

UNIVERSITY OF MINES AND TECHNOLOGY TARKWA

FACULTY OF INTEGRATED MANAGEMENT SCIENCE

DEPARTMENT OF MANAGEMENT STUDIES

THE ROLE OF EFFECTIVE INVENTORY MANAGEMENT PRACTICES ON

ORGANISATIONAL PERFORMANCE: CASE STUDY OF TARKWA

MUNICIPAL HOSPITAL



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MASTER OF BUSINESS AND TECHNOLOGY MANAGEMENT

(SUPPLY CHAIN MANAGEMENT)

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A THESIS REPORT ENTITLED

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ORGANISATIONAL PERFORMANCE: CASE STUDY OF TARKWA MUNICIPAL
HOSPITAL

BY

SOLOMON KWESI ACQUAH

SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
THE DEGREE OF MASTER OF BUSINESS AND TECHNOLOGY MANAGEMENT
(SUPPLY CHAIN MANAGEMENT)



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DECLARATION

I declare that this project thesis is my own work. It is being submitted for the degree of **Master of Business and Technology Management (Supply Chain Management)** in the University of Mines and Technology (UMaT), Tarkwa. It has not been submitted for any degree or examination in any other University.

.....

(Signature of candidate)

..... day of (Year).....



ABSTRACT

The study aimed at investigating the role of effective inventory management practices on organisational performance; a case study of Municipal Hospital Tarkwa. The specific objectives of the study were to establish the inventory management practices used by organisations, to find the effect of inventory management practices on organisational performance and to determine the challenges of implementing inventory management practices in organisations. The study adopted the descriptive and causal research designs and used questionnaire as the data collection instrument. Data were collected from 200 respondents and IBM SPSS analytical tool was used to perform the analysis. The results were presented using frequency tables and descriptive statistics tables. The study also used probit regression analysis to establish the relationship between the dependent and the independent variables. The findings show that the stakeholders of the hospital are generally happy with the service delivery of the hospital. Thus, the results show that the hospital adopts various inventory management practices including; *activity based costing, economic order quantity, material requirement planning, materials resource planning, enterprise resource planning, distribution requirement planning, and just in time*. The study concludes that effective inventory management positively affects the performance of organizations, in this case, the service quality delivery of organizations. The study recommends to organisations to successfully implement an effective inventory management system. This will help reduce the risks of shortages. In addition, the concept of inventory management could be simplified for organizations in Ghana. This can be done through education or training and to all staff in organisations to enlighten them on the need of effective inventory management practices on their organisations performance.

DEDICATION

This piece of work is dedicated to my two lovely boys: Paakwow and Jerren.



ACKNOWLEDGEMENTS

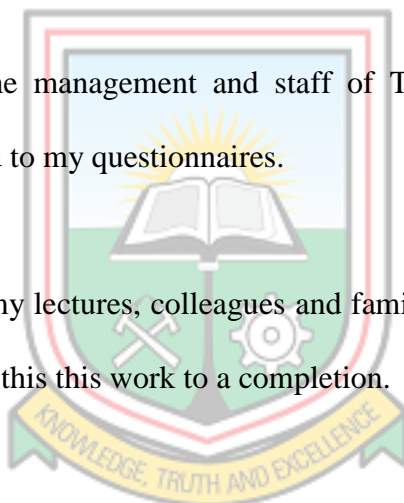
Special thanks go to the Almighty God who in his boundless mercy gave me the grace, wisdom, strength, health, endurance and foresight to undertake this thesis.

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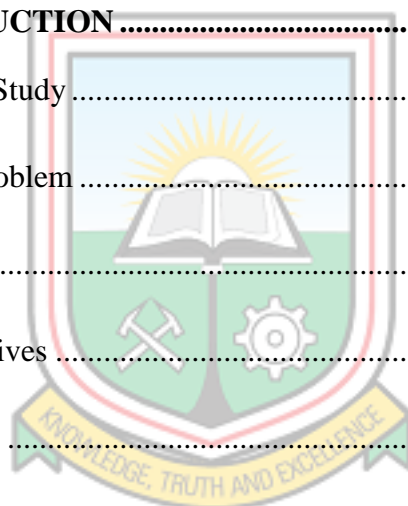
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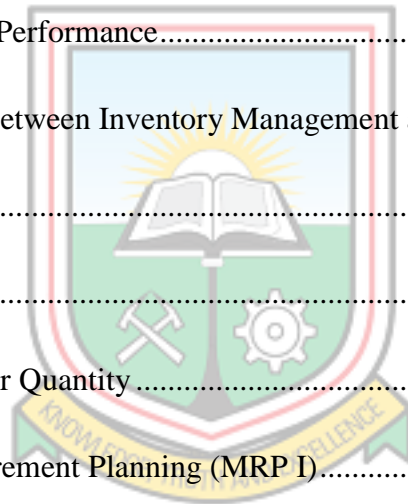
May the Good Lord Bless you all. Amen!

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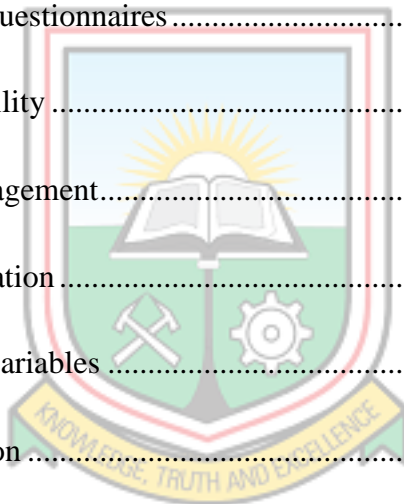
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CHAPTER 1

INTRODUCTION

1.1 Background to the Study

Every organisation exists and operates with a profit motive except non-governmental organisations (NGOs). However, either a business entity or a non-governmental organisation (NGO) keeps all manner of inventory. Effective inventory management practices have positive results on organisational performance.

Inventory management is the process of efficiently controlling the continual flow of items in and out of existing inventory (Wisner and Leong, 2011). Inventory is kept mainly to serve as a buffer between demand and supply. The terms stock and inventory are often used interchangeably. Coyle *et al.*, (2003) explains that inventory is raw materials, work-in-progress, finished goods and supplies needed for creation of a firm's products and services. An effective stock management is very significant in all organisations either manufacturing or service. The two most obvious significant of inventory management are laid on financial and operational view.

Firstly, Song *et al.*, (2006), strongly believes that inventory holds a firm's 50% to 60% of its total assets in the manufacturing organisations. Ramakrishna, (2005) is also of the view that 75% to 80% in wholesales and retails businesses. The pharmacy department is one of the most consumers of the hospital budget and one of the few areas where a large amount of money is spent on buying medicines and drugs. 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 of pharmacy stock by keeping a close

supervision on important drugs, prevention of pilferage, and priority setting in purchase and distribution of drugs. According to Miller (2010), inventory management involves all activities put in place to ensure that customer have the needed product or service. It coordinates the purchasing, manufacturing and distribution functions to meet the marketing needs and organisational needs of availing the product to customers.

Secondly, it is very imperative to operate without enough stock in the service sector. The hospital that is a service sector cannot compromise on this. The hospital needs to keep adequate stock to cater for the patients. After the diagnoses of patients, the only remedy to their ill health are drugs and medicines that needs to be stocked and effectively managed by staff. Ineffective holding and management of stock may result in higher expiration level (Chopra and Meindl, 2007). Therefore, the amount of inventory kept by the hospital depends on the operational needs and as such characterized by time needed to acquire deliveries of stock, availability of capital, cost of storage required for detailed records in the form of stock issues that is kept using store records. Gudum (2002), puts it that, increased cost, delays, stock outs and uncertain planning are as a results of uncertainty and variability of time with regards to the flow of information as well as the flow of goods.

The municipal hospital in Tarkwa is a giant in its environs in terms of service delivery and serves an average of 350 patients a day. It is paramount for the hospital to procure and store medical and non-medical materials in order to give proper medical care to its patrons (patients). For a successful delivery, it has to surmount inventory management challenges such as; shortages of medical supply, holding of excessive stock, a large sum of obsolete stock and stock losses.

Therefore, effective inventory management practices such as activity based costing (ABC analysis), economic order quantity (EOQ), materials requirement planning (MRP I), materials resource planning (MRP II), enterprise resource planning (ERP), distribution resource planning (DRP), just-in-time (JIT) and so on have become necessary in recent businesses in so as to gain excellent quality service delivery. This will enhancing supply chain competitiveness and performance, reducing cost and increasing profitability, in addition to increasing market share, growth and expansion of business (Rao and Rao, 2009). In order for businesses to improve on performance, it necessary to ensure effective inventory management practices.

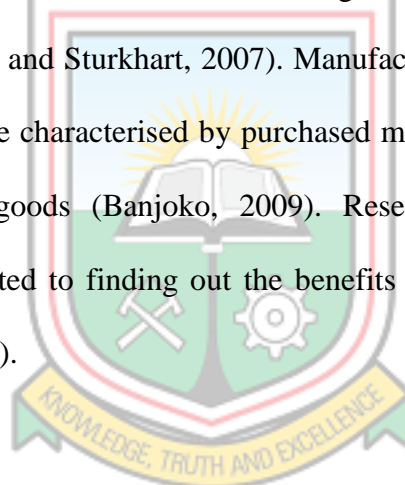
1.2 Statement of the Problem

Inventory management is among any firm's largest investment and holds the largest percentage of cost (De Leeuw *et al.*, 2011). There is no doubt that inventory management needs a treat as a main policy variable by top management. Nonetheless, most organisations have failed to do so because they give little or no attention to this area (Ogbo, 2014). Inventory management practices have been a challenge to many organisations in the world especially in the developing countries and in sub-Saharan African countries such as Ghana and Nigeria (Miller, 2010). Whiles numerous firms use automated software tools to facilitate their inventory management practices, they still may use the ones that apply a single strategy to the whole portfolio of products that are offered to clients which has many disadvantages.

Again, review of literatures show that logistics researchers focused on integrating inventory control with other traditional logistics activities such as transportation and warehousing but less literature on the practices of inventory management. Researchers in the field of supply chain management also focus on getting the right product to the right place at the right time.

Stank *et al.*, (2001); Wisner and Leong, (2011) suggest that an inventory control policy perspective, researchers have started to address questions concerning how collaboration across business units may influence an organisation's inventory policy decisions. Gakuru, (2012) argues that frustration is a key factor that impedes the application of inventory management.

Akintonye, (2014) found out that effective inventory management leads to improved performance in an organisation. Song *et al.*, (2006) explains that, 50% - 60% of total costs are saved from effective materials inventory management in the manufacturing organisations. In an organisation, the total cost can significantly reduce to 6% by effectively managing inventory (Bell and Sturkhart, 2007). Manufacturing organisations hold various types of inventory that are characterised by purchased materials, work-in-progress (WIP), materials and finished goods (Banjoko, 2009). Researches conducted on inventory management are not limited to finding out the benefits of inventory cost among private companies (Kariuki, 2003).



In contrast to the manufacturing sector, service organisations cannot operate without inventory. With specific reference to the health sector as a service organisation, the purchase of drugs and medical supplies need adequate stocking and disbursing with time. Thus, for the hospital to be accorded as a good service provider, it must discharge its services in addition to the stocked drugs and allied medications. Stevenson, (2009) points out that, higher expectation of patients could be achieved successfully and resourcefully by managing the available inventory at the right place, right quantity, right time, right quality and right cost to fervently save expiration. Most organisations especially the public service sector is of the view that inventory management practices are the sole business and concern of the

stores department but this is not the case. Inventory management practices and decisions are shared responsibilities of the entire organisation. Thus, burdening the stores with the sole management responsibilities brings challenges such as selection of suppliers, stock obsolescence, high cost of inventory, delivery challenges, stock-out and many more (Mentzer, *et al.*, 2007).

Managing inventory is a subset of the supply chain and various researches have been conducted to find out the influence of supply chain on organisational performance such as service logistics (Shams-ur and Tritos, 2008), retailing (Rajwinder, Sandhu, Metri and Kaur, 2010) and integrated operations strategy (Kannan and Choon, 2005). Going forward, more researches were conducted; Jonsson and Mattsson (2010) studied on the inventory management practices and its implications on perceived planning performance, whereas Heck *et al.*, (2010) deliberated in more details in their proposed framework with regard to improving the performance of inventory management with a process-oriented measurement framework. On the other hand, Kagashe and Massawe, (2012) argues that researches conducted on inventory management practices on organisational performance are limited. Whiles Chalotra, (2013) believes that, diverse challenges arise from inventory control because its demand is in hourly basis in contributing to organisational performance. In view of this, Rossetti, (2008) proposed that future researchers should look into the areas of inventory management practices in the service organisations particularly public hospitals.

In the health service sector, a quality of health service delivery is dependent on the good inventory management practices and vice-versa. It is obvious that effective inventory management practices have bearing on organisational performance. The big questions are “How can the health service organisation; The Municipal Hospital of Tarkwa’s inventory

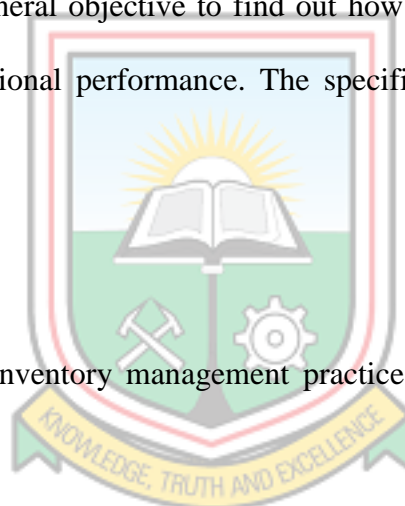
management affect the organisation's performance? How has the hospital managed its stocks? How effective has its methods been? What inventory management practices has effect on the hospital's ability to provide quality healthcare services? What are the challenges that the hospital faces in managing its inventory? From the forgoing, it is imperative that more research be done to this effect. Thus, the reason for cogently adducing the topic; The Role of Effective Inventory Management Practices on Organisational Performance.

1.3 General Objective

This research has the general objective to find out how effective inventory management practices affect organisational performance. The specific objectives have been outlined below.

1.3.1 Specific Objectives

1. To establish the inventory management practices adopted by Tarkwa Municipal Hospital.
2. To find the effect of inventory management practices on organisational performance in Tarkwa Municipal Hospital.
3. To determine the challenges of implementing inventory management practices in Tarkwa Municipal Hospital.



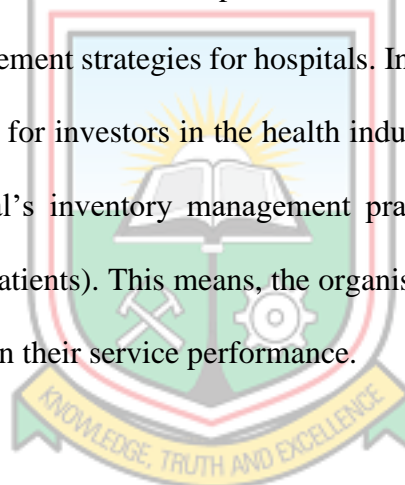
1.4 Research Questions

What is the effect of inventory management practices on organisational performance? The specific questions are:

1. What are the inventory management practices adopted by Tarkwa Municipal Hospital?
2. What is the effect of inventory management practices on organisational performance in Tarkwa Municipal Hospital?
3. What are the challenges faced by the Tarkwa Municipal Hospital in implementing inventory management practices?

1.5 Significance of the Study

For many factors, research into the role of effective inventory management on organisational performance is significant. First, it will help the healthcare industry establish effective and efficient inventory management strategies for hospitals. In addition, this research will aid in management policy guide for investors in the health industry, in that, the study will reveal the nature of the hospital's inventory management practices and the extent of service delivery to their clients (patients). This means, the organisation can base on the outcome of this research to improve on their service performance.



Moreover, this research will serve as a secondary data of reference on the subject matter. This is because the analysis will serve as a potent guide for future researchers and students who are interested in investigating into the topic under study. In order to achieve better balance between theory and practice for best results. The outcome of this research will be practically put into effective use to ensure value creation. Thus, this study will shed light and offer procedures to the public and private healthcare and other organizations for enhanced inventory management practices and performance.

1.6 Scope of the Study

This research work focuses on the role of effective inventory management practices on organisational performance, taking its case from the Municipal Hospital of Tarkwa in the Western Region of Ghana. The primary areas that the study sought to cover were the management of medicines and non-medical supplies. Thus, data were solicited from various departments and units' staff of the hospital. This will help to establish the inventory management practices used by the organisations, also to ascertain the effect of inventory management practices on the organisation's performance, and determine the challenges of implementing inventory management practices in the organisations.

1.7 Limitations of the Study

A research of this nature should have been conducted in all health service sectors in the country but there are constraints of resources such as time, inadequate finances and materials. Thus, the study is limited to a case of the Municipal Hospital of Tarkwa in Western Region of Ghana, which is a vibrant healthcare service delivery organisation. Again, time resources are a great constraint. A longer period for this research on the topic effective inventory management practices on organisational performance in all the healthcare sectors in the region or the country at large would have helped to uncover more outcome in this study.

1.8 Organisation of the Study

This study was organised into five chapters; the first chapter sought to introduce the study, dealing with the study's background, statement of the problem, research objective, research questions, methodology, limitations, and organisation of the study. The second chapter reviewed literature of authors on the study. A comprehensive review of the topic from well-

endowed writers on stock management, service level in service organisations, theories, empirical reviews, conceptual framework as well as other needful write-ups that are of much importance to this project. In the third chapter, data collection methods, sample and sampling procedure, description of research instruments used for data gathering and the data analysis methods and the organisation's profile were explored. The fourth chapter was devoted for discussing and interpreting the findings of the study from the research. Lastly, the fifth chapter gave a summary of this thesis, conclusion and some fruitful recommendations based on the outcome of this study.



CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

The literature review part of this research seeks to explore previous studies done that are related to the main topic of this research. It is important that an in-depth review be made on literatures governing inventory management practices as well as organizational performance in healthcare service delivery. Sequentially, a conceptual review, theoretical review, empirical review as well as development of a conceptual framework from the reviews is constructed.

2.1 Conceptual Review

2.1.1 Meaning of Inventory

Inventory can be defined as a stock or store of goods. This store of goods is usually found within an organization's premises or sometimes kept in close proximity to the location of the firm due to its intricate nature to help fulfil an organization's need. Anil and Suresh, (2009) defined inventory as items which stocked for sale or in the process of manufacturing or in Stock and Lambert, (2001) the form of materials yet to be used. This means, the items could be finished goods that are kept or stored to be consumed or still in the manufacturing process or raw materials.

Davis *et al.*, (2003) also defines inventory as the stock of any items or resources used in an organization. They further explained that inventory could include inputs such as financial, energy, human, equipment, and physical items such as raw material; inputs such as parts, components, and finished goods; and interim stages of the process, such as partially finished

goods or work-in-progress (WIP). Meanwhile, Ballou, (2004) also came out with the definition that inventory is a stockpile of raw materials, suppliers, components work in process, and finished goods that appear at various points throughout an organization's production and logistics channel.

Coyle *et al.*, (2003) holds the same idea that inventories are “raw materials, work-in-progress (WIP), finished goods and supplies required for creation of a company's goods and services”. Inventories are the physical resources that a firm holds in stock with the notion of selling it or converting it into a more valuable state. Sharma, (2003) also clarifies that inventory are the quantity of goods, raw materials, or other resources that are idle at a given point of time.

Van, (2005) recorded that inventory is a list of goods and materials, or those goods and materials themselves that are held in stock by a business. The term can also used for a list of contents of household and testamentary purposes of possessions of someone who has died. Lyons and Gillingham, (1981) cements it with the understanding that raw materials are commodities such as steel and lumber that goes into final product. Suppliers include items such as Maintenance, Repair and Operating (MRO) inventory that do not go into the final product. Work-in-progress are materials that have been partly fabricated but are not yet completed and finished goods are completed items ready for shipment (Kothari, 1992). From the forgoing, it could be summarily deduced that the authors have a basic concept for their definition of inventory. They categorized inventory into raw materials, component parts, suppliers or finished assemblies which are bought or sourced from outside the organization or manufactured in the organization.

2.1.2 Types of Inventory

According to Ruston *et al.*, (1999), there are a number of different types of stock that can be found in a firm's supply chain. These are generally held at strategic positions throughout the firm's logistics network and have particular interface with supplies or customers. Meanwhile, Stock and Lambert, (2001), classified inventory into six main types based on the reasons for which they are accumulated, they are: Cycle stock, In-transit inventories, Safety or buffer stock, Speculation stock, Seasonal stock and Dead stock.

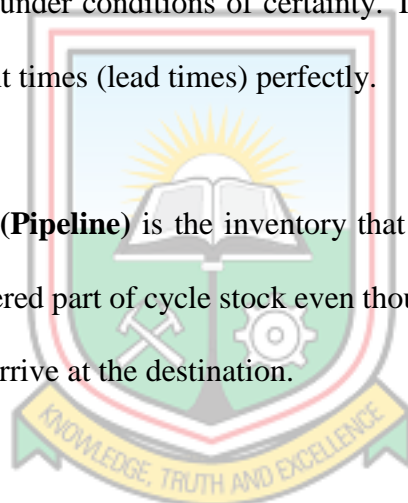
1. Cycle Stock is the inventory that results from the replenishment process and is required in order to meet demand under conditions of certainty. That is when the firm can predict demand and replenishment times (lead times) perfectly.

2. In-Transit Inventory (Pipeline) is the inventory that is en route from one location to another. It may be considered part of cycle stock even though it is not available for sale and or shipment until after it arrive at the destination.

3. Safety or Buffer Stock is the stock held in excess of cycle stock because of uncertainty in demand or lead-time. The notion is that a portion of average inventory should be devoted to cover short-range variations in demand and lead-time.

4. Speculative Stock is inventory held for reasons other than satisfying current demand. That is inventories purchased as a result of speculations of price hikes.

5. Seasonal Stock is a form of speculative stock that involves the accumulative of inventory before a season begins in order to maintain a stable labour force and stable production runs



or in the case of agriculture products, inventory accumulated as a result of a growing season that limits availability throughout the year.

6. Dead (obsolete) Stock is the set of items for which no demand has been registered for some specified period of time. They are out of date, deteriorated or no longer useful as a result of advancements in technology. Dead stock may be obsolete throughout a company or at a stock keeping location.

A more recent research conducted by Nayan *et al.*, (2018) classifies inventory under the following type:

1. Raw materials: Basic unfabricated materials which have not undergone for any operation as they are supplied from vendor directly e.g. Round bars, angles, channels, pipes, etc.

2. Brought-out parts: These parts refer to those finished parts, subassemblies which are purchased from outside as per specification.

3. Work-In-Progress (WIP): It is the items, or materials in partially completed condition of manufacturing e.g. subassemblies.

4. Finished goods inventories: Completed products ready for dispatch or waiting for sales

5. Maintenance, repairs and operating stores: These are not the items that actually do not form the part of final product but are consumed in production process e.g. oil, grease etc.

6. Tools inventory: It includes market procured tools as well as special tools manufactured for the purpose of manufacturing a single product also.

7. Miscellaneous inventories: Office stationeries, consumable stores.

Nayan *et al.*, (2018) explained further that another way of classifying inventories is:

1. Lost size inventory: Inventories procured for particular lot size.

2. Transportation Inventory: If material is in transportation for longer time, that also indicates inventory.

3. Anticipation inventories: These are built up for a particular season when demand is high and it remains demandable only for shorter duration.

4. Fluctuation inventories: These are the inventories as a result of non-accurate sales forecast and so as to satisfy variations in demand.

2.1.3 Reasons for Holding Inventory

The five basic reasons for holding inventory outlined by Stock and Lambert, (2001) are as follows. Firstly, holding inventory helps an organisation to achieve economies of scale in the aspect of buying, transportation and manufacturing. Secondly, it is necessary for an organisation to hold inventory so as to balance supply and demand, most especially seasonal supply and/or demand. The third reason why organisations keep inventory is to help them in their manufacturing specialisation. Holding inventory in an organisation helps it to specialise in the product that it manufactures. Stock and Lambert, (2001) believes that, the fourth reason why an organisation will keep inventory is to protect or shield it from demand uncertainties and order cycles. For example, management may expect a price increase or a strike which may require them to purchase in excess to support production. Lastly, a firm may hold inventory to act as a buffer between a critical interface within the supply chain, this is due to the geographical separation of members in the supply chain network. Stock and Lambert, (2001) believes that, this will help to achieve time and place utility throughout the supply chain.

meanwhile, Ballou, (1999) strongly disapproves of these reasons for holding inventory, judging with three reasons: (1) inventory is deemed wasteful, in that it absorbs much capital

which could have been put to other good use (2) inventory could deteriorate which might lead to poor customer satisfaction, if products are not properly stored (3) to encourage insular behaviours in the whole logistics and supply chain. The preceding theories are very significant to this research because it recommends that, even though inventory is very needful in an organisation, it must be managed properly to avoid wastage and deterioration, since the amount used for procuring goods for stock could have been use for other things.

2.1.4 Benefits of Inventory

According to lyson *et al.*, (2004) effective inventory management has the following benefits; (1) complete information about the value of the inventory (2) complete control of the inventory and (3) complete visibility on quantities at hand, quantity committed, quantities sold and response time to demand changes reduced.

Stevenson, (2009); Stock and Lambert, (2001), agree that the main objectives of inventory management are to reduce the total cost of logistics activities, to forecast the effect of organisational policies on inventory levels and to maximise profit. Meanwhile, Stock and Lambert, (2001) provides five purposes that inventory serve in a firm; protection from uncertainties in demand and order cycle, aids an organisation to achieve economies of scale, balances supply and demand, aids in specialisation in manufacturing and acts as a buffer between critical interfaces in the supply chain.

2.1.4.1 Protection from Uncertainties

Many organisations hold inventory as a protection against uncertainties. Stock and Lambert, (2001) makes it clear that raw materials inventory in addition to those needed to support production can result from speculative purchases made because management anticipates either a future price increase or a strike.

Raw materials will enable an organisation to achieve the following benefits:

1. To take advantage of quantity discount of market prices
2. To guard against inflation.
3. To provide strategic stocks of items which could be in short supply due, for instance, to strikes or other supply problems as a form of investment when price increases are anticipated

To cater for the variability of supply (Stevenson, 2009; Stock and Lambert, 2001).

Work-in-progress inventory is often maintained between manufacturing operations within a plant to achieve the following benefits:

- i. To avoid a shut down if a critical piece of equipment were to break down
- ii. To equalize flow, since not all manufacturing operations produce at the same rate
- iii. To improve the utilization of plant, processes and labour.

Finished goods can be used as a means of improving client service levels by reducing the possibility of a stock out due to unanticipated demand or variability in lead time. In the case where inventory investment is increased, it will enable the manufacturer to offer optimum levels of product availability and less chance of a stock out. Provides off- the- shelf customer service and finally, provides an insurance against plant or equipment breakdown and in some instances, against internal or suppliers' strikes (Stock and Lambert, 2001).

2.1.4.2 Economies of Scale

Keeping inventory in an organisation is beneficial if it needs to achieve economies of scale in terms of manufacturing, purchasing and transportation. For instance, a firm may take advantage of the per unit cost discount connected with procuring raw materials. Nonetheless, contractual negotiations can be made on annual volumes of products to be purchased and not the individual product's cost. Again, products that are purchased in bulk gains less transportation cost because full track loads (FTL) and shipments attract higher discounts than less truckload (LTL) and less than car load quantities (Stock and Lambert, 2001).

2.1.4.3 Balancing Supply and Demand

It necessary to hold inventory due to seasonal supply and/or demand. For example, a producer of condoms may experience substantial increase in sales volume during Valentine's Day and Easter Monday's. On the other hand, demand for a product (medicines and medical supplies) may be reasonably stable during the year but raw materials may be available only at certain periods in the year. This is a good example for producers of some clinical drugs (Stevenson, 2009). This makes it crucial to manufacture finished products in abundance of existing demand and keep them in inventory, except the raw materials can be procured from part of the world in diverse growing time of year (Stock and Lambert, 2001).

2.1.4.4 Act as Buffer Stock

Buffer stock is mainly kept in an organisation to shield against errors in forecasting, the lead-time or the demand during the lead-time (Lucey, 2009). It is held in distinct workplaces against the probability that the upstream workplace may be a little delayed in long setup or change in certain period. The stock is then used whereas a changeover is happening. These categorisations apply to the whole Supply chain and not only within a facility or plant.

Where these stocks contain the same or related products, it is the work practice to hold all these stocks mixed together before or after the sub-process to which they relate. This minimises costs. Due to the mixed up nature of the stock, there is no visual reminder to operators of the adjacent sub-processes or line management of the stock, which is due to a specific reason and should be a specific person's duty with inevitable consequences. Some plants have centralized stock holding across sub-processes, which makes the condition even more critical (Stevenson, 2009).

2.1.5 Inventory Cost

Lucey, (2009) presents a strong point that inventory denotes a huge investment in a firm be it the firm's policy to hold inventory or not. Coyle *et al.*, (2003) affirms that, this huge investment in inventory comes with associated cost that has three main importance. Firstly, inventory cost shows a major component of the total logistics cost in various organisations. Secondly, the amount of inventory that an organisation keeps in its logistics system has a great effect on the service level of its clients. Thirdly, the inventory carrying cost that an organisation bear is mostly because of trade-off decisions in logistics that the organisation takes.

The major costs that comes with investing in inventory and its management are classified below. These inventory cost classifications are based on the benefits that the holding of inventory brings to the organisation. The types of cost related with inventory are costs of holding stock (carrying costs), costs of obtaining stock (ordering cost), stock out costs, and the cost of the stock itself.

2.1.5.1 Cost of Holding Stock

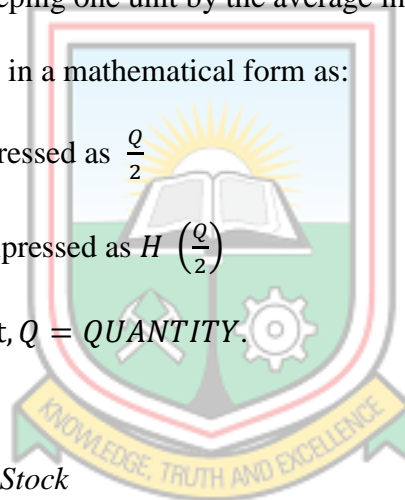
The carrying cost or the cost of holding stock is defined by Lucey, (2009) as the variable cost of holding inventory on hand. This cost is a blend of the costs related with opportunity costs such as; interest on capital invested on the stock, storage charges (rent, lighting etc.), taxes, equipment maintenance and running cost, insurance and security, shrinkage, and other variables. It represents one of the highest costs of logistics.

Any organisation just like the hospital can calculate the cost of holding a unit of inventory for a year. In this manner, it can easily calculate the yearly inventory holding cost by multiplying the cost of keeping one unit by the average inventory held per annum. Coyle *et al.*, (2003), represents this in a mathematical form as:

Average inventory is expressed as $\frac{Q}{2}$

Annual holding cost is expressed as $H \left(\frac{Q}{2} \right)$

Where H = Holding cost, Q = QUANTITY.



2.1.5.2 Cost of Obtaining Stock

The cost of obtaining stock is also known as procurement or ordering cost. According to Coyle *et al.*, (2003); Lucey, (2009), this is an inventory cost incurred by ordering supplementary stock which is not part of the cost or expense of the product itself. This covers the clerical and logistical costs associated with the ordering, payroll and products received departments; transport cost; and start up and tooling costs associated with each manufacturing operation where goods are produced internally.

The costs, sometimes known as ordering or procurement cost is the expense of placing an order for additional inventory and does not include the cost or expense of the product itself.

It includes the clerical and administrative costs associated with the purchasing, accounting and goods received departments; transport cost; and set up and tooling costs associated with each production run where goods are manufactured internally. Set up cost refers more specifically to the expense of changing or modifying a production or assembly process to facilitate product line change over's. The fixed part of set up cost must include use of the capital equipment needed to change over production firms, while the variable expense might include the personnel costs incurred in the process of modifying or changing the product line (Coyle *et al.*, 2003; Lucey, 2009).

2.1.5.3 Stock-out Costs

Lucey, (2009) describes stock-out costs as "the costs of out-of-stock running." Coyle *et al.*, (2003) also argues that when a consumer demands or needs it, it is the consequence of not making a commodity available. If an item is not available for sale, a buyer may approve a back order for the appropriate product to be available in the future, or may buy (or replace) the product of a rival, taking direct benefit from the business experiencing the stock out. The financial loss would be indirect, but longer lasting, if the business permanently loses the client to its competitor. A stock out can result in no new products or semi-finished products or parts on the physical supply side, suggesting idle machine time or even closing down an entire production facility. Lucey, (2009) explains that stock-out costs include lack of contribution by the loss of sales induced by the stock-out, loss of potential sales when buyers may move elsewhere, production stoppage costs caused by work-in-progress stock and raw materials, and additional costs involved with immediate, often limited amount, replenishment orders. Lucey, (2009) again suggests that it could be impossible to calculate stock-out expenses. The fundamental reason why stocks are kept in the first place is the reduction of stock-out costs.

2.1.5.4 Cost of the Stock

Coyle *et al.*, (2003) explains that, the cost of the stock is also known as the cost of the procured product are the actual prices of the products or the cost of production. These are the cost that organisations take into consideration in time of bulk buying and investing in production cost in a likely long batch runs. An organisation may procure some parts that will be used for its finished products and this can be calculated by multiply the cost of one procured unit (P) by the number of finished product demanded in a year (D), while purchasing cost is stated as purchased \times demand. $P_c = P \times D$

2.1.6 The Need for Inventory Management in Hospitals

Effective inventory management practices are crucial for the successful operation of any hospital. This is because the hospital is a multifaceted organisation and the amount of money that goes into inventory is sometimes a bigger proportion of the hospital's total budget. Burns, (2002) clarifies that, the cost of suppliers for the pharmacy is 15% to 20%, medical medical-surgical suppliers constitute 30% to 50% and other equipment rates 11% to 24% allocation of the total budget. It is obvious that medical surgical suppliers need detailed attention in hospital budgeting. Nonetheless, hospitals also provide huge amount of services to diverse patients from all occupations, physicians and staff as well. Some of the major services are dietary, linen, housekeeping, pharmacy, laboratory, surgery, administration etc. All these units and departments in the hospital facility need some distinct supplies, which needs to be managed effectively in order to reduce cost and increase performance that will in turn increase service satisfaction level in patients.

Moreover, it has been established by Eckert, (2007) that a hospital's medical supplies constitute a larger part of the organisation's total asset. It is prudent that the hospital

effectively manages its return on investment that is profit after tax divided by the hospital's total assets. This is a measure of the return on investment (ROI) which rises up when inventory is reduced. Otherwise, Koin *et al.*, (2014) a higher level of stocked inventory will negatively affect organisational performance.

2.1.7 Challenges of Holding Inventory in the Hospital

Amidst the diverse challenges that hospitals face in their inventory management, demand and supply uncertainties are very significant ones (Syntetos *et al.*, 2009; Syntetos *et al.*, 2010; Willemain *et al.*, 2004) especially in forecasting. Most often, there are inconsistencies in coming out with accurate demand forecasts and information sharing amongst the functional units that are in-charge of demand and supply forecasting. In so doing, a lot of inefficiencies like high frequency of reorders, shrinkages, lack of storage space, out of stock, high cost and excessive manual labour may erupt with time (Danas *et al.*, 2002; Breen and Crawford, 2004; Dongsoo, 2005; 45. Essoussi, 2010).

The demand of medical supplies that is, both consumables and non-consumables for patients' use should be made readily available in the hospital even though these resources may be scarce. The great challenge of neglecting the inventory management practices by the many partners in the facility is a big blow (Rivard-Royer *et al.*, 2002; Schneller and Smeltzer, 2009; Breen and Crawford, 2004)

Finally, proper storage facilities for some items are also a big challenge, whereas improper space may cause products to ruin and results in monetary losses. Challenges in distributing products from the storeroom to other places where they need to be used. These movement and control of stocks are very complex in nature especially in large hospital facilities. In

some cases, additional storerooms may be needed at some vantage points in the facility (Laeiddee, 2010).

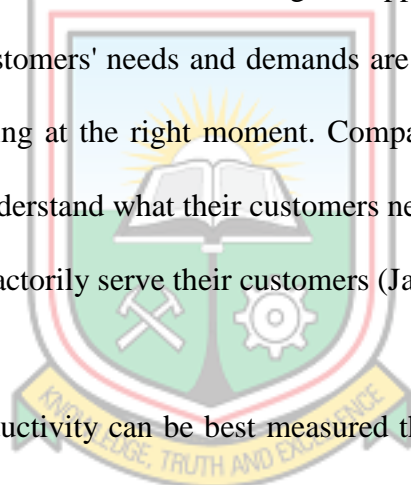
2.1.8 Inventory Management

According to West, (2009) inventory management is the continuing process of planning, organizing and controlling inventory that aims at minimizing the investment in inventory while balancing supply and demand. Precisely, the process seeks to minimise procurement and carrying costs by keeping an effective stock of goods to satisfy customer and prescriber demands. In the healthcare delivery sector such as the hospital where most of the deliveries are services, inventory will refer to the tangible goods like drugs to be sold to patients and other non-medical supplies needed for the smooth run of the facility (Nayan *et al.*, 2018). Managing materials (pharmaceutical products) in that process is an integral part of the business model for all pharmacy settings as hospital practices (West, 2009).

Coyle *et al.*, (2003) also came out with the definition that inventory management is the active control program that allows the management of sales, purchases and payments. Stressing on their definition, they believe that inventory is a critical factor for success in every organisation. They added that inventory plays a dual role in organisations by influencing the cost of sales and supports order fulfilment (customer service). Mentzer, *et al.*, (2007) affirms that effective inventory management is very essential for the success of organisation's performance. Meanwhile, Stevenson, (2009) outlined two major concerns in inventory management. Firstly, inventory management comes with ordering and carrying cost. Secondly, inventory management is concerned with the degree of customer service in other to get the right products in the right quantities, at the right place and the right time.

2.1.9 Organisational Performance

The success of a company is calculated by either reducing spending or rising benefit. Company performance management is important; in many businesses, the supply chain accounts for about 75 percent of operating spending costs (Palevich, 1999). A typical performance metric used when assessing performance is effectiveness (Chase *et al.*, 2002). Performance requires minimizing the high costs of the entire system, including transport and storage to raw materials, WIP and inventories of finished products. In order to be effective, businesses should use strategies targeted at gaining optimum cost savings and non-value-adding processes should be minimized, economies of scale pursued and optimization techniques introduced in order to achieve the highest opportunity for use. Being sensitive includes ensuring that customers' needs and demands are met. Success, on the other hand means doing the right thing at the right moment. Companies should ensure that they do sufficient research and understand what their customers need and should have access to the right instruments to satisfactorily serve their customers (Janat, 2009)



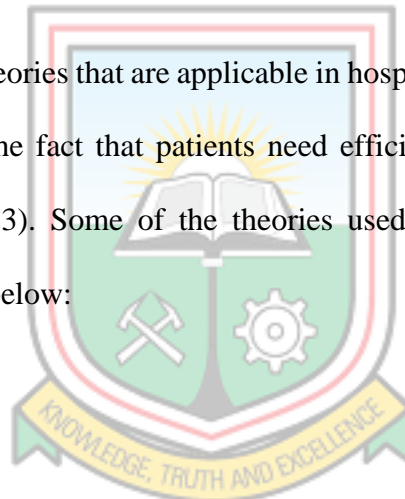
Therefore, corporate productivity can be best measured through running cost savings and customer service delivery levels. Competition from low-cost countries and domestic economies is faltering as more manufacturers are competing with international markets. Naturally, the focus of many suppliers and retailers has turned to reducing prices and waste. It is also very important to know the proper cost saving strategies and to understand the main cost drivers in a company's operations. While there is an obvious desire for cost savings, the truth is that many organizations do not realize where the majority of the cost of a product lines. It is also equally important to consider the overhead framework, as this can help to identify perverse rewards that may affect future decisions (Meeker and James, 2004).

2.1.10 Relationship between Inventory Management and Organisational Performance

Different authors have been doing various endeavours to clarify the relationship between inventory management practices and the effectiveness of a firm. Rajeev, (2010) contends that stock administration practices are a method for procuring intensity. Effective inventory management processes help increase operational efficiency of firms; improves customer service; reduces inventory and distribution costs; and enables businesses track items and their expiration dates consequently balance between availability and demand (Pandey, 2004).

2.2 Theoretical Review

Inventory management theories that are applicable in hospitals are mostly effective than any other sector because of the fact that patients need efficient services in terms of medical supply (Hani, *et al.*, 2013). Some of the theories used in managing inventories in the hospitals are deliberated below:



2.2.1 ABC Analysis

The Activity Based and Costing (ABC) Analysis is a major and recognised theory in inventory management. A nineteenth century Italian economist named Pareto propounded this. This theory help manager's gain interest on the critical few (A-items) and not on the insignificant many (C-items). It groups items into three parts as A, B and C that can be managed and controlled separately. A-items comprise only 10% of all inventory items. They are kept under strict control of higher management as they consume the top 70%- 80% of the total inventory consumption value of the organisation. B-items are the interclass items, which include 20% of total inventory items. They need adequate control by middle management because they consume 20% of annual consumption value, whiles C-items need

control by lower management, which also add up to 70% of total inventory items and consume 10% of the annual consumption value (Coyle *et al.*, 2003; Yu, 2010; Khurana *et al.*, 2013; Kumar and Chakravarty, 2014). This theory helps to minimise a firm's working capital, maximise effectiveness of inventory spending and reduces cost of losses from pilferage, shrinkage, or obsolescence down to 20%. It also helps the firm to keep reliable levels of inventory by offering products to consumers (patients) with no cost on shortages of inventory.

The main aim of this theory is to make sure that products are efficiently maximised by focusing on the items that have potential savings. It is very effective to use the selective control method to treat all products identical (Lysons and Gillingham, 2003). This theory is very significant to the study in a hospital because it portrays all kinds of inventory as important and group them according to their need.

2.2.2 Economic Order Quantity

Plasecki (2001); Lysons and Gillingham (2003), explain that the economic order model is designed to maximise an organisation's income by minimising total inventory cost. This is an accounting formula for ensuring that both the order cost as well as the inventory cost are at the barest minimum. However, they believe that accounting models reveal assumptions; this model has been found to be true as an effective inventory management technique when the demand and lead-time are comparatively stable especially when there is variability and uncertainty (Lysons and Gillingham, 2003). The significance of this theory to the study is that, an organisation is able to meet the expectations of its clients. This is because it advises on the right quantity of stock level that an organisation must keep in other to reduce an organisational cost.

Economic Order Quantity Model

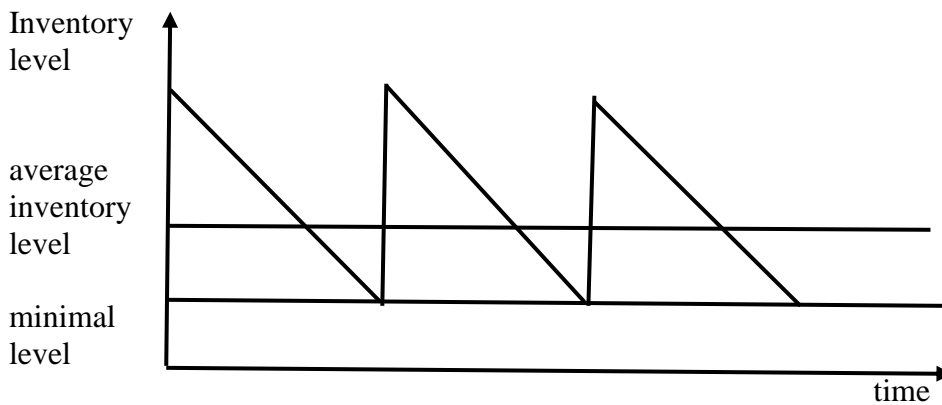


Figure 2.1 Source: J. G. Kalberg, K. L. Parkinson, (1993) Corporate liquidity: Management and Measurement, IRWIN, Homewood, p. 538

The EOQ model requires two equations:

$$EOQ = \frac{\sqrt{2 \times P \times K_z}}{C \times v} = \frac{\sqrt{2 \times P \times K_z}}{K_u}$$

Where EOQ = economic order quantity:

P = demand for the product/inventory in period (year, month)

Kz = cost per order

Ku = holding cost per unit in period

The holding cost factor (Ku) is a result of cost²

Opportunity costs (price of money tied-up in inventory) such as storage, insurance, transportation, obsolescence, wasting and spoilage costs.

2.2.3 Material Requirement Planning (MRP I)

According to Ballou, (1999), material requirement planning (MRP I) is an automated method of supply scheduling where the timing of acquisition products or productions output is synchronized to meet period-by-period operations requirement. This practice is used if an organisation wants to avoid carrying huge inventory in respect to the right requirement at

the right time. Lyson and Gillingham, (2003) also have the same concept for the definition of MRP I. meanwhile, they believe that this practice is made up of an end product to time period called the bucket which is scheduled for a maximum of a year's forecast to provide information for sales and marketing. Still on the definition, Coyle *et al.*, (2003) believes that practice is made up of a set of logically related procedures, decision rules and records designed to translate a master production scheduling into a time-time phased net inventory requirements for every component of material needed to come out with this plan.

The aims of materials requirement planning (MRP I) as outlined by Lysons and Gillingham, (2003) are:

1. To coordinate ordering, delivering of materials and components with production requirements.
2. To stimulate planning and controlling of inventories and to ensure that the needed materials available right on time for use.
3. To stimulate panning amongst the buyer and supplier to each other's gain.
4. To facilitate prompt action to be taken to overcome material or component shortage due to contingencies and late deliveries etc.

Meanwhile, Coyle *et al.*, (2003) ascribes two main goals to materials requirement planning. They believe that, to ensure the availability of materials, component and products for planned and customer service delivery these two gaols must be adhered:

1. Maintain the lowest possible inventory level.
2. Plan manufacturing and purchasing activity schedules.

In sum, the Material requirement planning (MRP I) theory considers the current and planned quantities of parts and inventory products with the time schedule for planning. This brings

about quicker and flexible response to service delivery. this is because the theory is modelled on client architecture.

2.2.4 Manufacturing Resource Planning (MRPII)

Coyle *et al.*, (2003) said that, manufacturing resource planning (MRP II) permits an organisation to incorporate financial planning and operations or logistics into their inventory system. They further stated that, manufacturing resource planning (MRP II) functions as an exceptional planning tool. The technique aids in describing the likely results of implementing strategies in areas such as logistics, manufacturing, marketing, and finance. Therefore, MRP II helps an organisation to conduct “what if?” analysis and to come up with the right product movement and storage strategies at and between points in an organisation’s logistics system.

The American Production and inventory Control Association adds that, MRP II is a system construed around materials requirement planning and includes the additional planning functions of production planning, master production scheduling and capacity requirement planning. Lysons and Gillingham, (2003) exaggerated that manufacturing resource planning (MRP II) has a broader implication than the materials requirement Planning (MRP I). Stock and Lambert, (2001) concludes that, material resource planning (MRP II) is an advancement of the material requirement planning (MRP I), emphasising on the fact that the latter has financial, marketing and purchasing component in addition. This is an inventory theory that needs to be practice in the healthcare sector in that, it stresses on the need to carry quantities of stock that is needed at a given time to avoid excessive inventory and help reduce holding or carrying cost.

2.2.5 Enterprise Resource Planning

According to Stock and Lambert, (2001) the Enterprise resource planning (ERP) is a theory that includes the primary accounting roles such as: accounts payable, accounts receivable, and general ledger in addition to the logistics functions used to manage an organisation. Lysons and Gillingham, (2003) confirms that, the ERP is a business inventory management model that has a multi-module application software that is added to all departmental functions in organisations. Explaining further, they believe that the ERP is a hybrid module of material requirement planning (MRP I) and material resource planning (MRP II). This theory states that, MRP I and I are limited to functions of making the manufacturer to track the supplier. Work in progress and the output of finished goods to meet sales order but the ERP can be accessed in all departments of an enterprise, allowing managers and users to have a full view of what is and what is not taking place in the entire organisation.

2.2.6 Distribution Requirement Planning (DRP)

Distribution Requirement Planning (DRP) is a technology that works in logistics operations through Information Technology (IT) as a sophisticated planning approach for multiple distribution stages. As indicated by Gebicki *et al.*, (2103), the scheme is capable of helping to consolidate shipments to multiple locations spread over a vast geographical area, thereby helping to reduce freight costs. In addition, the scheme has many benefits in terms of increasing inventory exposure in the supply chain and distribution by reducing inventory and storage room ratios. Lysons and Gillingham, (2003) defined Distribution Resource Planning as an inventory control scheduling technique that applies material requirements planning principles to distribution inventories. It may be regarded as a method of handling stock replenishment in a multi-echelon environment.

Vollman *et al.*, (1997) observed that Distribution Requirement Planning (DRP) serves a central role in co-coordinating the flow of goods inside the factory with the system modules that place goods in the hands of the customers, and provides the basis for integrating the manufacturing resource planning (MRP II) system from the firm to the field. The fundamental reason for Distribution Requirement Planning (DRP) is to predict demand more effectively and leverage the data back for use in the construction of production schedules. In that manner, by using Material Requirements Planning (MRPI) in combination with production plans, a business can reduce inbound inventory. By the use of Distribution Requirement Planning (DRP), outbound inventory is minimised (Coyle et al, 2003). The significance of this theory to this analysis is that it implies that by matching inventory status with the estimated amount of products required to reach the production schedule, inventory amounts are calculated.

2.2.7 Just-In-Time System (JIT)

Harber *et al.*, (in Biggart and Gargeya, 2002) note that the just-in-time (JIT) production system (as the Toyota production System) was developed by Shigeo Shing and Taichi Ohno at the Toyota Motor plant in the mid-1970. Many names are referred to as JIT production: zero inventory system (ZIPS), minimum inventory production system (MIPS), Kanban production, kaizen production, stockless production, inventory systems for pull-through production and Quick Response (QR) Since its inception, JIT production has gained a great deal of coverage, both as a theory and a disciplinary system of production. The theory of JIT development is based on three basic principles: waste reduction, continual enhancement of effectiveness and promotion of preparation and implementation of worker participation. Gourdin, (2001) adds that this concept of just-in-time production allows producers to work closely with suppliers and transport providers to get the requisite details.

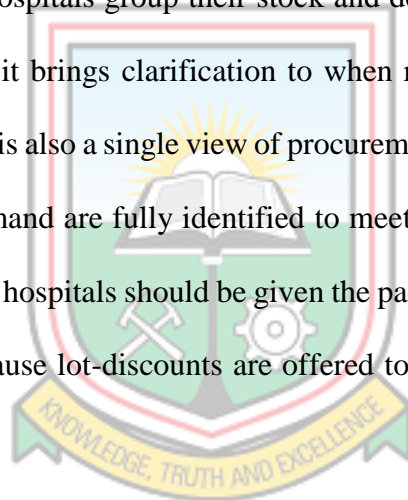
The Just in Time is an inventory management practices with the objective of maintaining just sufficient material at the right place and at the right time in order to make first the right quantities of inventories (Carlson, 2002). According to Voss, JIT is viewed as a “Production methodology which aims to improve overall productivity through elimination of waste and which leads to improved quality”. JIT provides an effective production in an organization and delivery of only the necessary parts.

2.3 Empirical Review

Tarurhor and Osazevaru, (2021) conducted a study on the effect of inventory management on customers satisfaction using lead-time as their moderating variable in public hospitals in Nigeria. They targeted a sample population of two hundred and six-five and issued self-administered to Medical Doctors, Nurses, Pharmacists, and Medical Laboratory Scientist for responses. Questionnaires were also structured for customers (patients). Thus, one hundred and five questionnaires for the former and one hundred and sixty for the latter. These returned questionnaires were regressed and a structural equation modelling was used to analyse the responses. They as well researched on the impact of inventory management on patients’ satisfaction. The outcome of this research showed that lead-time has the tendency of moderating between strategic partnership, lean inventory and information technology that alternates between inventory management and customer satisfaction. At five percent (5%) significant level, lean inventory, strategic supplier partnership recorded statistically positive significance with customer satisfaction. The researchers recommended that the government should focus on lead-time prevent lack of primary inventories in the hospitals.

Kihara and Ngugi, (2021) conducted a research on Inventory Management Systems and Performance of Public Hospitals in Kenya; Case Of Counties under Universal Health Care

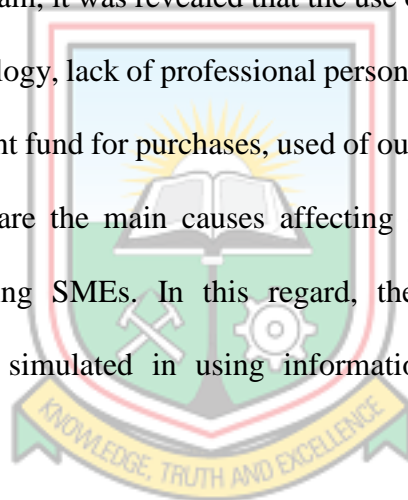
Programme. The proceedings and outcome are as follows. They use the descriptive research design in order to get answers to their research questions and control variance. Their sample population was 109 workers in public hospitals various towns in Kenya. The researchers administered open-ended questionnaires to gather primary data and as well gathered secondary data too. Afterwards, they found out from the results that Just in Time Management Practices is best used in the hospitals and gives rapid responses whiles permitting the hospitals to keep operations performed quickly and move on to new products swiftly if the need be. They reported that effective inventory management practices aid hospitals to save money that would have been spent on slow moving items. Furthermore, they pointed out that, if hospitals group their stock and define them into categories whiles keeping update on them, it brings clarification to when reorder must be made as well as procurement order. There is also a single view of procurement order records. Thus, perpetual and seasonal items in demand are fully identified to meet patients' needs. The researchers further recommended that hospitals should be given the pace to make their own negotiations with suppliers this is because lot-discounts are offered to hospitals when they are directly from distributors.



Mbah *et al.*, (2019) studied on inventory management and operational performance of manufacturing firms in South-East Nigeria. They administered questionnaires to three hundred and seventy-one to a sample population of four manufacturing industries across in southeast Nigeria. They gathered their responses using SPSS and excel to analyse the results descriptively. They also used regression to test for the hypotheses on the data gathered. The results showed a positive and significant relationship between Just in time, inventory cost, materials requirement planning, and strategic supplier partnership and operational performance of the industries selected. The researchers then recommended that the

manufacturing organisations should adopt these inventory practices in order to control cost because they have effect on performance.

Sola, (2018) explored the impact of inventory management practices on the performance of SMEs manufacturing subsector in Oyo state Nigeria. In the survey, the researcher randomly distributed 129 structured questionnaires to the manufacturing industries in three (3) cities and towns. Upon gathering the responses, the researcher used mean and percentages of descriptive statistics and regression to analyse the data. The outcome showed that inventory management practices have a significant and positive effect on performances of Manufacturing SMEs. Again, it was revealed that the use of manual inventory management system and lack of technology, lack of professional persons, purchase of materials with near expiration date, insufficient fund for purchases, used of outdated storage facilities and delay in delivery of materials are the main causes affecting effective inventory management practices in Manufacturing SMEs. In this regard, the researcher recommended that organisations should be simulated in using information technology to manage their inventory.



An extensive research by Ceylan and Bulkan, (2017), was on the Drug Inventory Management of Pharmacy using ABC and VED Analysis. This study was carried out in a health care facility in Turkey. They believed that the most intricate and larger amount of inventory kept in the hospital are drugs and should be managed very well. In addition, for a better and effect service delivery, drugs must be supplied and stocked in the right quantity, and time to ensure flow of supply to patients. Their analyses showed that Activity Based Costing and Vital Essential Desirables are the most important inventory practices that a health care facility can use to manage and improve on its performance. They concluded that

ABC analyses is very essential for drugs management that reduces expenditure and increases effectiveness in management of drugs. However, VED, cannot be over ruled in achieving the use of ABC inventory management practices thus, must be practiced hand in hand in order to achieve high use of budget to prevent Stockout and administer better services to patients.

Otchere *et al.*, (2016) researched on inventory management practices in some selected firms in Ghana. Their focus was to assess the inventory management practices on the firms and their existing controls. In so doing, the researchers used interviews and administered questionnaire to obtain primary data from respondents in the organisations. The approach was purely a purposive sampling to gain responds from inventory management staff. It was analysed quantitatively using SPSS and Microsoft excel. The findings shows that the organisations understudies used various inventory management techniques to aid them stock inventory properly to give better services to customers. On the other hand, the study revealed that lead-time challenges because of bureaucracy are prevalent in the study organisations which results in several cancellations of procurement requests thus affecting customer service delivery. The paper made a strong recommendation to the organisations to adopt the use of inventory management softwares to enable them function effectively and efficiently.

A study conducted by Mahyadin *et al.*, (2016) on the correlation between inventory management practices and performance in Malaysian public hospitals had these steps to gain their findings. The researchers first made a cross-sectional descriptive study on 143 public hospitals. They used online questionnaires to solicit for the data. The researchers used both descriptive statistics and Pearson correlation to test the effect of inventory practices and controls on performance using SPSS 21.0 for the 81 responses gathered had 78.64%

response rate. The results showed a positive linear correlation between inventory practices and performance ($r = 0.799$, $n = 81$, $p < 0.01$). They indicated that positive correlation between the variables will aid in the prevention and management of inventory most especially drugs. They adduce that, the large hold of inventory that is drugs and its management can be learnt in private hospitals and other organisations, adding that the findings are not limited to public health cares in Malaysia. Again, they argue that the findings could be useful for Main Medical Stores both in public and private hospitals too in order to increase performance.

Munyao *et al*, (2015) also investigated into the role of inventory management practices on production departments' performance in manufacturing firms. Their objectives were to find the inventory management techniques used by their case study, establish the effect of inventory management practices on manufacturing performance, to determine the performance level of manufacturing firms and to determine whether computerised inventory influences the production departments' performance. In view of this, the researchers used the descriptive research design. They targeted the rolling mills, food and beverage and textiles production industries. They used the stratified sample technique on a sample population of 45 industries out of 150. The researchers used questionnaires as mean of gathering responses after testing its reliability. The results revealed that the just in time, periodic review technique, materials requirement planning (MRP I), economic order quantity and action level methods are the most effective inventory management practices that enhance performance. The most practised was action level methods but MRP I was the most effective method.

2.4 Conceptual Framework

Reichel and Ramey, (1987) deduced that a conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation. From the forgoing, it could be strongly conceptualized that if activity-based costing, economic order quantity, materials requirement planning, manufacturing resource planning, enterprise resource planning, distribution resource planning, just-in-time are effectively used as the main practicing independent variables with quality service delivery and cost reduction as the dependent variables of inventory management in organization, it will help improve performance drastically.

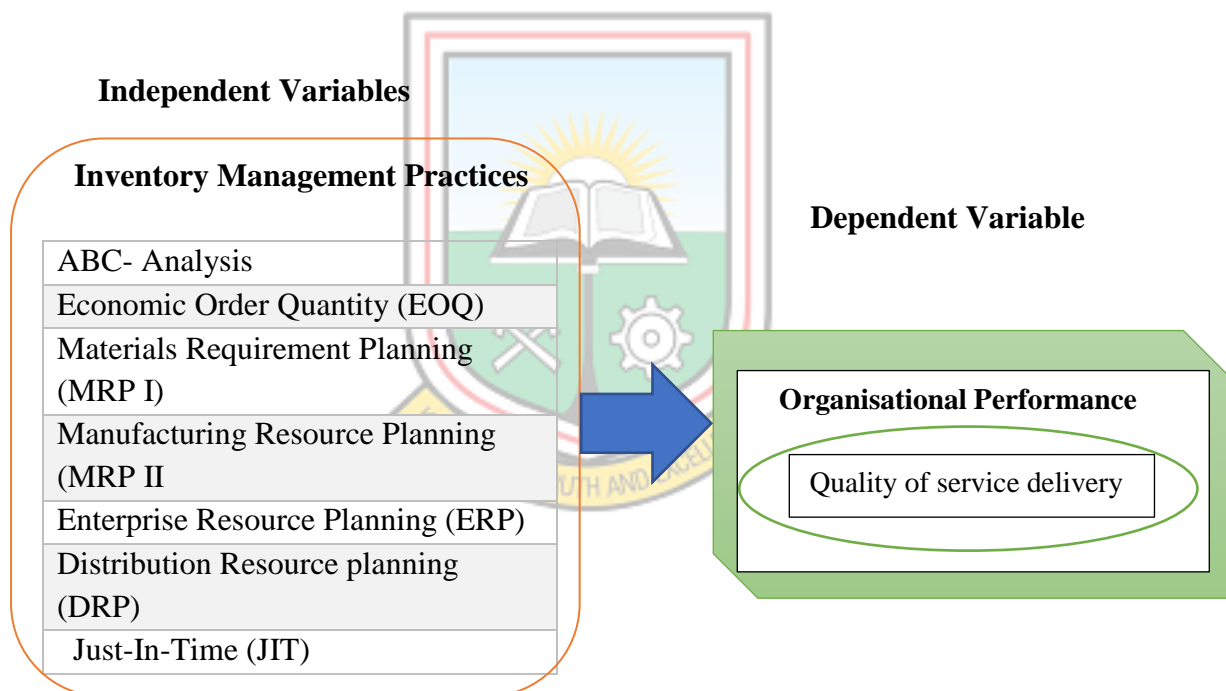


Figure 2.2: Conceptual model

Source: Author, (2020)

The aim of this conceptual framework from Figure 2.2 is to categorize and define concepts related to the analysis and map relationships among them. Such a structure allows the researcher to define the ideas, map the research grounds or conceptual distance, systematize connections among concepts and identify gaps in literature (Creswell, 2003).

From the conceptual framework, the hospital's quality of service delivery is the dependent variable that stems from organisational performance, which are being predicted by inventory management practices. The extent of this relationship is being tested in the research scope and study area.

There has not been any work undertaken to assess the effects of inventory control activities and the delivery of healthcare services. The consistency of inventory investment and inventory records has a positive effect on operational efficiency, according to Oballah *et al.*, (2015). In their research, Anichebe and Agu, (2013) have concluded that there is an essential connection between successful management of inventory and organizational effectiveness. Management of inventories has a huge influence on corporate management. There is strongly favourable association between effective inventory management and a firm's profitability. The study concluded that inventory management practices are very critical for organization's performance and success. This study therefore sought to use the conceptual framework in Figure 2.2 to determine the role of effective inventory management practices on organizational performance focusing on Tarkwa Municipal Hospital. The research design of the study in the next chapter and the design of the data collection tool and data collection and analysis were developed from this conceptual framework.

2.5 Chapter Summary

To date, research examining performance variable on quality of service delivery has lacked drastically. However, understanding the characteristics and interrelationships of effective inventory management and its relationship variables in organisational performance is critical for supply chain management and particular in inventory management practices.

This increased focus in surveys reflects an increasing understanding of the connection between effective inventory management and firm performance. Several factors that determine the effectiveness of the inventory management practices on organisational performance are not on service delivery but cost reduction, operational performance, planning and control, service logistics and inventory records. Obviously, the extensive review of literatures reveal the gap in the research into effective inventory management practices that looks specifically into quality of service delivery of performance in hospitals.



CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter gives the layout of the methodological approach to the whole study. A descriptive summary of the research design, population of the study, sample size and sampling technique, data collection methods and the instruments used were presented. Again, the validity and reliability of the instruments were tested, the utmost ethical consideration was ensured and how the data was analysed. Lastly, a brief history of the study area, that is, the Municipal Hospital in Tarkwa was also addressed.

3.1 Research Design and Strategy

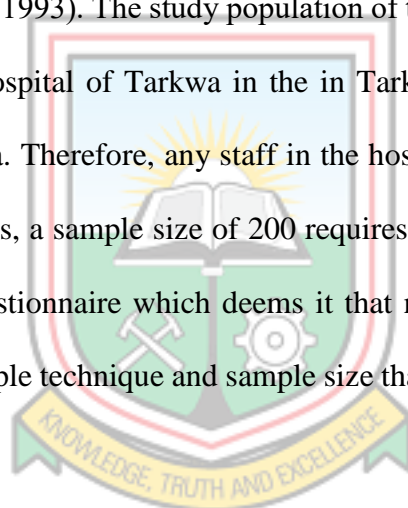
According to Klopper (2008), “The research design is the plan or blueprint that the researcher uses in conducting the research”. This study mainly used descriptive and causal research design. Cooper and Schindler, (2006) explains that a descriptive survey is a method that is purposely used to describe “what exist” presently with regards to the variables at stake. Thus, it is more appropriate to use descriptive survey collects data at first hand in a survey where the population is too many for direct observation (Mouton, 1996). Polit and Hungler, 1993) adds that, “A survey obtains information from a sample of people by means of self-report, that is, the people respond to a series of questions posed by the investigator”. In this study, the report is obtained from the self-administered questionnaires given by the (investigator) researcher.

Again, Rocco, *et al.*, (2011) has it that causal research falls under the classification of conclusive research, since it attempts to reveal a cause and effect relationship between two

variables. Thus, casual research design was used because this research is on the effects of inventory management practices on organisational performance of Tarkwa Municipal Hospital (Cooper and Schindler, 2006). The sampling technique that this research employed has been well addressed. The data collection instrument and the methods used in collecting the data are also present in this chapter.

3.2 The Population of the Study

“A population is defined as set of elements such as: individuals, objects, events and cases with some common observable characteristics which could be sampled for inclusion in a study” (Burns and Grove, 1993). The study population of this research comprised the entire staff of the Municipal Hospital of Tarkwa in the in Tarkwa Nsueam Municipality in the Western Region of Ghana. Therefore, any staff in the hospital is eligible to respond to the questionnaire. Nonetheless, a sample size of 200 requires halve of the entire population of 400 to answer to the questionnaire which deems it that not the total population could be captured. In sum, the sample technique and sample size that follow categorically justifies it.



3.3 The Sampling Technique and Sample Size

The purposive sampling, convenience and random sampling technique were used to select participants for this study. The staff in the hospital that managed inventory were selected using purposive sampling technique. Staff in other departments and units who are not directly managing inventory were also selected using the convenience sampling. In some cases, the simple random sampling was applied, in that, some sample (respondents) in the various units and department was selected on chance based on availability and readiness to answer the questionnaire.

Staff were selected from departments and units that deals directly with inventory management. Staff from other departments and units that do not deal directly with inventory management but use inventory in the hospital. The study sought to employ a sample size of two hundred (200) staff from the sample population base on the fact issued by Pallant, (2007) that a sample size of thirty (30) and above does not violate or cause major hitches in statistical measures even if the responses are not normally distributed. From the forgoing, two hundred (200) questionnaires were used to solicit for answers on the topic at hand from some top management and staff from the municipal hospital in Tarkwa. For accurate data, Taro Yamane’s 1967 sampling formula was used to calculate for the sample size.

The formula is $n = \frac{N}{1+N(e)^2}$ where n denotes the sample size, N denotes the total accessible population, and e denotes the precision level. Therefore the study’s sample size was: $n = \frac{400}{1+400(0.0025)} = 200$ Respondents

Table 3.1: showing the sample size

Category	Accessible Population	Sample size (<i>Respondents</i>)
Management	5	5
Stores department	14	14
Procurement unit	5	5
Pharmacy department	14	14
Records unit	18	14
Administration	28	18
Accounts and finance	20	10
Service providers	296	120
Total	400	200

Source: Researcher, 2021

3.4 Data Collection Technique

In order to achieve the objectives outlined in chapter one, this research analysis used primary data. The researcher for the purpose of gathering primary data used a structured questionnaire. The questions were formulated in such a way that the respondents' views were made up in the most productive way. The questionnaires were structured in terms of measures of the close-ended and likert scale in particular. However, the respondents were not able to share their varied viewpoints on different facets of effective inventory management practices on organisational performance. Each respondent was presented with a self-administered questionnaire, during which it was collected within a span of one month. They were coded and modified for completeness and accuracy after the questionnaires were obtained.

3.4.1 Primary Source

Base on the objectives of the study, it was necessary to collect first-hand data from the case study. In so doing, primary data was gathered from the Municipal Hospital in Tarkwa. This was mainly obtained by self-administered structured questionnaires on the topic under research.

3.4.2 Data Collection Instrument

The sole data collection instrument was the questionnaire. Anichebe and Agu, (2013); Oballah *et al.*, (2015) has it that, a properly designed questionnaire has the tendency to solicit for answers that meets the objective of the study. Again, the use of questionnaire was very convenient for respondents to give answers and relatively economical compared to other research instruments. The researcher got information that enriched the outcome of the study's result by the use of questionnaire as the only data collection instrument.

3.4.3 Pre-testing of Questionnaires

According to Anichebe and Agu, (2013); Oballah *et al.*, (2015) it is prudent to pre-test questionnaires in order to determine the extent to which respondents understand the questions on the questionnaires. This was achieved through the answers that respondents gave and as a result, some questions were deleted, others were also reframed. This helped to gain face validity of the data collection instrument.

3.5 Validity and Reliability

According to Polit and Hungler, (1993), the validity of an instrument is the degree to which an instrument measures what it intends to measure. To achieve this, the researcher structured the questionnaires to include a variety of questions that were answered by the staff that deals directly and indirectly with inventory management in the hospital in line with the study's objective on the effective inventory management practices on organisational performance. The content of the questions was formed based on the information gathered from the literature review. To ensure content validity of questions, consistency was ensured during the administration of the questionnaires. The questionnaires had clear instructions and all respondents could read and answer the questions. The questionnaires went through the hands of the researcher's supervisor, some academicians and other researchers for scrutiny in order to ascertain its validity. This helped the researcher to rephrase, remove and add up some of the questions to best fit the study's objective and make it meaningful for analysis (Burns and Grove, 1993).

Miles and Huberman, (1994); Polit and Hungler, (1993) defines reliability as the degree to which a measuring instrument has the attribute to produce consistency in response when subjected to a number of trials on different respondents on the same case study. This can be

achieved by pre-testing the data collection instrument (questionnaire) which is also known as piloting before administering on the genuine respondents. In so doing, the researcher can minimise bases of errors such as data biasness. Moreover, reliability of data mostly comes with the intuition of the researcher becoming subjective in his style concerning the study (Wilson, 2010). In this study, the reliability of the questionnaires answered by the various employees of the Municipal Hospital in Tarkwa was achieved because there was a consistency in responses. This was because of the researcher avoiding physical, psychological and visual cues from respondents, thus maintaining privacy, anonymity and confidentiality of all respondents. Examples are avoiding friendship with respondents, writing names of respondents and getting support from respondents. Finally, a Cronbach's alpha was ran on the 47 items on the instrument and a result of 0.871 indicates that the data collecting instrument is strongly reliable.

3.6 Data Analysis Management

The data that was solicited from the respondents in line with the three objectives were analysed in the following manner. Firstly, the analysis on the Section "A" that sought for respondents' biodata was done using descriptive statistics such as frequency distribution and percentages. Secondly, section "B" carries the first objective of the study; to establish the inventory management practices use by the hospital. The responses gained from the respondents were also analysed using descriptive statistics.

Thirdly, analyses on the section "C" was based on the second objective; to find the effect of inventory management practices on the hospital's performance was analysed using regression model. The constituent of the variables for the regression models are the seven independent variables: *ABC Analysis, economic order quantity (EOQ), materials*

requirement Planning (MRP I), manufacturing resource planning (MRP II), enterprise resource planning (ERP), distribution resource planning (DRP) and just-in-time (JIT) and that of the dependent variable is the hospital's performance (looking specifically at quality of service delivery).

Finally, the questions in section 'D' was based on the third objective which was to determine the challenges of implementing inventory management practices in the hospital were also analysed using descriptive statistics. These methods of analyses were adopted by the researcher because they concisely enhanced clarification and description of the presentation of the data collected. The Table below gives the summary of the analysis of the data collected from respondents on the topic under study that is strictly in line with the objectives.

Table 3.2: summary of data analysis technique.

Questionnaire	Information	Data Analysis
Section A:	Demography	Descriptive Statistics
Section B:	Objective one (1)	Descriptive Statistics
Section C:	Objective two (2)	Regression Analysis
Section D:	Objective three (3)	Descriptive Statistics

Source: Researcher, 2021

3.6.1 Model Specification

In order to find the effect of inventory management practices on the hospital's performance, a probit regression model was used. The interpretation of the equation is given as:

$$Y = \beta_0 + \beta_1ABC + \beta_2EOQ + \beta_3MRPI + \beta_4MRPII + \beta_5ERP + \beta_6DRP + \beta_7JIT + E_t$$

Where;

Y ----- Performance (Dependent variable)

β_0 ----- intercept, $\beta_1, \beta_2, \beta_3, \beta_4, \dots \beta_7$ are the coefficients of the variables.

ABC ----- Activity Based Costing

EOQ ----- Economic Order Quantity

MRPI ----- Materials Requirement Planning

MRPII ----- Materials Resource Planning

ERP ----- Enterprise Resource Planning

DRP ----- Distribution Requirement Planning and

JIT ----- Just in Time

E_t ----- Error term

3.6.2: Definition of Variables

Table 3.3 shows the prescribed definition and explanation of the variables used for the data in this research. These descriptions are on the dependent variable, independent variables and other control variables.

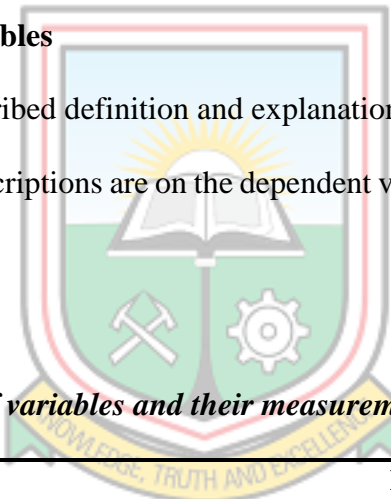


Table 3.3: Explanation of variables and their measurement

Variable name	Definition
Dependent variable (Service Quality)	<i>How would you rank the quality of service delivery for this hospital? This question was used to measure the dependent variable on a scale of 1-5 where; Very low = 1, Low =2, Moderate =3, High = 4, Very high =5. It was recoded as dummy variables where “1” becomes “0”, “2” becomes “0”, and “3”, “4”, “5” becomes “1”, where 0 = “No” and 1= “Yes”</i>
Independent variables (Inventory Management Practices)	
Activity Based Costing (ABC)	<i>The hospital classifies items according to their stock value. This was measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Economic Order Quantity (EOQ)	<i>The hospital implements a standard cost-effective order of a number of stock, measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Materials Requirement Planning (MRP I)	<i>Are there planning systems where bills of materials are 100% accurate in this hospital? This was measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>

Materials Resource Planning (MRP II)	<i>The hospital uses planning to aid in strategic logistics planning, measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Enterprise Resource Planning (ERP)	<i>The hospital adopts supply forecasting for optimal profit. Also measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Distribution Requirement Planning (DRP)	<i>The hospital uses distribution scheduling to predict demand more effectively, measured on a scale of 1-5, where represents never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Just in Time	<i>The hospital acquires goods at the right time and quantity, Also measured on a scale of 1-5, where never = 1, rarely =2, sometimes =3, often= 4, Always =5.</i>
Control Variables	
Gender	<i>Gender was recorded on a scale of 1- 2, where male is “1” and female is “2”.</i>
Department	<i>Department was recorded on the scale of 1- 8, where Management = 1, Procurement = 2, Inventory Management = 3, Pharmacy = 4 Records = 5, Accounts = 6, Administration =7 and Service Providers = 8</i>

Source: Researcher’s computation, (2021)

3.7 Ethical Consideration

According to Cresswell, (2003), the researcher must ensure the utmost ethical clearance for all the participants in order to alleviate a given challenge. The objective of this study is to find out the relationship between effective inventory management practices and organisational performance. Therefore, the precise respondents are the ones directly involved in inventory management activities in the hospital.

The findings and recommendations of this research are of direct benefit to these employees. Upon detailed explanations of the purpose of the research to these respondents, they gave full consent of their preparedness to partake in the study. Thus, the respondents were cogently assured of the highest anonymity and confidentiality in their involvement in answering the questions. Moreover, all information obtained from respondents were analysed explicitly without any due influence of the researcher’s own consent or subjectivity.

3.8 The Study Area (Tarkwa Municipal Hospital)

The Tarkwa Municipal Hospital was the setting for the study on the topic: The Role of Effective Inventory Management Practices on Organisational Performance. The hospital has since its inception in November, 2013 operated as the referral facility of the municipality under the name “Tarkwa Municipal Hospital”. It is located at Tarkwa in the Western Region of Ghana.

The hospital provides service to over 380 outpatients and 105 in-patients on a daily basis. The average annual patient load is usually around 21,000 patients (End of year Report, 2020). The preparation for the construction of the hospital begun in 2008. However, actual construction started late 2009, and completed in 2011. Major installations were done in 2012, pending its commissioning by the central government. The commissioning of the hospital delayed a bit due to bad access road, non-availability of utilities such as water and telephone among others. As a result, the hospital’s buildings and equipment were deteriorating at a fast pace due to neglect. The management of the then Tarkwa Government Hospital, now Apinto Hospital thought it wise to move in with existing staff and equipment from the District Hospital in 2013. Management then appealed for support from the Municipal Assembly which graciously donated a lump-sum of money in addition to the internally Generated Fund to enable the hospital purchase furnishings for all units to commerce smooth business.

CHAPTER 4

RESEARCH FINDINGS AND DISCUSSIONS

4.0 Introduction

This chapter presents the results and discussion of the study from the questionnaire. Specifically, the chapter presents the demographics of respondents using frequencies (counts) and percentages for easy comparison. Figures are presented to create pictorial view of the demographics of respondents. Further, the chapter presents the responses on the study area, using minimum and maximum figures, mean, and standard deviations. Regression analysis is also ran, showing the association between inventory management practices and performance.

4.1 Demographic Information

The demographic information of the respondents shows the characteristics of respondents, based on their gender, age, marital status, education, number of years of experience and their category of staff in their organization. As stated earlier, the demographic information is presented in pie charts and graphs below.

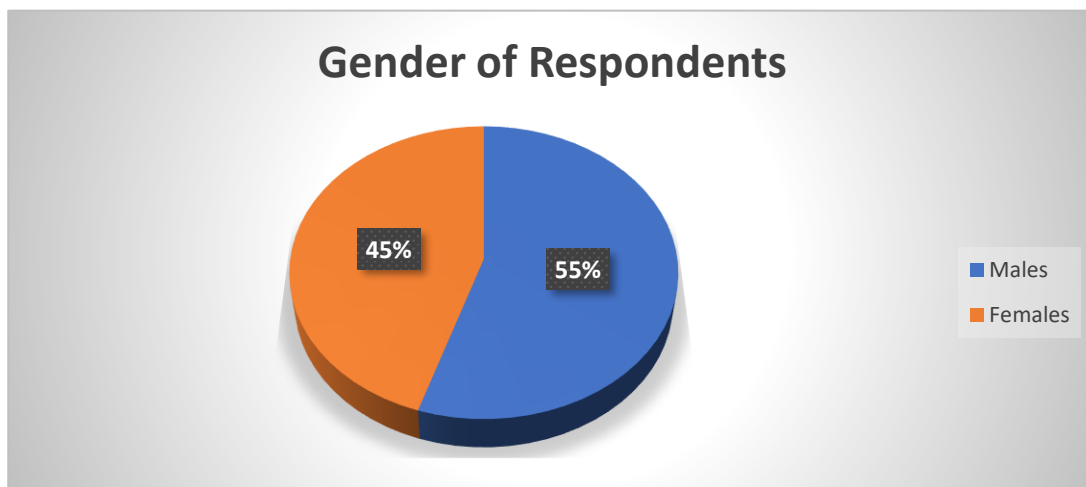


Figure 4.1: Gender of respondents
Source: Field Data, 2021

From the Figure 4.1, it can be seen that 110 of the respondents, which is equivalent to 55% were males, and 90 of the respondents, representing 45% were females. This indicates that males dominated the working population of the hospital.

Furthermore, the age distribution of the respondents shows that respondents within the ages of 20-29, made up the majority of respondents. In essence, the respondents within the ages of 20-29 were 95 in number, representing 47.5%. This was followed by the ages of 30-39 with a frequency of 69, which is equivalent to 34.5%. Those with the ages of 40-49 years with a count of 19, which is equivalent to 9.5%, those with the ages of 18-19 years had a frequency of 9, representing 4.5%, but there were no respondents with ages below 18 years. In addition, the respondents between the ages of 50-59 were 7. Finally, representing 3.5%, and there was only 1 respondent who was 60 years or older, representing 0.1%. The age distribution of the respondents is presented in Figure 4.2 below.

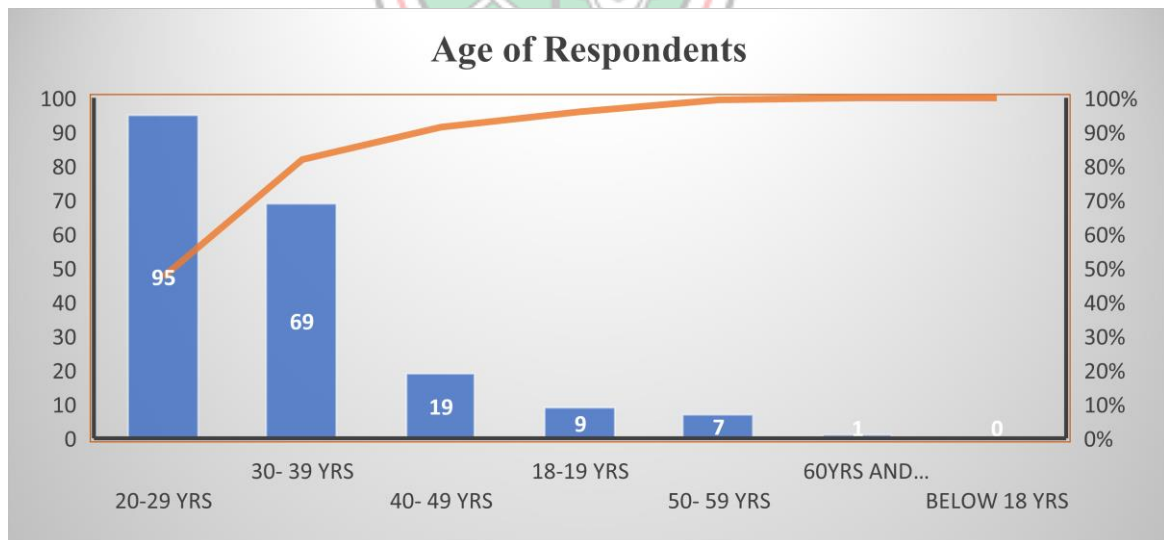


Figure 4.2: Age distribution of respondents

Source: Field Data, 2021

The marital status of the respondents sought to find whether the respondents were married or single, and whether or not they are divorced or widowed. From Figure 4.3, it can be seen that respondents who were single, made up the majority of respondents with a percentage of 57%. The respondents who were married, followed with 42%, and the remaining 1% were widowed. There were no respondents who were divorced.

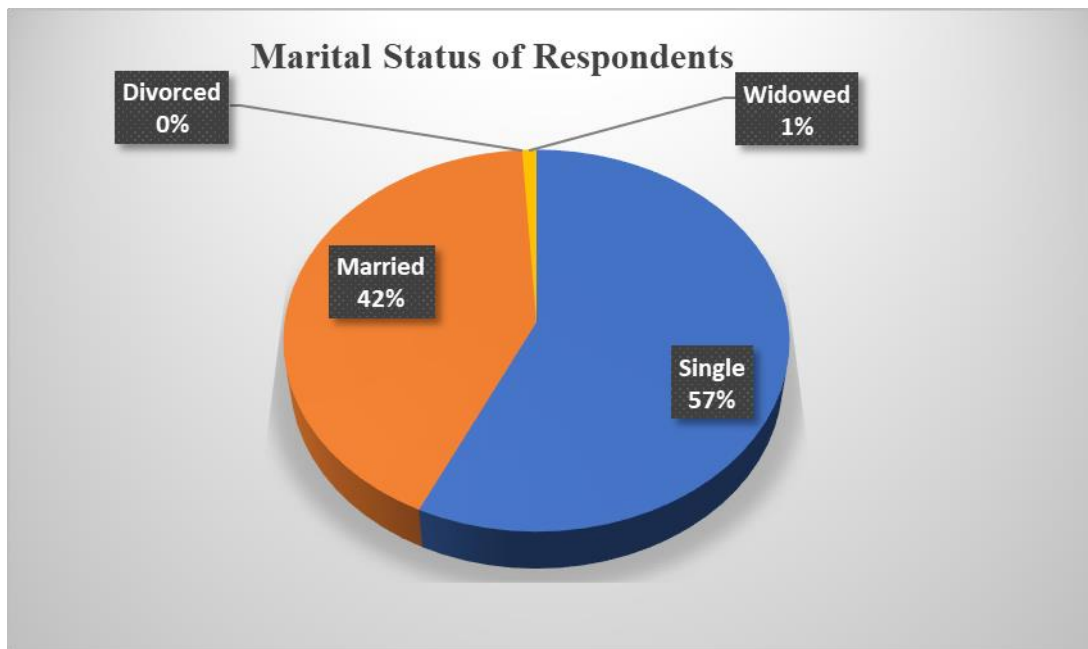


Figure 4.3: Marital status of respondents

Source: Field Data, 2021

About their educational background, the results showed that Diploma/HND holders made up the majority of respondents for this study. The Diploma/HND holders represented 51.5%; followed by the respondents with Bachelor Degree, with a percentage of 35.5%; followed by SSCE/SHS graduates representing 5.5%; Masters' Degree Holders representing

4%, JHS graduates with a frequency of 4, representing 2%. Finally, respondents with a doctorate had a percentage of 1.5%. This is depicted in the Figure 4.4.

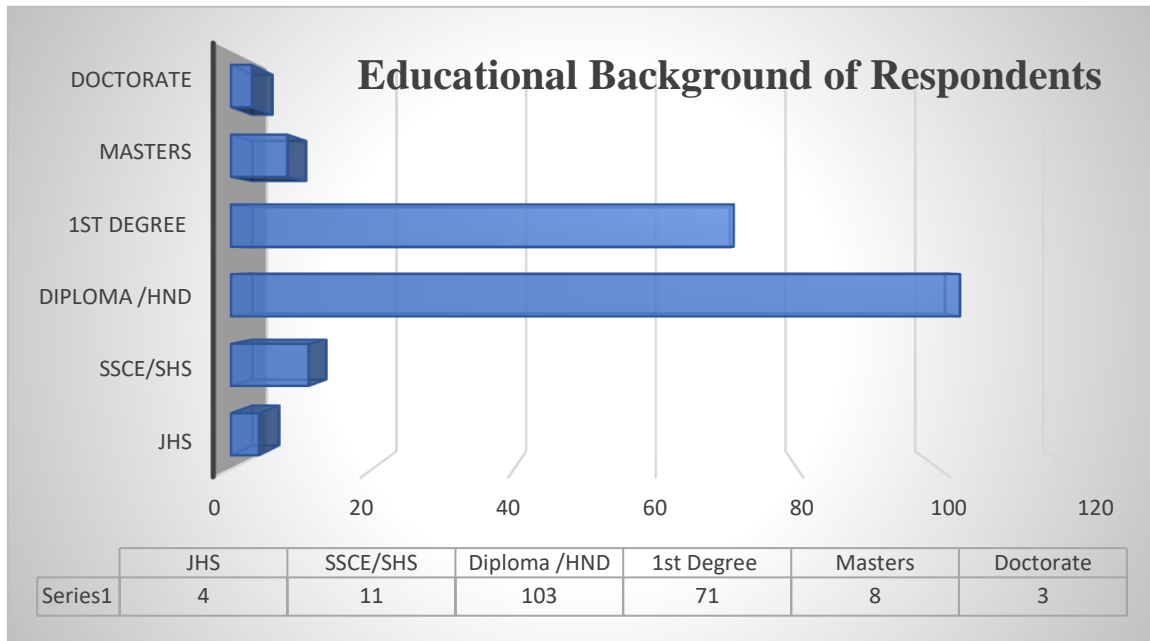


Figure 4.4: Educational background of respondents
 Source: Field Data, 2021

This study also looked at the number of years of experiences of the respondents and result is as shown in Figure 4.5.

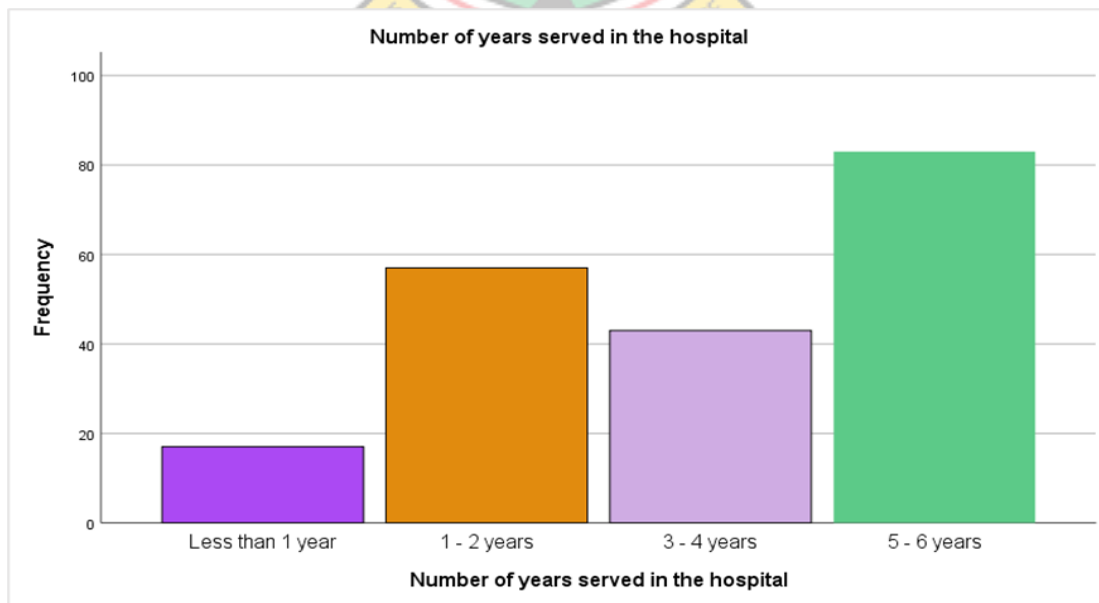


Figure 4.4: Number of years served in the hospital
 Source: Field Data, 2021

As shown in Figure 4.5, 8.5% had less than a year of working experience; 28.5% had between 1 and 2 years of experience. In addition, 21.5% had between 3 and 4 years of experience, and the remaining 41.5% had between 5 and 6 years of working experience.

The category of staff of the respondents sought to find the various units or departments that the respondents of the study worked in the hospital. The results showed that the majority of respondents were from the administration. As seen in Figure 4.6, the respondents from the administration were 18, representing 9%. The accounts department were 10, representing 5%, then the inventory management, pharmacy, and the records departments were 14 respondents each, representing 7% for each also. Respondents in the category as service providers were 120, representing 60%, and both Management and procurement departments had 5 each, 2.5%.

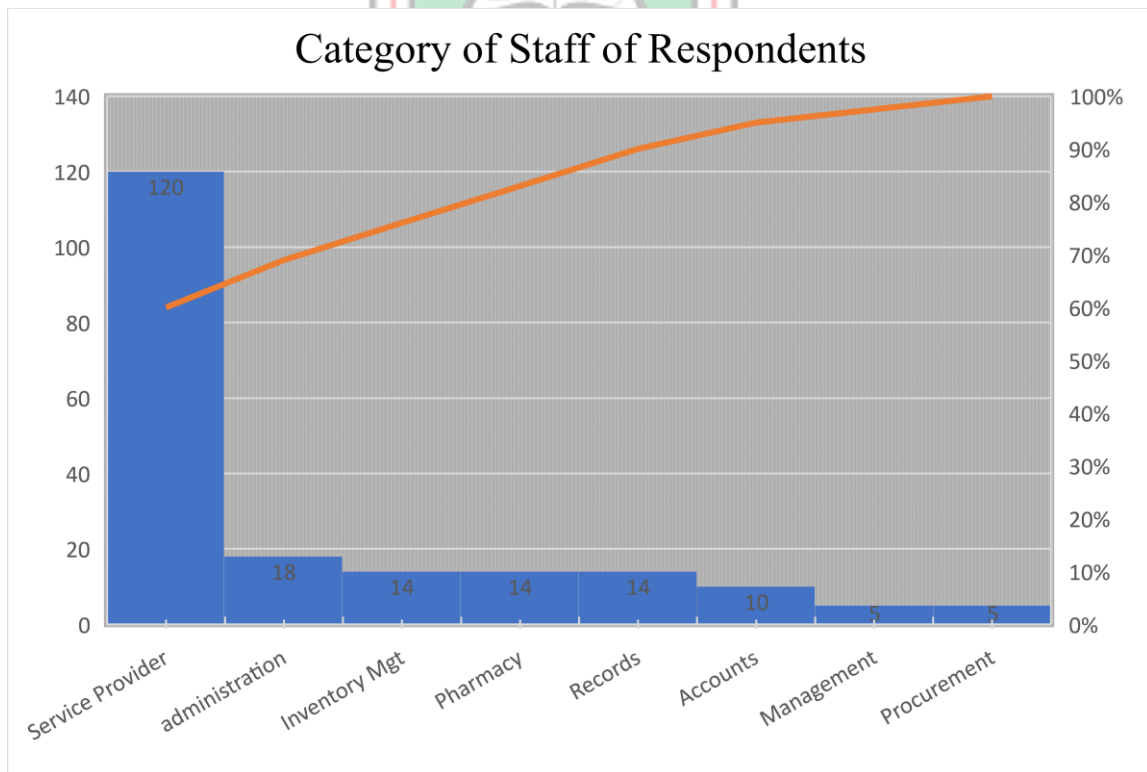
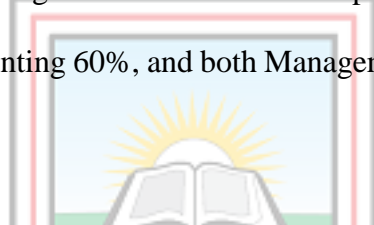


Figure 4.6: Category of staff of respondents
 Source: *Field Data, 2021*

4.2 Reliability and Validity of Constructs

The sampled data were subjected to a reliability test to check for the internal consistency of the survey responses. The Cronbach alpha was calculated for all the items in the data. Generally, an alpha of above 0.7 was preferred and used to gauge the reliability of the instruments. Results show that the survey responses were very compact with the calculated Cronbach alpha ranging from 0.719 to 0.933. The alpha level is reported in Table 4.1 below:

Table 4.1: Reliability and Validity of Constructs

Cronbach's Alpha	No. of Items
0.871	47

Source: Author's Computation.

The high alphas recorded suggest a corresponding high average correlation between items in the scale and hence greater reliability. It can therefore be concluded that there is internal reliability in the study, and hence results of this study are reliable.

4.3 Inventory Management Practices in the Hospital

This section of the analysis reports on the first objective of the study. The objective was set to establish the inventory management practices used by organisations. The purpose is to find out how the hospital manages its inventory to make sure that there is always available inventory to satisfy the needs of customers. To ascertain the average response of the respondents, responses less than 2.5, generally indicated disagreement to statements, responses greater than 2.5 but less than 3.5, indicates agreement, and the responses greater than 3.5 to 5.0 indicate agreement to statements.

Table 4.2 shows descriptive statistics on the inventory management practices at the Hospital. The findings reveal that the hospital classifies items in accordance with their stock values (Mean = 4.33, SD = 0.81). This implies that the hospital has the Activity Base Costing (ABC) practices is embedded in the inventory management. The ABC as an inventory management practice has been pivotal in helping the hospital to keep a reliable level of inventory by offering services to patients with no cost on shortages of inventory. Lysons and Gillingham, (2003) stressed that the main aim of this practice is to make sure that products are efficiently maximised by focusing on the items that have potential savings. It is very effective in the management of stock levels (Kumar and Chakravarty, 2014).

Table 4.2: Descriptive Statistics - Inventory Management Practices in the Hospital

Statement	Min	Max.	Mean	SD
The hospital classify items according to their stock value	2.00	5.00	4.33	0.81
The hospital implements a standard cost-effective order of several stocks	2.00	5.00	4.15	0.87
There are planning systems where bills of materials are 100% accurate in this hospital	1.00	5.00	3.89	1.07
The hospital uses planning to aid in strategic logistics planning.	2.00	5.00	4.19	0.81
The hospital adopt supply forecasting for optimal profit	1.00	5.00	3.94	0.96
The hospital uses distribution scheduling to predict demand more effectively.	2.00	5.00	4.24	0.84
The hospital acquires goods at the right time and quantity.	1.00	5.00	4.23	0.97

Source: Field Data, 2021

Furthermore, with a mean of 4.15 (SD = 0.87), respondents agree that the hospital practices the Economic Order Quantity (EOQ) in the management of their inventory. The EOQ has helped them in implementing a standard cost-effective order of several stocks as revealed by the study. This assertion is supported by Plasecki (2001), emphasised that the EOQ is designed to maximise an organisation's income by minimising total inventory cost.

Respondents fairly agree (mean = 3.89, SD = 1.07) there exist planning systems where bills of materials are 100% accurate in the hospital. This means that opinions were slightly divided as to how often the hospital uses the Materials Requirement Planning (MRP I) method to manage their inventory. In as much as the (MRP I) facilitates the automation of supply scheduling and timing of products acquisition, Coyle *et al.*, (2003) believes that practice is made up of a set of logically related procedures with complex rules and it is a practice that sometimes discourages supply chain managers.

The findings also reveal that Materials Resource Planning (MRP II) is one of the inventory practices used by the hospital (mean = 4.19, SD = 0.81). The respondents agree that the (MRP II) has positioned the hospital in planning to aid in strategic logistics planning. Stock and Lambert, (2001) indicated that material resource planning (MRP II) is an advancement of material requirement planning (MRP I), emphasising the fact that the latter has financial, marketing and purchasing components in addition. On whether the hospital uses the Enterprise Resource Planning (ERP), the respondents indicated they use the ERP in supply forecasting for optimal profit.

The Distribution Requirement Planning (DRP) also forms part of the inventory management practices the hospital uses. The respondents expressed that the hospital uses distribution

scheduling to predict demand more effectively. As cited by Coyle et al (2003), the DRP is used to predict demand more effectively and used to leverage data back of inventory.

With a mean of 4.23 and a standard deviation of 0.97, respondents agreed that the hospital acquires goods at the right time and quantity. This statement refers to the management of inventory under the Just in Time (JIT) Model. According to Carlson, (2002) the Just in Time model is just right for organisations that have the objective of maintaining just sufficient material at the right place and at the right time to make first the right quantities of inventories.

From the results, it can be established that all the inventory management practices have been adopted by the hospital to manage the effective and efficient delivery of its services. Thus, the respondents agreed that Activity Based Costing (ABC), Economic Order Quantity (EOQ), Material Requirement Planning I (MRP I), Materials Resource Planning II (MRPII), enterprise resource planning (ERP), distribution requirement planning (DRP), and just-in-time (JIT), are all practices that are used to manage the hospital's inventory. However, the results show that JIT, DRP, MRP II, EOQ, and ABC are used mostly in the hospital than MRP I, and ERP as shown in Table 4.3 above.

4.4 Inventory management practices on organisational performance

Concerning meeting the second objective of this study, the sure test was to run a regression analysis to know the effect of inventory management practices on the hospital's performance. However, descriptive statistics of the dependent and independent variables were first presented.

Table 4.3 shows the mean values for both the dependent and the independent variables. For the purposes of this study, the dependent variable is “Organisational Performance” whiles the Activity Based Costing, Economic Order Quantity, Materials Requirement Planning, Manufacturing Resource Planning, Enterprise Resource Planning Distribution Requirement Planning and Just-in-Time are the independent variables. Both the dependent and the independent variables were derived from the conceptual framework and subsequent questions were asked to solicit information per the characteristics of each variable

Table 4.3: Descriptive statistics of the dependent and independent variables

Variable	N	Min	Max	Mean	SD
Organisational Performance	200	0.00	1.00	1.85	0.001
Economic_Order_Quantity	200	1.00	5.00	4.04	0.902
Activity_Base_Costing	200	2.00	5.00	4.00	0.703
Materials_Requirement_Planning	200	2.00	5.00	4.05	0.818
Materials_Resource_Planning	200	2.00	5.00	4.20	0.769
Enterprise_Resource_Planning	200	2.00	5.00	4.06	0.706
Distribution_Requirement_Planning	200	1.00	5.00	4.07	0.713
Just_In_Time	200	1.00	5.00	4.09	0.842

Source: Field Data, 2021

4.4.1 Correlation of inventory management practices on organisational performance

The second objective of the study was aimed at investigating the relationship between inventory management practices and organisational performance. The results are shown in the Table 4.3. It can be observed that there is a positive relationship between all the variables. However, the Economic Order Quantity, Activity Base Costing, Materials Resource Planning, Enterprise Resource Planning, Distribution Requirement Planning and Just In Time are significant at 0.01 (1%) whiles the Materials Requirement Planning is significant at 5%. The findings essentially mean that there is a positive relationship between the

independent variables and the dependent variables. Therefore, an upward movement in any (or all) of the independent variable (Inventory management practices) will cause a proportionate upward movement in the dependent variable (Organisational performance). The reverse is also true.



Table 4.4: Pearson Correlation Co-efficient Analysis

	Performance (1)	ABC (2)	EOQ (3)	MRP I (4)	MRP II (5)	ERP (6)	DRP (7)	JIT (8)
Performance (1)	1							
ABC (2)	.266**	1						
EOQ (3)	.224**	.656**	1					
MRP I (4)	.179*	.724**	.666**	1				
MRPII (5)	.263**	.620**	.573**	.752**	1			
ERP (6)	.425**	.485**	.474**	.514**	.566**	1		
DRP (7)	.277**	.533**	.532**	.573**	.535**	.542**	1	
JIT (8)	.329**	.568**	.495**	.647**	.611**	.595**	.756**	1

Note: **. Correlation is significant at the 0.01 (1%) level (2-tailed).

*. Correlation is significant at the 0.05 (5%) level (2-tailed).

Source: Author's Computation, (2021).

Legend

1= Performance

2= Activity_Base_Costing (ABC)

3= Economic_Order_Quantity (EOQ)

4= Materials_Requirement_Planning (MRP I)

5= Materials_Resource_Planning (MRP II)

6= Enterprise_Resource_Planning (ERP)

7=Distribution_Requirement_Planning(DRP)

8= Just_In_Time (JIT)

4.4.2 Probit Regression Analysis

The study adopted probit regression analysis to investigate the effect of inventory management practices on organisational performance. The aim of using the probit regression is to measure the impact of the various independent variables (individually) on the dependent variable (Organisational Performance). According to McHugh, (2009) the probit regression is essential when a researcher is interested in investigating the impact of various explanatory (independent) variables on a response (dependent) variable. When the independent variables are compounded the analysis ignores the covariance among variables and are subject to confounding effects, as in the case of linear regression (McHugh, 2009).

As stated earlier under Table 4.4, the dependent variable is organisational performance, a dichotomous variable because of recoding from a scale of 1 to 5 on a likert scale. The independent variables on the other hand refer to the inventory management practices that are listed in Table 4.3 above. The general regression model was:

$$Y = 95.415 + 0.527ABC + 0.405EOQ + 1.072MRPI + 2.146MRPII + 0.324ERP + 1.902DRP + 0.455JIT$$

The variables in the equation analysis helped the researcher to model the chance of an outcome based on individual characteristics of the independent variables. From the Table below, the study shows that the Activity Base Costing has a significant relationship with the dependent variable ($p < 0.05$) at 0.2%, and that, a unit change in the ABC can cause a 0.527 change in the quality of service rendered at the hospital. Kelle et al. Beheshti *et al.*, (2017) agree that ABC analysis usage in hospitals rightly brings inventory management to stand and its good application decreases to the barest minimum all associated cost due to the arrangement of inventory, based on their entire value, which will in turn improve on performance through service delivery in the hospital.

Table 4.5: Results of Probit analysis

Variable	Coefficient	St. Err	P – Values
Activity Base Costing	0.527	0.621	0.002
Economic Order Quantity	0.405	0.435	0.038
Materials Requirement Planning	1.072	0.748	0.052
Materials Resource Planning	2.146	0.576	0.007
Enterprise Resource Planning	0.324	0.570	0.048
Distribution Requirement Planning	1.902	0.662	0.010
Just In Time	0.455	0.563	0.038
Gender	1.018	0.568	0.00
Department	0.4825	0.571	0.09
Prob (F-Statistic)	0.71946	1.911	0.37
Constant Term	95.415	1.861	0.014

Source: Author's Computation, (2021).

Again, the results show that the relationship between the Economic Order Quantity and the dependent variable is significant at 3.8% ($p < 0.05$) and has a coefficient of 0.405. This means that a unit change in the Economic Order Quantity can cause a 0.405 change in the quality of services rendered at the hospital. This outcome is in line with Otchere et al. (2016), that economic order quantity as a practice in hospitals aids to offer the best managerial decisions in uncertain conditions for demand and supply lead times. This will as a result, yield in quality service as a performance in the hospital.

On the other hand, Materials Requirement Planning is less statistically significant with a p-value of .052 (5.2%) which is greater than 5% ($p < 0.05$). However, a unit change in MRP I

can cause 1.072 change in the quality of service delivered at the hospital which will adversely affect performance. The MRP I is less significant in the hospital because an upgrade and a hybrid of it, which is MRP II and ERP performs more functionalities than it. This has made some organisations to rarely use them. Hospitals that operates based on forecasting, scheduling and lead-time may still use for smooth operation Kim, (2014).

Moreso, Materials Resource Planning MRP II is also statistically significant and this is affirmed by its p-value of 0.7% that is less than 5%. This implicates that a unit change in MRP II can cause 2.146 change in service delivery at the hospital. Furthermore, Distribution Requirement Planning and Just in Time inventory management practices are also significant to the quality of service with p-values of 0.010 and 0.038 respectively. Janakkumar T, (2017), Has it that, for large hospital that hold stock of diverse capacity needs MRP II and DRP to record its Items and those that needs to be allocated for patients, those are not accessible for use. The MRP II also helps in planning and scheduling, distribution when integrated into organisations inventory management.

The Enterprise Resource Planning (ERP) inventory management practice on the other hand has a perfect significant relationship with the quality of service offered at the hospital ($p=0.048$). Consequently, a unit change in the ERP model can cause a 0.324 change in the quality of services offered at the hospital. The result also shows that the Service Quality which is the constant term is significant at a 0.014 significance level ($p<0.05$) with predictability of 95.42%. These findings support the results in Table 4.5. This is in support of Sanja, (2013) that ERP with its well infrastructural systems in place adds value to organisation by supporting customer relationship and entire supply chain management. ERP system such as Electronic Medical Records (EMR) helps track patients care processes and

facilitate Decision Support System in the hospital. As a result, service delivery is enhanced, thereby increasing performance in the hospital.

4.5 Challenges of Inventory Management Practices in the Hospital

The third objective of this study is to determine the challenges of implementing inventory management practices in organisations. A descriptive statistics depicting the outcome of responses from respondents are presented in table 4.6 below.

Table 4.6: Descriptive Statistics - Challenges of Inventory Management Practices

Statement	Min	Max.	Mean	SD
The hospital has insufficient funds for procurement.	1.00	5.00	4.83	1.34
The hospital uses outdated storage facilities	1.00	5.00	4.59	1.32
Holding too much or too little inventory in the hospital	1.00	5.00	4.16	1.39
The hospital uses manual inventory management system	1.00	5.00	3.55	1.21
The hospital sometimes experiences system breakdown	1.00	5.00	3.48	1.18
There a loss of drugs and non-medicines through shrinkages	1.00	5.00	2.30	1.12
The hospital purchases drugs with near expiration date	1.00	5.00	1.71	1.04

Source: Field Data, 2021

On a scale of 1- 5, respondents were asked to indicate 1 - never, 2- rarely, 3 - sometimes, 4 -often and 5- always. Generally, the findings show that majority of the responses are skewed towards 4 (often) and 5 (always). For instance, with means greater than 3.5, respondents expressed that the hospital often experience internet connectivity challenges and there are intermittent changes in demand of stocks which causes disturbance in the hospital’s supply chain systems. The response with a mean of 4.83, ranked the highest posed challenge in the hospital, being insufficient fund for procurement. Tomlin, (2009) researched that,

insufficient fund for procuring drugs and non-medicines in hospitals is a standing challenge most especially in public hospitals.

Again, the study's response to the question on the hospital's usage of outdated storage facilities received the second highest rating. This might have a high negative effect on performance, in that, limited and old usage stock facilities are intimidating and can hinder smooth and effective practices.

The study again revealed that the facility could hold too much or too little inventory. This is seen from Table 4.7, as the third highest challenge with a mean record of 4.16. In as much as the hospital is challenged with partially using manual inventory management systems, it also experiences system breakdowns in its inventory management practices. This is depicted in Table 4.7 on the outcomes of 3.55 and 3.48 means respectively. There is rarely loss of drugs and non-medicines through inventory shrinkages in the hospital. This shows that the hospital employs effective and efficient inventory management practices, which ensure that there is always optimal use of materials in the hospital. However, the findings show that the hospital never purchases drugs with a near expiration date. In contrast, this has not been a challenge because of the effective manner with which it manages inventory. Issuing of quality drugs (non-expired drugs) to patients draws out quality of service and in term enhances excellent performance.

In contrast, Chase *et al.*, (2002) indicated in their study that performance requires minimizing the cost of the entire inventory management system, including transport and storage of raw materials, WIP and inventories of finished products. According to them, to be effective, businesses should use strategies targeted at gaining optimum cost savings and

non-value-adding processes should be minimized, economies of scale pursued, and optimization techniques introduced to achieve the highest opportunity for use. Being sensitive in these areas ensures that customers' needs and demands are always met.

4.6 Chapter summary

In sum, this chapter delved deeply into the findings and discussions of the survey from the field, that is, the responses from the respondents of this research. The questionnaire was used to collect data and questions were structured in line with three main objectives. Firstly, the demographic information of the respondents was analysed and results were presented in bar graphs and pie charts. Secondly, the objective to establish the inventory management practices in the hospital was analysed and discussed using mean and standard deviation. Base on the responses from the survey, it was clear that all the seven (independent variables) inventory management practices are used in the hospital. Thirdly, a regression was used to analyse the effect of inventory management on the performance of the hospital. The results proved that there is a moderate effect of inventory management practices on the hospital's performance, which is plus or minus ($\pm 43.8\%$). Lastly, the challenges that face the organisation in implementing inventory management practices were also discussed using mean and standard deviation. This was to achieve the third objective of the study. Based on the results, it was proven that the hospital employs effective and efficient inventory management practices in the hospital void of the challenges posed in the questionnaire.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.0 Introduction

Chapter five presents the summary of findings, concludes, and makes interesting recommendations based on the results of the study to the Tarkwa Municipal Hospital. The chapter also makes suggestions to policymakers and gives directions for future researchers.

5.1 Summary of Findings

The outcome of this research is organised under this subheading base on the three objectives of this study.

The first objective sought to establish the inventory management practices in the hospital. It is evident from the findings that the hospital adopts all the seven inventory practices. Most practised inventory management is the in the hospital is the Activity Based Costing with a mean of 4.33. In sum, the hospital is doing well by using these inventory management practices effectively, which significantly affects the quality of service delivery aspect of performance in the hospital.

Secondly, the quest to find out the effect of inventory management practices on organisational performance was also achieved. This was the second objective of this study. From Table 4.5, all the inventory managements that are practised in the hospital have significant effect on performance. Thus, a unit change in any of the inventory management practices will cause a significant change in service delivery the hospital. This will adversely affect the performance in the hospital.

Lastly, this research sought to determine the challenges in implementing inventory practices in the organisation. This was also achieved as the third objective of this study. Obviously, Table 4.7 projects that the hospital has insufficient funds for procurement with a mean of 4.83 being the highest challenge faced in the hospital. However, the hospital does a loss drugs and non-medicines through shrinkages and the hospital does not purchase drugs with near expiration date. This is because the mean values for these two challenges were 2.30 and 1.71 respectively, which were below the threshold mean of 2.50

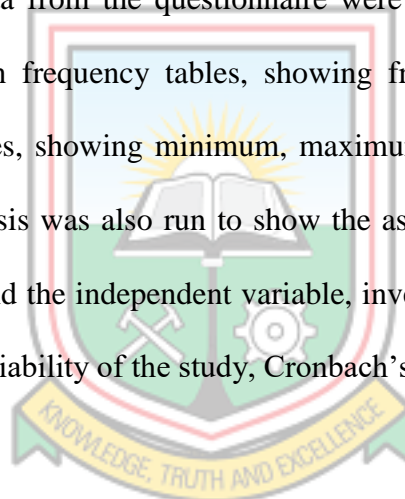
5.2 Conclusion

The purpose of this study is to find the effect of inventory management practices on the performance of organizations focusing on the Tarkwa Municipal Hospital. This study was necessary because inventory management has been a major challenge for organizations over the years (Miller, 2010), and organizations must find how effective management of inventory affects their performances so that they would be better positioned in determining the efforts that they exert into the management of their inventories. Even though inventory management has been studied extensively in other countries, the study of inventory management practices and their effect on performance is minimal in Ghana. To thoroughly achieve the main aim of this study, the study aim was divided into three main objectives as follows:

1. To establish the inventory management practices used by organisations.
2. To find the effect of inventory management practices on organisational performance.
3. To determine the challenges of implementing inventory management practices in organisations.

Three corresponding research questions were also formulated from these research questions so that successfully answering those questions will eventually lead to the achievement of the study objectives.

This survey research thus adopted the descriptive and causal research designs to describe the inventory management practices of the study organization, and to ascertain the effect of effective inventory management on performance respectively. Qualitative data that is also primary data was solicited with the help of a carefully drafted questionnaire that was distributed to 200 respondents from the hospital, using purposive, convenience, and random sampling techniques. Data from the questionnaire were analysed using IBM SPSS, and results were presented in frequency tables, showing frequencies and percentages, and descriptive statistics tables, showing minimum, maximum, mean, and standard deviation figures. Regression analysis was also run to show the association between the dependent variable (performance) and the independent variable, inventory management practices. To ensure the validity and reliability of the study, Cronbach's Alpha was also run.



Results of the study indicated that even though there were lots of females at the hospital, males were more, having a population of 10% more than the women. It was also revealed that there are more youths in the hospital than the old ones, especially those older than 39 years. The young youth, between the ages of 20 to 39, made up over 70% of the entire respondents, which implies that the hospital could be filled with young energetic youth, who can perform more tasks than the elderly ones. Since the young youth dominated the respondents, it is no surprise that the majority of the respondents were single with up to 57% of the population. This does not mean that there were no married workers at the hospital since married respondents made up a respectable 42% of the respondents.

The educational background of the respondents showed that even though there were several levels of education at the hospital, Diploma/HND, and Bachelor Degree holders made up the majority of respondents with 87% of the respondents. The others which made up 13%, included JHS and SSCE/SHS graduates, Master's Degree Holders, and Doctorate Degree Holders. It was also revealed that the majority of respondents have worked for more than 2 years and that only 8.5% of the respondents had less than one year of working experiences. Finally, the category or units where the respondents worked revealed that the administration gave the most respondents, representing 60%. The remaining 40% included Management, Procurement, Inventory Management, Pharmacy, Records, Accounts, and Service Provider. Furthermore, the results of this study revealed that respondents are happy about the service delivery of the hospital, and therefore a whopping 92% of the respondents said yes when asked whether the service quality in their hospital was high. The results thus show that the hospital adopts various inventory management practices, including *Activity Based Costing (ABC)*, *Economic Order Quantity (EOQ)*, *Material Requirement Planning 1 (MRP I)*, *Materials Resource Planning 2 (MRPII)*, *Enterprise Resource Planning (ERP)*, *Distribution Requirement Planning (DRP)*, and *Just-in-Time (JIT)*.

The study also showed that these strategies adopted by the hospital have proved effective for the organization. This is possible because the regression analysis from the study revealed a regression coefficient of 0.622 between inventory management practices and performance. The results thus show that an increase in inventory management practice of the hospital causes a 62.2% increase in performance, and a decrease in inventory management practice causes a 62.2% decrease in performance.

5.3 Recommendations

The following recommendations are made, based on the results of the study.

1. Effective Inventory Management is important, and therefore organizations must endeavour to practice effective inventory management activities that will enhance service delivery for customers, and enhance the smooth operation of the organizations, which will eventually lead to better performance. To successfully implement an effective inventory management system, organizations must clearly state their inventory management goals and strategies and communicate the same to all members and stakeholders of their organizations, especially their suppliers and transporters.

2. The Government of Ghana should also formulate policies and laws to enable organizations to engage in more effective inventory management practices. These policies should create avenues and template strategies for organizations that seek to engage in these practices. To motivate organizations to engage in effective inventory management practices, governments and organisational bodies should create means of recognition and motivation for organizations that successfully implement their inventory management systems in order to serve as motivation for others. Effective management of inventories means that quality healthcare will be delivered and citizens will enjoy better services in turn.

3. Policies such as periodic and continuous reviews should be enacted by the government to ensure that, businesses of particular sizes and profitability level should be mandated to employ effective inventory management systems throughout their operations. This would make effective inventory management enforceable to such organizations which in turn would lead to an upgrading of the state of businesses. Creating an effective inventory

management system may also create employment especially for experts in inventory management.

4. Also, the concept of inventory management should be simplified for organizations in Ghana. Meaning that employees in charge of inventory management in organizations must make it a point to periodically educate or inform other people especially management members in the organizations on effective inventory management and its benefits to get total organizational support for the management of inventory. This includes making the necessary resources in the form of funds and human available at every level of the inventory management system. This can be done through workshops, seminars, printing and sharing of brochures, and sending management e-mails.

5.4 Future Research Direction

Researchers can explore on other inventory management practices that were not part of this study's variables but can affect organisational performance such as cost reduction, supply and demand discrepancies. Again, researchers can outline other close related challenges of inventory management practices that affect organisational performance and research on them.

Apart from the organisational performance that this study sought to find, future researchers can also research into organisational operational performance. Moreover, researchers can focus on the same topic but in different hospitals and then align their results with this study's own to ascertain true or false effect of inventory management practices on organisational performance.

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APPENDIX A: RESEARCH TOOL – QUESTIONNAIRE

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FACULTY OF INTEGRATED MANAGEMENT SCIENCES
DEPARTMENT OF MANAGEMENT STUDIES

ROLE OF EFFECTIVE INVENTORY MANAGEMENT PRACTICES ON ORGANISATIONAL PERFORMANCE.

Dear Respondent,

This questionnaire is for academic purposes only. The researcher is a Master of Business and Technology Management (MBTM) student of the University of Mines and Technology (UMaT), Tarkwa, conducting a research on: The Role of Effective Inventory Management Practices on Organisational Performance; A Case of the Tarkwa Municipal Hospital in Tarkwa. This questionnaire is designed to solicit for your independent views on the above topic. You have been identified as one who can assist by responding positively to the questionnaire proposed for the research. You are highly assured of utmost confidentiality of the information you may provide and that your responses are for the purposes of this academic research only.

Thank you.

SECTION A: BACKGROUND INFORMATION

Please tick the appropriate box.

1. Gender: a) male b.) female

2. Age: a) below 18yrs b) 18 – 19yrs c) 20 – 29yrs
d) 30 – 39yrs e) 40 – 49yrs f) 50 – 59yrs g) 60yrs and above

3. Marital Status:
a) Single b) Married c) Divorced
d) Widowed

4. What is your highest educational background?
a) JHS b) SSCE/SHS c) Diploma/ HND
d) Degree e) Masters f) Doctorate

5. How many years have you served in this hospital?
a) < 1yr b) 1 – 2yrs c) 3- 4yrs d) 5- 6yrs

6. What category of staff are you in this hospital?
a) Management b) Procurement c) Inventory Management
d) Pharmacy e) Records f) Accounts
g) Service Provider

Kindly rate questions 8 and 9 base on the scale given. Very low - 1, Low -2, Moderate -3, High - 4, Very high - 5.

No.	Statement: Very low [1], Low [2], Moderate [3], High [4], Very high [5]					
		1	2	3	4	5
7.	How would you rank the quality-of-service delivery for this hospital?					
8.	To what extent the quality-of-service delivery in this hospital maintained?					
9.	How would you rank the time used for service delivery in this hospital?					
10.	To what extent is the quality of service delivery maintained in this hospital?					

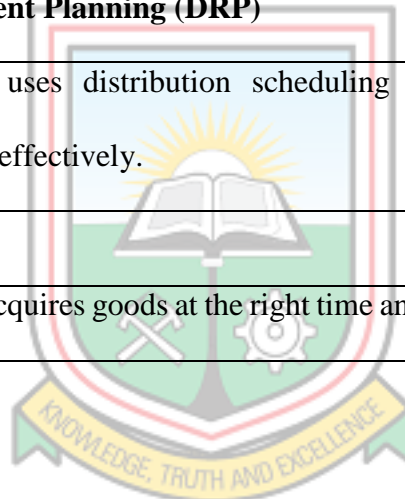
SECTION B: INVENTORY MANAGEMENT PRACTICES IN THE HOSPITAL.

Please indicate your consent about the following statements on inventory management practices used by hospital.

The scale below will be applicable: never - 1, rarely - 2, sometimes - 3, often - 4, Always - 5.

No.	Statement: Never [1], Rarely [2], Sometimes [3], Often [4], Always [5]					
		1	2	3	4	5
	Activity Base Costing (ABC) Analysis					
11.	Does the hospital classifies items according to their stock value?					
Economic Order Quantity (EOQ)						
12.	The hospital implements a standard cost-effective order of a number of stock					
Materials Requirement Planning I (MRP I)						

13.	Are there planning systems where bills of materials are 100% accurate in this hospital?					
Materials Resource Planning I (MRP II)						
14.	The hospital uses planning to aid in strategic logistics planning.					
Enterprise Resource Planning (ERP)						
15.	Does the hospital adopts supply forecasting for optimal profit?					
Distribution Requirement Planning (DRP)						
16.	The hospital uses distribution scheduling to predict demand more effectively.					
Just In Time (JIT)						
17.	The hospital acquires goods at the right time and quantity.					



SECTION C: THE EFFECT OF INVENTORY MANAGEMENT PRACTICES ON ORGANISATIONAL PERFORMANCE

Please indicate the extent to which you consent to the following statements in regard to the effect of inventory management practices on performance in the hospital.

The scale below will be applicable: never - 1, rarely - 2, sometimes - 3, often - 4,

Always - 5.

No.	Statement: never [1], rarely [2], sometimes [3], often [4], always [5]					
	Activity Base Costing (ABC) Analysis	1	2	3	4	5

18.	The hospital uses management system that classify items according to their stock value.					
19.	The hospital practices inventory activities that provides effective management of resources.					
20.	The hospital uses breakdown of prices of goods to aids in reducing stock holding cost.					
Economic Order Quantity (EOQ)						
21.	The hospital uses an orderly system to demand goods which minimises operational cost.					
22.	There is a system in place that enables the hospital to meet demand.					
23.	The hospital administers a periodical replenishment of stocks.					
Materials Requirement Planning I (MRP I)						
24.	The hospital uses a system that coordinates ordering and delivering of logistics required.					
25.	The hospital uses a planning system that helps to facilitate contingencies and overcome Shortages.					
26.	The hospital make use of planning coordination that helps to integrate buyer and supplier to each other's gain.					
Materials Resource Planning II (MRP II)						
27.	The hospital uses a system that helps to plan and control inventories to ensure availability of materials usage on time					
28.	The hospital manages inventory by avoiding excessive stock.					
29.	The hospital resourcefully manage inventory in order to reduce holding or carrying cost.					

Enterprise Resource Planning (ERP)					
30.	The hospital uses an improved system that connects to a wide range of suppliers.				
31.	The hospital uses an enhanced technology to integrated its supply chain partners.				
32.	The hospital has an integrated information sharing system.				
Distribution Requirement Planning (DRP)					
33.	There is an effective planning to predict demands of goods in the hospital				
34.	An efficient scheduling helps to reduce outbound inventory				
35.	There is an efficient coordination of the flow of goods in the hospital.				
Just In Time (JIT)					
36.	There is a reliability on supplies due to efficient practices.				
37.	The hospital makes judicious use of time to effectively manage inventory.				
38.	The hospital receives the quantity of goods needed from supplier.				
39.	The hospital administers services on timely bases to improve customer care.				

SECTION D: CHALLENGES OF INVENTORY MANAGEMENT PRACTICES IN THE HOSPITAL

Kindly indicate the challenges faced by the hospital in implementing inventory management practices.

Please tick in the appropriate box using the following rating:

never - 1, rarely - 2, sometimes - 3, often - 4, always - 5.

Statement: never [1], rarely [2], sometimes [3], often [4], always [5]						
		1	2	3	4	5
40.	The hospital uses outdated storage facilities.					
41.	The hospital uses manual inventory management system or lack of technology.					
42.	Delays in delivery of drugs and non-medicines leading to insufficient inventories.					
43.	Holding too much or too little inventory in the hospital.					
44.	There is lack of proper training on inventory management for staff.					
45.	The hospital has insufficient funds for procurement.					
46.	The hospital purchase drugs with a near expiration dates.					
47.	Are there loss of drugs and non-medicines through inventory shrinkages in the hospital?					

THANK YOU!