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**THE IMPACT OF INVENTORY MANAGEMENT PRACTICES ON THE
PERFORMANCE OF PUBLIC HOSPITALS. A CASE STUDY OF SELECTED
PUBLIC HOSPITALS IN BONO REGION OF GHANA**

BY

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**A THESIS SUBMITTED TO THE DEPARTMENT OF SUPPLY CHAIN AND
INFORMATION SYSTEMS, INSTITUTE OF DISTANCE LEARNING IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
THE DEGREE OF**

**MASTER OF SCIENCE IN
PROCUREMENT AND SUPPLY CHAIN MANAGEMENT**

SEPTEMBER, 2023

DECLARATION

I hereby declare that this thesis is the result of my original work towards the MSc. in Procurement and Supply Chain Management, and that to the best of my knowledge, it neither contains material published by another person nor materials which have been accepted for the award of any other degree of the University, except where due acknowledgments have been made in the text.

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DEDICATION

I wholeheartedly dedicate this thesis to my lovely brother, Mr. Evans Bediako.

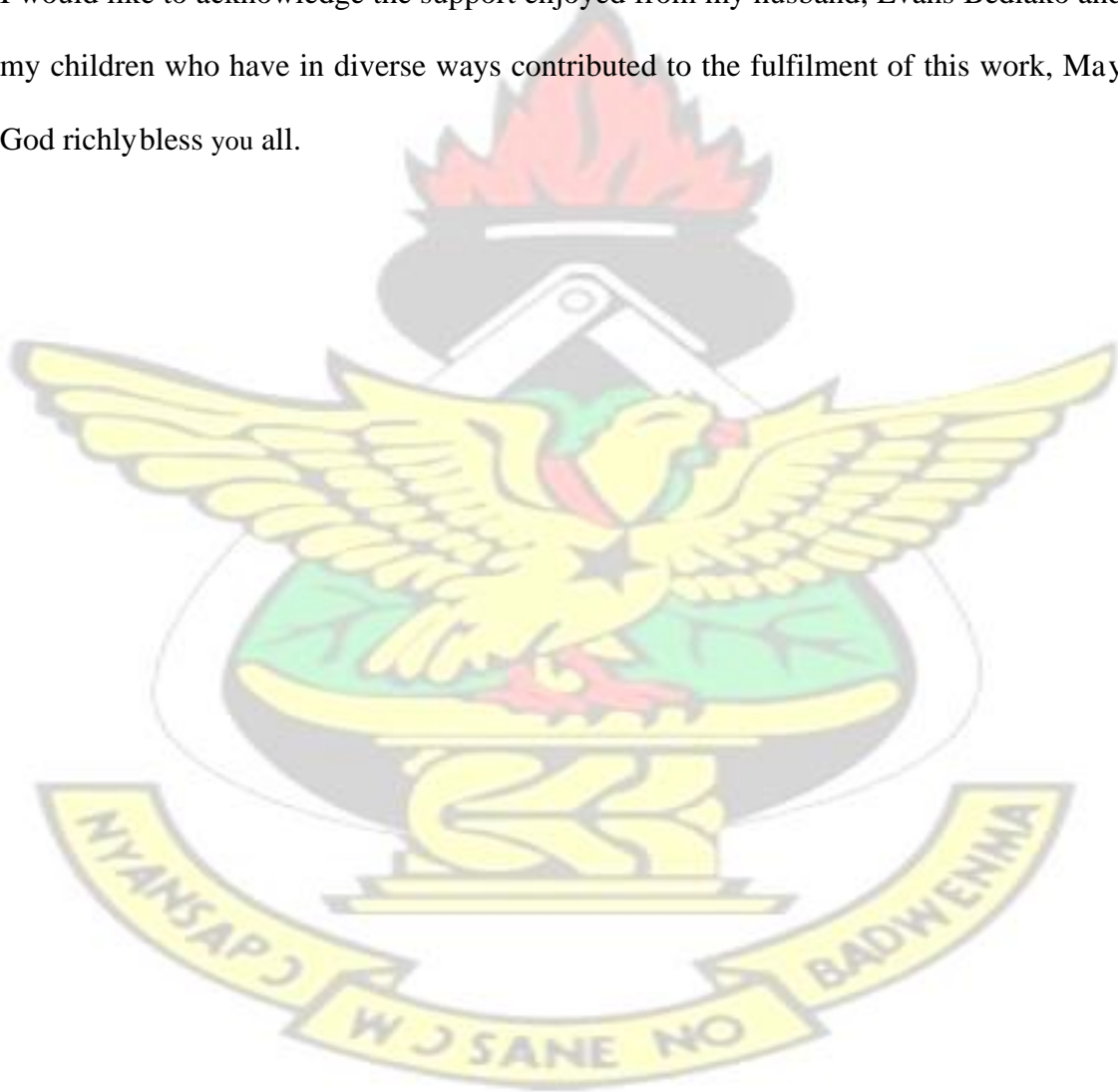
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ACKNOWLEDGEMENT

My profound gratitude first of all, goes to the Almighty God for his strength and mercy throughout this work. Special appreciation also goes to my supervisor Dr Emmanuel Quansah for his excellent supervision, guidance and motivations which helped me to successfully complete this thesis. May God continues to bless and keep him.

I would like to acknowledge the support enjoyed from my husband, Evans Bediako and my children who have in diverse ways contributed to the fulfilment of this work, May God richly bless you all.



ABSTRACT

The main objective of this study was to examine the impact of inventory management practices on the performance of public hospitals in the Bono Region of Ghana. The study evaluated the effect of strategic supplier partnership, information communication technology and ABC techniques of inventory management practices. The study employed census strategy because the public hospitals were few in the Region. The study used descriptive design type and data was collected from each of the 5 public hospitals in the Bono region of Ghana. The purposive sampling technique was used to select 5 management members from each of the 5 public hospitals to make a sample size of 50 respondents. The findings of the study revealed that there was a positive significant effect on strategic supplier partnerships, information communication technology and ABC techniques of inventory management practices and public hospitals performance. But among these inventory management practices, the one that has high impact on performance of the public hospitals in the Bono Region of Ghana was the application of information communication technology. The application of information communication technology explained about 62% of the variations between inventory management and the performance of the public hospitals. One of the key limitations was the tight schedule of the managers of the public hospitals to devote much time for the data collection exercise.

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LIST OF ABBREVIATIONS

BRHD	:	Bono Regional Health Directorate
MRO	:	Maintenance Repairs and Operations
WIP	:	Work in Progress
ICT	:	Information Communication Technology
EDI	:	Electronic Data Interchange
EPOS	:	Electronic Point Of Sale
RBV	:	Resources Based View
TCA	:	Transaction Cost Analysis
EOQ	:	Economic Order Quantity
DRP	:	Distribution Resources Planning
ERP	:	Enterprise Resources Planning
CHAG	:	Christian Health Association of Ghana
RHD	:	Regional Health Directorate
ELI	:	Empirical Leanness Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Globally, the basic purpose of most organizations either private or public is to maximize returns on investment and enhance customer satisfaction (Otundo et al; (2015). This goal of private and public institutions could be achieved through sound management of inventories. It was observed by Anichebe et al; (2013) that it seems most organizations that pay much attention to the storage and management of raw materials, finished goods, maintenance, repairs and operational supplies that aid in operations can better serve their customers. The ability of private and public sector firms to meet the timely demands of their customers or clients is a function of the availability of sufficient and quality inventories. The manufacturing as well as the service sector including public hospitals needs some level and sound management practices of inventories Onchoke et al; (2016). Throughout the world, firms including public sector that have a right blend of inventory management practices have competitive advantage over their rivalry firms.

Musau et al; (2017) argued that sound inventory management practices put up by management of the public hospitals is an excellent mechanism that is required by any healthcare system to function well for timely and efficient health service delivery. This implies that effective inventory management involves holding an adequate quantity of inventory so as to avoid interrupted services in healthcare delivery. Stock out in the public hospitals increases cost and poor service delivery to clients. Unsound inventory management practices can lead to waste and mismanagement of inventories in the hospitals (Oballah et al; 2015 and Lapide, 2010). By the nature of operations of public

hospital, it uses a lot of medical and non-medical supplies, mismanagement of these stock could lead to huge waste and increase cost of operations of the hospitals

It is impossible to offer any meaningful health service to the satisfaction of patients and clients without the availability of enough inventory (Hani et al; 2010 and Atnafu, 2018). For the public hospitals to provide quality and adequate health care service, there is the need to practice sound inventory management practices and controls so that healthcare delivery smoothened. Bawa et al; (2018) suggested that quality health care essentially is dependent on the availability of quality inventory at the right time. In the absence of inventory, health service delivery is severally affected. Sound management of health inventories will make drugs, medical suppliers, consumables and non-consumables available for smooth operations of the healthcare delivery in the Bono Region of Ghana. It is against this background that the present study wants to assess the effect of inventory management practices on the performance of public hospitals in the Bono Region of Ghana.

Agus and Noor (2010) points out that demand forecasting helps the organization to minimize operational costs, increased efficiency and on time delivery of goods and services in the public hospitals. This enables the public hospitals to plan for the future demand by meeting the growing needs of their clients. Sound inventory management practices enhance customer satisfaction and improve the image of the public health institutions. The cost of seeking healthcare services by the public is on the increase. It implies that public hospitals are required to provide high quality health care services to the public. It is therefore important that hospitals ensure smooth supply of the required stock to ensure uninterrupted supply. This calls for the effective and efficient inventory management practices in all unites and sections of the hospitals.

1.2 Statement of the problem

It has become evident that public hospitals throughout the world use a lot of stock in delivery healthcare services to the public Mehra et al; (2014). The flow of materials, goods and health services cannot function well in an environment of poor and inefficient health supply chain systems and innovations. An efficient inventory management practices are the fluid of health systems management especially the public hospitals Mungu et al; (2013). The expectations of the public seem to be complex and varied. This implies that meeting these varied public health needs, the public hospitals should adopt pragmatic and user friendly inventory management practices. The effective and efficient management of health commodities will ensure effective flow of medical supplies, avoidance of over and under stock including damage and expiry medical supplies. The resources are limited and hence the need to find the possible and effective ways of reducing cost of purchase and the cost of holding inventory in health service delivery.

The nature of demands in the public hospitals makes it difficult to make accurate and realistic demand forecast for medical supplies and other goods. There are a lot of demand uncertainties such as number of patients, flow of health commodities and logistics. As a result of these high levels of uncertainties, public hospitals tend to hold high levels of stock to meet demand of all forms. Public hospitals keeping high levels of stocks usually lead to high operational and logistical cost to the public purse. Beside, due to strict regulatory requirements by the public hospitals, some health personnel demand for some special medical supplies including medicines and non-medicines calling for high health inventory levels. This implies that sound inventory management practices should be employed by management of the public hospitals to reduce the risks of over or under supply of inventory.

There is no doubt that health inventory needs proper control due to the fact that it is the largest cost of business of the public hospitals (Singh & Singh 2014 and Chopra et al; 2003). It is against this background that the present study wants to assess the impact of inventory management practices on the performance of public hospitals in the Bono Region of Ghana. It is argued by (Naliaka et al; 2015 and (Ogbo et al; 2014) that effective inventory control practices enhance the growth and development of organisations including public hospitals in the Bono region of Ghana. Poor management of inventories will lead to increase in waste, cost, theft and pilferage of stock.

1.3 Objectives of the study

The general purpose of the study is to assess the impact of inventory management practices on the performance of public hospitals.

The specific objectives of the study include:

1. To assess the inventory management practices used by Public hospitals in Bono Region of Ghana
2. To determine the relationship between inventory management practices and performance of public hospitals in Bono Region of Ghana.
3. To determine the effect of strategic supplier partnership on performance of public hospitals in the Bono Region of Ghana.

1.4 Research questions of the study

1. What are the inventory management practices used by Public hospitals in Bono Region of Ghana?
2. What is the relationship between inventory management practices and performance of public hospitals in Bono Region of Ghana?
3. What is the effect of strategic supplier partnership on performance of public hospitals in the Bono Region?

1.5 Overview of methodology

The study will employ descriptive research design type and quantitative research approach. The study will use primary data that would be collected from the selected hospitals in the Bono Region of Ghana. The sampling techniques that will be used will include purposive and convenient sampling methods. According to Bono Region Health Directorate (BRHD), the region has 6 government hospitals dotted around the length and breadth of the Region. Out of this number, the researcher will purposively select 3 of them for the study. The respondents within the selected hospitals will be interviewed through purposive and convenient sampling methods. The managers, the medical superintendents, head of pharmacy, administrators, accountants or accounts officers, stores managers will be selected from each of these selected hospitals for interview on inventory management practices and performance of the hospitals. The descriptive and inferential statistics will be run to give meanings to the data collected. The Statistical package for Social Sciences (SPSS) version 25 will be used to capture, clean and run the data for further analysis.

1.6 Significance of the study

The study hopes to provide adequate information to Public hospitals on better ways of managing their inventory to achieve efficiency in their supply system. Supply chain professionals and finance managers will find this study useful since it will educate them on ways of mitigating inventory costs and improving efficiency in the delivery of goods and services.

The findings of this study will be useful to the district health directorate and the regional health directorate and policy makers since the study will shed more light on the state of the art inventory management practices in the public hospitals so as to avoid and reduce wastes. It will also highlight the key constraints facing implementation of inventory management practices in the public hospitals.

The study will be important since it will add knowledge in inventory management discipline of procurement and supply chain management. Academicians and scholars will also find this study useful in broadening their knowledge and skills in inventory management practices in the public hospitals. The findings will also serve as basis for other researchers to build their studies around it.

1.7 Scope of the study

The thesis would be undertaken within the jurisdiction of Bono Region of Ghana. The study will cover some selected public hospitals in the region. The main purpose of the study is to assess the impact of inventory management practices on the performance of public hospitals in the region. The study would be concentrating mainly on the public hospitals. The other private and lower level health facilities are outside the coverage of this thesis. The management members of the selected hospitals which will include the

medical directors, head of pharmacy, stores, supply chain and heads of departments will be contacted for interview. These members of management, seems to have more information about the operations of the hospitals and can respond to the questions for the study accurately. A structured questionnaire will be used for the data collection process. The questions in the questionnaire would cover major constructs in inventory management practices such as strategic supplier partnership, vendor managed inventory and records management.

1.8 Limitations of the study

This present study is facing with content and geographical limitations. In context, the study is limited by the busy nature of the key respondents of the study. The study population will include the medical directors, head of the pharmacy, and head of stores and head of supply chain officers or directors. These group of workers are the management of the hospitals and by their schedule, they are busy. It seems that collecting data from the management members of the hospital will not be an easy take. However, the researcher will manage the systems to access the needed data set from them or their representatives to enhance the credibility of the data and hence the study.

Secondly, the study is confronting with geographical limitations. The study is covering some selected public hospitals in Bono Region. These hospitals are sparsely distributed across the length and breadth of the region and some are in hard to reach communities. It means getting access to these hospitals due to rough roads, broken bridges and poor telephone communication networks is a bit difficulty. These challenges will be resolved through personal administration of the questionnaire and supporting it with online administration.

1.9 Organization of the study

This thesis is structured into five major chapters. The chapter one covers the background of the study which include problem statement, research objectives, research questions, significance, scope, limitations and organisation of the research. The second chapter is made up of the review of the related literature which include conceptual, theoretical and empirical perspective of the study. The third chapter focuses on the methodology of the study. The methodology of the study is made up of research design, study population, sampling techniques and methods, data collection methods and procedures, and finally data analysis and ethical considerations of the study. The chapter four presents the results and discussions of the study. Finally, the chapter five presents the summary of key findings, conclusion and recommendations of the study.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on inventory management practices and performance in the public hospitals in the Bono Region of Ghana. The literature review is presented under conceptual, theoretical, empirical and conceptual framework. The conceptual review presents the definition of inventory, meaning of inventory management, various forms of inventory management practices and performance of public hospitals and empirical evidence. The literature review also covered the key theories underpinning the current study.

2.2 Conceptual review

Samnani et al. (2017), Grant and Booth (2009) defined the conceptual review as that part of literature review of a study that identifies, classifies, defines and explains the main concepts in relation to the study. The definition and explanation of these key concepts in inventory management practices will enhance the understanding of these concepts within the context of the study. For the purpose of this study, the key concepts reviewed included; definitions of inventory, motive of holding inventory, inventory management, inventory management practices, and objectives of inventory management and firm's performance.

2.2.1 Definition of inventory

Inventories are defined as cited by Sola (2018) and Tamene (2016)'as raw materials, work-in progress, finished goods and supplies required for creation of a company's goods and services''. Raw materials are goods such as timber logs, sand for block

making and water for water producing firms. Raw materials turned out into the final product. In other hands, Maintenance, Repair and Operating (MRO) inventory are used up in producing the final product of the firm. This type of inventory does not form part of the final product but aid in producing the final product. Another type of inventory is work in progress. Raw materials are goods such as metals and timber make up the end products. Supplies' are part of materials, (MRO) inventory that do not include in the output (product). Work in progress is materials that in the manufacturing process or at a particular stage of production until the final product are manufactured. Finished goods are final product ready for shipment. Other scholars like Lwiki et al. (2013) and Mensah et al. (2015) also defined inventory as the number of items and amount of stocks (inventories) that firms keep at a given time. Besides, inventory is defined as "the stock or any asset needed in producing in a company. In a larger perspective, inventories are inputs for example, monetary resources, power, people, machines, and visible goods such as materials need for production (Sola, 2018). Crawford et al. (2018) also defined inventory as a stock of resources used to facilitate production or to satisfy customers demand. Inventory refers to stock of anything necessary to do business (Islam et al. (2019) and Orobia (2022). They further stated that stocks represent a large portion of organizational investment which must be well managed in order to maximize profits. In line with this, the term inventory consists of the materials, consumable and non-consumable items which firm uses in its daily operations.

2.2.2 Types of inventory

The types of inventory a firm could hold varies from organization to organization depending on the type of industry and the services or the products the firm is operating. The common inventory types included: stock of raw materials, work in progress,

finished goods and inventory in supplies such as stationery, fuel, bolt and nuts, oil and lubricants, hand gloves, tissue paper and many others.

According to Ahmedi et al. (2019), raw material inventories are those inputs from suppliers that have not yet entered the manufacturing or transformation process in the organisation. Those inventories are essential in helping a firm or organization to transform or process its final or semi-final products or services. The raw material inventories are the inputs that the firm needs to turn out the output of the firm. According to Bebkiewicz et al. (2020) a firm like public hospitals that are into health service delivery need inputs of various forms including human beings and materials to transform the health delivery process into the final service output. They argued that without adequate stock and sound management of raw material inventory in the organisation, the health systems including other manufacturing firms may not survive in production and delivery of delivery of the needed service.

Another type of inventory is the work in progress inventory (WIP). From the perspective of Crawford et al. (2018) work in progress (WIP) are products that have been partially finished. These are semi-finished products that are at various stages of production and these inventories provide a link between input and output stages. They represent products that need more work before they become finished products. Crawford et al. (2018) further observed that WIP differ from organization to organization because the type of WIP depends on the type of industry or the goals or the service that the firm is producing or rendering to the society.

Besides, finished goods are also another form of inventory. The finished goods inventory are the completed service or products which are ready for sale or to be delivered to the customer. They link production to marketing or consumption for

unanticipated failure in production and also meet unpredictable variables in customer demand. According to Bebkiewicz et al. (2020) and Mensah et al. (2015) finished goods inventory allows the firm flexibility in its production scheduling and in its marketing.

2.2.3 Reasons for holding inventory in the public hospitals

It seems that in the real business environment, demand and supply conditions are highly unpredictable and calls for adequate preparation in production. According to Hernawati et al (2019) inventories are held for three main motives: precautionary motives, transactional motives and speculative motives.

According to Gafaru (2019), precautionary motive of holding inventory means that stock held to guard against risk of unpredictable changes in demand and supply. In most cases, the level of demand of goods and the time required for supply cannot be known with certainty. Therefore, to ensure product availability, the organization maintains additional amount of safety stock to meet regular production and market needs. Firms should invest in stock control for precautionary motive to act as a buffer or link between demand and supply so that production can be geared to a more constant output.

Gafaru (2019) also argued that firms hold inventories due to transactional motives. Some inventories are needed to produce other products or services such as bolt and nuts, hand gloves, syringe, buildings and drugs and medicines in the hospital. The transactional motive is aimed at facilitating smooth operations of the firm on daily basis. According to Pandey (2002) transactional motive of holding inventory in an organization lay emphasis on the need to maintain inventories to facilitate smooth production and service operation.

Minja (2020), Ahmedi et al. (2019), Kenneth and Brian (2006) also suggested that firms hold inventory for speculative reasons to avoid future uncertainties in service delivery or production. He suggested that firm should therefore purchase goods and stock them in advance when they anticipate price increase in future and change in the conditions of demand and supply.

Besides, the motive of holding inventories, Riza et al (2018), have identified five reasons for holding stock. These reasons are:

- Economies of scale. A firm can realize economies of scale in manufacturing, purchasing and transportation by holding inventory. If the business buys large amounts, it gets quantity discounts. In turn, transportation can move larger volumes and get economies of scale through better equipment utilization. Manufacturing firms can have lower production runs if they hold more inventories, allowing per units fixed cost to fall.
- Balancing supply and demand. Some firms must accumulate inventory in advantage of seasonal demand. By manufacturing to stock, production can be kept throughout the year. This reduces idle plant capacity and maintains a relatively stable workforce, keeping costs down. If demand is relatively constant but input materials are seasonal, such as in the production of demand for fruits, then finished inventory helps meet demand when the materials are no longer available.
- Specialization Inventory allows firms with subsidiaries to specialize. Instead of manufacturing a variety of product and then ship the finished products directly to customers or to a warehouse for storage. By specializing, each plant can gain economies of scale through long production runs.

- Protection from uncertainties. One of the main reasons of holding inventory in the service organization is to manage unpredictability nature of demand and supply conditions. For instance a shortage of work in process means the product or the service cannot be fully completed. Finally, if customer order outstrips finished goods supply, the resulting stock outs could lead to the loss of customers leading to the poor services delivery to the organization.
- Buffer interface. Inventory buffer can create time and place utility. The buffer stock allows the firm to operate when stock levels are low and working towards replenishing the stock to its appropriate levels.

2.2.4 Definition of inventory management

Inventory management as cited by Ndirangung (2016) refers to the process and series of activities firms undertake to develop and manage the stock levels of inventories in the organization at the minimum cost. Inventory management is also defined as the process of continues flow of products coming in and going out of existing stock in a particular firm. In order to prevent the operations of the organization from having too high or low levels of inventory, the process of moving the items should be monitored for smooth operations. However, Chan et al. (2017) claims that the success of a firm can be achieved through effective inventory management systems. They said that the performance of the organisations is largely depending on the enhanced inventory management practices because holding and ordering costs will fail. In other words, Akinlabi (2017) observe that basically, the one of the main reasons of inventory management is to enhance the availability of operational resources for operational performance of the firm.

The concept of inventory management is an art of knowing how and when to replenish each material in a given group of items so as to maintain an optimum level of inventory necessary to support the production system at any point in time and at the least cost possible (Garcia, Moons et al. (2019). In line with this, inventory management entails taking decisions with respect to the determination of an appropriate order quantity so as to optimize investment by maintaining adequate and satisfactory level of materials capable of meeting the needs of customers. This implies that the overall aim of inventory management is to have what is needed and to minimize the number of times one is out of stock.

Besides, Mensah et al. (2015) state that inventory management is the various decisions taking by management of the firms in dealing with the inventories in the organizations. These decisions include inventory management policies and procedures for managing the inventory to and from the warehouses and the retail outlets in order to operate with an appropriate level of inventories. Inventory management is the serials of activities and process that management of a firm go through in controlling the inventory in the organization for optimal production and supply.

Again, Mathur et al. (2018) added that the major objective of inventory management is to inform managers on how much of goods to re-order, when to re-order the goods, how frequently orders should be placed and what the appropriate safety stock is for minimizing stock-outs. Thus inventory management involves determining when and how much to order, forecasting demand and stock replenishment, identifying the most effective source of supply, inventory monitoring and information management while meeting the ever growing customer needs who demand that products are delivered on time and in good condition (Volland et al. (2017).

Kinyua (2016) also describes inventory management as the decisions and activities that are performed by the organisations to ensure smooth flow of inventory from in and out of the firm to enhance operational performance. Inventory management takes into consideration the actual quantities and the monetary values of the inventories in fixing the inventory levels in the firm. The main idea behind inventory control is to plan the inventory levels in such a way that the firm will not have too much or too little inventory for operations. Firms holding too much inventory tied up capital whilst firms who holds too little inventory may experience stock out and its attendance challenges. Town & Namusonge (2015) states that inventory management is the putting together supplies, checking, making use of and procuring of stock for the firm. It has the aim of getting the exact inventory at the exact location in the exact time period with exact amount for the organization to function well.

Kanguru (2016), Teno et al. (2017) and Keebler et al. (2009) assert that inventory has three levels of costs which include; holding, ordering and shortage costs. They observe that the carrying cost of inventories include the costs of managing the inventory in stores or warehouse. The notable among these costs includes; premium (insurance), out of use and real cost (opportunity costs) of locked up capital. The second cost level is the ordering which include the cost of procuring, receiving and inspecting the inventory delivered. The last cost level of inventory is shortage cost which is the difference between the demand and supply of an item. If demand exceeds supply, there are shortages and its associated costs of managing to meet demand. The shortage cost in inventory perspectives may include loss of sale, loss of customers, goodwill, late charges and other costs as observed by (Wangari and Kagiri, 2015).

In view of this, inventory management is the art and science of maintaining stock levels that are appropriate for the operations of the firm so that management can achieve their operational objectives Akinlabi (2017) and Ageron (2018)

It is recognized that firms should managed inventories with the aim of minimizing the cost of inventories and also meeting the needs of their customers.

2.2.5 Inventory management policies in an organization

According Modak et al (2020), there are four policies for inventory management; inventory control, reactive policy, distribution resource planning and adaptive logic policy. Inventory control is the managerial procedure for implementing an inventory policy. Inventory control defines how often inventory levels are reviewed to determine when and how much to order. As cited by Kritchanchai et al. (2015) and Azghandi et al. (2018) that the inventory control system allows you to determine mistakes that have been made or identify areas that need immediate attention. The perpetual inventory control policy reviews inventory status daily to determine inventory replacement needs. Perpetual depends on accurate tracking of all stock-keeping units. It is implemented through re-order point and re-order quantity. Periodic review policy, reviews the inventory status of an item at regular time intervals say weekly or monthly. The basic re-ordering point is adjusted to consider the extended intervals between reviews.

The reactive policy method responds replenishment when available stock levels fall below a predetermined minimum then the same amount is procured (Modak et al. 2020). It depends on the assumptions of endless capacity of resources and unlimited inventory availability at the supply location. Reactive decisions rules assume that performance cycle time can be predicted and that cycle lengths are dependent. It operates best when customer demand patterns are relatively stable and consistent.

Planning policy methods use a common information base to coordinate inventory requirements across multiple locations or stages in the supply chain (Azghandi et al. 2018). Under planning; there is fair share allocation which provides each facility with an equitable or fair share of available inventory from a common source such as a plant or warehouse.

Another form of planning policy is distribution requirements planning. According to Cold feller (2003), this a sophisticated planning approaches that considers multiple distribution stages and their unique characteristics. It is a logic extension of manufacturing requirement planning although there is one fundamental difference between the two techniques. Manufacturing requirement planning is driven by a production schedules that is defined and controlled by management policy while distribution requirement planning is driven by customer demand.

Lastly, adaptive logic policy is a combined inventory management system used to overcome problems inherent from a reactive or a planning policy method (Azghandi et al. 2018). The factors that may make a reactive policy better in one situation may change over time to favour the use of an inventory planning system. This is the ideal approach inventory management policy system since it incorporates elements of both types and allows different strategies to be used with specific customer or product segment.

2.2.6 Inventory control systems

Material and supplies are part of inventories that organizations carries for the purpose of sale or as inputs to production process. Therefore, having a good inventory system enable the company to keep track on their inventory level as low as possible at

minimum cost. Choosing the right method and appropriate system enable the company to be more efficient (Rubigha et al. 2020 & Gurumurthy 2020).

A successful business depends on many reasons, one of the factor is a consistent system of inventory management which offers info to smoothly manage the materials, fully utilize people and equipment, communicate with customers and coordinate internal activities. Inventory system is used to analysing product sales, detect popular item in stock and ready to instantly fulfilling any customer's order. It also helps us know which special orders sell on occasion and have those products available in a limited quantity to keep inventory costs down and to develop a positive reputation for quickly filling special orders (Shiau, 2019).

A good inventory system means that organization have an up to date inventory count at all times, giving good customer service, giving accurate information to customer and improve image of the organizations Yadav et al. (2020). It is a vital that inventory management system allows managers to receive real time information on inventory. This will assist management to accurately made informed decisions, anywhere, anytime and save time and cost used for labour and thus working on inventory management properly (Rashid et al 2017). A properly managed inventory system can considerably improve the firm's performance (Koumanakos, 2008). Without doubt, the upgrade of technology change will increase the expenditure of health care but the best parts and among the benefits from its technologies become cheaper, faster, and mobile and more featured (YĠĠĠT (2017)

2.3 Inventory management practices

2.3.1 Strategic supplier partnership

Mathur et al. (2018) define partnership as a commitment that is expressed by clients and dealers to foster the relationship. Strategic supplier partnership exists between the customer and the suppliers without regards to size of the firms but for a long-term mutual relationship. The main objective of the strategic supplier partnership is to ensure and build excellent mutual understanding among consumer and producers of the firms. The idea of strategic supplier partnership was propounded in the 1980s to support the move for JIT manufacturing philosophy. The main aim of JIT inventory strategy is to reduce waste, lead times and facilitates inventory management process. The focus of strategic supplier partnership in supply chain is that both parties mutually benefit from the relationship.

The strategic supplier partnership is a long-term relationship between the customers and producers Truong et al. (2017). The contracts awarded under the strategic supplier partnership are longer term contracts with the intention of creating confidence in the supplier to invest and enhance the relationships. Supplier partnerships work well in an environment of effective communication between and among the partners. It seems suppliers with good communication skills work better with their customers to enhance output of the firms. Notwithstanding the improvement in electronic communication, interpersonal interactions between the customers and the suppliers are still necessary for operational efficiency. SME firms should fuse into their business operations the principle of early supplier involvement in design. The attempt by customers to involve the suppliers in product design will help to reduce the possibility of producing or supplying defective items and the risk of obsolescence Rakovska et al. (2008)

2.3.2 Information and communication technology (ICT)

Lin et al. (2009) and Zhu et al. (2012) suggested that in today's business environment including supply chain, ICT is critical element to the survival and growth of most firms. It seems most successful inventory managers need well organized logistical information and technological systems to enhance corporate performance. Information technological gadget like computers and mobile phones can assist in stock control by helping to calculate the ideal levels of stock to keep in order to meet the needs of customers.

The International Data Interchange Association defines Electronic Data Interchange (EDI) as the transfer of organised data from the computer of one organization to another by an electronic means. The message transferred is already agreed on by the parties involved in the transaction (Klapita 2021). The Electronic Data Interchange (EDI) is an electronic system which makes it possible for organisations to communicate between and among themselves without any human interactions. This technology has improved inventory management. It was observed by Ali et al. (2019) that information is the life blood of all organisations. Information supplies blood to the veins of the organization for effective operations (Mochama, 2019). The EDI systems electronically linked the buying organizations with its suppliers. It is a system that helps replenishment to be triggered and the message is transferred from the original destination without further possibility of distortions (Mohamad et al., 2016).

As EDI are able to link computers of suppliers and customers, they are able to interact with each other concerning inventory levels, production schedules and other information so that activities are smoothly put together without much human interactions. It enables firms to reduce paper work, ensure higher levels of accurate logistical data, reduced labour expenditure and reduced lead time that comes from

unexpected communication from the EDI systems (Okano et al. 2019 and Yunitarini et al. 2018)

Another technology in inventory management is (EPOS). The EPOS is basically aimed at scanning and capturing information about the goods sold. The EPOS systems cross check sales transactions and provide sales report on charges, quantity sold and types of product sold out as well as send out electronic intra and inter stores messages (Nzuza, 2015; Wanjira & Njagiru, 2018). The EPOS technology allows considerable cost savings and gives “real time” information on goods sold patterns of traffic in stores, popularity and profitability of every product line carried out. It enables inventory to be replenished based on demand, it reduces the problems of outmoded and destruction of stocks, it reduces the possibility of theft and supply valuable business information to customers. It leads to improved customer service and boasting of performance of healthcare delivery.

Bar coding technology in inventory management counts raw materials and finished goods of products (Attaran 2020). It is useful in inventory management because it provides the level of inventory, ensures faster data entry with greater precision, reduced labour costs, increase productivity and enhances responsiveness to clients and dealers (Kumar 2019).

2.3.3 ABC techniques of inventory management

The ABC technique is use to control and manage the flow of inventory within the organization including public hospitals. The ABC inventory control technique identifies and classify the supplies into three groups based on the value of the items or goods. According to the proponents of the technique, the group A items are the items with very high value. These are 15-20% of the items that account for 75% of the total

inventory value kept by the organization. The second group is classified as group B. These are items that have medium value and are 30-40% of the items that account for approximately 15% of total value (Odhiambo et al 2018, Njoroge 2015, Onkundi et al 2016). The third group is labelled as group C and these are the items with low value that are constituting 40-50% of the items that account for 10-15% of the annual inventory value kept in the organization (Murigi 2018).

According to Muri et al (2021), Ahmed et al 2019, Kumar (2015) and Pund (2016) the ABC groupings have implications on inventory management practices. The group A items are highly costly but few and hence should be kept and managed well to avoid losing them because they will cost the organization very much. It implies that management has to put in much efforts in safe keeping and using them. The group B items are average items in terms of quantity and should be managed with less attention whilst the group C items are more than average with regards to the quantity and should be given less attention. ABC inventory technique is facilitating inventory control, over-usage, selective control and enables companies to concentrate on the most cost-effective areas. In addition, it eliminates unnecessary paperwork and reduces stock holding costs.

2.4 Inventory management practices and Performance of Public Health Institutions

In public service, the major responsibility of every organization is to bring service closer to the people at satisfactory level. The provision of services that meet the demand of the general public will improve their living standard. This will in turn leads to increased level of public trust and confidence. In such situation, the level of employee involvement will be enhanced as they serve their customers. This will

ultimately lead to customers' satisfaction. In line with this, Otundo and Bichanga (2015) opined that level of service delivery is the most influenced operational performance in a public sector. This also agreed with Adersen and Christensen (2005), who stated that organizations which do not have performance means in their processes, procedures and plans experience lower performance and higher customer dissatisfaction. Accordingly, measuring the performance of inventory management in public health institution yields benefits such as cost reduction, improvement in quality control and customer satisfaction (Bowersox and Closs, 2002). In this study therefore, performance means the provision of essential goods or services that meet the demand of customers at the required time and place at the least possible price. On the other hand, performance here simply means customers satisfaction and cost reduction. It is only when these are achieved, that we can say that a public entity has performed effectively in the pursuit of its mandate.

2.5 Hypothesis development

2.5.1 Strategic supplier partnership (inventory management practice) and hospital performance

The strategic supplier partnership has become a crucial inventory management practices due to complexity of modern inventory management. Firm's partner with key suppliers to prevent stock out or over stock perhaps as a result of its relation with financial output of the firm. Several studies found out that there are direct relations between strategic supplier partnership (inventory management practice) and hospital performance (Ontita, 2016, Obermaier and Donhauser, 2012, Lwiki et al. 2013, Kanguru 2016, Enow and Isaacs 2016 and Ampadu 2017). This is because efficient strategic supplier partnership leads to cost minimization as it reduces waste, improves

lead time, redesigning of products to suit customers' needs, reinforcing effective communication among the firms and also offering assurance of long standing agreement between the suppliers and customers of the firms, which eventually improve financial performance of the firm. Based on the above discussions, the study hypothesized that:

H2: Strategic supplier partnerships have positive significant effect on the hospital performance.

2.5.2 Information and communication technology and hospital performance

The role of information and communication technology (ICT) in this modern business cannot be overemphasized. The various forms of ICT systems to manage inventories are all related to efficiency and cost minimization of inventories of the firms which could result in increasing sales and profitability of the firms. As it was observed by Zengwa & Choga, (2016), Lwika et al. (2013) Ampadu (2017), Shah and Shin, (2007) observed that the introduction and usage of ICT systems in managing the inventory of a firm, the company derived several benefits including enhanced profitability of the firm. This is possible because efficient ICT systems manage the inventory levels, demand and delivery dates, planning and forecasting without much human interferences. This eliminates human errors and mistakes that can cost the organization.

For example, the use of Electronic Data Interchange (EDI) system makes computers of suppliers and customers to communicate directly to each other about inventory management without human interventions. As a result of this faster means of communication between and across the firms, lead times, paperwork, staff costs and higher information accuracy leads to lower cost of production and enhanced profitability of the firm. Other ICT systems like Electronic Point of Sale (EPOS) and

RFID all aimed at reducing cost of managing the inventory and improve on working capital of the firm Ogonu et al. (2016). The study further proposed that:

H3: Information communication technology has positive significant impact on hospital performance.

2.5.3 ABC techniques of inventory management and hospital performance

The concept of ABC techniques of managing inventory is based on the principle of keeping strong eye on the most critical goods in terms of how much it is costing the firm in procuring and storing them. These goods considered to be critical are of high cost and must be stored and managed well due to their cost effect on the running and profitability of the firm. It is evident that goods with high cost has direct effect on the efficient and effective running of the firms (Odhiambo et al 2018, Njoroge 2015, Onkundi et al 2016). It is also showed that the cost of less critical goods are indirectly related to the profit levels of the firms (Muri et al; 2021, Ahmed et al 2019, Kumar; 2015 & Pund; 2016). Sound practices of ABC method of inventory management is critical to the efficient running of the public hospitals. Based on the above discussions, the study is proposed that:

H4: ABC techniques of inventory management has direct effect on the performance of the public hospitals.

2.6 Theoretical Review

2.6.1 Introduction

According to Creswell (2014), theory in research ‘‘is an interconnected set of ideas or formed into plan or hypotheses, which specify the relationship among variables typically in terms of magnitude or direction’’. This means that theory identifies and

specifies the nature of interrelationships between and among constructs of a study. (Tamene, 2016) stated that theory provides a guide to researchers to follow and explain, predict and understand the results and objectives of a phenomena. Theoretical framework provides a structure to situate the study within a theoretical context. It helps the researcher to carry out the study in the context of accepted theories (Varpio et al., 2020). This present study is grounded on five theories; operating cycle theory, strategic choice theory, transaction cost analysis, economic quantity theory and lean theory to examine the impact of inventory management practices on the performance of SMEs in Ghana.

2.6.2 Resource Based View Theory

Resource based view aspired to explain the internal sources of a firm's sustained competitive advantage (Kraaijenbrink, Spender & Groen, 2010). The Resource Based View (RBV) of the firm postulated that, resources internal to the firm were sources of competitive advantage (Tukamuhabwa, Eyaa & Derek, 2011). Such resources were valuable, rare, unique and difficult to substitute. Resources believed to be valuable were those that were capable of facilitating conception or implementation of strategies that improved performance, exploited market opportunities or neutralized impending threats (Barney & Clark, 2010).

The two assumptions for RBV theory were, resources and capabilities were heterogeneously distributed among firms; and resources and capabilities were imperfectly mobile, which made firms' differences remained stable over time (Ganotakis & Love, 2010). Every firm was different (heterogeneous) from other firms in terms of the resources and capabilities a firm possesses or accesses. These differences differentiated one firm from another and a firm 's success was due to its

firm-specific (idiosyncratic) resources (Karia & Wong, 2011). Accordingly, individual resources, competencies and capabilities of the organization were a bundle of the firm's resources or the essence of the resource-based view (Barney & Clark, 2010). For instance, in inventory business, a resource is described as a basic element or a prerequisite for the development and operation of logistics; and it is required for building up a firm's capabilities (Stadtler, 2015). The resource-based view (RBV) of firms mainly emphasized their internal strengths and weaknesses, in contrast to industrial organization economics which focused on firms' external opportunities and threats Shang & Marlow (2015), because when the external environment is unstable, a firm's own resources and capabilities may be easier to control (Shang & Marlow, 2015).

The resource focused perspective contends that a firm was a collection of tangible and intangible resources (Kraaijenbrink et al., 2010). This collection was unique to each firm so that each firm could be considered different (heterogeneous) from each other within the same industry i.e. no two companies possess the same experiences, or had acquired the same assets or skills or built the same organizational culture (Barney & Clark, 2010). Such differential endowment of resources among firms was the ultimate determinant of strategic decisions (Shang & Marlow, 2015). Ganotakis and Love (2010) used the RBV to explain the importance of inventory management to a firm. According to Ganorakis and Love, (2010), inventory flexibility and efficiency was considered to be a source of competitive advantage for entrepreneurial firms. Ownership of firm-specific assets enabled a company to develop a competitive advantage. They also found out that a company's competitive advantage was derived from the company's ability to assemble and exploit an appropriate combination of resources (Ganotakis & Love, 2010). In their study, Wong and Karia, (2010),

confirmed that, RBV focused on the idea of costly-to-copy attributes of the firm as sources of business returns and the means to achieve superior performance and competitive advantage. This theory is important in grounding the inventory categorization in understanding its influence on retail outlet internal resources as the firm sources of competitive advantage.

2.6.3 Operating cycle theory

According to Oseifuah and Gyekye (2017) the operating cycle theory provides guidelines on sound management of inventory in so as to improve on working capital in the organisation. An operating cycle represents the amount of time a firm consumes in acquiring inventory and selling out the inventory into cash. Oseifuah and Gyekye (2017) further argues that the time span of a firms operating cycle is a function of the payment terms agreed upon by the supplier and the customer. A shorter operating cycle implies that cash flow of the firm is held up for a shorter period of time (Wanjira & Njagiru, 2018). The theory was crucial to the measurement of cash management, inventory, accounts receivables and payables management and its resultant effect of the performance of public hospitals.

2.6.4 Strategic Choice Theory

Cherotich and Patrick (2019) said the strategic choice model explains the relationships between the choices of management decisions and the performance of a firm together with its internal and external environment. The theory lay much emphasis on the level of management decisions on the performance of a firm (Kairu, 2015). The model stressed that the level of performance of a firm is a function of the quality of its management decisions. It implies that sound decisions by management of a firm may

lead to improve performance level of a firm. The theory however did not take into accounts the other organizational level factors that have impact on performance such as technology, level of resources and external factors but only linked performance to management decisions. It seems management of public health institutions make a lot of inventory management decisions that have impact on the performance of the health institutions.

2.6.5 Transaction Cost Analysis

Transaction Cost Analysis (TCA) is a theory that explains that the expenses on the entire supply chain are kept within the minimum level (Munyao et al., 2015). TCA is widely adopted in a number of studies in economics including health supply chain management to assess the effect of business operations on performance of firms. In the beginning of 1970s, the mathematician and economist, Williamson, integrated TCA into the model of general equilibrium position in economics and established his transaction costs economics in the novel theory of an organization. Williamson (1981) as cited by (Munyao et al., 2015) argues that firms can reduce their costs of transaction via vertical integration, as well as improving the rate of trust. This type of integration is likely to decrease the expenditure on inventory management whilst improving the service level of the internal and external customers of the firm. The theory argued that the transactional cost on inventory seems to affect the cost on the entire supply chain in the organization. It implies that sound management of the transaction cost on inventory will reduce cost on the entire supply chain and improve on profitability and general performance.

2.6.6 Theory of Economic Order Quantity (Wilson EOQ Model)

The Economic Order Quantity model (EOQ) was developed by F.W.Haris in 1913 to model and determine the optimal inventory level at a given time. Wilson is given credit for his early in- depth analysis of the model (Achieng et al., 2018). The EOQ model is the level of inventory that minimizes the total inventory holding and ordering costs. The EOQ model assumes that demand is constant, lead time is fixed, the order is received at a go, quantity discounts do not exist and shortages of inventory or stock out do not occur.

One of the challenges of EOQ is that it does not take care of buffer stock against changes in lead time and demand variability which makes it difficult to practice it in the real situation. (Kasim et al., 2015) states that another challenge of the EOQ model is that for each item of stock there is the need to establish how much to order and when. And lastly, the model assumes that all other factors are held constant of which in real situations there are changes in the business environment such as transportation challenges, uncertainties in storage, customer demand patterns and external factors all together make it extremely difficult to practice in real life situations.

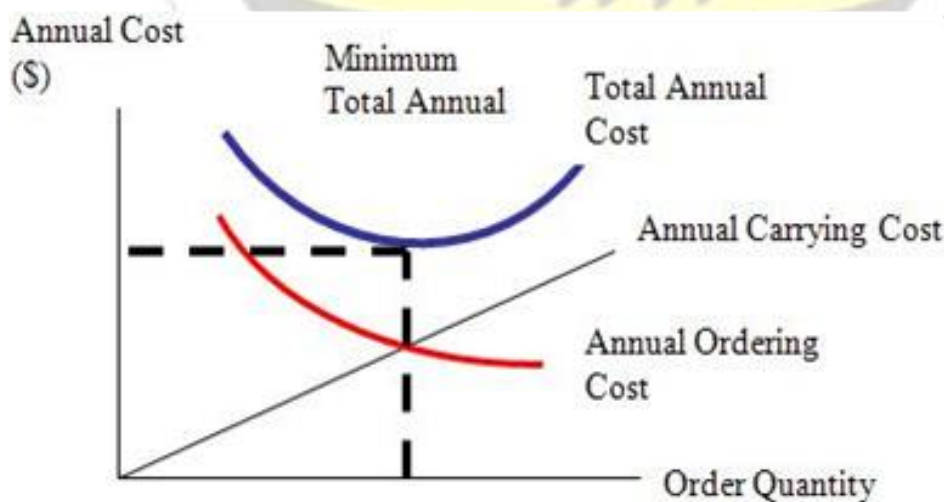


Fig. 2.1: The Economic Order Quantity (EOQ) Model

Sources: Adopted from Lwiki et al. (2013).

2.6.7 Lean theory

Wangari and Kagiri (2015) note that lean theory suggests that, inventory control is a crucial component of any supply chain management practices whether it is in the health service or product sector. Lean theory is strongly linked to Just in Time (JIT) concepts. The lean theory explains how firms and health organizations minimize the stock of inventories kept on site and eliminate inventory carrying costs.

JIT is an innovative stock management strategy: a supply and demand system encouraging flow-type production that attempts to precisely match the demand for care with supply (Baum 2006, Wangari and Kagiri, 2015). The concept of JIT was originally developed by Toyota Motor Company in Japan, and was then applied in a variety of industries worldwide, including healthcare. JIT systems can quickly respond to demand without the need for excess inventory. In JIT systems, suppliers deliver small quantities of supplies to the firms and organisations as they are needed, which avoids the problem of overstocked inventory and eventually lowers operational costs. JIT is a comprehensive inventory management technique that reduces waste and eliminates non-value-added items (Li 2015). Lean inventory systems result in less defects and larger product variety. The basic tenet of the lean supply chain is to improve profitability of the firm by reducing inventory holding cost. Inventory management plays very critical roles in aligning demand and supply within all parts of the supply chain (Mensah et al., 2015).

JIT systems restock inventory and place a reorder for future resources when a preset minimum value is reached, using a pointer when more stock is needed to meet the current demand (Karkowski et al., 2017). For each supply category, the order quantity is determined to avoid a lack of stock during the time between orders. Differences in demand between different types of supplies are expected,

and must be determined using robust software. Some items that must be prioritized, such as life-saving medical and surgical items and other essential items; these are defined, while the items to which JIT can be applied are identified (Kester et al., 2001). Therefore, JIT requires the establishment of a monitoring and evaluating system that is able to detect and determine minimal acceptable inventory levels.

In JIT, healthcare organizations and suppliers work together to deliver inventory on time. To successfully run a JIT system, a close relationship must be built between the health organisations and suppliers (Karkowski et al., 2017). Without excessive inventory, healthcare organizations will depend on their suppliers. JIT is demanding on suppliers, so having reliable suppliers is an important factor in building the relationship between the health institutions and suppliers (Kua-Walker 2010).

2.6.7.1 Importance of JIT systems

JIT systems work well in normal settings, providing solutions to many issues faced by other inventory systems as well as many long-term benefits. Overstocking results in waste and lost and damaged items (Neil 2004, Baum 2006). The several benefits of using JIT in healthcare organizations include increased quality and efficiency, and savings in healthcare resources. Applying this method creates a stabilized work schedule and increases productivity (Siddiqui 2022) Therefore, the adoption of JIT by healthcare facilities has been widespread. The most common benefit of using JIT is cost reduction.

JIT helps to increase inventory turnover ratios, leading to higher efficiency by preventing products from staying in storage for long periods. In addition, applying JIT saves time; with a smaller inventory, the time spent on ordering, purchasing and managing stock is lowered, which can improve productivity and services. Monitoring and management of inventory can also be improved because of the low number of items in the inventory (Kaswan et al., 2019). Close management of smaller stocks reduces the chance of wasting inventory items. Another advantage of the JIT approach includes improved work and operation flows, enhancing overall performance of the health institutions. (Canel et al., 2000) JIT can also improve service quality, leading to increased customer satisfaction (Jackson 2017).

2.6.7.2 Risks of using JIT systems in hospital settings

One of the major concerns with JIT systems is the uncertainty and unpredictability of the volume of hospital work (Neil 2004), which can pose a serious risk to hospital operations when the demand unexpectedly increases and the current inventory is insufficient. This may lead to zero stock, which can seriously affect patient care (Baum 2006).

Another issue regards suppliers, particularly for vendors that import items from overseas and may experience disruptions in shipments. To address these issues, stock levels need to be closely monitored and managed over time. One solution is to keep a buffer inventory to avoid stock running out. However, this buffer or emergency inventory needs to be balanced to avoid holding a large amount of stock, which would conflict with the main goal of a JIT system, or holding too little stock, which would not resolve the issues or address the risk of shortages.

Another solution is to use JIT systems only for general suppliers items that do not directly impact patient care or affect emergency situations like labels, swab, pads, linens, etc. (Doughty et al., 2020), (Kua-Walker 2010). This helps to ensure that inventory costs remain low without risking patient safety. The improvement of cash flow and cost saving are mainly coming from reduction of inventory holding, minimize storage area, utilities, personnel and damage items. (Lai and Cheng 2016, Raj et al., 2022, Raj et al., 2022).

Besides, solution is to establish a contingency response plan with the supplier or with other healthcare institutions as well as considering a rapid communication between all sectors in timely manner to reduce the delaying of delivery and avoiding overstocking and shortages (Cheng and Podolsky 1996, Lai and Cheng 2016, Peng and Pang 2019, Okeagu et al., 2021). This type of effective and timely manner agreement should include essential supplies and priority medicines was very useful to overcome JIT limitation and maintaining resilience supply chain during health crisis like COVID-19 (Doughty et al., 2020).

JIT systems are difficult to operate and require the close monitoring of supply consumption. The supply forecast needs to be calculated using statistical tools and techniques to ensure accurate forecasting (Li 2015), as JIT relies on accurate data describing the consumption of the resources. Thus, JIT may not be ideal for every institution and often requires extensive preliminary planning to ensure that the system can work appropriately. Each institution needs to assess their situation and ability to establish a JIT system by weighing the costs and benefits of such a system.

Another issue related to JIT is transportation and delivery costs, which tend to be high. The cost mainly depends on the transport type and vehicle used, and the distance traveled. The system is designed to decrease inventory and order stock when needed, relying on the certainty of on-time delivery. This may mean frequent deliveries, which decreases efficiency and increases delivery associated costs, which is an additional cost factor that needs to be considered and discussed with suppliers (Kim and Rifai 1992).

2.7 Empirical Review

This aspect of the work reviews the scholarly studies that have been done in other parts of the world about the impact of the inventory management practices on the performance of public hospitals.

Sporta (2018) examined the effect of inventory control techniques on organizations performance of Kenya Medical Supplies agencies. The general objective of the study was to access the effect of inventory control techniques on the performance of the medical supplies agencies. Research data were collected through structured questionnaire, interviews or direct observations. The data were analyzed using descriptive and inferential statistics which was done with the aid of statistical package for social sciences (SPSS), Version 19.0. Multiple regression was used in testing the hypotheses at 5% level of significance. The result of the analysis showed that the sig-value (P-Value) is 0.001. This means that all the inventory control techniques (Enterprise Resources Planning - ERP, Distribution Resource Planning - DRP, inventory records keeping and strategic supplier partnership) have significant and positive influence on organizational performance of Kenya Medical Supplies Agencies.

Onikoyi et.al; (2017) empirically evaluated the effect of inventory management practices on financial performance. The major objective of the study was to examine how stock management is used as an essential tool for profitability and growth in a manufacturing industry. The data for this study were collected purely through secondary sources by extracting the relevant figures from annual report and account of Larfage Cement Africa, Plc, from 2005 – 2013. Data was analyzed using descriptive statistics while multiple regression was employed in testing the hypothesis at 0.05 level of significance. The result of the analysis revealed that there is positive relationship between inventory management, control policy and profitability.

Atnafu and Balda (2018) carried out an empirical study to investigate the impact of inventory management practice on firm's competitiveness and organizational performance among micro and small enterprises in Ethiopia. The main objective of the study was to examine the impact of inventory practice of micro and small enterprises competitiveness on their performance. Data were collected through the aid of structured questionnaire administered to 188 micro and small enterprises. Structural equation modeling was used in testing the hypotheses and to establish the relationship between the research variables. The results indicated that higher level of inventory management practices can lead to an enhanced competitive advantage and improved organizational performance.

Bawa, Asamoah and Kissi (2018) conducted an empirical research to examine the impact of inventory management on the performance of listed manufacturing firms in Ghana. Data were gathered from 14 listed manufacturing firms in Ghana Stock Exchange over a period of ten (10) years, from 2007 – 2016. Regression equations stated in the form of return on assets and operating cash flow was used in analyzing firm's performance. Pearson correlation and multiple regression analysis were used in

testing the study hypotheses. The empirical results provided evidence that the main variable, inventory management has no impact on firm's performance and is insignificantly related to firm performance of manufacturing firms in Ghana.

Oballah, Waiganjo and Wachiuri (2015) examined the effect of inventory management practices on organizational performance in public health institutions in Kenya. Data were sourced through open and closed ended questionnaires. Data collected were analyzed with use of Pearson's correlations coefficient and multiple linear regression. The findings revealed that inventory shrinkage has negative significant influence on Kenyatta National Hospital, while inventory record accuracy and inventory investment have positive significant influence on the performance of the hospital.

Agu, Obi-Anike and Eke (2016) evaluated the effect of inventory management on organizational performance of selected manufacturing firms in Nigeria. The study sought to ascertain the effect of inventory control on the productivity of selected manufacturing firms. Data were sourced primarily with the aid of structured questionnaires. Analysis of data was done using descriptive statistics while the study employed Pearson product moment correlation coefficient and simple linear regression in testing the hypotheses. The result of the analysis revealed that inventory management is essential in the operation of any business. The study therefore recommended that organizations should train their personnel in the area of inventory control management that will empower them to be in charge for the smooth running of the inventory management activities.

Wangari and Kagiri (2015) investigated the influence of inventory management practices on Safaricom Kenya Limited competitiveness. Data were sourced through the means of drop and pick structured questionnaires. Regression analysis result showed

that inventory shrinkage and inventory turnover were significant predictors of competitiveness in Safaricom Ltd. Musau, Namusonge, Makokha and Ngeno (2017) carried out an empirical research to investigate the effect of practices used in inventory management on the performance of textile manufacturing firms in Kenya. Structured questionnaires and interviews were employed to gather data from 139 respondents. Multiple regression and correlation analysis were applied to test the relationship between the research variables. Among key practices identified for inventory management included: achievement for demand forecasting to determine stock coverage; proper material handling to address stock out; timely response to customer references; ensuring inventory accuracy records and achieving optimal utilization. The result of the analysis indicated that all these inventory management practices have a positive significant influence on the performance of textile manufacturing firms in Kenya.

Kaithe and Achuora (2017) conducted an empirical study to evaluate the influence of inventory management on performance of private commercial banks in Kenya. Data were collected using self-administered questionnaire. Analysis of data was done through the use of descriptive and inferential statistics, while multiple regression was used to establish the relationship between the dependent and the independent variables. The findings of the analysis showed that information technology, inventory control techniques, inventory cycle counting and warehousing management system have a positive relationship with performance of private commercial banks in Kenya

Onchoke and wanyoike (2016) examined the influence of the practices of inventory control on the procurement performance of Agrochemicals distributors in Nakuru central sub-country in Kenya. Data were sourced through the means of structured questionnaires which were administered by the researcher through drop and pick

procedure. Descriptive statistics was used in data analysis, while correlation and regression was employed to establish the influence of the independent on the dependent variable. The result of the analysis revealed that internal inventory security procedural practices, inventory auditing and computerized inventory control both individually and collectively have significant positive influence on the procurement performance.

Adamu (2016) studied the empirical effect of inventory management on financial performance of Nigerian conglomerate companies. The study aimed at establishing the relationship between inventory management and financial performance. Data for the study were catered for all conglomerate quoted companies in the Nigerian stock Exchange market as at 31st December, 2010. The study covered the period of 2010-2014. Descriptive, Pearson correlation and multiple regression were used to analyze the data. Findings from the analysis showed that inventory management is significantly related to the profitability of the company. This implies that an efficient management of the inventory cycle will enhance the profitability of the company.

Imeokparia (2013) investigated the relationship between inventory management and performance of food and beverage companies in Nigeria. The objective of the study was to determine the relationship between inventory control and success of the company. Data were sourced through secondary means from annual financial reports and accounts of food and beverage companies listed on the Nigerian stock exchange. Multiple regression method was adopted in analyzing the data. The result revealed that there is significant relationship between inventory management and performance of food and beverages companies in Nigeria.

Sindhu, Nirmalkumar and Krishnamoorthy (2014) carried out an empirical research on the performance analysis of inventory management system in construction industries in India. The main objective of the study was to analyze the inventory management control adopted in the effective utilization of inventory at the construction site. Data were sourced primarily by administering structured questionnaires to the various construction companies. Findings revealed factors that affect inventory management and improved efficiency of project management and to reduce waste of materials within the industry.

Anichebe and Agu (2013) evaluated the effect of inventory management on organizational effectiveness in selected organizations in Enugu, Nigeria. Data were collected through questionnaires. Analysis was done using descriptive statistics while Pearson product moment correlation coefficient and linear regression was used to test the study hypothesis. Result of the analysis showed that irrespective of the fact that organisations painted the picture that they were applying the tenets of good inventory management, they from time run into the problems of inventory inadequacy, which affected their production, leading to scarcity of one brand of their product or the other, thereby affecting their profitability.

In Kenya, Munyao et al. (2015) evaluated the roles that inventory management practices play in the performance of the service sector. The study found out that using technology to manage inventories has effect on performance of the public hospitals. The results of the study shown that action level methods, just-in-time, periodic review technique, Material Requirement Planning (MRP1) and Economic Order Quantity (EOQ) are examples of inventory control methods used by public health institutions. In spite of the fact the MRP1 was considered to be the most appropriate inventory control

method, most of the public health institutions in practice use action level inventory methods.

Another study was carried out by Koumanakos (2008), revealed that more inventories are held by the public health institutions, the higher customer service level and hence profitability. A similar study conducted by Eroglu et al. (2011) portrayed that there was direct relationship between inventory management practices and firm output. The study used Empirical Leanness Indicator (ELI) as a measurement scale to carry out the study. The study argued that inventory leanness is one of the most effective inventory management practices. They recommended that lean production do not keep inventory as it wastes resources and reduces firm performance.

A study carried out by Samuel (2012) to assess the impact of inventory management automation on performance of supermarkets in Western and Nyanza provinces, Kenya. The study employed a descriptive type of study design and the results showed that sound inventory management practice lead to improved performance of supermarkets

A study was conducted in Malaysia by Agus and Noor (2006), on the perceptions of managers on inventory and supply chain management practices and firm's output. The inventory management practices that were considered for the study included lean inventory systems, technology and strategic supplier partnerships. The researchers used questionnaire to collect information to assess inventory management practices used by the sampled SME firms. The firms were randomly selected from non-food-based manufacturing companies in Klang Valley, Malaysia. The results from the study depicted that inventory management practice has direct correlations with profitability of the firm.

Besides, Roumiantsev and Netessine (2007) carried out a study on inventory management practices and financial performance of a firm for the period of 1992-2002. It concluded by the study that inventory management has direct effect of financial performance of the firm. Again, Heikkilä (2002) examined inventory management and consumer satisfaction. The study portrayed that there was a positive relationship between the variables.

In another study, Nyabwanga & Ojera (2012) found out the relationship between inventory management practices and performance of hospitals in Kisii Municipality in Kenya. This study employed a sample size of 70 SSEs as well as structured questionnaires for the study. The findings of the study show a positive relationship between firm's performance and effective inventory management practices. They further revealed that the budget on inventory had the greater effect on firm's performance. The study suggested that owners or managers of small-scale enterprises employed the use of relevant inventory management practices as a means of enhance their firm's operational output.

In Kenya, Lwiki et al. (2013) assessed inventory management practices and financial performance of sugar manufacturing firms. The study assessed lean inventory system, supplier networking and information technology as the key inventory management practices. This study was a survey that was conducted within the period of 2002 – 2007 to cover all the eight operating sugar manufacturing firms in Kenya. The study used both field level data and already existing sources of data. The secondary data was collected from the annual financial performance statements which were obtained from the year book of sugar statistics. The study used structured and semi structured questionnaires which was answered by key informants in the firm. Both the descriptive

and correlation statistics were run. They concluded that there is direct relationship between inventory management practices and returns on sales and equity.

In Ghana, Kasim et al. (2015) assessed the inventory management practices of SMEs in the northern part of Ghana. The study aimed at finding out the effect of inventory management practices on financial output of SMEs. The study used descriptive survey design and quantitative approach. The data was collected by the use of questionnaire from about 1000 owners or managers of SMEs. The study used stratified random sampling technique to carry out the study. A sample of 300 SMEs were identified and interviewed and the results showed that sound inventory management led to positive impact of the financial performance of SMEs. One of the conclusions of the study was that stock management practices have effect on the financial performance of the SMEs. The study recommended that efficient stock management practices enhances the operations of the SMEs especially finances.

In another study in Ghana by Prempeh (2015) on the impact of efficient inventory management on the profit levels of manufacturing companies in Ghana. The study used a cross sectional design type and employed the use of already existing information. The data covered the period 2004 to 2014 which was collected from four manufacturing firms listed on the Ghana Stock Exchange (GSE). The study used purposive sampling methods to select the four manufacturing firms listed on the Ghana Stock Exchange. The data was cleaned to delete companies whose data were not updated and regression was used to run the data. The results from the study showed that there was a strong positive correlation between raw materials inventory management practices and profit levels of production companies in Ghana.

2.8 Conceptual Framework

A conceptual framework is a pictorial representation of the key concepts, constructs or variables of the study and their interrelationships to each other. The conceptual framework is basically a model or a plan of the study (Maxwell, 2004). It serves as a guide to refine the study goals, research questions, methods and justification of the study. The conceptual framework of a study provides a structure to guide the study. A conceptual framework of a study is a broad-based ideas and principles from related fields of the study to form as basis and platform upon which the study is based. It shows the path of the study throughout the life of the study (Mensah et al., 2020).

It seems in most studies diagrams are used to define and demonstrate the relationships of the study constructs in relation to the problem statement of the study (Mensah et al., 2020). In contracts, Behl et al. (2019) argued that a conceptual framework can also be presented in written form for better understanding of the constructs and their interrelationships.

Based on this, the present study used both the pictorial and written form to illustrate the relationships between and among the constructs of the study. The conceptual framework of this study in figure 2.1 is constructed by the researcher to explain the impact of inventory management practices on the performance of public hospitals in Bono Region of Ghana. The conceptual framework has five main constructs on inventory management practices which include strategic supplier partnership, lean inventory systems, information and communication technology, ABC technique of inventory management, distribution resource planning and vendor managed inventory. These five main constructs of the study form the independent variables whilst the dependent variables are the indicators for firm performance of public health institutions.

The conceptual model of this study explains that sound inventory practices of these constructs will have positive impact on the performance of the public hospitals in Bono Region of Ghana. In contracts, mismanagement of sound inventory practices by the public hospitals in the Bono Region of Ghana will have negative effect on the performance of the health institutions. The literature is supporting that sound inventory management practices such as information and communication technology, lean inventory systems and strategic supplier partnership have positive effect on SMEs firm's performance Lwiki et al. (2013), Kanguru (2016), Enow and Isaacs (2016) and Ampadu (2017). This is the reason why the present study adopted this model to examine the relationship between the inventory management practices and performance of public hospitals in the Bono Region of Ghana.

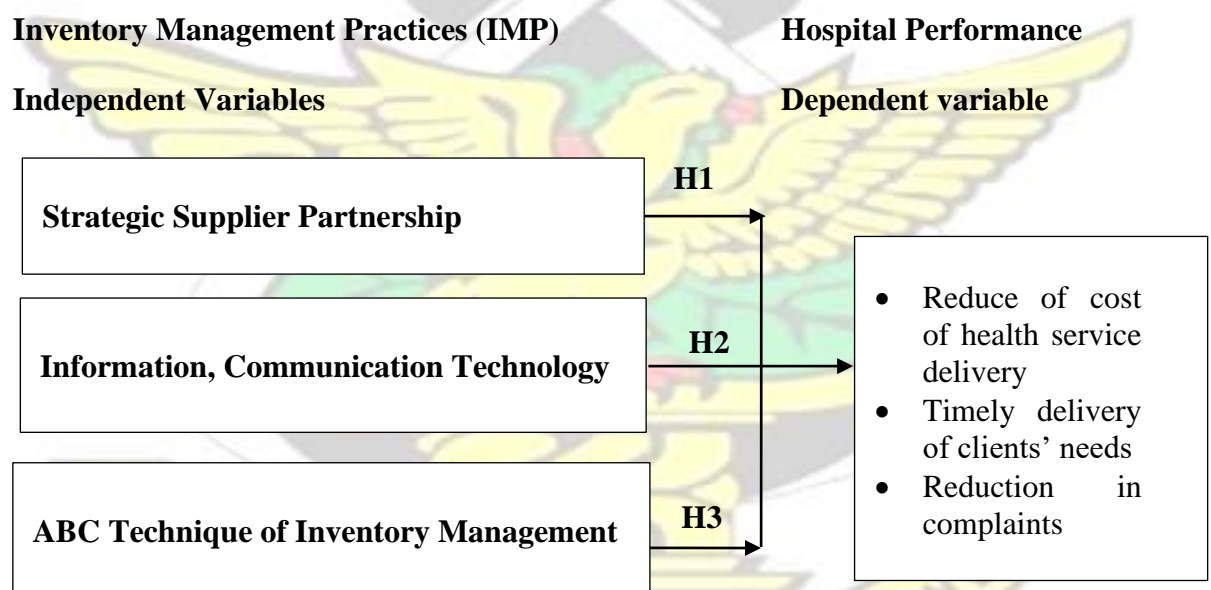


Fig. 2.2: Theoretical model of the study

Source: Author's constructs (2023)

CHAPTER THREE

RESEARCH METHODOLOGY AND PROFILE OF THE STUDY AREA

3.1 Introduction

This chapter presents the methodology that is used in this study. Research methodology is a vital facet of any research. This section addresses issues relevant to the methods employed in order to achieve the objectives of the research. Details of the research design, study population, sample and sampling procedures, data sources, and data collection were covered in this chapter. In addition, the instrument for data collection and analysis were described, as well as the concepts of validity and reliability, as well as ethical reasoning.

3.2 Research design

The research design, according to Haradhan (2017), is the conceptual framework within which the research is conducted. It serves as a blueprint for knowledge collection, measurement, and analysis. In all, it is a source of inspiration and guild to the research work (Akhtar, 2016). Data collection, measurements, and data analysis will be challenging without a research strategy. This could have a negative impact on the research and lead to its failure. As a result, before beginning research activities, an efficient and appropriate design must be established (Akhtar, 2016).

The quantitative research design was employed for this study. It used numerical values to explain the phenomenon under consideration. This makes understanding and interpretations of the situation easier (Patel and Patel, 2019). This is often appropriate for the study because it helped to explain the situations as it existed. This present study employed the use of survey approach because the study covered larger geographical area. It was cost effective to use survey strategy to collect data from well dispersed

geographical area. The respondents were asked to fill out a questionnaire, which was used to collect the primary data. The questionnaire was an institutional type rather than the household questionnaire.

3.3 Population of the study

A study's population is the sum of all potential persons, objects, or measurements of interest (Navarro et al., (2007). Babbie (2007) on the other hand, believes that a population is a group of people who the researcher is interested in for the sake of generalization. According to Bajpai (2009), the group must have information that is relevant to the investigator. The study's population is made up of the procurement and its related officers in the public hospitals in the Bono region of Ghana. The target population of the study will include the procurement officers, stores managers, the pharmacists, the medical directors and heads of user departments.

3.4 Sampling techniques and sample size

A sample is a small portion of a larger population (Saunders, 2015). In the literature, there are several sampling techniques that can be used to determine the sample size for a study. Saunders et al (2015) distinguish between probability and non-probability sampling strategies. The likelihood of members of the population being picked is known in the probability sampling approach, but the probability of members of the population being selected is unknown in the non-probability sampling technique. The probability sampling technique was used by this study because the study unit is known. A census technique was adopted since the unit of the study was few and known. The researcher used the census approach for the study because it would have enhanced the outcome of the study and the cost in carry the work would be manageable. According

to Sekaran & Boogie (2011) census enhances validity of the study providing a true measure of the population with no sampling error, availing detailed information about small subgroups within the population and providing benchmark data for future studies. The census technique was used to select all the 5 public hospitals (The sunyani regional hospital, Sunyani municipal hospital, Sampa government hospital, Seikwa and Tain government hospitals) in the Bono Region of Ghana.

In each of the public hospitals in the region, non-probability sampling techniques was used to select the respondents. The study could not have dealt with all the population in these public hospitals, hence the need to sample the respondents. The process of selecting a subset of a population from which data is collected rather than the complete population is referred to as sampling (Allwood, 2012). The term "sample" refers to all of the people who were chosen for sampling Etikan et al; (2017). When funding and time are insufficient to allow data collection on a broad population, sampling is used in research. This concept underpins the need for and execution of sampling in this research. A research sample is defined as a subset of the target population from whom data will be collected. According to Saunders et al. (2009), the sample size of a survey most commonly refers to the number of units chosen from which data was collected. According to Saunders et al. (2009), the quality of any research is determined not only by the suitability of technique and apparatus, but also by the size of the sample utilized.

The purposive sampling technique was used to select the Medical director, the head of Pharmacy, the hospital administrator, the head of stores, the Accountant, and the heads of user departments from each hospital. In each of the public hospitals, 5 heads of user departments were selected through a convenience sampling techniques to participant in

the study. It implies that 10 respondents were selected from each hospital across the 5 hospitals making the sample size of 50 respondents.

3.5 Sources of data

The study acknowledges the presence of the two main sources of data; the primary source and secondary source. According to Saunders (2015), primary data are gathered using either questionnaires or structured interview guide. Primary data is first-hand information gathered from respondents using structured questionnaires and interviews or either of them (Creswell, 2006). On the other hand, secondary data are those data that are obtained from database systems, record books of institutions and others. However, this study used primary data.

Structured questionnaires were employed together data from respondents. The questionnaire has two types of questions: open ended and closed ended. The respondents were given a list of different replies to choose from, and they were asked to pick the one that best represented their point of view. The open-ended questions, on the other hand, did not have any options. The responses of the respondents were captured in their entirety as a result of this. The respondents responded to the questions in the way that he or she understood them. It is important to note that respondents were given the time to consider the questions in order to deliver accurate responses. Before conducting the full-scale questionnaire administration, the researcher did informal pretesting of the draft questionnaire with a few probable respondents. Questionnaires were serially numbered to assure correctness, completeness, and quality.

3.6 Data collection methods

There are two main sources of data for the social science research and these are primary and secondary data. A primary data by definition is the data that is collected from the field the first time and it is used for the purpose for which it was collected. In contrast, secondary data is the data that is already collected or generated by other producers for other purposes rather than the reasons for which it was collected. Secondary data already exist (Saunders & Thornhill, 2003; Robson, 2012). This present study used primary data and which was collected from the owners and managers of the public hospitals in the Bono Region of Ghana. The primary source of data is used for this study because secondary data was not available to assess the impact of inventory management practices and performance of public hospitals.

The data for the study was collected through the use of structured questionnaire. The questionnaire was developed and designed by the use of Likert type of questions to assess the impact of inventory management practices and performance of public hospitals in the Bono Region. The Likert types of questions have been used because it would help the researcher to gather the needed information about the subject matter under study. The study also used the Likert measuring scale of 1- 5 as used by (Borges et al; 2019, Njoroge et al; 2015 and Krichanchai et al; 2017, Mori et al; 2021) to assess the impact of inventory management practices and performance of public hospitals. The questionnaires were organized into four sections. Section A of the questionnaire collected background information of the respondent and the firm whilst section B covered the inventory management practices adopted by the public hospitals. The section C of the questionnaire gathered information about the challenges of implementing the inventory management practices and the section D asked questions

on the effect of the inventory management practices on the performance of public hospitals in the Bono Region of Ghana.

The data was collected through internet and the use of Google questionnaire. The google link was developed and forwarded to the respective target population of the study. Some of the critical questions were made mandatory (restricted) so that the respondent cannot skip them without answering them. For the respondent to qualify, the person should be working the hospital. There was a question to filter the eligibility of the respondent without which the respondent could not move to the next questions. These restrictions in the questionnaire are set to ensure that the respondent does not skip an answerable question.

3.7 Data analysis

Prabhat and Meenu (2015) defined data analysis as the process of systematically applying statistical and logical techniques to describe and illustrate, condense and summaries and evaluate data. The data for this present study was analyzed by the use of Statistical Package for Social Sciences (SPSS) version 25. The data analysis was in two parts; descriptive and inferential statistics. With regards to the descriptive statistics, the study used means, percentages and standard deviation to describe the data. With respect to the inferential statistics, the study used multiple regression and Pearson correlation models to examine the relationship between inventory management practices and the performance of the public hospitals. The data was displayed by the use of tables and regression equations.

Multiple regression model specifications: Equation 1

$$P = \alpha_0 + \alpha_1 SP + \alpha_3 ICT + \alpha_4 ABC + e$$

Where,

P = Performance (dependent variable)

α = Constant

SP = Strategic Supplier partnership

ICT = Information communication technology

ABC = ABC technique of inventory management

e = error term

$\alpha_1, \alpha_2, \alpha_3$, = Predictor variables

3.8 Reliability and validity

The reliability and validity of research instruments are not wholly achieved or assured unless pre-testing of the research instrument is conducted (Creswell, 2009). Pre-testing is conducted to expose the researcher to the results that are to be expected from the field including the challenges that are likely to occur. Through the pre-testing, information gathered allows the researcher to remove questions that are likely to cause embarrassment to respondents and amend questions that were not understood by respondents due to its wording, structure and formatting. These changes are done in order to fulfil the content validity of the study. The content validity is confirmed after the pretesting and as well, face validity is also assured. By reducing questions that may negatively affect the process of gathering data and possibly improving the quality of data, reliability of the research instrument was met (Saunders et al., 2009). Pre-testing makes it possible for research instrument to measure what they are supposed to measure. This makes the research instrument consistent in terms of repeating the study

or replicating the study elsewhere. To satisfy the condition of reliability, questionnaires were adopted from researchers of authority in the chosen field and guided by the academic supervisor who supervised the research work. Validity was ensured by personally administering the questionnaires to respondents who have enough knowledge and was able to contribute to the study in that effect (Vasuki, (2021).

3.9 Ethical considerations

The rightness of the researcher's behavior in respect to the rights of individuals who become the subjects of the researcher's work is described by Saunders et al. (2012). Being professional in what one does necessitates ethical concerns. According to (Bryman & Bell, 2007, Bell et al. 2022). Ethical consideration is the commitment made by the researcher to take into account the necessary ethics.

In complying with these ethical standards, this research was conducted in an honest fashion devoid of deception. Prior to administering the questionnaire, informant consent was sought from respondents who were willing to participate in this study by the researcher. Specifically, the study's purpose and relevance were explained to the informants. In addition, there were four major ethical factors that were applied to the study; (1) anonymity of the respondents, (2) seeking the consent of respondents, (3) information confidentiality and lastly, (4) conducting a study in a safe environment.

3.10 Profile of the public hospitals in the Bono Region of Ghana.

Bono Regional Health Directorate (RHD), used to be Brong Ahafo Regional Health Directorate. The change in the name was as a result of regional re-organization policy implementation, which led to creation of two new regions (Bono East and Ahafo

Regions) out of the then Brong Ahafo Region in 2019 (Bono Region – Ghana Health Service (ghs.gov.gh , accessed on 14/2/2023)).

The RHD is responsible for policy dissemination, stakeholder dialogue, capacity-building, coordination of planning and implementation of health policies and programmes in the region. The Departments under the RHD provide technical support, monitoring and supervisory functions of health services delivered at the district, sub-district, and community level in the region. Under the RHD, we have 12 Municipal/District Health Directorates headed by Municipal / District Directors of Health Service who provide supervision, technical and management support as well as champion the implementation of health policies and programmes in the districts and sub-districts within the region.

Health services in the region are provided by government, CHAG, private and quasi-government health facilities. The total number of facilities in the region is 461. Ghana Health Service facilities are 366, private (62), CHAG (25) and quasi-government (8). Health facilities delivering specialists services in the region include Dorma (eye, newborn care), Wenchi (urology), and the Bono Regional Hospital (various specialties including paediatrics, maxillo facial surgery).

The Bono Region has 5 public hospitals namely Sunyani Regional Hospital, Sunyani Municipal Hospital, Seikwa Government Hospital, Sampa District Hospital and Tain Government Hospital. The other hospitals are CHAG or private and or quasi-government. (Bono Region – Ghana Health Service (ghs.gov.gh , accessed on 14/2/2023))

As the body responsible for health services in the region, the RHD maintains close links with all other agencies of the Ministry of Health, the local government system, traditional authorities, and other stakeholders in health including development partners, and civil society in the region. The Regional Health Directorate (RHD) represents the administrative apex of health services delivery within the region. The mandate is to provide and prudently manage comprehensive and accessible health service with special emphasis on primary health care at regional, district and sub-district levels in accordance with approved national policies. The RHD also works with headquarters, health partners, and other stakeholders to increase access to health services, through the provision of health infrastructure, human resources, logistics/health commodities, public health and clinical



CHAPTER FOUR

PRESENTATION OF DATA ANALYSIS AND DISCUSSIONS

4.1 Introduction

The main goal of the study is to assess the impact of inventory management practices on the performance of public hospitals in the Bono region of Ghana. The background information on the respondents were run and the other descriptive and inferential statistics were analysed.

4.2 Responses rate of the study

The main instrument for data collection was e-questionnaire. After the data was collected, collated, cleaned and analysed, it revealed that about 5 respondents did not response to the questionnaire appropriately. So those questionnaires were removed from the dataset and hence the analysis. The sample size for the study was 50 out of which 5 was not complete by the respondent. Based on this, the response rate for the study was 90 percent ($45/50 \times 100$). The response rate for this study was enough to measure the variables of the study. Cooper and Schindler (2006) argued that a response rate of about 50 percent should be appropriate to analyses the data of the study and generate the necessary reports. They further argued that despite the minimum threshold of 50 percent, the higher the percentage the better the result of the study. It implies that the response rate of 90 percent for this present study would be sufficient to carry out the analysis for the study. The non-response rate will not affect the credibility of the study in any way.

4.3 Background characteristics of the respondent

The bio data of the respondents were analysed in this section. The main variables considered in this section include age, sex, working experience and educational level.

Table 4.1: Background characteristics of the respondent

Categories		Frequency	Percent (%)
Gender	Male	20	44.4
	Female	25	55.6
	Total	45	100
Age	21 – 30	9	20.0
	31 - 40	17	37.8
	41- 50	17	47.8
	50+	2	4.4
	Total	45	100
Position	Supply chain officer	5	11.1
	Stores manager	11	24.4
	Medical Superintendent	5	11.1
	Accounts officer	9	20.0
	Head of User Department	4	8.9
	Head of Pharmacy	11	24.4
	Total	45	100
Experience	1-5 Years	8	17.8
	5-10 Years	20	44.4
	Over 10 Years	17	37.8
	Total	45	100
Educational level	Diploma	10	22.2
	Bachelor's Degree	21	46.7
	Master's degree	14	31.1
	Total	45	100

Source: Field Data, 2023

Table 4.1 presents the bio data of the respondents. The gender distribution of the study showed that about 55.6 percent of the respondents were females whilst about 44.4 percent were males. This implies that the females were dominated in the study because public health is female domineering sector especially in the Bono region of Ghana.

Table 4.1 also showed that majority of the respondents were within the ages of 41-50 years (47.8%) and followed by 31-40 years (37.8%). About 4% of the respondents were within the ages of 50 years and above whilst the lowest age group was within the ages of 21-30 years (20%).

In Table 4.1, with respect to the positions that respondents hold in the hospitals, stores manager and head of pharmacy were mostly contacted during the period of the census. It was followed by the accounts (20%), medical superintendent and the supply chain officer (11.1% each).

The table 4.1 also indicates that about 44 % of the respondents were having working experience between 5-10 years. It means that larger numbers of the respondents were having extensive experience over their work whilst those have been working with the public hospitals in the Bono region were about 38 %. The workers with less than 5 years were only 18% of the respondents. The implication is that most of the workers have much experience in their areas of specialization.

Finally, table 4.1, portrays the educational level of the respondents. The study showed that majority of the respondents were having their first degrees (47%) and followed by those with master's degrees (31%). The least academic qualification was diploma degree. The public sector is well stocked with right academic staff especially in the field of inventory management.

Table 4.2: The interpretation of the study's responses

Grading (mean scores)	Responding Variables	Meaning of the responding variables	Interpretation of the responding variables
0.0-0.99	strongly disagree	Very poor	Below expectation
1.0-1.99	Disagree	poor	within expectation
2.0-2.99	Neither Agree nor Disagree	neither poor nor good	Neither below or above expectation
3.0-3.99	Agree	Good	Achieved expectation
4.0 -4.99	Strongly Agree	Very good	Exceeded Expectation

Source: Field Data, 2023

A Likert scale of 1 to 5 was used as the measuring unit for both the questionnaire and the descriptive analysis of the study. The measuring scale ranges from 1 for strongly disagree to 5 standing for strongly agree. The mean values were used to interpret the descriptive statistics as shown in Table 4.2 The more the mean value is moving closer to the upper limit of this mean ranges, the better the indicator is performing.

4.4 Descriptive statistics of the study

This section of the study covered the descriptive statistics of the study. The descriptive statistics were run on the main construct of the research such as strategic supplier partnership, information communication and technology and ABC techniques and their impact on the performance of the public hospitals in the Borno Region of Ghana.

Table 4.3: Descriptive statistics on strategic supplier partnership (SSP)

Statements	N	Mini	Maxi	Mean	Std. Dev
The hospital involves suppliers early in the procurement process	45	1	5	3.22	1.204
The hospital uses fewer suppliers as against many suppliers	45	1	5	3.24	1.171
The hospital's inventory staff usually have frequent meetings with its suppliers	45	1	5	3.16	1.205
The hospital shares complete information among its suppliers	45	1	5	3.27	1.116
Proper communication between the hospital and its suppliers	45	1	5	3.27	1.214
Long – term agreements between the hospital and its suppliers	45	1	5	3.31	1.258
Composite mean				3.24	

Source: Field Data, 2023

Table 4.3 portrays that the public hospitals in the Bono region of Ghana used strategic supplier partnership practices in managing their inventories to some extent with a composite mean score of 3.24. the study revealed that good communication exists between and among the hospitals and their suppliers with a mean average of 3.27. This enhances effective management of their inventories to reduce cost and waste from the systems. Another strategic strategy of the hospitals is to deal with fewer supplies as against many suppliers in managing the inventories in the hospitals with a mean figure of 3.24. This help them to concentrate on their strategic suppliers for better understanding, collaborations, resolutions of conflicts and building stronger team work. The most important supplier strategy the hospitals are using is establishing long standing agreement with their suppliers (means of 3.31). The framework buyer supplier relationship is helping the hospitals to better manage the inventories as suppliers are at times bound and held liable for the supply.

Table 4.4: Descriptive statistics on information communication technology

Statement	N	Mini	Maxi	Mean	Std. Dev
The hospital has computerised all inventory management systems	45	1	5	3.31	1.258
The hospital's computers are linked with those of suppliers in a real time environment	45	1	5	2.56	1.307
The hospital uses Data Interchange Technology (EDI)	45	1	5	2.89	1.229
We use computers to record inventory received from suppliers and issued out to user departments	45	1	5	3.29	1.375
We use mobile phone to place orders, fellow-ups and ask clarifications from suppliers	45	1	5	3.07	1.338
Composite mean				3.13	

Source: Field Data, 2023

From table 4.4, information communication technology has real impact on inventory management and resultant effect on the performance of the public hospitals in the Bono region of Ghana as shown by the overall mean of 3.13. The study's results show that most of the public hospitals have computerised their inventory management systems (mean of 3.31). the mechanical means of managing the inventories are reducing human errors and wastes of all forms and improve output per head. The second most relevant information and communication technology is that computers are used to record inventories received from suppliers and issued out to end users in the public health systems in the Bono region of Ghana (mean of 3.29). It was observed by the study that most of the public hospitals use mobile phones to place orders, do follow-ups and ask for clarifications from suppliers and other stakeholders. The use of the mobile phones facilitates management of the inventories in the hospitals (mean of 3.07). It reduces movement cost of people and materials as accurate information is obtained on the inventories before any personal movement or actions are taken.

Table 4.5: Descriptive statistics on ABC Techniques

Statements	N	Mini	Maxi	Mean	Std. Dev
The hospital uses ABC Analysis to reduce stock holding cost	45	1	5	2.93	1.136
The hospital uses ABC techniques for monitoring the most costly items	45	1	5	3.13	1.198
The hospital uses ABC analysis to classify items according to their stock value	45	1	5	3.07	1.250
Composite mean				3.04	

Source: Field Data, 2023

As shown by table 4.5, the ABC techniques used by the public hospitals have effect on the running of the inventories and hence the hospitals. The overall average of 3.04 is illustrating that ABC techniques have impact of the performance of the public hospitals. The public hospitals used the ABC methods to monitor the items or inventories that were mostly costing the hospitals. The hospitals were able to identify and group the items or supplies that are highly costly and keep eagle eyes on their security, movement and maintenance. This reduced cost of keeping inventories to the minimum.

Table 4.6: Descriptive statistics on performance of the public hospitals

Statement	N	Mini	Maxi	Mean	Std. Dev
Reduction in Number of complaints from our customers/ clients	45	1	5	3.91	1.203
Hospital bed capacity	45	1	5	3.00	1.314
Hospital facilities	45	1	5	3.27	1.195
Number of people treated and discharged	45	1	5	3.18	1.051
Composite mean				3.34	

Source: Field Data, 2023

Table 4.6 expressed that inventory management has effect on the performance of the public hospitals in the Bono Region Ghana. The composite mean of 3.34 is showing that sound inventory management practices lead to improved performance of the public hospitals. It came out that the complaint levels of the users or clients of the public hospitals have reduced to the barest minimum with an average mean of 3.91. Sound and effective inventory management could lead to reduction in wastes of all forms, reduction in shortage or shrinkage of inventories, holding cost and ordering cost as well as disposal costs. It could also be seen from the study that hospital facilities are increasing due to sound management of inventories and adoption of inventory management practices (mean of 3.27). The number of patients treated and discharged increased as every logistics were available for efficient and effective work to be performed (mean of 3.18).

4.5 Reliability and validity Test

The reliability test has been run for the study to assess the extent of consistency between and among the variables used to measure the impact of inventory management practices on performance of public hospitals in the Bono Region of Ghana. The reliability test was run by using Cronbach's Alpha reliability test. The Cronbach's Alpha of 0.7 or more is recommended rate for reliability test for a given study (Saunders, 2012).

Table 4.7: Reliability and validity Test

Statement	Cronbach's Alpha	Number of Items
Strategic Supplier Partnership (SSP)	0.81	6
Information communication technology (ICT)	0.74	6
ABC Techniques	0.86	3
Organisational performance	0.73	4
Overall Alpha	0.79	

Source: Field Data, 2023

Table 4.7 portrays the reliability test of the study for the main constructs using Cronbach's Alpha reliability test. The construct for the study was grouped under strategic supplier partnership, Information communication technology and ABC technique. With regards to table 4.7, for each of the key constructs to measure inventory management practices recorded Cronbach's Alpha that was more than the minimum threshold of 0.7. This means that there was internal consistency in the independent variables used for the study. This means that using the same data collection instruments and procedures for the present study, the results could be repeated.

Table 4.8: Multicollinearity Test

Variables	Tolerance	VIF
Strategic supplier partnership	0.431	2.32
Information Communication Technology	0.35	2.85
ABC technology	0.68	1.47

Source: Field Data, 2023

Table 4.8 tested multicollinearity of the study. In research, multicollinearity is where one or more of the variables measuring the independent constructs are directly related to each other. It was observed by Gitau (2016) that collinearity is where some

independent variables can be detected having linear relationships. The results from the multicollinearity test on the independent variables should have a maximum threshold of .5 and 5 for both the tolerance and variance inflation factor (VIF) respectively as recommended by Gareth et al. (2013). The analysis of the multicollinearity results in table 4.8 for this present study is less than the maximum threshold of .5 and 5 for tolerance and VIF respectively. These results imply that multicollinearity was not present to affect the independent variables. It also means that the independent variables for the study are not interrelated.

Table 4.9: Model fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.628 ^a	0.394	0.350	0.71307
a. Predictors: (Constant), Strategic Supplier Partnership, Information communication technology, ABC techniques				
b. Performance				

Source: Field Data, 2023

Table 4.9 presents the fitness of the regression model used to evaluate the impact of inventory management practices on the performance of public hospitals in the Bono region of Ghana. From Table 4.9, the R^2 was 0.628 which implies the about 62.8 percent of the differences in public hospital performance was responsible for the variations in the inventory management practices adopted by the public hospitals. This means that adopting sound inventory management practices in the running of the public hospitals has the possibility of improving the performance of the hospitals. The R representing the correlation coefficient of 0.394 was expressing that there is a strong positive relationship between performance of the public hospitals and inventory management practices. It implies that the public hospitals practicing sound and

achievable inventory management practices will enhance the performance of these hospitals.

Table 4.10: ANOVA Analysis

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.547	3	4.516	8.881	.000 ^b
	Residual	20.847	41	.508		
	Total	34.394	44			

a. Dependent variable: Performance (Pcom)

b. Predictors: (Constant), ABCcom, SPcom, ICTcom

Source: Field Data, 2023

Table 4.10 expressed the results of ANOVA computation that was used to test the significance of R and R² through the application of F-statistics (8.881). The F statistic (8.881) is significant since the p (.000) < 0.05. Since the F statistic is significance, the model is best in explaining the variations in the performance of public hospitals. Thus, sound inventory management practices will lead to performance of the public hospitals.

Table 4.11: Coefficients of regression model

COEFFICIENTS^A

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	1.046	0.456		2.293	0.127
1	SPcom	0.039	0.195	0.037	1.98	0.020
	ICTcom	0.621	0.212	0.601	2.926	0.030
	ABCcom	0.074	0.123	0.88	0.597	0.004

a. Dependent Variable: Performance

Source: Field Data, 2023

Table 4.11 presents the results of the regression model coefficients used to analysis the effect of inventory management practices on performance of public hospitls. The regression model of the study is specified as $Pcom = \alpha_0 + \alpha_1 SPcom + \alpha_2 ICTcom + \alpha_3 ABCcom + e$. This regression equation was transformed into $Pcom = 1.046 + 0.039SPcom + 0.621ICTcom + 0.074ABCcom + e$.

Table 4.11 is expressing the link between inventory management practices and the performance of the public hospitals in the Bono Region of Ghana. The study showed that with regards to strategic supplier partnership, there is positive relation to the performance of the public hospitals in the study area. The study showed that if all other factors remain constant, a unit change in strategic supplier partnership will cause performance of the public hospitals to increase by 0.039 units ($P=0.020<0.05$).

The study as shown in Table 4.11 also revealed that there is a positive relationship between information communication technology to the performance of public hospitals. Statistically, the model is also showing that a unit change in information communication technology, will cause the public hospitals' performance to increase by 0.621 units ($P=0.030<0.05$). Table 4.11 also showed that a unit change in the ABC technique will increase the performance of the public hospitals by 0.074 units ($P=0.040<0.05$).

From the table 4.11, it is typically showing that sound inventory management practices will have positive effect on the performance of the public hospitals. The regression model is showing that ($\alpha = 1.046$) if all factors contributing to public hospitals' performance are held constant, the public hospitals will improve performance by 1.046 units. As shown by Table 4.11, the most critical inventory management practices were information communication technology which is responsible for about 62 percent to the

changes in the performance of the public hospitals but the least inventory management practice observed by the study is the strategic supplier partnership.

Table 4.12: Correlation between inventory management practices and firm performance

		Pcom	SPcom	ICTcom	ABCcom
Pcom	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	45			
SPcom	Pearson Correlation	.452**	1		
	Sig. (2-tailed)	0.002			
	N	45	45		
ICTcom	Pearson Correlation	.623**	.754**	1	
	Sig. (2-tailed)	0.000	0.000		
	N	45	45	45	
ABCcom	Pearson Correlation	.413**	.405**	.565**	1
	Sig. (2-tailed)	0.003	0.020	0.000	
	N	45	45	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Table 12, is indicating the relationship between inventory management practices and performance of the public hospitals. The outcome of the study is showing that there is a positive significant relationship between inventory management practices and the performance of the public hospitals. The correlation coefficient of 0.452 is expressing that a unit increase in sound inventory management practices will lead to a unit increase in performance of public hospitals. All most, invariably a unit decrease in the activities of inventory management practices could lead to poor performance of the public hospitals. From table 4.12 also, there is a positive significant relationship between and among strategic supplier partnership, information communication technology and ABC techniques.

4.6 Discussions of findings

4.6.1 Strategic supplier partnerships have positive significant effect on public hospital performance.

The outcome of the study showed that strategic supplier partnership has a positive and significant relationship on performance of public hospitals. This implies that sound inventory management practices could lead to increase in the performance of the public hospitals. The other side is that poor handling and management of the inventories of the public hospitals could lead to poor performance of the hospitals. This assertion is supported by several studies (Ontita, 2016, Obermaier and Donhauser, 2012, Lwika et al. 2013, Kanguru 2016, Enow and Isaacs 2016 and Ampadu 2017) that there are direct relations between strategic supplier partnership (inventory management practice) and public hospitals' performance. This is because efficient strategic supplier partnership of inventory management could lead to cost minimization as it reduces waste, improves lead time and also offering assurance of long standing agreement between the suppliers and customers of the public hospitals.

4.6.2 Information communication technology has positive significant impact on hospital performance.

Out of the three variables used for the study, information communication technology is strongly positively related to the performance of the public hospitals in the Bono Region of Ghana. The use of mobile phones, internet and intranet, and the use of the computers for managing inventories in the public hospitals have enhance the performance of those public hospitals. The study concludes that information communication technology is critical to the management of modern day inventories which has the positive effect on performance of the organisations. This conclusion was

in line with various studies (Zengwa & Choga, 2016, Lwika et al. 2013, Ampadu 2017, Shah and Shin, 2007) that information communication technology has positive effect on inventory management and organisational performance. This is possible because with efficient ICT systems to manage the inventory levels, demand and delivery dates, planning and forecasting without much human interferences usually improves inventory management practices. This eliminates human errors and mistakes that can reduce cost the organization and improve output per head and profitability.

4.6.3 ABC techniques of inventory management has direct effect on the performance of the public hospitals.

The study concludes that ABC technique of managing inventories have positive and direct effect on performance of the public hospitals in the Bono Region of Ghana. The study agreed that grouping the inventories according to their value and cost will help the public hospitals to manage the items that are with high cost of purchasing and keeping. This reduces wastes and cost to the hospitals. Some authors (Odhiambo et al 2018, Njoroge 2015, Onkundi et al 2016, Muri et al; 2021, Ahmed et al 2019, Kumar; 2015 & Pund; 2016) agreed with this claim that ABC technique will improve management of inventories and eventually improve output of the organisations. Sound practices of ABC method of inventory management is critical to the efficient running of the public hospitals

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section of the study is to cover the summary of key findings, conclusion, recommendations and suggestions for further studies. The findings will be focusing on the objectives and hypothesizes of the study.

5.2 Summary of findings

The study sought to evaluate three main objectives. These are:

1. To assess the inventory management practices used by Public hospitals in Bono Region of Ghana
2. To determine the relationship between inventory management practices and performance of public hospitals in Bono Region of Ghana.
3. To determine the effect of strategic supplier partnership on performance of public hospitals in the Bono Region of Ghana.

The study tested three hypotheses on inventory management practices and the public hospitals' performance. The results of the hypothesis revealed that there is a positive significant relationship between and among strategic supplier partnership, information communication technology and ABC technique of managing inventories in the public hospitals in the Bono Region of Ghana.

Strategic supplier partnership and public hospital's performance

The first hypothesis of the study revealed that strategic supplier partnership has positive significant effects on the performance of public hospitals in the Bono Region of Ghana. This means that sound inventory management practices identify and use by the

management of the public hospitals will improve performance of the public hospitals in the study area. In other hand, poor and mismanagement of inventories in the public hospitals will increase cost of managing the hospitals and lead to poor performance.

Information communication technology and public hospitals' performance

The second hypothesis of the study also revealed that there is a positive significant relationship between information communication technology and performance of public hospitals. It means that effective and efficient applications of information and communication tools will add value to inventory management and public hospital's performance.

ABC techniques and performance of public hospitals

The third hypothesis of the study showed that there is a positive significant relationship between ABC technique and performance of public hospitals. It concluded that ABC technique will improve performance of the public hospitals since it will group the items based on their value and cost. The study suggested that the ABC technique will keep strong eyes on watching and managing the goods with high cost in order to maximise the returns on investment in inventory.

5.3 Conclusion

The study employed strategic supplier partnerships, information communication technology and ABC technique of inventory management to as the main constructs to assess the impact of inventory management practices on the performance of the public hospitals. It concludes that appropriate utilisation of these key inventory management practices such as strategic supplier partnership, information communication technology and ABC technique will improve the performance of the hospitals in the public sector.

5.4 Recommendations

The study is recommending that:

Public hospitals should make use of information communication technology as a priority in managing the inventory of the hospitals for optimised returns on the investment in inventory. The full scale applications of information communication technology such as mobile phones, internet and intranet, radio frequency applications and bar code on inventory management will improve operations of the inventory of the hospitals. It will reduce human interactions and increase accuracy of managing the inventories in the hospitals.

The public hospitals should apply other inventory management practices such as just in time, distribution resources planning and enterprises resources planning and max-mini inventory control methods. Some of these inventory control methods are sophisticated and robust in improving the turnaround of the inventory in the public hospitals.

The public hospitals should be sourcing and procuring the medical supplies from the right place, at the right time and the right price and conditions of the goods. The public hospitals should be purchasing from the right supplier based on competition instead of other non-competitive methods such as sole or single sourcing, for personal gains, collusions and hiking of procurement contracts.

5.5 Suggestions for future research

In relation to future studies, the study is recommending that mixed approach methodology to be used instead of single approach method to assess the inventory management practices and the performance of the public hospitals. The sample size should be increased so as to be more representative to reflect the characteristics of the study area.

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APPENDIX

SURVEY QUESTIONNAIRE

This study is undertaken by a student pursuing Msc. degree in Procurement and Supply Chain Management from the Kwame Nkrumah University of Science and Technology (KNUST). The research topic is **the impact of inventory management practices on the performance of public hospitals in Bono Region of Ghana**. This questionnaire is designed to elicit information to enable the researcher to undertake the study for academic purpose. Please your time and energy used in responding to this questionnaire are highly appreciated. Please you are assured that any information given shall be treated with outmost confidentiality and anonymity. Kindly tick/select responses you deem appropriate and provide short and concise answers where necessary.

Thank You.

Section A: Background information of the respondent

1. Which hospital do you work for?
2. Please indicate your age bracket: A. 21-30 years [1] B. 31 - 40 years [2]
C. 41 – 50 years [3] D. Above 50 years [4]
3. Please indicate your gender: A. Male [1] B. Female [2]
4. Please what is your highest educational level: A. SHS/VOCATIONAL [1] B. Diploma [2] C. Bachelor's degree [3] D. Master degree [4]
F. Others, specify.....
5. Please what is your position?
A. Supply chain officer/manager [1] B. Store officer/manager [2] C. Medical Sup/director [3] D. Accountant/Accounts officer [4] E. Head of pharmacy [5] F. Head of Department and
G. Other, specify
6. How long have you been working with this hospital?
A. Less than 5 year [] B. 5-10 years [] C. Over 10 years []

Section B: Inventory management practices

Please indicate the extent to which you agree with the following statements on the Strategic supplier partnerships used by your public hospital. The scale below will be applicable: **1=very small extent, 2= small extent, 3= moderate extent, 4= Large extent, 5= to a very large extent**

CODE	STATEMENT					
SP	STRATEGIC SUPPLIER PARTNERSHIPS (SP)	1	2	3	4	5
SPE1	The hospital involves suppliers early in the procurement process					
SPF2	The hospital uses fewer suppliers as against many suppliers					
SPS3	The hospital's inventory staff usually have frequent meetings with its suppliers					
SPI4	The hospital shares complete information among its suppliers					
SPC5	Proper communication between the hospital and its suppliers					
SPL6	Long – term agreements between the hospital and its suppliers					

Sources: Borges et al; (2019), Njoroge et al; (2015) and Krichanchai et al; (2017)

Please indicate the extent to which you agree with the following statements on the Information communication technology as an inventory management practices used by your public hospital. The scale below will be applicable: **1=very small extent, 2= small extent, 3= moderate extent, 4= Large extent, 5= to a very large extent**

CODE	STATEMENT					
ICT	INFORMATON COMMUNICATION TECHNOLOGY (ICT)	1	2	3	4	5
ICC1	The hospital has computerised all inventory management systems					
ICS2	The hospital's computers are linked with those of suppliers in a real time environment					
ICD3	The hospital uses Data Interchange Technology (EDI)					
ICR4	We use computers to record inventory received from suppliers and issued out to user departments					
ICP5	We use mobile phone to place orders, fellow-ups and ask clarifications from suppliers					
ICM6	The hospital maintains a database for all its suppliers					

Sources: Borges et al; (2019), Njoroge et al; (2015) and Krichanchai et al; (2017)

Please indicate the extent to which you agree with the following statements on the ABC Techniques of inventory practices used by your public hospital. The scale below will be applicable: **1=very small extent, 2= small extent, 3= moderate extent, 4= Large extent, 5= to a very large extent**

CODE	STATEMENT					
ABC	ABC TECHNIQUES	1	2	3	4	5
ABCR1	The hospital uses ABC Analysis to reduce stock holding cost					
ABCM2	The hospital uses ABC techniques for monitoring the most costly items					
ABCC3	The hospital uses ABC analysis to classify items according to their stock value					

Sources: Mori et al; (2021)

Section C: Performance of public hospitals

Please indicate the extent to which you agree with the following statements on the performance of your public hospital. The scale below will be applicable: **1= No improvement, 2= slightly improved, 3= moderately improved, 4= improved, 5= very highly improved**

CODE	STATEMENT					
PER	PERFORMANCE OF PUBLIC HOSPITALS	1	2	3	4	5
PERC1	Reduction in Number of complaints from our customers/ clients					
PERB2	Hospital bed capacity					
PERF3	Hospital facilities					
PERT4	Number of people treated and discharged					
PERR5	Level of referrals					

Sources: Njoroge et al; (2015) and Krichanchai et al; (2017)