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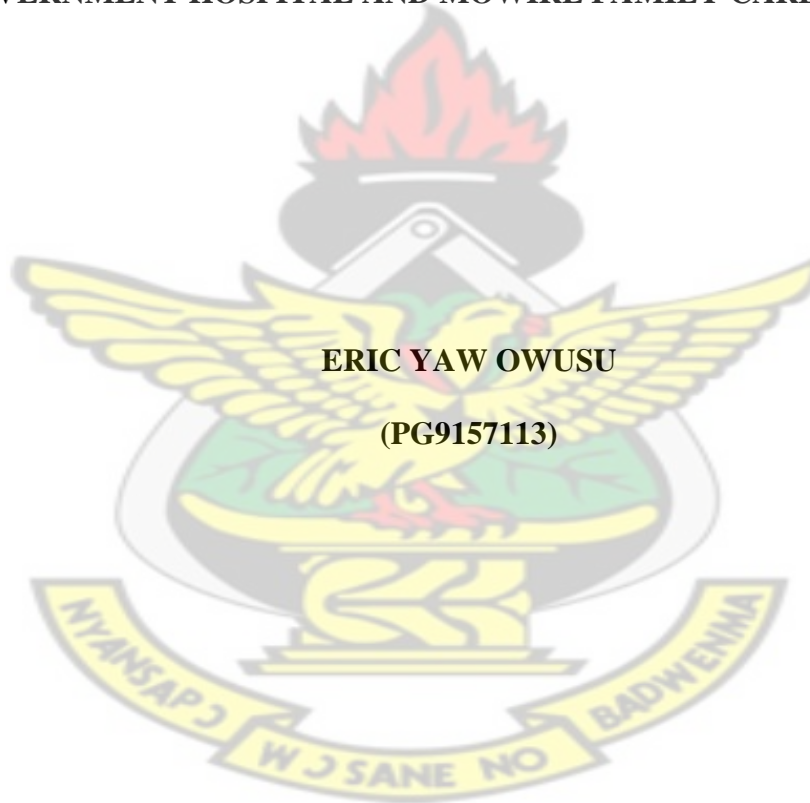
**COLLEGE OF ARCHITECTURE AND PLANNING**

**(DEPARTMENT OF BUILDING TECHNOLOGY)**

**INVENTORY MANAGEMENT IN THE PUBLIC HOSPITALS:**

**THE CASE OF ANKAASE GOVERNMENT HOSPITAL, AFRANCHO**

**GOVERNMENT HOSPITAL AND MOWIRE FAMILY CARE HOSPITAL**



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**NOVEMBER, 2014**

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**BY**

**ERIC YAW OWUSU**

**A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF BUILDING  
TECHNOLOGY, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR  
THE DEGREE OF MASTERS OF  
PROCUREMENT MANAGEMENT**

**NOVEMBER, 2014**

## DECLARATION

I, Eric Yaw Owusu hereby declare that this thesis is the result of my personal work. Apart from the references cited that have been acknowledged, everything detail in this research are my personal research work. The work has never in part or full been submitted anywhere for the award of any degree anywhere.

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## DEDICATION

I wish to bless God for His faithfulness. The Lord God has sustained me. I dedicate this masterpiece to my wife Mrs. Victoria Owusu-Rockson and my children, for their love and support throughout the two years I was on the programme.

# KNUST



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I must state clearly that without the above mentioned people I would not have fulfilled my dreams. I wish all of them success in their endeavors.

It is unfortunate that the expression of appreciation, no matter how extensive is always incomplete and the above is no exception.

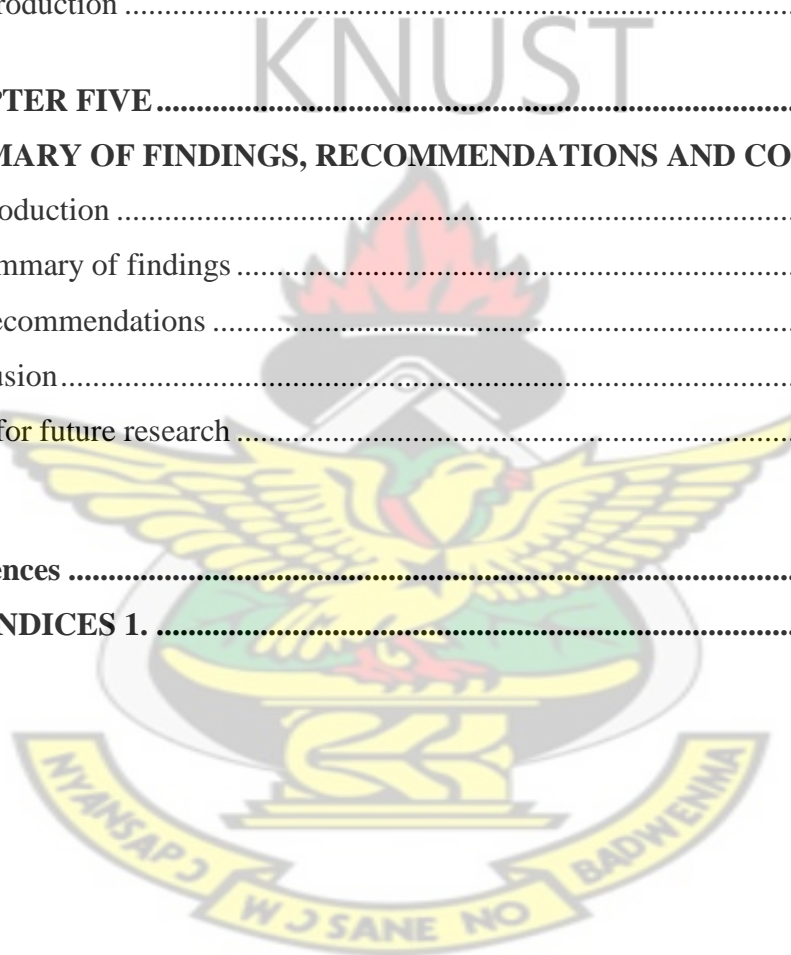
## ABSTRACT

The concern of all public hospitals has been how to effectively ensure adequate supply of goods and equipment to ensure optimum supply and demand. In most public hospitals as the problem has been, it's either an overstocking or under stocking leading to shortage or surplus hence incurring avoidable cost. This study aimed at finding out how effective inventory management was in selected public hospitals. The study adopted the case study design with the research approach being mixed method (Qualitative & Quantitative). The study employed both probability and non-probability random sampling Techniques to sample 65 health workers in three hospitals in the Afigya Kwabre District. Data were analyzed descriptively, while the qualitative responses were analyzed thematically. The study identified that an appreciable number of hospital staff understand the concept of inventory management (74.1%). The commonest inventory technique used was the ABC method with majority 49.2(32/65) of the staff admitting the use of requisition forms during the demand for goods from the stores. Coding system continue to be used in itemizing goods at the stores department, however this was done manually at the various units of the hospitals. The challenges that impede upon the effective hospital inventory management include inaccurate level of inventory management, delay of request poor record-keeping and over-supply. The effectiveness of inventory in hospitals is crucial for effective health care delivery. This research has brought to the fore the gaps in the inventory management in the selected public hospitals. A concerted effort need to be put in place to recruit skilled purchasing and supply persons with ample training to manage inventory. More to it is the call for a network and systematize inventory processes to track all inventory in the hospitals.

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## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.1 Introduction

Inventory management has become important issue in every organization at the global scale. In fact, it is widely ascertained that effective inventory management eliminate waste, reduce cost and add value to goods and services which are all critical ingredients that determine profitability level of organisations in this contemporary era. Inventory management according to Leenders (1997) is, “that which involves the planning, ordering, and scheduling of materials used in the manufacturing process”. It exercises control over three types of inventory, thus, raw materials, work in progress, and finished goods.

Hospital inventory management in Ghana is seen as a vital management functions in hospital administrations. In the case of drug inventory, hospitals’ pharmacies in the country are experiencing inventory problems resulting in wastage and shortage of drugs (Sarpong, 2012). Apart from that, other inventory management in the various health based organizations in the country is sometimes problematic which need to be resolved to improve efficiency in health care delivery in the country.

It is worldly ascertained that technology has now taken the world’s Centre stage in almost every activities of man; notwithstanding, inventory management in many health based organisations in the country are still struggling to adopt technologically - oriented system of managing inventory (Sarpong, 2012). The apparent upshot of poor inventory

management according to Fox and Tyler (2002) is the deteriorating effect on patient care due to delayed procedures and drugs substitutions

In fact, ineffective and poor inventory management in the health sector's organizations occurs not only from the perspectives of the hospital administrators in the various health stations; but also, the procurement expertise of those managing the entire inventory processes come to play (Alverson, 2003).

This implies that ensuring effective hospital based inventory management would involve multi-dimensional approach that extends from various levels; including the procurement processes of such materials, to the human resource base and their levels of skills in the various concerned departments as well as the various facilities available at the health station.

The concern of this study is to disentangle the effects of effective inventory management at the Ankaase Government's hospital, Family Care Hospital–Mowire and Afrancho Government Hospital.

## **1.2 Problem Statement**

Ensuring effective and efficient hospital inventory management has become a major concern in the country. Though, there are number of organisations in the country which are into inventory management; not much is ascertained when it comes to success stories of ensuring proper inventory management practices in the country. More importantly, there is even a strong link between effective inventory management and the health status of patients in the various health care stations in a country (Fox and Tyler; 2002), thus; the need for effective hospital inventory management in the country.

Another problem in hospital establishments is the issue of balancing the supply of inventory with demand for inventory, in order to evaluate the impact of effective inventory management in the health service in the country. It is unswerving sight to notice that many of the health based organisations in the country either over-stock their materials particularly that of drugs or under-stock them. These surpluses and shortages occur as a result of improper inventory management such as; inappropriate coding system, improper records keeping, problem of storage, stock-taking among others. It is worthy to attest that; whereas surplus materials can result in capital cost, storage cost, inventory service cost and inventory risk cost; shortages on the other hands result in increasing order cost, risk cost and most especially causing poor satisfaction to the user, customers or the user department.

These problems make this study very relevant so as to bring on board the relevance of ensuring effective inventory management in the various health care stations in the country.

### **1.3 Research Questions**

The following questions are asked to help the research to conduct the study. They are;

- How effective are the inventory management practices at the selected hospitals.
- What are the main inventory management techniques used by hospitals? and
- How appropriate are the equipment and tools should for inventory management at the selected public hospitals?

#### **1.4 Aim**

The aim is to investigate challenges in the inventory management at selected hospitals.

#### **1.5 Specific Objectives**

- To detail the inventory management practice at the selected hospitals.
- To identify the challenges with inventory management of Ankaase Government Hospital, Afrancho Government Hospital and Family Care Hospital-Mowire; and
- To identify the appropriateness of tools and techniques used at the stores in the hospitals

#### **1.6 Significance of the study**

The study is very relevant as it provides sequence of advices to every organization especially the health-based organisations as to how to ensure effective inventory management of their commodities, the kinds of benefits that accrue to it and the various means of undertaking such management practices.

Notwithstanding, the study would also help the researcher, academicians, students and other concerned stakeholders to know and understand the inventory management problems as well as the various interconnecting constraints and challenges faced by the health sector's organisations. This will make the various stakeholders to appreciate the efforts made by the researcher to help the health sector and other organisations to eliminate waste and add value to the organization assets.

Apart from that, the study provides laudable basis for further studies by researchers, students and academicians in the area of inventory management. It can be used as a reference material for advance studies. In fact, this study can even be used as a manual

by different organisations which want to ensure effective inventory management of their goods or commodities. This is because; it provides lessons and recommendations which when adopted by organisations would help to improve upon their inventory management.

Finally, the study brings to light the hidden benefits of effective and efficient inventory management and its contributions to organizational success. It even brings on board the effects of hospital inventory management on patient's care. This creates awareness to stakeholders to undertake effective, efficient and daily inventory exercises of their materials, facilities, drugs and other essential commodities.

### **1.7 Overview of methodology**

The researcher will use the case study design in selecting three hospitals in the Afigya Kwabre District. The research approach will be both qualitative and quantitative. Simple random and non-probability purposive sampling techniques will be used in sampling respondents from three selected hospitals. The data will be analyzed descriptively

### **1.8 Scope of Study**

The scope of the study is divided into two parts; the Geographical and the Contextual scope. The Geographical scope considers the location in which the study is to be undertaken while the Contextual scope takes into account the content of the study. The scope of the study is limited to Ankaase, Afrancho and Mowire Government Hospital's Supply Chain Management Unit. Ankaase, Afrancho and Mowire are a community located within the Afigya Kwabre District in the Ashanti Region of Ghana. These three

hospitals were selected because they are the only hospitals in the study area that render all the generalized health services.

The scope of the study was informed by time and financial constraints faced by the researcher.

The Contextual scope of the study is to examine the effectiveness of inventory management, the various techniques adopted by the Ankaase, Afrancho and Mowire Hospital's Supply Chain Management Unit; evaluate appropriate equipment and tools, the effects of drug inventory management on patient's care and to provide recommendations to help improve upon the hospital's inventory management.

### **1.9 Organization of Study**

This research work will be structured into five (5) main chapters. The first chapter contains the introduction of this research and it specifically looks at the backgrounds of the study, statement of problems, aim, objectives, research methodology, scope of research, and organization of study. The second chapter contains the literature review. Some related inventory Management literature is reviewed in this section which gives the study a theoretical base. The third chapter is made up of the research methodology used in gathering the necessary data and materials for this research. The fourth chapter also embraces all significant results of the administrated questionnaire. The fifth and final chapter also seeks to give summary of the findings, recommendations to these problems and conclusion.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

The significance of inventory management can never be overlooked in any establishment. The essence of effective inventory management has been accorded by Fox and Tyler (2003), Alverson (2003) and Baumer (2004) in their respective studies. Any well planned organization with explicit goal(s) and objective(s) must have a good inventory system to ensure effective management of organizational assets and to promote organizational growth.

Hospital inventory management is very critical and has a direct relationship with patients' well-being and recovery (Gillerman and Browning; 2000). Good and effective inventory management in all respect in hospitals would therefore improve the well-being of patients as well as ensure success, utilization of services and sustainability. In actual fact, health care in this contemporary era has become complex, complicated and costly with regards to the cost and management of drugs, surgical materials and equipment (Manhas; 2012). Also, the increase in level of information and literacy and the demand for more complex medical care have pop-up calling for accurate and efficient inventory management practices.

This chapter of the study would involve a reviewed literature on the concept of inventory management and its relevance, inventory management practices, various inventory management techniques and the tools and equipment for inventory management.

## **2.2 The Concept of Inventory, its Control and Management**

Inventory in its self is ambiguous and manifests itself much in the manufacturing domain. The term has diverse meanings and varies according to the perspective of the concerned organization. The term ‘inventory’ refers to the stockpile of production a firm is offering for sale and the components that make up the production.

One can also define the term as expandable physical articles for resale for use in manufacturing, a production or for consumption in carrying on business activity such as merchandise, goods purchased by the business which are ready for sale or any usable but idle resources in an organization. Effective management of inventory could be determined by inventory turnover ratio.

Alverson (2003) explains Inventory management as the determination of optimal policies and procedures for procurement of commodities or materials. The activity is very crucial especially when it becomes difficult to imagine a real work situation in which the required material would be made available at the point of use immediately. Thus inventories could be visualized as ‘necessary evil’. However; in Sarpong’s study (2012) involving the use of survey as a research design and a target population of some selected health facilities and their pharmacy department; dubbed “Drug Inventory Management at Hospitals in Greater Accra Region and its effects on Patient Care”, it was well attested that the goals for controlling inventory are minimizing the total cost and maximizing service level by balancing demand and supply.

The study added that having too much inventories implies holding high cost and having too little leads to rise in ordering cost. This therefore calls for appropriate inventory management practices in order to achieve the lowest possible total cost.

Inventory management is characterized by numerous methods or approaches; however, the push and the pull approaches are the ones commonly adopted. Baumer (2004) ascertained the fact that the push system is the old but is still widely used by many establishments in managing their inventories. The push system involved the storage of raw materials before actual production takes place and the products are produced to stock before orders are placed.

The approach is influenced predominantly by demand estimation in the near future with products and information flowing within the same manner between or amongst seller(s) and buyer(s). Sarpong (2010) affirmed that the pull system on the other hands is used as a response to confirm orders. Here, products are produced after or at production planning stage, implying that stock does not contain finished goods, rather semi-finished ones. Clients send their demands and place orders on sellers for products which are pulled through the delivery channel to the clients. The approach involves interactive communication processes and is mostly adopted within departments of many organizations. Note that, the approach places emphasis on delivering supplies as and when they are needed rather than keeping inventory. This improves inventory turnover by bringing inventory to a minimum.

In the case of the medical environment, the push system is widely used since drugs and other essential equipment and facilities must be readily available instantaneously when

they are needed. Baumer (2004) is of the view that inventory management practices in hospitals should be quite diverse from other organizations since hospitals are not in for huge profit from their services such as the sales of drugs; rather service should be accorded the highest priority, followed by minimizing costs and losses.

Keeping inventory and its management has a strong link with improving firms' service delivery and economies of scale; however, the practice is also associated with costs. The cost could be from ordering the materials (Ordering cost), holding stock of materials (Holding cost) or a stock-out cost (Gaither and Graizier, 2002).

The ordering cost involves costs and time spent on requesting for quotations, entering purchase order, approving order, checking received order, invoicing, making payment and reviewing order report. Holding Cost is divided into three categories namely risk costs, storage costs and finance costs. Risk costs include deterioration, obsolescence, damage and theft. Storage costs are associated with renting, building, racking, special storage such refrigeration, and handling costs. Finally, finance costs include interest on money invested in inventories and insurance. Stock-out Cost is the cost of not having products available or enough when they are demanded by customers. Calculating this type of cost is very cumbersome. Stock-out cost in some organization such as hospital might be greater than the other types of organization.

There are some key terms in inventory and are: the lead time which stipulates the interval between ordering and receiving the order; the Holding (carrying) costs which involve the costs of carrying an item in inventory for a length of time, usually a year. Ordering cost is also another important term in inventory control and management and

involves the costs of ordering and receiving inventory. Shortage cost occurs when the demand for inventory exceeds the supply for it.

Inventory has a counting system as defined by Stevenson (2005). They are basically the periodic system and the two-bin system. The periodic system involves the physical count of items made at periodic intervals. Under this system is the perpetual inventory system which keeps tracks of removals from inventory continuously, thus, involves monitoring current levels of each item under consideration. The two-bin system on the other hands involves two containers of inventory where reorder is made when the first is emptied. Here, universal bar codes are printed on every label that has information about the item to which it is attached.

There is however another important counting system in inventory management and control. This is usually treated as a separate method from the other two methods. The method as attested by is called cycle counting (Stevenson , 2005). The cycle counting involves the physical count of items in inventory. This special counting method involves cycle counting management, the level of accuracy needed in counting, how the cycle counting should be performed and whose responsibility is involved in the cycle counting.

Stevenson (2005) established the following as the types of inventory: Raw materials & purchased parts, partially completed goods called *work in progress*, Finished-goods inventories (*manufacturing firms*) or merchandise (*retail stores*), Replacement parts, tools, & supplies and Goods-in-transit to warehouses or customers. The functions of inventory include but not limited to the following; to meet anticipated demand, to

smooth production requirements, to decouple operations, to protect against stock-outs, to take advantage of order cycles, to help hedge against price increases, to permit operations and to take advantage of quantity discounts.

The functions of inventory control and management cannot be over-emphasized. The functions involved first; inventory control and management ensures the achievement of satisfactory levels of customer service while keeping inventory costs within reasonable bounds. The leveling of customers' service and the costs of ordering and carrying inventory are all vital functions of inventory control and management.

### **2.3 Effectiveness of Inventory Management in hospital establishments**

Inventory management is very important in every organization. Ashok (2013) in his study attested that inventory management contributes to profit maximization in a direct manner. According to him, a firm which neglects the management of inventories, will have to face serious problems relating to long term profitability and may likely fail to survive. Inventory constitutes a major component of working capital in firms; thus, the success or failure of an organization would undoubtedly depend upon its inventory management performances. In fact, proper management and control of inventory do not only solve the problem with liquidity but also increase profitability. This, thus; calls for effective inventory management practices in any organization.

Inventory should be available in proper quantity at all times, neither more nor less than what is required. Inadequate inventory adversely affects smooth running of business, whereas excess of it involves extra cost, thus, reducing profits of firms. Ashok (2013) stipulated that the primary objective of every inventory management practice is to avoid

too much or too little of it so that uninterrupted production and sales with minimum holding costs and better customer's services may be available.

Rossetti et al., (2008) apprehended that inventory management is a component of supply chain management. Another key component of supply chain management as stipulated by ibid (2008) is inventory distribution. Supply chain management is defined as the process of efficiently integrating suppliers, manufacturers, warehouses, and stores so that merchandise is produced and distributed in right quantities, to the right locations, and at the right time in order to minimize system wide costs while satisfying service-level requirements. Despite the benefits that accrue to inventory management; in the healthcare environment, it has received very low priority. According to Rossetti et al., (2008), recent studies have shown that tremendous cost savings and potential revenue can be generated with the enhanced management of distribution and inventory. It is estimated that hospitals could reduce its expenses by at least 2% through better and effective inventory management and distribution of finished medical materials. This according to Schneller et al (2006) represents a percentage of total expenses, not just the amount providers spend on supplies and pharmaceuticals.

Supply chain system from which inventory management is a key component comprises of complex networks consisting of many different partners at various stages of the value chain. According to Burns (2002), the three major players at the various stages in the supply chain are the product manufacturers, the purchasers and the health care providers.

The roles of the three players are essential in ensuring the effectiveness of inventory management in hospitals. Burns (2002) placed emphasis on the roles of the key players or actors in the supply chain so as to ensure the effectiveness of inventory management in the concerned health care facility. The manufacturers make the products; the purchasers get the products through administration fees and distribution fees and the providers such as the hospitals consume the products while providing patient care.

Another key player which is often not considered is the payer which comprises of individual patient and his employer who pays for the services of the provider. Within the health care value chain, the products (drug, devices and equipment, supplies etc) are transported, stored, and eventually transformed into health care services for the patient.

Effective inventory management is very crucial as attested by Stevenson (2005). He proposed in his study that the practice helps to keep track of inventory through the provision of reliable forecast of demand, knowledge of lead times, reasonable estimates of holding costs, ordering cost and shortage costs. Effective inventory management practices help to develop a classification system for inventory that fits the concerned organization.

The lack of effective control and management of inventory can make hospital supplies especially susceptible to inventory shrinkage due to theft, damage, loss and midnight requisitions. High-value drugs and devices are a target for sophisticated criminals, but even low-value items such as bandages, gloves and incontinence products walk out the door unaccounted for. The theft of equipment and supplies costs hospitals \$4,000 per staffed bed each year—millions of dollars annually at a large hospital or health system,

according to a 2004 estimate by Sun Microsystems (“RFID: Coming to a Hospital near You,” Sun Microsystems Press, April 2004).

Many of the solutions for militating against shrinkage in inventory management involve the use of technology such as radio-frequency identification; to better track inventory. The use of technological inclined inventory management and control in hospitals would not only help prevent theft cases but they also help locate supplies more easily during emergencies.

In ensuring effective inventory management, Darling and Sandy (2010) stipulated that hospitals need to ask themselves this question “Are we optimizing resources currently available through distributors and suppliers?” In fact, product manufacturers, distributors and third party logistics providers are all rethinking their fundamental business models and trading relationships that require hospitals to maintain adequate storage capabilities to newer models aimed at reducing inventory levels and storage capacity. According to Darling and Sandy (2010), contemporary hospitals are breaking their cases and stocks into smaller units and are fully undertaking management techniques aimed at supporting low-unit-of –measure or best unit-of-measure delivery that are directed to patient areas. With just-in time distribution, hospitals maintain nearly stockless inventory nowadays. In reality, the emergence of these models and approaches have over the years improved the effectiveness of inventory management in various health care facilities. Kamani (2004) established that ensuring effective inventory management in the context of hospital is outsourcing the inventory to a third party. According to his study, outsourcing is very relevant as it eliminate poor quality data about products and vendors, analyzing spending patterns of the hospital, using a good

classification system of the medical supplies, and ensuring product entries with relevant data. This finding is supported by Nicholson et al., (2004) when they developed an analytical model to study and analyze the impact of outsourcing of inventory decisions to third party provider that offers inventory management in health care.

#### **2.4 Appropriateness of inventory Management tools Techniques of Inventory**

Inventory management and its control are exercised by introducing various measures or techniques of inventory management and control, such as ABC analysis, fixation of norms of inventory holdings and reorder point. These techniques of inventory management are discussed below.

The first technique according to Coyle and Bardi (2003) is the ABC Analysis of Inventories which is based on the principle that a small portion of the items may typically represent the bulk of money value of the total inventory used in the production process, while a relatively large number of items may be from a small part of the money value of stores. According to Manhas (2012), the money value in ABC approach is ascertained by multiplying the quantity of material of each item by its unit price. According to this approach to inventory control and management, high value items are more closely controlled than low value items. He added that each item of inventory is given A, B or C denomination depending upon the amount spent for that particular item. “A” or the highest value items should be under the tight control and under responsibility of the most experienced personnel, while “C” or the lowest value may be under simple physical control. The relative position of these items show that items of category A should be under the maximum control, items of category B may not be given that much attention and item C may be under a loose control. After classification, the items are

ranked by their value and then the cumulative percentage of total value against the percentage of item is noted. This approach is also attested by Bloomberg and Hanna (2008).

Research by Thawani (2007) brought to light some benefits that accrue to this inventory management technique and are: the technique or approach ensures a closer and a more strict control over such items, which are having a sizable investment in there. The technique also releases working capital, which would otherwise have been locked up for a more profitable channel of investment, reduces inventory-carrying cost, it also enables the relaxation of control for the 'C' items and thus makes it possible for a sufficient buffer stock to be created and finally, it enables the maintenance of high inventory turnover rate in organizations.

Apart from the ABC approach, another important technique of inventory management as attested by Manhas (2012) is fixations of norms of inventory holdings. With this technique, the materials department set norms of inventories. The department then ensures the smooth operation of the inventories based on the norms. Usually, the approach may requires that norms of inventories are set by top levels workers usually after consultation with the material department instead of the material department setting the norms of inventory management and control. Some factors such as the lead time for deliveries, the rate of consumption, the requirement of funds, cost of storage, price fluctuations, space availability, insurance cost, obsolescence price, Economic order quantity (EOQ) and others come to play when we talk about this technique of inventory control and management.

Economic Order Quantity involves the assumption that only one product is involved. it also considers that the annual demand requirements for the inventory is known, demand for inventory is even throughout the year, the lead time does not really vary and that each order is received in a single delivery and that no quantity discounts is allowed.

Re-order point of inventory management and control is also another technique. According to Chungsiwapornpong (2007), Reorder point is the level of inventory at which the firm places an order in the amount of Economic Order Quantity (EOQ). With this approach, new goods arrive before the firm run out of goods to sell. He attested that the vital information needed by using this approach include the usage rate, the lead time and safety stock. Usage rate is the rate per day at which the material is consumed in production or sold to customers. Lead time on the other hands is the time between placing on order and receiving goods. The lead time information is mostly provided by the purchasing department. Safety stock refers to the minimum level of inventory expressed in terms of several days' sales. In terms of computation, the approach involves multiplying the usage rate and time in the number of days that the firm or organization wants to hold as a protection against shortages.

Re-ordering could involve the Economic Order Quantity. This situation occurs when the quantity on hand of an item drops to the economic order quantity; the item is then reordered. This is usually the appropriate time to re-order under the EOQ. Another appropriate time to reorder under the EOQ is at the safety stock level. Here, the stock is held in excess of the expected demand due to variable demand rate or lead time. Another level is the service level. Here, probably, the demand will not exceed supply during the lead time, thus, making it appropriate to re-order.

Several factors influence re-order point in inventory control and management. The determinants of the reorder point entail the rate of demand including the lead time, demand and/or lead time variability and the stock out risk (safety stock).

The problem with this approach is that it is cumbersome compared to the other approaches of inventory management and control.

Inventory management and control operates with certain models. They include Economic Production Quantity Model. With this model, production is done in batches or lots. Here, the capacity to produce a part exceeds the part's usage or the demand rate. The Economic Production Quantity is similar to the Economic Order Quantity. The only difference lies with the orders. This model receives orders in incrementally manner during production process. The assumption under this model is that only one item is involved. Apart from that, annual inventory demand is known, the usage rate is constant and that usage occurs continually, there is constant production rate, lead time does not vary and no quantity discounts are allowed.

Another model by Stevenson (2005) for inventory management and control is the fixed order interval model. Here, orders are placed at fixed time intervals involving order quantity for next interval, the interest of suppliers to encourage fixed intervals, the possibility of only periodic checks of inventory levels and the rise of stock-out. The benefits that accrue to this model is the tight control of inventory items-thus, items from the same suppliers may yield savings in ordering, packing, shipping costs and might be practical when inventories cannot be closely monitored. The demerits associated with this model is the requirement of a larger safety stock; hence, the increment in carrying cost and the costs of periodic reviews.

There is also a single period model. This model is for ordering of perishable items and other items with limited useful lives. This model factored into consideration two vital cost components which are the shortage cost and the excess cost. The shortage cost involves the unrealized profits per unit whereas the excess cost involves the difference between purchase cost and the salvage value of items left over at the end of the period. it is very pertinent to know as established by Stevenson (2005) that too much inventory tends to hide problems making it easier to live with problems than to eliminate them, costly to retain and involves wise strategy, reduces lot sizes as well as safety stock.

Leenders(1997), points **out purchasing systems** as one of the techniques of controlling inventories. The terms stockless purchasing and systems contracting are often used interchangeably. Actually, stockless purchasing systems are a special sub set of systems contracts where the purchaser's stock is taken over by a supplier. The supplier's delivery system is so reliable and fast that there is no need for any safety stock on the purchaser's premises. Typical applications include, but are not limited to office, electrical, plumbing and building maintenance supplies of a relatively standard nature. Coupled with ADI and direct delivery to the place of use, the stockless systems not only help reduce inventory levels, but also purchasing, receiving, handling, invoicing, and payments costs.

**Determining order quantities and inventory levels** is another technique. In the following sections, some relatively simple theoretical models used to determine order quantities are discussed. The application of these models depends on whether the demands or usage of the inventory is dependent or indecent. Dependent demand means

the item is part of larger component or product, and its users are dependent on the production schedule for the larger components. Independent demand means the usage of the inventory item is not driven by the production schedule (Peter and Watterman, 1998). In terms of Minimum-Maximum Inventory Levels, it is theoretically the minimum inventory levels could be zero. The last unit of inventory would be used at the moment a new shipment arrives. The maximum inventory would then be the correct ordering quantity or economic order quantity. This buffer system is not as popular as it once was for it tends to encourage the maintenance of excess inventories.

The optimum model: Here, the company should introduce policies to reduce lead time, regulate usage and thus minimize safety stock. Therefore the finance manager should ensure that only an optimum amount is inventoried in inventory to achieve the trade off between profitability and liquidity. Materials management is there a managerial process of counting planning, coordinating, control, monitoring and motivation.

**With Materials requirements planning (MRP)**, one of the assumptions behind this models just described is that demands for the item being purchased or made is independent of all other demands. This situation is true for most manufacturers finished goods. However, sub-assemblies, raw materials and parts do not exhibit this independence. Demand for these items is dependent on the assembly schedule for finished goods. Similarly, many MRO items depend on maintenance schedule. Recognition of the existence of demand dependence lies behind the techniques known as materials requirements planning (MRP).

MRP systems attempt to support the activities of manufacturing, maintenance or use by meeting the needs of the master schedule. In order to determine needs, MRP systems

needs can be accurate bill of materials for each final product or project. These bills can take many forms but it is conceptually advantageous to view them as structural trees. Seven general types of structural tree can identified. Process industries as oil refiners and drug and food manufacturer generally take a few raw materials and make a much larger number of end products.

Manufacture/assemblies such as the automobile companies make a number of components purchase others and assemble them into end products (Hellen, 1993). Assemblers, such as electronic companies, buy components and assemble them into finished products. Each type of firm can use MRP profitably but the greatest benefits usually accrue to the middle group because of the greatest complexity of its operations. The goals of MRP are to minimize inventory, to maintain a high service coverage and to co-ordinate delivery schedules for manufacturing and purchasing activities. These aims often conflict in other systems but under MRP are achievable simultaneously. The feature and ability of modern MRP systems to allow rapid re-planning and searching and in response to the changes of a dynamic environment are responsible for attractiveness of MRP.

**Just in Time Purchasing Emerges.** It means the uninterrupted flow of 100% acceptable materials delivered on due date as option cost 100% of time. The techniques of techniques includes supplier certification materials, requirements planning, (MRP) manufacturing resources planning, (MRP II) bar coding systems, contracting, electronic data interchange (EDI) value analysis and work simplification. This type of purchasing production and inventory control has the great advantage of locating and fixing quality problems immediately. Ingle makes the point, “it is like large rocks under

the water in a lake”. If the water level is too high one can see these and necks and avoid the danger. Similarly if the inventory is small, the defects are spotted and corrected immediately. There is less scrap and remark and quality improved dramatically.

The supplier provides full time on site personnel who attend design-engineering meeting, investigates their products and use the company’s purchase orders to affect delivery.

**Inventory recording technique;** Inventory recording is under taken to reduce the error relating to inventory accountability and accuracy in a firm’s investment in inventories. Inventory recording may take forms stock taking and sport checks which are process of physically counting, weighing or otherwise measuring the quality of each item in stock and recording system should reduce the discrepancies between stock in record and the physical stock.

Inventory storage and issues; Stock is vital tool to achieve an efficient inventory management system. Since there is storage and issue of inventory, the cost of obsolescence and fraud, management should ensure performance of all storage and issue functions. (Leenders, 1997)

The chosen materials valuation should be used consistently in order to meet the requirements of the consistency policy of accountability any change should be reported and its impact on the reported profits. Firms should therefore identify and employ the stock valuation method, which is in line with their objective and the legal and accounting framework.

Inventory models; Inventory models aim at minimizing materials costs. The order quantity that minimizes the cost of holding stock is determined. The key issue is the

determination for when to order and how much to order. Materials models range from those concerning stock files and investment or stock records to economize costs calculated according to a number of formulas.

**Trial and error technique:** This is the simplest method of material control. In this case, management determines the level of inventory basing on the prices, orders and value of items of inventory. Material controlling is accessing the need for material and then taking appropriate action to meet this need (Lau and Snell, 2006).

**Two Bin System;** the two-bin system involves the storage of each item in two storage bins. In case the first bin is emptied, an order must be placed for re- supply. The second bin will contain sufficient quantities to last until fresh delivery is made. However, since this is not based on any format analysis of stock usage, it may result in holding too much or too little stock.

**ABC-Analysis model;** Since most organizations maintain different types of materials with different value, minimum attention is devoted to different items with the highest value. The difference involves of the different classes of inventory leads to the inventory control model by importance and exception or ABC analysis. The ABC analysis involves the following:-Classify the items of inventory determining the expected used in units and price per unit for each item, determine the total value of each item by price and units, rank items according to value, and determine Percentage (%) ratio or units of each item to total items and value. Therefore proper ABC analysis leads to better control over materials and consequent reduction in cost associated with materials.

## **2.5 Appropriate tools and Equipment for Inventory Management**

Inventory management solely depends on certain tools and equipment which ensures good and successful inventory management and control. Some of these tools include but not limited to the following; First is the economic order quantity which enables the determination of optimal size of order to place on the basis of demand or usage of the inventory (Bloomberg and Hanna, 2002). The Economic Order Quantity is defined as the order size that will result in the lowest total of order and carrying costs for an item of inventory. They argue that the successful use of the tool of inventory management, certain constraints and assumptions should be considered. They include the assumption that the demand for the materials being drugs, chairs or any other facilities are known. Another assumption of this tool is that sales occur at a constant rate.

However; here, the model or tool may be used for goods that are sold in relatively constant amount throughout the year. Another assumption is that the cost of running goods is ignored or is omitted. This is to say that the tool does not factor into due account cost associated with storage, delays or lost sales. Also, safety stock levels are not factored into account. Safety stock level is the minimum level of inventory that the organization wishes to hold as a protection against running out of goods. Usually, the technique of safety stocks is used to overcome the problems of uncertainty in inventory control and management.

The other tool is the order point formula. Coyle and Bardi (2003) established that this tool tells inventory managers the optimal point at which to reorder a particular item of inventory. The re-order point is the level of inventory at which the firm places an order in the amount of Economic Order Quantity. Here, if the organization which could be a

hospital or an industry places order when the inventory reaches the reorder point, the new materials such as drugs and other materials would arrive before the firm or the organization runs out of materials or goods. Just like what was indicated by Bloomberg and Hanna (2002), this tool of inventory management also come with certain assumptions. They include: the anticipated scarcity of materials, expected price charge, obsolescence risk, government restriction on inventory and the presence of competitive market.

A Study by Sarpong (2012) indicated that all the tools of inventory management provide means for determining an optimal average level of inventory for the firm or the organization under consideration. It is relevant to pinpoint that the tools wok effectively in addition to inventory ratio analysis. These ratios together with the tools help in effective inventory control and management Hopalprishan and Sunderland (1984). The ratios are; inventory to sales ratio, inventory turnover, sales to inventory, inventory to current assets, inventory expressed in terms of number of days sales, sundry creditors to inventory amongst others.

According to Ghosh and Gupta (1979), the inventory to sales ratio determines the variations in the level of investment. The inventory turnover ratio tells the inventory manager the rapidity with which the inventory is turned into receivable through sales. Here, the higher the inventory turnover; the more efficient the management of the organization is in terms of inventory management and control. The sales to inventory ratio also term as the annual net sales per ratio at the end of the fiscal period indicates the volume of sales in relation to the amount of capital invested inventories. Another important ratio is the inventory to current assets ratio. This ratio establishes the amount

of investment in inventory per rupee of current assets investment. Inventories expressed in terms of number of days of sales are also another ratio used in combination of the tools and equipment of inventory management (Hopalprishan and Sunderland (1984). Mathematically, the ratio is expressed as inventory per sales as a product of 365 days (number of days that make up a year). It indicates the size of inventory in terms of number of days-sales. The last ratio to be discussed in the chapter is the sundry creditors to inventory. This important inventory management ratio indicates the extent to which inventories are procured through credit purchases and also explains the extent of inventory procured through cash purchases.

Interestingly, the tools and ratios of inventory control and management are utilized in the organization taking into account the following measures of inventory management. The central objective is to ensure effective and efficient inventory control and management (Alverson, 2003). They are but not limited to the following; first is the size of inventory under consideration. The other measures are apart from the size of inventory itself are the size of raw material, work in progress, stores and spare parts and finished goods inventories. They are very important determinants to ascertain effective inventory management in any establishment under concern.

## **2.6 Conclusion**

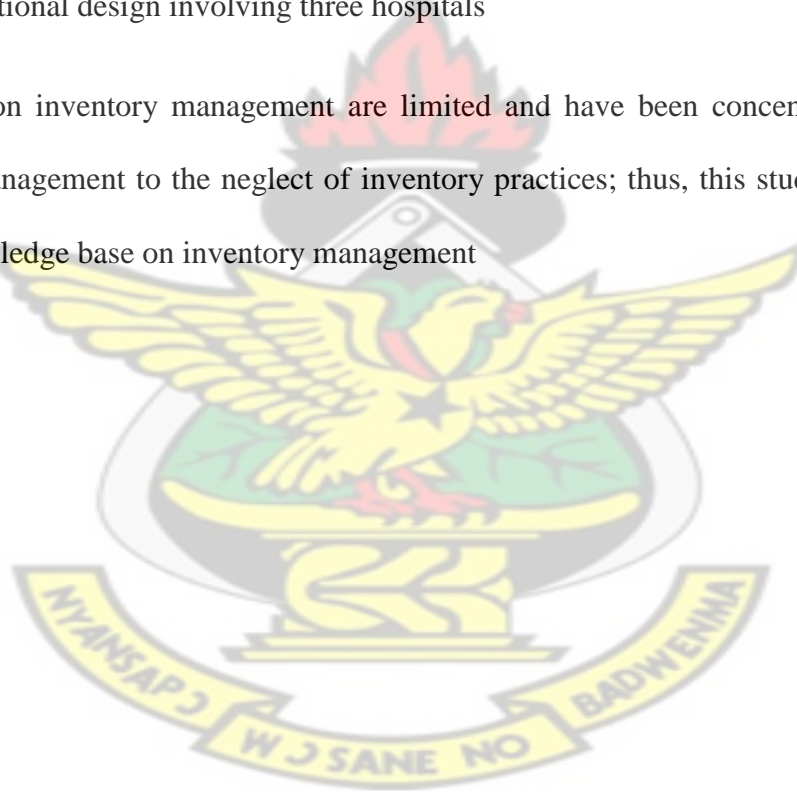
The critical concern for effective inventory management should one of the hall-marks of every organization (Gillerman and Browning; 2000). In fact, inventory management; particularly the health sector and other sensitive organizations such as meat processing companies, food processing organizations and others is very relevant and as such appropriate tools, equipment and other effective inventory management practices need

to be put in place to ensure effective and efficient inventory control and management.

The review has brought to the fore that Available literatures placed emphasis on industry/ factory inventory management to the neglect of hospitals.

The limited studies on hospital inventory management are concentrated on drug inventory management. This study however places emphasis on overall inventory management in the direction of equipment, books, drugs and other materials. Methodologically, most literatures are case studies. This study is however a descriptive cross sectional design involving three hospitals

Studies on inventory management are limited and have been concentrated on supply chain management to the neglect of inventory practices; thus, this study would expand the knowledge base on inventory management



## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter outlines how the study was conducted. The chapter is arranged as follows: Study area, Research design, Target population, Sampling procedure and sample size, Data collection instruments, Pre – testing of questionnaire, and Data analysis and presentation.

#### 3.2 Study Area

The study was conducted in the Afigya Kwabre District. The Afigya Kwabre District Assembly, which is one of the two hundred and sixteen (216) Metropolitan/Municipal/District Assemblies in the Ashanti and Ghana respectively established with Legislative Instrument (L. I) 1885 of 1st November, 2007. It was carved out of the former Kwabre and Afigya Sekyere District Assemblies. The District has Kodie as its capital.

The District is located in the central part of Ashanti Region of Ghana and has an area of about 342.3 square kilometers being 1.44% of the land size of Ashanti Region. The District is bounded by Kumasi Metropolitan Assembly to the South to the North, Offinso Municipal to the west and Kwabre East District to the East and Atwima Nwabiagya to the South-West. According to the 2010 population and housing census, the District has an estimate population of about 136,140 with four (9) settlements attaining the status of urban town, namely; Atimatim, Afrancho, Kyekyewere, Tetrem, Nkukua Buoho, Heman, Ankaase, Ahenkro and Kodie . The

population growth rate is 3.2% which is above the Regional growth rate of 2.9%. The district is divided into 8 area councils. The study is conducted in three hospitals in the Afigya Kwabre District. These are the Family Care hospital, Afrancho Government Hospital and the Ankaase Government Hospital

Family Care Hospital (FCH) is located within Afigya Kwabre district and its sub district is Afrancho. The district was formed in November 2007 from Afigya Sekyere and Kwabre districts. The district capital is Kodie which is 30 minutes' drive from Kumasi and less than 10 minutes' drive to Offinso Municipal Assembly. FCH was established on the 2<sup>nd</sup> of September 2004. FCH is the biggest private hospital and fastest growing hospital in the district. The hospital has as its mission as being able to help their clients regain health and wellbeing, promote, rehabilitate and preserve their health through affordable health care, including all stakeholders.

The vision of the hospital is therefore to be the best private health service provider in the country by 2020, among the best by 2015, and among the best in Ashanti region by 2013. Among the services that the hospital offers include Outpatient Clinic, 24hrs Emergency Service, General Clinical, Reproductive Health, Family Planning practices, Laboratory Services, Surgical, Ultra sonography, Maternity, Dispensary, Nutrition, Maternal and Child health, Electro Cadiogram (ecg).

The Afrancho Hospital started as Community Health Centre in 1985. It was upgraded to become a community hospital in 1989 by the Social Investment Fund. It is located in Afigya Kwabre District Assembly in the Ashanti Region. It is bounded by on the north

by Buoho Township, on the south by Kronum, Krobo on the east and on the west by Bronkong.

The Ministry of Health then started its full operation on 2<sup>nd</sup> August, 1994. The geographical location of the hospital, the road network of the country and the commercial nature in the district make the hospital accessible to all the areas that share boundary with the town and that are further away. It is located on the main highway road of the Northern Region. It is the second largest hospital in the district. The main occupation activities of the residents are trading, farmers with few industries like Breweries, Bams, and Quarry Company. Its mission states that the “Afrancho Health delivery service seeks to provide quality service to meet the needs and expectations of all clients”. The vision of the hospital is to become General Hospital by 2015.

The Methodist Faith Healing Hospital is a non-profit and non-government organization which seeks to provide spiritual and quality health care to all patients in its environment and beyond. The building was dedicated on 24<sup>th</sup> September, 1988 and started treating outpatients from 25<sup>th</sup> March 1991. As its vision, the hospital seeks to become a centre of medical excellence which will restore and maintain the total wellbeing of its patients through preventive, curative and rehabilitative services. The facility also seeks to provide teaching, training opportunities for health care personnel and to carry out medical research work. The mission of the hospital is to make life whole by delivering holistic and quality health care to humanity.

The hospital provides maternity, surgical, chaplaincy, counseling, diagnostics, public health, obstetric and gynecological, mortuary, HIV treatment services and recently

optical and physiotherapy clinics. The facility serves as a referral hospital for the Afigya Kwabre and Kwabre East districts in the Ashanti region

### **3.3 Research Design**

Research design forms the methodological framework of the thesis. All other components of the methodology are chosen based on the design used. The two major forms of research approaches are quantitative and qualitative approaches. A combination of the two designs forms another design called mixed design (triangulation).

While the Quantitative design gathers large amounts of data on participants that and often associated with questionnaires or structured interview schedules, the qualitative design uses is participant specific and in-depth interviews to elicit the opinions of participants to be able to understand their feelings or actions.

It is often associated with unstructured interviews and discussions, and does not require large samples. Triangulation combines both qualitative as well as quantitative designs with an objective to generalize certain views as well as obtain vivid opinions. This research used the triangulation. The research design used in this study was the cross sectional method. This is considered the most appropriate method since it were three units were studied in the Afigya Kwabre District. Young (1960) asserts that case study is a very powerful form off qualitative analysis that involves a careful and complete observation of a unit, in this case the hospitals.

### **3.4 Target Population**

The target population for this study constituted all the staff in the selected hospitals. The total staff strength of the three selected hospitals is 324. This is shown in the table below

**Table 3.1 Population in selected hospitals**

Ankaase Methodist Healing Hospital	123
Family Care Hospital, Mowire	131
Afrancho Government Hospital	70

**Source: Compiled from the profile of the three Hospital's**

### **3.5 Sampling Procedure and Size**

The researcher employed multi- purpose sampling techniques. Purposive sampling was employed to selecting key staffs that were directly related to hospital inventory management. The main assumption underlying the use of the purposive sampling method is sampling with a purpose. Thus, the sampling technique is applied where there is a pre-defined subgroup(s) with particular characteristic(s). The characteristics are that, these institutions all deliver generalized health services and also have departments that are common to each other.

Within the purposed groups, a simple random sampling technique was used to select research participants out of the sub group population.

The researcher proportionally sampled 26, 14, 25 from the Family Care Hospital at Mowire, Afrancho Government hospital and the Ankaase Methodist Faith Healing hospital.

This was in the proportion of 131:123:70. The total sample size for the study will be 65.

### **3.5 Data collection instruments**

The researcher used questionnaire for the collection of data. The questionnaire was both close ended and open ended arranged in accordance with the research objectives. Open –

ended questionnaire was employed where there was the need to allow respondents to provide their own answers to the questions for the purpose of achieving the objectives of the study. In that instance, Face – to – face interviews with the use of questionnaire was the method of data collection.

### **3.6 Pre-testing of questionnaire**

The researcher pre – test the data collection instrument. This was aimed at eliciting any errors, ensure clarity and logical inconsistency. This helped the researcher to eliminate possible challenges before the actual administering of questionnaire was done. In this regard 15 persons were pre-tested in similar hospital at Ahenkro.

### **3.7 Data Analysis and Presentation**

The data was analyzed descriptively with the qualitative data analyzed thematically. Both Univariate and bivariate analyses will be done using The SPSS version 20 software. The data was presented using descriptive statistical tools such as bar charts, figures, and in tables.

### **3.8 Ethical Considerations**

The participation in the study was voluntary and the respondents could withdraw from the study at any time. The researcher duly recognized and acknowledged all necessary authorities refereed to forestall academic thievery and plagiarism. The researcher ensured the anonymity and confidentiality of the information gathered for the study.

## CHAPTER FOUR

### PRESENTATION OF RESULTS AND DISCUSSIONS

#### 4.1 Introduction

This chapter of the study entails the results obtained from the respondents and discussions. Both results and discussions are grouped under the objectives of the study dubbed: techniques of inventory management practices, effectiveness of inventory management practices and appropriateness of equipment and tools for inventory management.

#### 4.2 Results

**Table 4.1: Relationship among Gender of Respondents, their Educational Levels and their Working experience**

Years of experience	respondents	Working	Educational Level of Respondents				Total
			Primary School	Secondary School	Other tertiary	University	
Less than 1 year	Gender of Female		0	0	4	1	5
	Respondent Male		1	1	3	2	7
	Total		1	1	7	3	12
Between 1 and 3 Years	Gender of Female			2	12	4	18
	Respondent Male			1	4	2	7
	Total			3	16	6	25
4 to 7 years	Gender of Female				4	2	6
	Respondent Male				6	1	7
	Total				10	3	13
Above 7 Years	Gender of Female				2	3	5
	Respondent Male				2	2	4
	Total				4	5	9

Source: Author's Construct; 2014

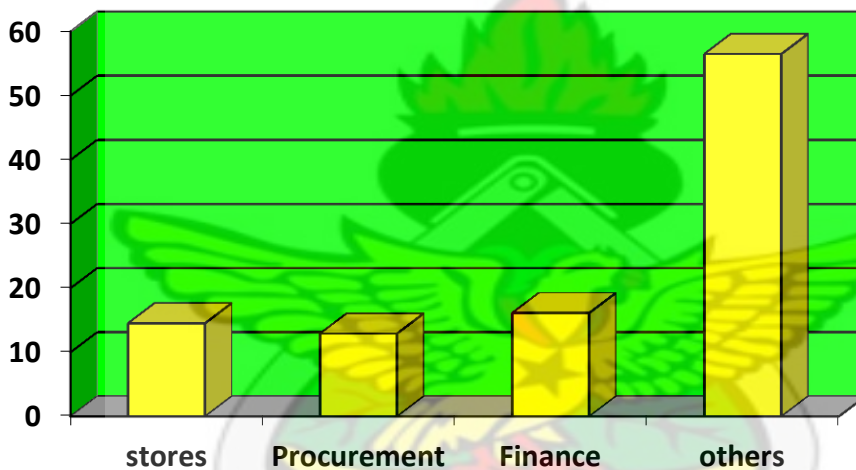
The study investigated into the Gender of respondents, their level of education and their working experiences. As indicated in table 4.1, female respondents who had working experience below one (1) year and had attained tertiary level of education instead university (only one) were four (4). No female respondent with working experience less than one year had attended school up to primary and secondary level of the educational calendar. For males who had less than one working experience, one (1) had primary education, one (1) secondary education, three (3) had attained tertiary education (excluding university) and one (1) had attended university.

The number of females with less than one year working experience were five (5) which is two (2) lower than the number of males (7). In sundry however, the total number of both males and females with less than one (1) working experience were twelve (12).

No male and female with working experience between 1 and 3 years attained education up to the lowest level (primary). Three respondents said they had attained only secondary level of education; two (2) females and one (1) male. Four (4) females had attained university education while two (2) males had also attained university education. A total number of sixteen (16) respondents had attained tertiary education excluding university.

This represents 64% of the total number of respondents within that particular working experience group of 1 and 3 years. Respondents with working experience of 4 to 7 years who said they had attained university education were three (3) while those other tertiary education were ten (10); seven higher than those with university education. None of this group of respondents attended school only up to either primary or secondary education.

The same results in terms of primary and secondary education were obtained for those with working experience above 7 years. However, in terms of university educational attainment; three (3) females and two (2) males were with such educational qualification while four (4) had attended other tertiary education with two (2) being males and the same number being females. The results indicate that as the working experience of respondents goes higher; their level of education also goes higher implying that working experience and education levels are directly related.



**Figure 4.1: Respondents Departments**

**Source; Author's Construct; 2014**

From figure 4.1; one could find that the respondents in the various stores in the hospitals understudy occupy 14.5% of the total number of respondents in the study. This in absolute figure is 9 out of 65 respondents. Respondents in the procurement departments were 8 representing nearly 13%; those in the finance department were 10 (15.4%). Other departments took chunk of the respondents' population. 35 out of 65 were in other departments. This in percentage wise is approximately 57% of the total respondents'

population. Three respondents refused to indicate the department in which they belong to.

#### 4.2.2 Techniques of Inventory Management used

**Table 4.2: Department of the respondent and Whether they understand the term Inventory Management**

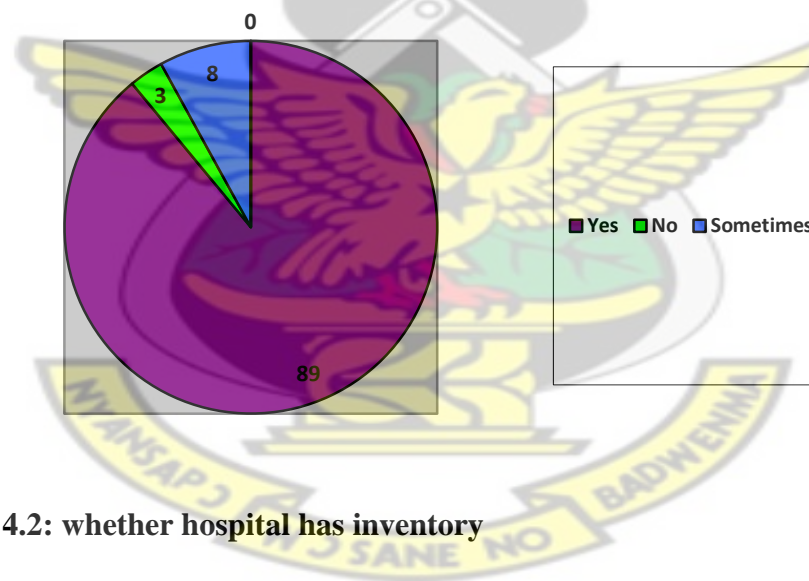
	Whether respondent understand the term Inventory Management			Total
	Yes	No	Somehow	
Stores	8	0	1	9
Department of the Procurement	8	0	0	8
respondent Finance	7	1	2	10
Others	23	2	10	35
Total	46	3	13	62

Source: Author's Construct; 2014

A total number of sixty two respondents replied to this question. A total number of forty six (46) representing 74% said they understand the term “inventory management”. Some explained that the term constituted “*a system put in place for purchases of items by the hospitals*”, “*how best stores can make good use of items so as not go wastes*”, and “*controlling goods in stock*” stock-taking”.

Out of this, eight (8) were store keepers, eight (8) were in the procurement department, seven (7) were in the finance department while twenty three (23) were in other

departments excluding the aforementioned departments. Only three (3) sincerely said they really do not understand what the term means while thirteen (13) indicated they somehow understand the term “inventory management” but not to the fullest as attested by the majority population. All respondents in the various stores and procurement department revealed that they understand the term. In the finance department, only one respondent indicated that he/she does not understand the term while two (2) said they somehow understand the term. The greater number of respondents who foretold that they really understand the term made the study easier for the researcher since the researcher did not have to go the extra mile to explain the term to his study audience



**Figure 4.2: whether hospital has inventory**

**Source: Author’s Construct; 2014**

Figure 4.2 indicates the results obtained when the respondents in the various hospitals were interviewed. 89% of the respondents established that their hospitals practice inventory. This represented 57 out of the total sum of 65 respondents. Only two (2)

respondents said the hospitals they worked for do not practice inventory. This represents approximately 8% of the total respondents' population. Five (5) respondents indicated that somehow their hospitals practice inventory representing 7.8% of the total number of respondents.

Fifty two (52) respondents further revealed that their hospitals track inventory while six (6) indicated they their hospitals do not track any inventory. This represents 9.4% of the total respondents. Six respondents also affirmed that the hospitals somehow track inventory.

**Table 4.3: Whether hospital has an inventory management policy**

	Frequency	Percent
Yes	46	74.2
No	7	11.3
Sometimes	9	14.5
Total	62	100.0

**Source: Author's Construct; 2014**

The study examined the views of the respondents as to whether they have inventory management policy in their respective hospitals. The mean mark obtained from the results was 1.40 with 46 (74.2%) respondents attesting that their respective hospitals have inventory policy to guide overall processes of inventory in the hospital. Seven (7) respondents representing only 11.3% said no while nine (9) indicated that somehow there is an inventory policy in their hospitals.

**Table 4.4: Whether hospital has an inventory management policy and the nature of inventory management policies used**

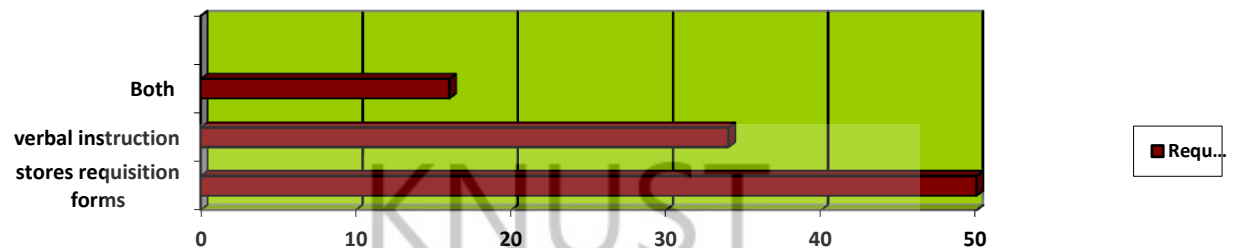
	The nature of inventory management policies used in the hospitals				Total
	Centralized	Decentralized	Both centralized and Decentralized	None	
Whether hospital Yes	30	7	8	0	45
has an inventory No	0	0	0	1	1
management policy Sometimes	6	1	1	0	8
Total	36	8	9	1	54

Source: Author's Construct; 2014

The study attempted to establish a relationship between the existence of inventory management policy and the nature of inventory policies used. Thirty (30) out of forty five (45) respondents who indicated that their hospitals have inventory management policy ascertained that they practice the centralize system of inventory management while only seven (7) indicated that they practice decentralized system of inventory management. None of this category of respondents indicated that they practice dual system (both centralized and decentralized). However, respondents who indicated that sometimes their hospitals has inventory management policy indicated that they practice centralized (6), decentralized (1) and both (1).

Respondents were further asked as to whether space cost increases as inventory levels rise and vice versa in the hospital. Here, 16 out of the 65 indicated that it is true at all times, 29 respondents said it is sometimes true. This represented nearly 45% of the total

number of respondents. 26.2% said it is not at all true that space cost increases as inventory levels rise.



**Figure 4.3: How user department in the hospital request for Goods from stores department**

**Source: Author's Construct; 2014**

Figure 4.3 shows how user department in the hospital request for goods from stores department. In terms of the use of requisition form, 32 attested that they adopt such approach. 22 respondents said they use the verbal instruction approach to request for goods from the stores department (34.4%) while 10 out of 65 respondents said they use both requisition form and verbal instruction depending on the circumstances at hand. This represented 15.6% of the total number of respondents. As to whether hospitals use par levels for inventory items, 33(51%) out of 65 gave the answer “yes” while five (5) gave the answer “no” representing 8.1%. 24 respondents indicated that sometimes they use par levels for inventory levels but not in all cases. This number represented almost 39% of the total sampled population in the study.

As to whether serial levels are used on inventory items at hospitals, 49.2% (31/65) said “yes” while 11.1% (7/65) said “no”. 25 respondents (39.7%) said sometimes they use serial levels but not in all cases. Again, as to whether the hospitals track inventory that are perishable, 19 respondents said “sometimes”, 12 said “no” while 30 gave “yes” as the answer.

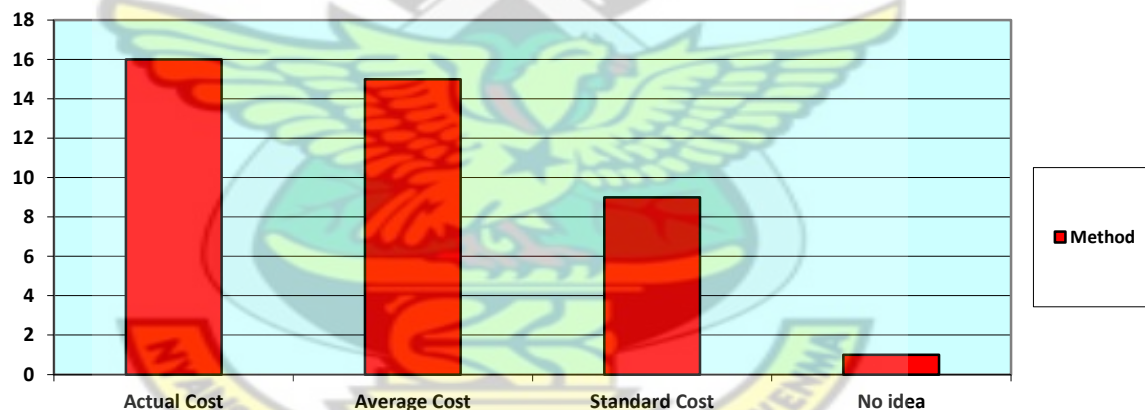
#### ***4.2.3: Discussions on Techniques of inventory management used***

The term inventory is understood by large number of the respondents. This implies that the essence of effective inventory management has been accorded by many of the respondents (Fox and Taylor; 2003). Understanding inventory and knowing its relevance has also be ascertained by Alverson (2003) and Baumer (2004) in their respective studies. Many hospitals in the study practice hospitals affirmed their knowledge of inventory management at least of a sort; implying that if these hospitals should effectively practice inventory management, they are likely to reap the benefits of inventory as attested by Sarpong (2012) as to minimize cost and to maximize service level by balancing demand and supply. Most respondents confirmed that they practice the ABC approach of inventory management.

This method according to Coyle and Bardi (2003) is based on the principle that a small portion of the items may typically represent the bulk of money value of the total inventory used in the production process, while a relatively large number of items may be from a small part of the money value of stores. The use of ABC approach is also acknowledged by Bloomberg et al., (2008) and Manhas (2012). Not only do the hospitals practice inventory but they also have policy to guide and control staff with the

processes of inventory. This could help the hospitals to reap the benefits of inventory Thawani(2007). The study's results show that inventory management policies are rather centralized instead of decentralization which would allow other staff members to provide the needed inputs in terms of policy guidelines to guide inventory management in the various hospitals. In terms of the request for goods under the inventory practices of the various hospitals in the study, the use of requisition forms dominates instead of verbal instruction or both. This poses some challenges to sub department in terms of being under-stocked or over stocked with their specific departments or units as directives have to be given from superiors

#### ***4.3 Effectiveness of inventory management practice***



**Figure 4.4: Method use for inventory pricing within hospital.**

**Author's Construct; 2014**

Forty one (41) health workers responded to this question. Thus, the response rate was 63.1% in respect of this variable. The common method used for inventory pricing as affirmed by most respondents (16/41) representing 39% is the use of the actual cost method. This was followed by the average cost method (15) recording a percentage of

nearly 37 which is only 2% lower than the majority. 9 said they use the standard cost method (22%) while one person said he/she has no idea regarding the method used for the pricing. This was only 2.4% of the number of respondents who answered the question posed by the researcher.

**Table 4.5: How often hospital user department request goods from the storehouse and the authorization person to sign for the issue of goods in the stores department in the hospital**

		The authorization person to sign for the issue of goods in the stores department in the hospital				Total
		<i>Stores personnel</i>	<i>Procurement Manager</i>	<i>Sales Manager</i>	<i>Any other</i>	
How often hospital user department request goods from the storehouse Total	<b>Daily</b>	11	3	0	0	14
	<b>Weekly</b>	9	6	0	0	15
	<b>As when the need arise</b>	23	8	1	3	35
		43	17	1	3	64

**Source: Author's Construct; 2014**

Table 4.5 shows the results for cross tabulation between how often hospital request goods from the storehouse and the authorization of person to sign for the issue of the goods in the stores department in the various hospitals. In terms of daily basis, store personnel serving as authorization persons were eleven (11) and procurement managers were three (3). On weekly basis, store personnel still dominate in terms of persons to authorized the goods with a population of nine (9), followed by procurement managers of six (6). In case of as and when the need arises, store personnel were twenty three (23), procurement managers were eight (8) and one (1) sales manager. Any other personnel apart from the aforementioned were three (3). The total number of stores personnel who authorize goods in the store departments are forty three (43), followed by procurement

officers of seventeen (17), any other personnel of three (3) and one (1) sales manager.

Personnel who authorize on daily basis are fourteen (14), weekly basis are fifteen (15)

and as and when the need arises are thirty five (35).

**Table 4.6: Whether the hospital embarks on stocktaking, how often stocktaking is conducted at the hospital and how goods are received at the stores in the hospital**

How goods are received at the stores in the hospital			How often stocktaking is conducted at the hospital			Total
			Monthly	Quarterly	Yearly	
Checking for quantity	Whether the hospital embarks on stocktaking	Yes	11	6	3	20
		No	2	1	0	3
		Sometimes	1	0	1	2
	Total		14	7	4	25
Checking for the source	Whether the hospital embarks on stocktaking	Yes	6	2	1	9
	Total		6	2	1	9
	Whether the hospital embarks on stocktaking	Yes	5	3	2	10
Physical counting	Whether the hospital embarks on stocktaking	No	1	1	0	2
	Total		6	4	2	12
	Whether the hospital embarks on stocktaking	Yes	2	2	1	5
By examination/Observation	Whether the hospital embarks on stocktaking	No	0	1	0	1
	Total		2	3	1	6
	Whether the hospital embarks on stocktaking	Yes		1		1
None of the above	Total			1		1
	Whether the hospital embarks on stocktaking	Yes		1	1	2
All	Total			1	1	2
	Whether the hospital embarks on stocktaking	Yes	24	15	8	47
Total	Whether the hospital embarks on stocktaking	No	3	3	0	6
		Sometimes	1	0	1	2
	Total		28	18	9	55

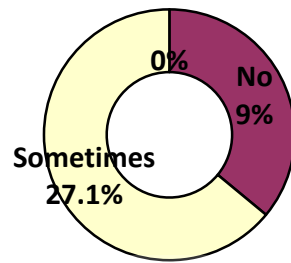
Source: Author's Construct; 2014

The study also considered a cross-tabulation among three variables dubbed: stock-taking, how often it is been embarked by hospitals and how goods are received at stores in the hospital.

Results as indicated in table 4.6 reveal that 11 respondents indicated that stock is taking on monthly basis. This same number said their hospitals embark on stock taking. They also indicated that the hospitals check for quality. On the same platform, 2 said “no” and 1 said “sometimes”. They also admitted that the hospital check for quality of goods. 6 respondents who said their hospitals check for quality said stock taking is rather conducted on quarterly basis instead of monthly basis while 3 said it is on yearly basis.

Another set of respondents claimed that hospitals check for the source of goods. Of this number, six (6) said stock is taking on monthly basis, 2 said on quarterly basis while 1 said annual basis.

In terms of physical counting of the goods, 5 said stock is taking on monthly basis, 3 said it is rather on quarterly basis while 2 said it is on annual basis. They all admitted that stock is taking in their hospitals. The total number of respondents who said stock is taking on monthly basis were 28, 18 said quarterly basis rather while 9 said yearly basis. The number of respondents who retorted to this question was 55 out of the total number of 65.



**Figure 4.5: whether items at the store are coded**

**Source: Author's Construct; 2014**

Thirty four (34) participants representing 58% of the study population said the items at the stores were coded while 15.3% (9/65) hold a view of otherwise. 16 respondents said sometimes items are coded but not in all case. This represents 27.1% of the total number of respondents.

Respondents further indicated the kind of system they use for data collection for inventory. Here, 26/65 said they use the bar code system, 19 said they use the electronic system while 5 indicated other systems rather than the two which have been mentioned. 15 respondents gave no answer for such variable. In terms of the view that stores have fixed place of location, 80% said “yes”, 12% said “no” and 8% said “sometimes”, response level was rather 60 out of 65 respondents in the study.

#### ***4.3.1 Discussion on Effectiveness of inventory management practices at the hospital***

The main method used for inventory pricing is the actual cost method. Average cost and standard cost are somehow practice in the various hospitals. Departments request for goods mostly when the need for such goods arises. This findings corroborates with that

of Ashok (2013) who opines is very important since inadequate inventory adversely affects smooth running of the concerned institutions, whereas excess of it would involve extra cost; thus, the need to request for goods only when the need for such goods arises.

Store personnel are mostly the authorization personnel to sign for the issue of goods in the hospitals. Hospitals basically embark on stock taking with stock taking usually conducted on monthly basis. In terms of stock taking, emphasis is placed on the roles of key actors or staff so as to ensure effectiveness of inventory management in the various health care facilities (Burns, 2002). Items used in the various hospitals are coded as ascertained by many respondents. This makes inventory management very easy and straight forward.

#### ***4.4 Appropriateness of equipment and tools that is use at store***

**Table 4.7: Whether respondents have identified par levels for inventory, whether hospital use reorder quantities for inventory items and whether hospital track inventory by Agency Cross tabulation**

Whether hospital track inventory by Agency			Whether hospital use reorder quantities for inventory items			Total
			Yes	No	Sometimes	
Yes	Whether respondents	Yes	5	1	0	6
	have identified par	No	0	1	0	1
	levels for inventory	Sometimes	0	0	1	1
	Total		5	2	1	8
No	Whether respondents	No	2			2
	have identified par	Sometimes	1			1
	Total		3			3
Total	Whether respondents	Yes	5	1	0	6
	have identified par	No	2	1	0	3
	levels for inventory	Sometimes	1	0	1	2
	Total		8	2	1	11

**Source: Author's Construct; 2014**

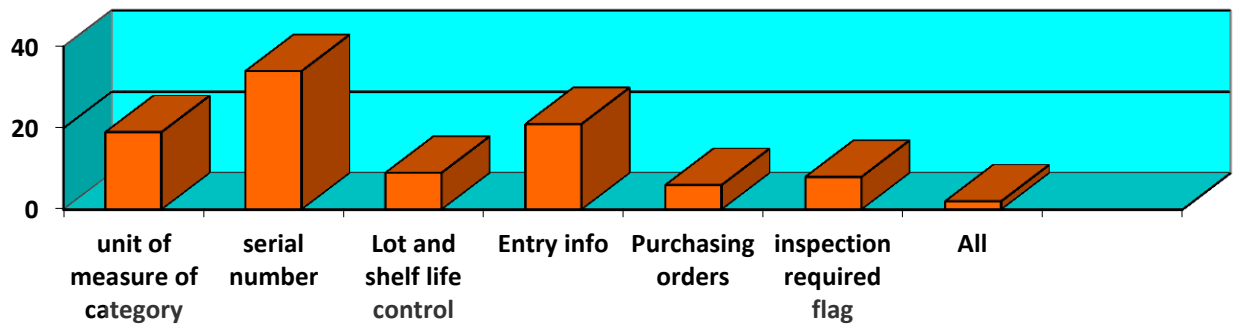
In terms of whether respondents have identified par levels for inventory; 6 said “yes” while 1 said “no”, 1 gave the answer “sometimes”, of the number who said “yes”, 5 agreed that their hospitals use re-order quantities, 1 said his/ her hospital does not use any re-order quantities for inventory. 8 of the respondents agreed that their hospital track inventory by agency while 6 said “no”.

**Table 4.8: Whether hospital track inventory by both Facility and Agency and whether hospital has consigned inventory Cross tabulation**

	Whether hospital has consigned inventory			Total
	Yes	No	Sometimes	
Whether hospital track inventory by both Facility and Agency				
Yes	11	3	3	17
No	1	1	0	2
<b>Total</b>	<b>12</b>	<b>4</b>	<b>3</b>	<b>19</b>

**Source: Author's Construct; 2014**

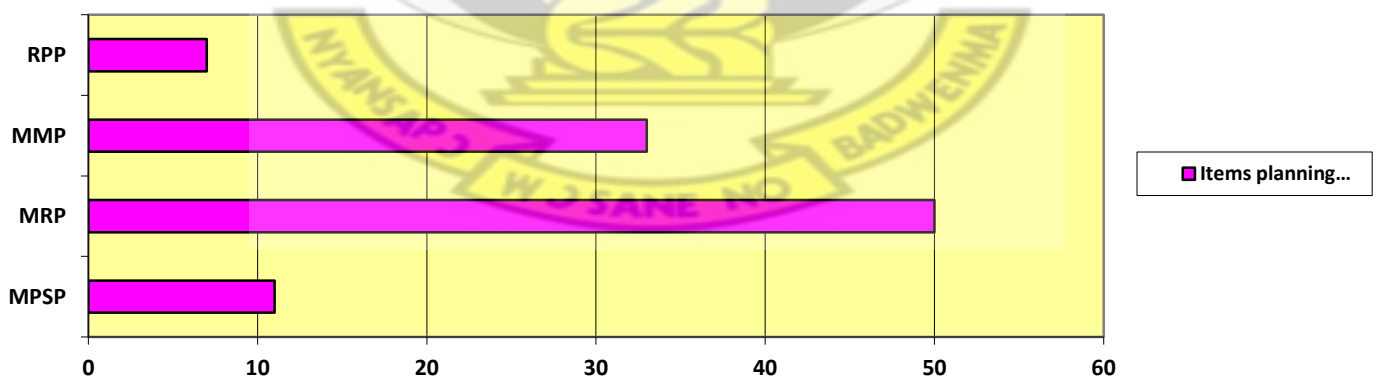
A total number of 17 respondents indicated that their hospitals track inventory by both facility and agency. The knowledge variation on how the hospital tracks inventory relates to the different categories of inventory that is managed in the hospitals and the unsystematized nature of inventory management in the hospitals. Of this number, 11 said their hospitals have consigned inventory while 3 said “no”, 3 respondents said “sometimes”, only 2 respondents said their hospitals do not track inventory at both facility and agency. With this number of respondents, 1 said his/her hospital has consigned inventory while 1 said otherwise.



Source: Author's Construct; 2014

**Figure 4.6: Basic Information recorded about items description during inventory.**

The number of respondents who attested to the unit of measure category was 10 representing 19% of total respondents. Serial number recorded the highest number of 18 representing 34%. Only 5 respondents affirmed to lot and shelf life control while 11 said the basic information about items was the shipping and order. Those who affirmed to entry information, purchasing orders, inspections required flag and all the above description were 3, 4, 1 and 1 accordingly.



**Figure 4.7: Items Planning Methods used in hospitals**

Source: Author's Construct; 2014

Figure 4.7 shows the items planning methods used in the various hospitals under study. 5 respondents said their hospitals use the master production schedule planning method. This represents 8% of the total number of respondents. Interestingly, 23 respondents representing 50% said they use the material requirements planning, 15 respondents said they use Min-Max Planning (MMP). This represents 33% of the total respondents' population. Only 3 indicated that they use the reorder point planning (RPP) method of item planning. This represents 7% of the total number of respondents in the study.

**Table 4.9: Whether hospital keeps track of order cost and carrying cost**

	Frequency	Percent
Yes	33	68.8
No	2	4.2
Sometimes	13	27.1
Total	48	100.0

**Source: Author's Construct; 2014**

Table 4.9 shows the opinions of respondents with regards to whether the hospitals keep track of order and carrying cost. Here, 33 representing 68.8% indicated that hospitals indeed keep track of order cost and carrying cost. 2 respondents (4.2%) however hold a contrary view.

**Table 4.10: Whether purchase requisition are automatically generated to maintain optimal inventory levels**

	Frequency	Percent
Yes	21	40.4
No	13	25.0
Sometimes	18	34.6
Total	52	100.0

**Source: Author's Construct; 2014**

A total number of 52 respondents showed their views with regard to whether purchase requisitions are automatically generated to maintain optimal inventory levels. 21/52 revealed that there is optimal purchase requisition to maintain optimal inventory levels in their hospitals. This represented 40.4% of the total respondents who replied to this question. 13 respondents (25%) however said there are no purchase requisitions to maintain optimal inventory levels in their hospitals. 18 (34.6%) said sometimes there are purchase requisitions to maintain inventory levels.

**Table 4.11: Whether the hospital generate forecast based on service level**

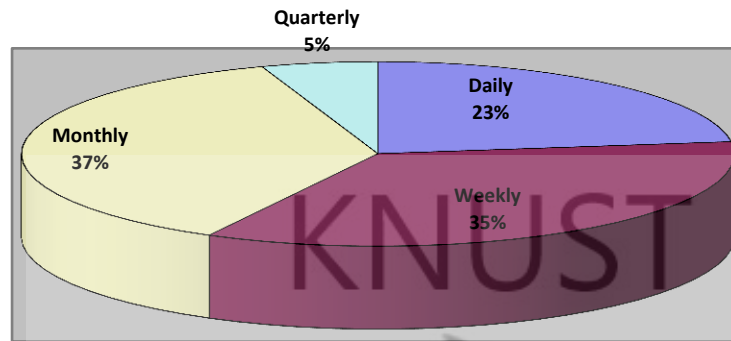
	Frequency	Percent
Yes	26	44.1
No	10	16.9
Sometimes	23	39.0
Total	59	100.0

**Source: Author's Construct; 2014**

In terms of whether the hospital generate forecast based on service level; 26 respondents said “yes” while 10 gave the answer “no”. 23 which are only three lower than the majority group said sometime hospital generate forecast based on service level. Respondents’ opinions were seek as to whether hospital generate forecast based on alpha factor and as to whether hospital use trend model in generating forecast.

20 (36%) said hospital generate forecast based on alpha factor while 10 said that hospitals do not generate forecast based on alpha factor (18%) who constitute 25 respondents said it depends since sometimes hospital adopt forecast base and in some cases they do not. As to whether hospital use trend model in generating forecast, 17 said “yes” while 8 said “no”. Majority of the respondents (30) said “sometimes”. finally, in

the direction of whether hospital use seasonally model, 38% gave the answer “yes”; 22% gave the answer “no” while 40% said “sometimes”.



**Figure 4.8: how frequent physical inventory is performed**

**Source: Author’s Construct; 2014**

In the direction of the frequency of how physical inventory is performed in the study hospitals, 13 gave daily as the answer (23%), 20 said weekly (35%), 21 said monthly (37%) while 3 gave quarterly as the answer (5%).

Respondents’ views were solicited as to whether Activity Based Cost (ABC) is assigned to inventory items. Here majority (25) said not in all cases but sometimes their respective hospitals do assigned ABC to inventory items. 24 (41.4%) said their hospitals adopt the ABC technique while 9 (16%) said “no” in terms of the use of the ABC technique.

The dominant inventory report demanded by management is the control reports (23 attested to it). This is followed with the management a reports (14) and finally transaction reports (11).



**Figure 4.9: Overall rating of inventory management policies in the studied hospitals.**

**Source: Author's Construct; 2014**

Large number of respondents indicated that inventory policies are moderately managed by the various hospitals (43 representing 81%). This was followed by the opinion that inventory policies are effectively managed (9 representing 17%) while only one (1) person said in terms of overall rating, he/she thinks inventory policies are poorly managed (approximately 2%).

#### ***4.4.1 : Discussion :The appropriateness of equipment and tools that are used***

Hospitals usually track inventory by agency and have adopted the reorder quantities for inventory items as ascertained by many of the respondents. The relevance of the Reorder quantities and inventory levels has been proved by Peter and Watterman (1998). Most of the hospitals have consigned inventory while some track inventory not only by agency but also with facility. The major item planning method used is the material

requirement planning which according to Hellen (1993) is mostly used in manufacturing firms instead of hospitals; this is followed by Min-Max Planning. To identify hospitals to be using the material requirement planning is quite contrasting as the general item planning method used in hospitals has to do within Min-Max planning or the reorder point planning. The findings possible suggest that staffs of the various hospitals and even most procurement officers are not familiar with what constitute an item planning method theoretically. This explanation emanates from the fact that few persons managing the various procurement outfits had qualifications in procurement or had had ample knowledge in procurement practice.

Others practice master production schedule planning while minute number of hospitals adopt the reorder point planning method. Hospitals in this study basically adopt track order costs and carrying cost of inventory, generate forecast based on service and undertake frequent physical inventory. All these practices help to determine optimal size of order to place on the basis of demand or usage of the inventory (Bloomberg and Hanna, 2002). In terms of overall rating, greater number indicated moderate management of inventory in their hospitals. This calls for effective policy measures to help improve inventory management practices in the various hospitals in the study

## CHAPTER FIVE

### SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

#### 5.1 Introduction

This is the final chapter of the study. Here, the findings especially the novel ones are summarized to facilitate in the easy understanding and appreciation of the whole study. Recommendations as well as the conclusion of the study would be provided in this chapter. The key findings are grouped under the various objectives of the study likewise the manner in which the results of the study were presented.

#### 5.2 Summary of findings

##### *5.2.1 Techniques of inventory management used*

- Greater number of respondents 74.1% (46/62) of staff including procurement officers understands the term “inventory management”. Only one (1) finance officer did not really understand what the term means.
- Majority of the respondents (57/65) representing 89% indicated that their hospitals practice inventory. Most of the staffs were in the known of the availability of inventory management policy to serve as a driver for the overall processes of inventory management. This is acknowledged by 74.2% of respondents (46/62 responses).
- Though there is the existence of policy for inventory management; many (30) indicated that the nature of the policies used is rather centralized to management. Lower grade staffs are not given the node to participate in terms of decision

making of inventory management; though some (only 7) revealed that they practice decentralization system as the nature of their policies.

- The use of formal means (requisition forms that need to be filled) in terms of the request for goods dominate 49.2%(32/65), though verbal instruction is somehow employed during securing goods and services in the studied hospitals (22 attested to it).

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### ***5.2.2 Effectiveness of inventory management practices***

- Actual cost of inventory pricing remains the commonest pricing method employed by many hospitals in inventory management processes .This was affirmed by 63.1% of staff.
- Department request for goods mostly when the need arises (23) for such goods with store personnel (43) being the main authorizing staff to sign for the issue of goods in the various stores in the hospitals understudy.
- 58% of the respondents claimed that items at the various stores are coded for easy identification and for regular checks on them.
- 80% of the respondents further claimed that stores have fixed locations in their hospitals with proper ventilation systems

### ***5.2.3 Appropriateness of tools and equipment for inventory management practices***

- Majority of the respondents (5 out of 6 who were recorded) said hospitals have identified par levels of inventory indicated that the hospitals use re-order quantities for inventory items.

- Again, greater number of 11 out of 17 who were recorded indicated that hospitals track inventory by both facility and agency and have consigned inventory also.
- The basic information recorded about items descriptions during inventory is the use of serial number (18). This was followed by unit of measurement category (10).
- The main item planning used in the various hospitals is the material requirement planning (23 respondents). Most respondents (33) further indicated that hospitals keep track of order cost and carrying cost.
- Physical inventory is mostly practiced on monthly basis (37%) followed by weekly basis (35%), daily basis (23%) and finally quarterly basis (5%). The dominant inventory report demanded by management is the control reports. This was attested to by 23.
- In all, the rating respondents gave to their inventory management is moderate score (81%). This calls for improvement in inventory management in the various hospitals.
- The major Challenges associated with inventory management at the hospitals were the fact that inventories were not taken regularly, expiration of drug and medicine because stocks are not taken on time and some drugs also get short in demand. There are challenges associated with inaccurate level of inventory management. The delay of request continue to pose a major challenge. Record-keeping constitute a challenge as important entries are sometimes ignored. There

are problems with over-supply. Moreover material prices do not reflect market prices.

#### **5. 4 Recommendations**

1. It is recommended that the Public Procurement Authority strengthens its supervisory role to ensure that public hospitals really procure goods within the required time frame. This demands that all bottlenecks in the tendering process and the procurement are removed so as to ensure timely delivery of hospitals goods and equipment to avoid shortages.

2. The researcher recommends that inventory management policies and procedures be decentralized to make room for hospital staff who are at the bottom of the administration structure and are directly engaged in the day to day inventory management process to make their input to inform management about procurement decisions

3. Management must ensure that all demands are made through requisition through stores as verbal instruction sometimes causes difficulties I managing inventory effectively.

4. It is recommended that hospitals procure software's for online procurement of goods and equipments. This will reduce the burden of managing inventory manually. The application of a networked inventory management system will improve the records system at not only the stores but also other departments

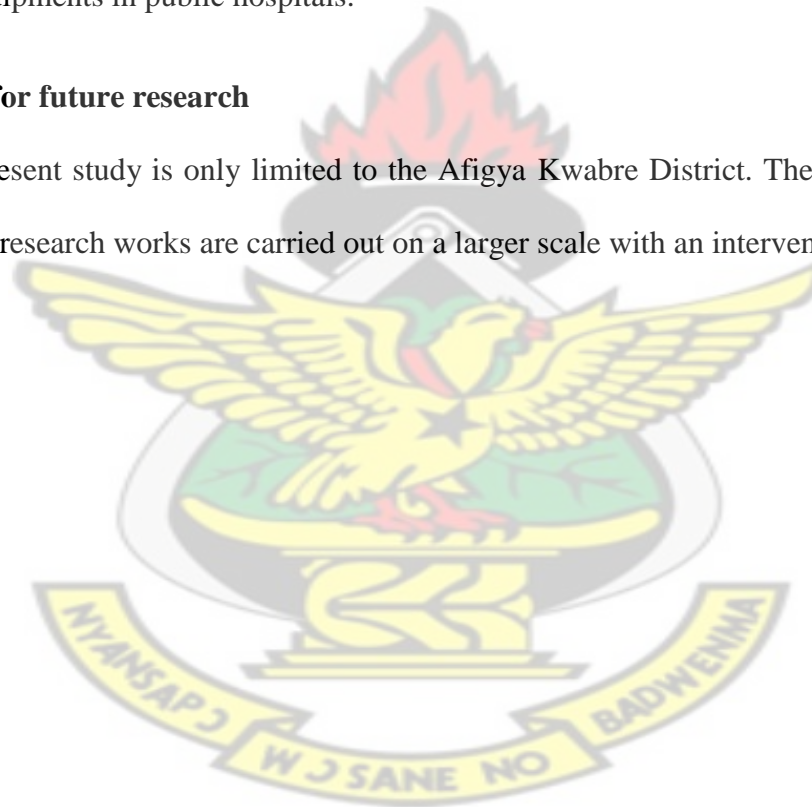
It is further recommended that periodic training be conducted for all staff directly related to inventory management. This can even reduce the tendency to recruit from external when procurement unit become vacant

## **Conclusion**

This study has identified the tools and techniques used in the public hospitals in managing inventory. The findings of the study provide hospital managers the opportunity to know how effective their inventory management techniques are, how appropriate they are and the challenges associated effective inventory management. Hospital administrators have to pay attention to training of their staff, periodic stock-taking as well as managing inventory effectively to ensure optimum provision of goods and equipments in public hospitals.

## **Areas for future research**

This present study is only limited to the Afigya Kwabre District. The researcher hopes similar research works are carried out on a larger scale with an intervention study.



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## APPENDICES 1.

### KWAME NKURMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY COLLEGE OF ARCHITECTURE AND PLANNING DEPARTMENT OF BUILDING TECHNOLOGY

I am Eric Yaw Owusu, a postgraduate Msc. Procurement Management student at the above named University carrying out a study at this hospital. ***This study aims at exploring the effectiveness of inventory management practices at hospitals.*** Please be assured that the responses provided will be kept confidential.

*Thank you in advance*

#### **SECTION A: BIOGRAPHIC DATA**

*(N.B Answer by Ticking where applicable)*

1. Gender

(a). Female ☐

(b). Male ☐

2. Age

(a) Below 21 ☐

(b) 21-30 ☐

(c) 31-40 ☐

(d) 41& above ☐

3. Education Level

(a) Primary ☐

(b) Secondary ☐

(c) Tertiary ☐

(d) University ☐

(e) Others (Specify) -----

4. Years of Working in this hospital

(a) Less than 1 year ☐

(b) Between 1 and 3yrs ☐

(c) 4 to 7years ☐

(d) Above 7 years ☐

5. Position held in the hospital

-----

6. Please state your department

a. Stores ☐ b. Procurement ☐ c. Finance ☐ d. Administration ☐

e. Others ☐ Please Specify.....

**SECTION B: TECHNIQUES OF INVENTORY MANAGEMENT USED**

7. Do you understand the term inventory management?

(a) Yes ☐

(b) No ☐

(c). Somehow ☐

8. What is your understanding of inventory management?

.....  
.....  
.....

9. Does your hospital have inventory?

(a) Yes

☐

(b) No

☐

(c). Sometimes

☐

10. What are the kinds of inventories that are managed at this hospital?

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-----  
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11. List the methods used by this hospital in managing the inventories.

-----  
-----  
-----

12. Does your hospital track any inventory currently?

(a) Yes ☐

(b) No ☐

(c). Sometimes ☐

13. How many inventory items does your hospital currently track?

.....  
.....

14. If you track inventory items how are you adding them to the system?

- a. Manually ☐ b. Online ☐ c. through a data feed from another software application ☐ database ☐ d. Others ☐ Please specify.....

15. Does this hospital have any inventory management policy?

- a) Yes ☐ b. No ☐ (c). Sometimes ☐

If yes, what type?

- a) Centralized ☒  
b) Decentralized ☐  
c) Both ☐  
d) None ☐

16. Storage space cost increase as inventory levels rise and vice versa in this hospital

- a) True At all time ☐ b. Sometimes true ☐ c. Not at all true ☐

17. How does the user department request goods from the stores department in this hospital?

- a) Through store requisition form ☐ By verbal instruction ☐  
b) Both by requisition and verbal instruction ☐  
c) Other, please specify.....

18. List the inventory types that are currently stored by your agency (i.e. Fuel, bulk, automotive supplies, etc.).

.....  
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### **SECTION C: EFFECTIVENESS OF INVENTORY MANAGEMENT PRACTICES**

#### **AT THE HOSPITAL:**

19. Do you use par levels (a fixed quantity of an item that must be kept on hand to support operations) for inventory items?

(a) Yes ☐ (b) No ☐ (c).  
Sometimes ☐

b. Are Serial Numbers used on inventory items?

(a) Yes ☐ (b) No ☐ (c).  
Sometimes ☐

20. Does your agency track inventory items that are perishable?

(a) Yes ☐ (b) No ☐ (c).  
Sometimes ☐

21. Define the method used for inventory pricing within this hospital (actual cost, average cost, standard cost).

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22. How often does the user department request goods from the storehouse?

a) Daily ☐ b. Weekly ☐ c. As when the need arise ☐

23. Who has the authority to sign for issue of goods in the stores department?

a) Stores personnel ☐ b. Procurement manager ☐ c. Sales manager ☐  
d) Any other, specify.....  
e)

24. Does the hospital embark on stocktaking?

(a) Yes ☐ (b) No ☐ (c).  
Sometimes ☐

25. If yes to **Q24**, how often is it conducted?

a) Monthly ☐ b. Quarterly ☐ c. Yearly ☐ d. Any other,  
specify.....

26. How are goods received at the storehouse?(Multiple response possible.)

a) Checking for quantity ☐ b. Checking for the source ☐

- c) Physical counting ☐ d. By examination/observation  
 e) None of the above ☐ e. Others ☐ Please

Specify.....

27. Are the items in the store coded?

- (a) Yes ☐ (b) No ☐ (c)  
 Sometimes ☐

28. Does each item has its fixed place of location?

- (a) Yes ☐ (b) No ☐ (c)  
 Sometimes ☐

**SECTION D: THE APPROPRIATENESS OF EQUIPMENT AND TOOLS THAT IS USE AT THE STORE IN THE VARIOUS HOSPITAL**

29. Describe the internal policies that must be considered regarding Inventory purchasing or processing.

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30. Describe how the hospital's storage facilities are designed/setup.

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31. Does your hospital use a bar code system or an electronic data collection system?

- a. Bar code system ☐ b. Electronic data collection system. ☐  
 c. Other ☐ Specify .....

32. Describe the procedures used for replenishing inventory.

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33. Have you identified par levels for your inventory? (How much inventory you should keep in stock.)

(a) Yes ☐

(b) No ☐

(c)

Sometimes ☐

34. Do you use reorder quantities for inventory items? (This determines the stock-keeping inventory level at which you launch a replenishment order.

(a) Yes ☐

(b) No ☐

(c)

Sometimes ☐

35. Does this hospital track your inventory by

a. Facility (locations) (a) Yes ☐

(b) No ☐

b. Agency (a) Yes ☐

(b) No ☐

c. By both Facility and Agency (b) Yeas ☐

(b) No ☐

d. Not applicable (a) Yes ☐

(b) No ☐

36. Do you have Consigned Inventory

(a) Yes ☐

(b) No ☐

(c)

Sometimes ☐

37. What basic information do you record about items description. (Multiple options possible)

- a. Unit of measure category [ ☐ ] b. Serial number [ ☐ ] c. Lot and shelf life control [ ☐ ] d. Receiving location [ ☐ ] e. Inspection required flag [ ☐ ]
- f. Shipping and order [ ☐ ] f. Entry information [ ☐ ] g. Purchasing information [ ☐ ]

g.

Others.....

38. What item planning methods does this hospital use

- a. Master production schedule (MPS) planning [    ]    b. material requirements planning (MRP) [    ]    c. Min-max planning (minimum quantity at which to reorder and maximum quantity to maintain in inventory) [    ]    d. Reorder point planning [    ]    e. Other [    ] specify.....

b. How do you keep track of lead time required to procure at your unit

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40. Do you keep track of order costs and carrying costs for items?

- (a) Yes ☐    (b) No ☐    (c)  
Sometimes ☐

41. Are purchase requisitions automatically generated to maintain optimal inventory levels?

- (a) Yes ☐    (b) No ☐    (c)  
Sometimes ☐

41b. How does your unit calculate demand history based on past transactions to perform forecasting?

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42. Does your outfit generate forecast based on any of the following factors?

**a.** Service level (probability that an order can be filled immediately from available inventory)

(a) Yes ☐ (b) No ☐ (c)  
Sometimes ☐

**b.** Alpha factor (to smooth demand across periods)

(a) Yes ☐ (b) No ☐ (c)  
Sometimes ☐

**c.** Trend model (smooth on upward or downward trend in demand based on a specified trend factor)

(a) Yes ☐ (b) No ☐ (c)  
Sometimes ☐

**d.** Seasonality model (based on seasonal adjustments)

(a) Yes ☐ (b) No ☐ (c)  
Sometimes ☐

43. How frequently do you perform Physical Inventory?

a. Daily [ ] b. Weekly [ ] c. Monthly [ ] d. Quarterly  
[ ]  
e. Mid-yearly [ ] f. Annually [ ]

44. Do you assign ABC (activity based costing) classes to inventory items?

(a) Yes ☐ (b) No ☐ (c)  
Sometimes ☐

45. What types of inventory reports does management demand or require (**Multiple options possible**)

- a. Transaction reports [    ]   b. Management reports (on-hand, planning, accuracy, status) [    ]   c. Control reports (value your inventory and adjust costs) [    ]   d. other? [    ]

46. What are the best features of your current system of inventory management in this hospital

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47. What deficiencies are associated with the current system of inventory management policies and practices in this hospital

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48. How would you rate the hospitals overall inventory management policies and practices at this facility

- a. Effectively Managed [    ]   b. Moderately managed [    ]   c. Poorly Managed [    ]