve are backed by appropriate supporting documents. It was realised that even though suppliers are to be paid within 90 days after supplies have been made; this is not strictly adhered to due to inadequate inflow of funds caused by delays in National Health Insurance Schemes' reimbursement. The effect the delayed reimbursement is refusal of suppliers to supply goods on time which subsequently affects delivery of service.

5.4 Involvement of Departmental Heads in Supply Chain Management

It was also found that Ridge hospital has a functional Entity Tender Committee (ETC), whose main duties are to approve annual procurement plans, meet quarterly to plan for purchases that are to be done in the ensuing quarter. They also approve or reject recommendation reports submitted by a Tender Evaluation committee. The Public Procurement Act, (Act 663, 2003), mandates every public health facility to set up Tender Evaluation Panel (TEP) as an ad hoc committee of not more than five members. This committee should be made up of members with relevant technical skills, and one Administrator (who is not a member of the TEP). Although this committee is in place, most departmental heads complained that they do not serve on the committee during tender evaluations. Some participants admitted that even though they get busy with

clinical duties, they could still be involved in some aspects of the procurement process, at least, their inputs could be considered during the annual forecasts.

5.4.1 Ad Hoc or Emergency Purchases

The study showed that the facility does a lot of ad hoc purchases which result in high cost of goods, defeating the principle of value for money. Sometimes, suppliers take advantage of the facility's dire need of the goods to price them higher than the normal price. Ad hoc purchases arise due to improper forecasting and unforeseen high attendance of patients. On the average, the facility does ad hoc purchase every fortnight. This is a setback because the procurement Act does not encourage ad hoc purchases.

5.4.2 Availability of Good and Shortages

The study revealed that clinical staff members become too occupied with patients' care that they forget to check their stock levels until items get completely depleted. As espoused by Rivard-Royer, (2002), there is a high occurrence of stock outs in hospitals because the medical staff in the wards does not have time to be concerned with efficient material operations as they are much occupied with taking care of patients.

The research revealed that memos are sent to the administration whenever there are shortages. As indicated by the accident and emergency department head, this situation delays supplies due to the bureaucracies involved in administrative procedures. According to some departmental heads, the memos have to be approved by the administrator before being forwarded to the medical director for authorisation to purchase. This situation, according to some respondents can take weeks. Between the time the shortage occurs and the time new deliveries are taken, departments borrow goods from each other to provide service. This, the study found to be a good practice but goods that are unique to particular departments cannot be borrowed from others. For instance, the records department uses

folders as its core item and they cannot be borrowed from anywhere in times of shortage. The head stated that whenever there are shortages of folders, patients records are written on papers and later transferred to a folder when new stocks arrive. The risk here is that there is a high tendency of misplacing the patients' information which can subsequently affect their diagnosis and treatment.

5.4.3 Expiration of Goods

The Supply Officer explained that in issuing the goods to the departments, the concept of First to Expire First out (FEFO) is applied, instead of First in First out (FIFO). Therefore expiration of goods hardly occurs. However, expiration of goods occurs whenever the Regional Medical Store pushes goods that are close to expiration to the facility. The study found this to be a disturbing situation because it causes the facility to lose revenue.

5.4.4 Delays in Delivery of Stock

The study uncovered that, the processes involve in SCM sometimes causes delays in supplies. Alt (1997) argues there is the need to comb through the variety of products on the market before procuring. But this can delay the process.

Another factor that delays supply of goods at Ridge hospital is the late payment of suppliers due to delays in NHIS reimbursement. According to the annual performance review report of 2011, about 80% of patients who access healthcare at Ridge hospital are NHIS subscribers. The head of accounts lamented that the tariffs paid by the scheme for services provided are woefully inadequate, beside reimbursement is also delayed. As at the time the data was being collected for this study in April, the facility had not received reimbursement since November 2013. This situation delays payment of suppliers causing them to hold back their stocks. There have been instances where suppliers have demanded a full payment of all monies owed them before delivering new goods to the facility. The

delays in supplies of goods have serious consequences on service provision. Sometimes patients are asked to buy some of the items themselves and those who may not be able to afford would have to wait for supplies to be made before services can be provided to them. This has the potential of complicating patients' illness. Also low quality goods supplied can cause delays because it takes some time for the goods to be returned to the supplier for replacement.

According to Geir et al, (2006) involves the flow of products, services, finances and information flow. Therefore, there was the need to examine how information flow between departments of the hospital could help prevent stock-outs. The results of the study revealed that the media of communication within the facility is through phone calls, memos and direct contact. In times of shortages, information sharing helps the departmental heads to borrow goods from each other. The departments also call the Supply Officer sometimes to inform her of their stock levels.

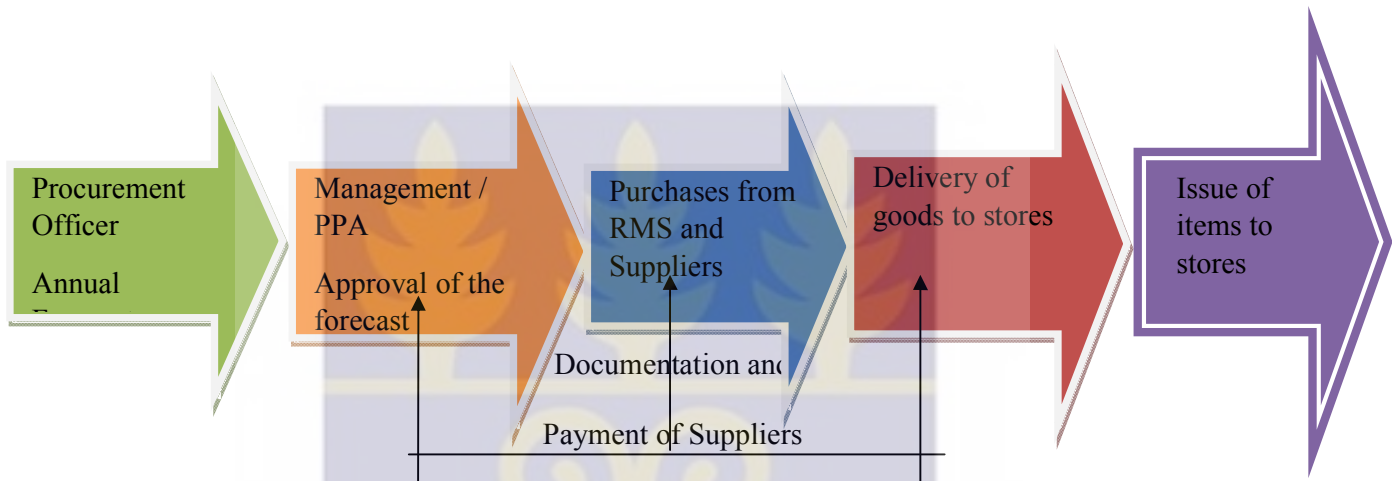
However, participants of the study indicated the need for full integration of the system, through the use of information and communication technology to enhance SCM processes at the facility. Vickery et al. (2003) confirmed that supply chain coordination and integration is facilitated by using integrated information technology, which directly impacts on financial performance of firms.

It was found that processing of suppliers documents for payment to be made takes longer period because papers have to physically move from one officer to the other and in some instances some do get lost. This situation increases delays and hence, shortages. As Mentzer et al., (2001) indicated, the essence of SCM is about solving the problems of functional divisions or silos that occur between and within organisations. Barki and Pinsonneault,(2005) further indicated that departments within most hospitals act as

functional silos, but not as a unified whole. Integrated or computerisation of SCM system at Ridge hospital, would enable every SCM practitioner to know whenever goods are delivered to the stores, stock levels and payment of suppliers.

From the analysis and discussion, SCM practices at Ridge hospital can be conceptualized in the figure below.

Figure 3 shows SCM process in the ridge hospital.



The figure shows typically the processes involved in SCM practices at Ridge hospital. Unlike the framework that was conceptualized in the literature review chapter, this framework gives a different picture of SCM concept at Ridge hospital. The study found that the processes involved in SCM at Ridge hospital are not cyclical but rather a linear one. The process includes forecasting for the year, using the consumption pattern. These demand forecasts are approved by management before purchases can be made from the RMS or suppliers. Goods are then delivered to the stores and the supply officer issues them out to the user departments. The necessary documentations and payment of suppliers are done at management level to pay suppliers.

5.5 Conclusion

The chapter discussed the results of the study by relating the findings with existing literature and drew comparisons and contrasts in the supply chain management and health delivery literature. It was realised from the discussions that SCM practices at Ridge hospital is not cyclical. A framework of SCM practices at Ridge hospital has been developed to give a true picture of the process in the facility.



CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATION

6.0 Introduction

This chapter presents a summary of the research findings and conclusions drawn from the study. The final part of the chapter makes recommendations based on the findings of the study.

6.1 Summary

The study has assessed supply chain management operations in Ridge hospital; the facility is also known as Ridge Regional hospital. The hospital serves as a secondary facility in the Greater Accra Region and also provides primary healthcare services to its clients. The entire research centered on three objectives; to identify the operational factors of SCM in Ridge hospital, examine the effects of SCM on healthcare delivery and examines how information flow between departments can help prevent stock-out situations. In fulfilling the objectives, a number of literature on SCM were reviewed. Moreover, the Public Procurement Act of Ghana, (Act 663, 2003), which is a guiding document for public procurement was also reviewed. Additionally, the hospital's annual reports from 2010-2012 and Greater Accra regional performance review report for 2013 were used.

The theoretical underpinning of the research is the systems' theory and Barbara's theoretical model on Commercial Procurement and SCM in Hospitals was adopted in explaining how SCM system works in Ridge hospital. According to the theory, systems operate like the human body with different parts functioning together as a whole. Just like the human body, departments within Ridge hospital interrelate with each other with the ultimate aim of providing quality healthcare to patients. The clinical staffs are directly

involved in the provision of service, while the non clinical staffs are indirectly involved through the provision of inputs and managing administrative issues.

A qualitative approach was employed for the study in order to gather data from respondents frame of experience of the concept. In selecting respondents, only members of staff who are directly involved in SCM practices were purposively sampled to participate in the study. A total of sixteen respondents, made up of eight departmental heads, six entity tender review committee members, an internal auditor and the store keeper participated in the study. Interviews were conducted on one on one basis with the help of an interview guide. In analysing the data, the study objectives were used as the main themes and several sub themes emerged under each of them.

It was found that operational factors of SCM at Ridge hospital are: procurement process, requisition and issue of goods, payment of suppliers and involvement of departmental heads in SCM. Supply chain management factors that affect healthcare delivery are: shortages, ad hoc or emergency purchases, expiration of goods, delays in delivery of goods and delayed payment of suppliers. Again, it was realised that SCM activities in the hospital are not integrated or computerised.

The findings showed that SCM process at Ridge hospital does not begin and end with user department, making it a linear process. The process has been drawn to give a pictorial understanding of the concept in the facility.

6.2 Recommendations for academia, policy and practice.

To ensure effective and efficient supply chain management of non-drug consumables in Ridge hospital, the following are being recommended;

The study found out that Heads of departments, who are directly involved in healthcare provision are not involved in the procurement process. It is therefore recommended that these officers be involved to make inputs regarding specifications of goods and quantities required for a period in the annual forecasts. Again, the study indicated that sometimes annual forecasts are not done accurately resulting in shortages anytime patients' attendance increases. To prevent stock-out situations, it is recommended that the procurement officer should determine the consumption pattern of all departments well and also find out the seasons of the year when patients' attendance increases, so as to make adequate provision for stocks accordingly, since shortages of goods, according to the study can have consequences on patients' health.

In order to make the procurement process less cumbersome, the Regional Health Directorate should ensure that the Regional Medical Store is well stocked with all consumables at all times. This may cut down the processes health facilities go through in the procurement of their goods from external suppliers. The medical store should also provide goods that ensure value for money rather than to push goods that are close to expiration to the facilities.

Furthermore, to serve as a deterrent to other suppliers, any supplier who supplies goods other than what has been specified in the award letter for three consecutive times should be blacklisted from the hospital's suppliers' list.

Moreover, the study showed that items are not purchased quarterly, but rather in monthly slots or as and when needed. Management of Ridge hospital should try and stop this practice since it does not ensure continual flow of goods all year round. It rather increases ad hoc purchases which does not ensure value for money since most ad hoc purchases are

done in a rush, making some suppliers to take undue advantage of the facility by increasing their prices.

The findings suggested that integration or computerisation of SCM process in the facility would make the system more efficient; therefore, management of Ridge hospital should take steps to integrate the procurement system. The use of information technology will prevent functional silos and minimise the bureaucratic formalities that delay SCM practices.

Most importantly, Government, and for that matter, the National Health Insurance Authority should be proactive in reimbursing the facility early enough to enable them pay their suppliers on time. This will make suppliers supply goods on time to and prevent shortages and further result in providing uninterrupted service to the public.

6.3 Conclusion

Findings of the study indicated that operational factors of SCM at Ridge hospital are procurement process, requisitions, costing of goods to user departments, payment of suppliers and involvement of departmental heads in the procurement process. Factors such as shortages of goods, delayed payment of suppliers, expiration of goods, delay in delivery of goods and ad hoc purchases were found to be affecting healthcare delivery in the hospital. Again the study revealed that even though departments share information on SCM issues through telephone calls, memos and meetings, an integrative approach of the system could enhance efficiency and availability of goods for healthcare delivery. The study further found that delayed reimbursement of NHIS claims further delays the payment of suppliers and hence delayed delivery of good. It was realised that about 80% of patients who access healthcare at Ridge hospital are NHIS subscribers. Therefore delays in reimbursement have consequences on the facility's finances.

It was found from the discussion that SCM at Ridge begins with the preparation of procurement plan by the Procurement Officer using consumption patterns. It was however, realised that using the consumption pattern sometimes creates shortage situations and this normally occurs when patients' attendance rate increases; a situation which cannot be predetermined accurately. Again, shortage of goods is attributed to delays in supplies due to the bureaucratic process involved in the procurement activities.

The non-involvement of departmental heads in the process results in procuring items that do not meet the specification. Inability to pay suppliers on time is a challenge in the SCM process at Ridge hospital. This situation is as a result of delays in reimbursement by the National Health Insurance Scheme which makes the facility unable to honour its indebtedness to the suppliers resulting in delays in supplies, since some suppliers are mostly not willing to keep supplying when they have not been paid earlier supplies.

Due to the above, it is recommended that future researchers should focus their attention on exploring the effects of delayed NHIS reimbursement of claims on SCM of non-drug consumables and its consequences or effects on service delivery.



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APPENDIX

CATEGORY OF RESPONDENTS	INTERVIEW GUIDE
UNIT HEADS	<ul style="list-style-type: none"> ❖ Processes involved in getting items from the stores ❖ Involvement personnel in the procurement process ❖ Sharing of information among departmental heads and the procurement officer regarding stock levels ❖ Availability of goods
PROCUREMENT OFFICER STORE KEEPER	<ul style="list-style-type: none"> ❖ Please explain the term, Supply Chain Management. ❖ Mention the processes involved in Supply Chain Management in the facility. ❖ Please describe the operational factors of SCM in the facility. ❖ Do you think the factors affect supply of goods. Please Explain. ❖ Sharing of information among departments on Supply Chain Management ❖ Delays in supply of goods ❖ Number of times purchases are done in a year
CORE MANAGERS	<ul style="list-style-type: none"> ❖ operational factors of S C M ❖ payment of suppliers ❖ Factor that accounts for ad-hoc purchases ❖ Causes of shortages of goods ❖ Sharing of information among core managers and departmental heads on SCM ❖ The operational challenges of SCM