

Operational or Paper Work? Management and Control of Inventory in Two Public Hospitals in Ghana: Health Leaders' Viewpoint

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Abstract

Background: Effective inventory management and control have been associated with numerous benefits for healthcare institutions, including improved organizational performance and enhanced competitive advantage.

Objectives: This study aimed to investigate the practices, impacts, and challenges of inventory management and control in two public hospitals in Ghana.

Methods: A qualitative phenomenological approach was adopted in this study. Thirty participants—comprising procurement managers, officers, storekeepers, and other relevant administrative staff—were selected through purposive and convenience sampling. Data were collected using in-depth interviews and focus group discussions. Thematic content analysis served as the primary analytical technique, complemented by interpretative phenomenological analysis to deepen the understanding of participants' lived experiences.

Results: Participants reported key inventory control practices such as First-In-First-Out (FIFO), Last-In-First-Out (LIFO), and First-Expiry-First-Out (FEFO). Positive outcomes identified included improved availability of medical supplies, reduced waste and cost, and enhanced patient safety. However, challenges included limited financial resources, delays in supplies, and instances of mismanagement or misuse of stock by healthcare staff.

Conclusion: The study recommends enhanced collaboration among healthcare stakeholders to address persistent inventory management challenges. It further encourages policymakers and hospital administrators to invest in inventory systems and staff capacity-building to strengthen overall healthcare delivery.

Keywords: Inventory Management, Public Hospitals, Ghana, Procurement, Healthcare Delivery

1. Background

Several striking advancements as well as improvements in technology and increasing incorporation of business and administrative practices into the prevention of illnesses and public health service delivery have had enormous impacts on public health practice.¹ Nowadays, healthcare industries have been noted for paying more attention to improvement, value addition, provision of quality care, reduction of healthcare expenditure, ensuring patient safety, achieving effectiveness and ensuring efficiency of their resources and materials.² Clients expect the smooth functioning of healthcare facilities with favourable outcomes and tend to blame management when their expectations are not fulfilled.² To overcome this setback, the tasks of healthcare facilities should be performed in the most efficient and effective manner through the control and management of their working

resources and materials via an approach known as inventory management and control.³

Inventory refers to the totality of all the stock, which includes raw materials, work-in-progress, and finished goods that enable organizations to produce or serve. It may also refer to the total amount of goods and/or materials contained in a store or factory at any given time.⁴ Inventory management is a specialized branch of materials management within the supplies and services delivery process. All business organizations require inventories. Inventory management is responsible for planning and controlling inventories from the raw materials stage to final consumers.⁵

Generally, an inventory management system is the set of policies that monitors and controls the level of inventory and determines what levels should be maintained, when stock should be replenished, and how

large the order should be.⁶ In other words, inventory management is a scientific technique concerned with planning, organizing, and controlling the flow of materials from their initial purchase through internal operations to distribution to service points. The main aim of inventory management is to obtain the right quantity and quality of supplies at the right time, in the right place, and at the right cost.⁷ Inventory control, on the other hand, is concerned with the maintenance of items or materials at a level at which purchasing and associated costs are the lowest possible without interfering with supply.⁸

Effective inventory management and control has been linked with numerous advantages for healthcare institutions. For instance, effective inventory management and control plays an important role in improving organizational performance and gaining competitive advantage.² It also demonstrates a significant impact on hospital performance in terms of achieving better results through reduced capacity adjustments and service delays, in addition to providing quality care.^{9,10}

One significant impact of effective inventory management and control is the reduction in the operational costs of healthcare institutions. A study conducted in New Delhi at a 1,500-bedded state-funded hospital revealed that a better inventory control technique brought about 20% savings in hospital expenditure.⁸ Therefore, for many healthcare managers across the globe to minimize their operational costs or expenditure, it is imperative that they put in place effective inventory management and control systems in their facilities.²

The overall goal of inventory management is to balance supply and demand in order to maintain customer satisfaction and drive profits.⁴ The activities of effective and efficient inventory management are critical to any successful business. The act of inventory management and control enables organizations to make the right decisions about what to buy, how much to buy, and when to buy within their capital limits. These are considered “value decisions.” Excessive inventory investments can tie up capital that may be better utilized in other areas of the business.¹¹ On the other hand, insufficient inventory investment can lead to shortages and a failure to satisfy customer demand. A balance must be struck and maintained consistently.¹²

Availability of good quality stock in the right quantity, at the right place and time, and at the right cost is the essence of inventory control and management. This, in turn, is essential for the smooth functioning and service delivery of any healthcare facility.⁸ This action is aimed at improving performance and minimizing uncertainties, as the demand for goods and services and their required timing are often unpredictable in healthcare institutions. Such uncertainties often result in stockouts and customer dissatisfaction.⁵ Several other issues also arise from poor inventory management and control in

healthcare institutions. For example, the human body’s blood circulation system is analogous to a logistics system, which transports and provides oxygen and other essential nutrients to various body tissues on a continuous and regular basis to enable the organism to survive. Hence, any fluctuation in blood supply or essential medicines to a patient in a health facility can lead to severe morbidities and, in some cases, even death.⁸

The significant advancements in healthcare technology and management practices have not completely addressed the many challenges that healthcare institutions continue to face in relation to inventory management and control,¹ particularly in public hospitals in developing countries like Ghana. Despite the numerous advantages associated with effective inventory management,⁸ there is a lack of comprehensive empirical research on inventory management practices, their impacts, and associated challenges in public hospitals in Ghana—particularly in the Effutu Municipality. This gap hinders the development and implementation of evidence-based strategies to improve these practices.

2. Objectives

This study aimed to ascertain the inventory management and control practices, their impacts, and associated challenges in two public hospitals in the Effutu Municipality in Ghana, as information on such practices is limited in these settings. The study sought to achieve the following specific objectives:

- i. To investigate the practices of inventory management and control in two public hospitals in the Effutu Municipality of Ghana;
- ii. To assess the impact of inventory management and control on healthcare delivery in two public hospitals in the Effutu Municipality of Ghana; and
- iii. To identify the various challenges affecting inventory management and control in two public hospitals in the Effutu Municipality of Ghana.

3. Methods

3.1. Study Design

This study employed a qualitative phenomenological design as the framework for achieving the study’s objectives. Phenomenological research is inherently descriptive. Through this design, the researchers aimed to explore the structure of the phenomenon—specifically, the management and control of inventory in two public hospitals in Ghana—as accurately as possible. The qualitative phenomenological design helped to broaden the researchers’ understanding of inventory practices and challenges in the study sites. It created an awareness of inventory control practices and allowed for the exploration of participants’ lived experiences, providing sensory insight into the practices and the reasons for the challenges in the healthcare settings. This design

therefore enabled an in-depth, multifaceted exploration of inventory management and control within the selected hospitals.

3.2. Study Area

3.2.1. Profile of the Trauma and Specialist Hospital

The Trauma and Specialist Hospital is a specialized secondary referral facility, now upgraded to a Regional General Hospital, located in the Effutu Municipality. It functions as the final referral point for hospitals, health centers, and clinics within and beyond the municipality. The hospital also receives patients from neighboring municipalities, including those from the national capital. The facility, constructed as a turnkey project, was originally intended as a district hospital but was converted to a secondary referral hospital upon completion. The project was undertaken by EN-projects on behalf of the Ministry of Health.¹³

Located in the municipal capital and commercial hub, the hospital's vision is to become a well-resourced, secondary referral facility and a center of excellence in providing comprehensive healthcare, with capabilities for medical training and research. Its mission is to contribute to socioeconomic development and wealth creation by delivering accessible, restorative, promotive, and rehabilitative health services through highly motivated, skilled, and client-focused staff, in collaboration with key stakeholders.¹³

3.2.2. Profile of the Winneba Municipal Hospital

The Winneba Municipal Hospital is a public healthcare facility accredited by the National Health Insurance Scheme (NHIS) and is situated within the Effutu Municipality, close to the main market of the municipal capital. Commissioned in 1929, the hospital initially had only male and female wards. Over time, the female ward was divided into general and maternity sections, and a small room was converted into a children's ward. Although plans for a hospital extension were initiated in the 1950s, the project was suspended. In 1973, a 28-bed maternity block was completed and handed over to the hospital. A permanent isolation block, completed the following year, was later converted into a children's ward. Currently, the hospital comprises male, female, maternity, and children's wards, with a total bed capacity of 129. It serves patients from the municipal capital and surrounding towns.¹⁴

3.3. Target Population

The target population comprised procurement managers, procurement officers, hospital storekeepers, and other relevant staff at both the Trauma and Specialist Hospital and Winneba Municipal Hospital. These individuals were selected due to their in-depth knowledge and capacity to provide detailed and factual data on inventory management and control.

3.4. Inclusion Criteria

Participants included procurement managers, procurement officers, hospital storekeepers, and other healthcare staff who were present during the data collection period and consented to participate in the study.

3.5. Exclusion Criteria

Those excluded from the study were procurement personnel and hospital workers who were on leave or declined to participate.

3.6. Sampling Technique

The study employed the purposive and convenience sampling techniques to select administrative staff as the participants for the study. The specific administrative staff selected for the study were procurement managers, procurement officers and store keepers. Purposive sampling is the process of sampling participants in a qualitative study based on the researcher's own judgement. It allows the selection of participants who understand and have in-depth knowledge about the phenomenon of the study and meet the criteria of inclusion.¹⁵ Hence, this technique allowed the researchers to select participants who were eligible and capable of providing detailed and factual data on the topic under investigation for analysis.

3.7. Sample Size Determination

The sample size aimed to include a sufficient number of participants to generate comprehensive data.¹⁶⁻¹⁸ Hennick and Kaizer¹⁹ suggested that between 9 and 17 participants are appropriate for in-depth interviews, while Marshall et al.²⁰ recommended 15 to 25 interviews for single-case qualitative studies. Vasileiou et al. proposed a maximum of 30 participants for qualitative health research,¹⁶ and Daniel argued that at least 20 participants are ideal for qualitative inquiries.²¹ These recommendations justified the use of 30 participants for this study, enabling rich and detailed data collection on the topic.

The researchers recruited 15 participants from each hospital. Data were collected through in-depth interviews and focus group discussions. Thus, the total sample included 30 participants, comprising procurement managers, procurement officers, hospital storekeepers, and other relevant staff.

3.8. Data Collection

This study used both in-depth interviews and focus group discussions (triangulation) for data collection. Both the in-depth interviews and focus group discussions were conducted with the help of guides developed from literature reviews, similar prior studies, and input from study constituents. The interview and focus group discussion guides were validated by experts in inventory management and piloted among 10 participants, after which necessary corrections were made. The flexible in-

depth interview guide was divided into two parts: Part A, with closed-ended questions on inventory management practices, and Part B, with open-ended questions exploring the impacts on healthcare delivery. The focus group discussion guide used open-ended questions to gather data on the challenges affecting inventory management and control.

3.9. Data Collection Procedures

Participants were visited at their respective hospitals and briefed on the study's purpose. Upon consent, interviews and discussions were scheduled at mutually convenient times. All participants signed consent forms. Interviews began with general questions before addressing specific study objectives. Sessions lasted 20–30 minutes and were audio-recorded, unless declined—in which case, notes were taken manually.

Focus group discussions were conducted with a maximum of eight participants per group at each facility. This yielded four discussion groups. Data collection was conducted over two weeks (14th–20th August 2023) following ethical clearance from the participating hospitals.

3.10. Data Management and Analysis

Data from tape-recorded interviews and field notes were personally managed by the researchers, with field notes typed and saved on password-protected computers. Audio recordings were backed up on personal computers, email accounts, and Google accounts. Transcripts were created by the researchers in Microsoft Word 2016, integrating written responses from participants who declined audio recording. Content analysis with Interpretative Phenomenological Analysis (IPA) approaches to qualitative data analysis were employed using Microsoft Excel to code and analyze the data. Combining content analysis with IPA allows for both systematic categorization of data and deep exploration of participants' lived experiences. While content analysis helps identify recurring patterns and themes across the dataset, IPA offers a detailed, interpretative understanding of how individuals make sense of their experiences. IPA was used to understand the participants' experiences within the context of inventory management and control practices. This combined approach enhances both breadth and depth, making it especially useful when the research aims to capture shared issues while also giving voice to individual perspectives. Findings were presented as selected quotes, supporting contextual analysis and discussion. Alpha and alphanumeric codes were used to represent participant identities.

3.11. Ethical Considerations

An introductory letter from the researchers' department was submitted to both hospitals for ethical clearance. Written approval was granted before data collection

commenced. Participation was voluntary, with informed consent obtained from all participants. Confidentiality, anonymity, and privacy were ensured throughout the study, and participants were informed of their right to withdraw at any time. The data collected was used solely for academic purposes and was not shared with third parties.

4. Results

4.1. Practices of Inventory Management and Control

The practices mentioned by the respondents reflect the widely known principles of inventory management and control within healthcare institutions. These practices are detailed below. The interviews revealed that inventory management and control practices consisted of employing various processes, techniques, and innovations to ensure the consistent availability of quality and reliable healthcare materials. The most commonly cited inventory control methods were First-In-First-Out (FIFO), Last-In-First-Out (LIFO), and First-Expiry-First-Out (FEFO). During an individual interview session, one participant noted:

“Inventory management and control are the maximum level, the minimum level, and your re-order level of healthcare items in the hospital store department. All these three components need to be set in order to track goods or items in stock, the ones running out of stock, and when to re-order new goods or items. All of these are needed so there wouldn't be a breakage in the supply chain. Our health facility makes use of the FIFO, LIFO, and FEFO inventory management and control techniques.” (Participant: TPA)

Three other participants—TPC, WPA, and WPC—concurred with this statement. In a similar vein, another participant explained:

“Inventory management and control in our hospital entail the use of software to track items and generate reports on inventory levels, usage patterns and expiration dates. This practice monitors costs and negotiations with suppliers to minimize expenses and maximize savings. This practice further ensures that items are stored in a secure and organized manner, with clear labelling and easy access for staff.” (Participant: TPB)

This observation was affirmed by participants TPD, WPB, and WPD. In addition, TPE, which was support from WPE, mentioned:

“The hospital makes use of the FIFO, LIFO, and FEFO technique, and the most utilized is the FEFO.” (Participant: TPE).

4.2. Impact of Inventory Management and Control on Healthcare Delivery

Regarding the impact of inventory management and control on healthcare delivery in the two selected public hospitals, participants identified several benefits. These included the availability of necessary medical supplies,

reduction in waste, cost savings, and improvements in patient safety. One participant stated:

“In our healthcare facility, effective inventory control and management can have a significant impact on the delivery of healthcare through ensuring availability of necessary supplies, improving upon patients’ safety, minimizing waste and cost, enhancing efficiency, and the delivery of high-quality healthcare services.”

(Participant: TPF)

This viewpoint was supported by participants TPG and WPF. In addition, another participant echoed the following sentiment:

“Inventory control and management has an impact on the overall performance of our hospital by ensuring that the facility has the necessary supplies on hand to provide safe and effective healthcare to their patients.”

(Participant: WPG)

WPH also confirmed this statement.

4.3. Challenges Affecting Inventory Management and Control

Participants identified various challenges hindering inventory management and control in the two hospitals. These included limited resources, delays in supplier deliveries, insufficient funding, and the misuse or mismanagement of medical supplies by healthcare staff. A focus group discussant stated:

“In our healthcare facilities, our major inventory management challenge is limited resources to invest in the inventory management system, making the implementation of inventory control practices very difficult.” (Discussant Group: TSHG1)

This was corroborated by a member of another focus group, WMHG1. Another discussant noted:

“There is a delay in goods/items on the side of the suppliers due to inadequate funds to pay suppliers on time. Also, the mismanagement and misuse of items by the healthcare workers is another significant challenge.” (Discussant Group: TSHG2)

WMHG2 expressed a similar concern. Another discussant highlighted:

“There is a delay in goods/items on the side of the suppliers. Furthermore, the mismanagement and misuse of items by the medical staff are inventory management and control challenges facing our healthcare organization.” (Discussant Group: TSHG1)

This concern was echoed by three other groups—TSHG2, WMHG1, and WMHG2. In response to these challenges, participants described measures being undertaken to address them. A discussant reported:

“We have put in place measures to be able to get enough resources from the region to invest in inventory management systems. Also, we are putting in place measures to properly monitor the use of items by the health workers.” (Discussant Group: TSHG1)

This was affirmed by TSHG2. In addition, WMHG1 and WMHG2 stated:

“We are also talking to the management so that they can pay our suppliers on time to avoid the delay of the supply of goods or items needed for healthcare delivery.” (Discussant Groups: WMHG1 and WMHG2)

5. Discussion

Most of the participants believed that inventory management and control practices comprise the use of various processes, techniques or innovation to ensure the quality of healthcare services in hospitals. These results reflect the widely known practices of inventory management and control in healthcare institutions. For instance, research has shown that the inventory management system is the set of policies that monitors and controls the level of inventory and determines what levels should be maintained or when stock should be replenished and how large the order should be.¹⁹ Not differently, inventory management is a scientific technique concerned with planning, organizing and controlling the flow of materials from their initial purchase through internal operations to distribution to service point. This practice is to ensure that right quantity and quality of supplies are supplied at the right time, right place, with the right cost.¹⁸ Inventory control on the other hand, is concerned with the maintenance of items or materials at a level at which purchasing and its costs are at the lowest possible level without the interference of supply.¹⁴ This implies that the management of the healthcare facilities used for this study may have recruited qualified and competent personnel to oversee the various inventory management and control activities in the hospital. This observation is very critical to healthcare institutions because patients and customers expect the smooth functioning of health care facilities with favorable outcomes, and if these healthcare facilities do not fulfil these expectations, then the management is blamed for this setback.⁵ To overcome this setback, the tasks of healthcare facilities should be performed in the most efficient and effective manner through the control and management of their working resources and materials via an approach known as inventory management and control.⁵ Healthcare facilities which do not fulfil these expectations are more likely to lose their competitive advantage in the healthcare market.

Various inventory control and management practices such as the use of technologies or software, FIFO, LIFO, FEFO, were re-iterated by the participants as being carried out in their healthcare organizations. Findings were in line with research that FIFO, LIFO, and FEFO were parts of the effective inventory control and management practices utilized in healthcare facilities.¹ These practices ensure that the right quantity and quality of healthcare supplies are available for healthcare

services. For instance, FIFO, LIFO, and FEFO techniques ensure a decrease in expired or sub-standard supplies in health facilities by ensuring that medical supplies with their best quality are utilized for healthcare services. The use of technology or software in the practice of inventory management and control is commendable as it depicts the deployment of supply chain innovation in these facilities. This deployment will facilitate the request and delivery of materials by suppliers as well as the re-distribution of medical supplies within healthcare facilities. This finding reflects the excerpts of the Resource-Based View (RBV) theory which is defined to include all the tangible and intangible assets that organizations use to plan and implement their various strategies.³ As a result, organizations including healthcare facilities can attain a competitive edge in customer development by their possession resources that are rare, valuable, imperfectly imitable and unique such as a software or technology and deploying them in effective ways including the management and control of inventory in hospitals.³

Participants mentioned availability of necessary medical supplies, minimizing waste and cost as well as improving patients' safety in the health facility were the major impact of inventory management and control on healthcare delivery in their hospitals. These discoveries support literature which asserts that effective inventory management and control has been linked with numerous advantages for healthcare institutions. For instance, an effective inventory management and control plays an important role in improving organizational performance and competitive advantage.⁵ It also portrays a significant impact on hospital performance in terms of giving better results in reducing capacity adjustment and service delays in addition to providing quality of care.^{7,8} Findings also concur with a similar study by Onyango²⁶ who discovered that inventory practices had influenced positively on supply performance whose indicators were inventory holding cost, stock outs, cost of ordering and obsolescence. The availability of quality healthcare services in their right quantities plays a significant role in ensuring that healthcare services provided to patients, clients or customers of various healthcare facilities are made readily available and in a manner that reduces issues of adverse events or health risks. Proper inventory management and control in hospitals will ensure that inventory is not ordered in an urgent manner or expiry of medical supplies are eliminated and if not possible, reduced to the barest minimum. This practice will reduce the cost and waste of inventory. This will contribute towards the increase in the financial performance of these hospitals. In all, availability of necessary medical supplies, minimising waste and cost as well as improving patients' safety plays a major role in the overall pre-finance of hospitals as these advantages will enable healthcare institutions to attract new customers or clients as well as

retain old ones. This commensurates with improvement in customer base and financial performance and growth of healthcare facilities.

The present study discovered that challenges affecting inventory management and control in the selected hospitals included limited resources to invest in inventory management, delays of supply of goods from suppliers, insufficient funds and the misuse or mismanagement of medical supplies by medical staff. Contradict to the present findings, Barasa et al.⁴ found four main inventory management challenges emerged namely: lack of a dedicated county central store; inefficient inventory management system; staff shortage and unavailability of guidelines for inventory management that are up to date. The mentioning of insufficient funds provides evidence that financial issues facing healthcare facilities affect their inventory management and control. Also, the misuse or mismanagement of medical supplies by medical staff could imply that punitive laws regarding the appropriate use of medical supplies in the selected healthcare facilities is lacking or not enforced enough to deter medical staff from misusing or mismanaging medical supplies or equipment.

A major inventory management and control practice challenge re-iterated was delays in supply of goods from suppliers. This discovery is very worrisome as with the healthcare delivery regimen, a small compromise or delay in medical supplies can immensely contribute to worsen patients' or clients' health and in extreme situations, lead to the demise of patients. This situation will adversely affect the reputation and performance of hospitals as it reduces their capacity to retain clients or attract new ones. The establishment of early supplier involvement and effective relationships ensure that the supply chain activities of organizations are quick and devoid damages or delays. This will enable healthcare organizations to enjoy the quick supply of medical goods and equipment to facilitate healthcare delivery. With respect to the financial burden linked with effective management and control of inventory, the establishment of supply chain innovations enhances the performance of healthcare organizations through the promotion of effective management and control of inventory which comes with little financial obligations.

6. Conclusion

The study observed that inventory management and control practices such as First-In-First Out (FIFO), Last-In-Last-Out (LIFO) as well as First-Expiry-First-Out (FEFO) were contributing heavily towards availability of necessary medical supplies, minimizing waste and cost as well as improving patients' safety in the selected hospitals in the municipality. However, the effect of these advantages were minimized by challenges such as limited resources to invest in inventory management, delays in

supply of goods from suppliers, insufficient funds and the misuse or mismanagement of medical supplies by medical staff. The study recommends that effective inventory management and control practices have enormous benefits for healthcare facilities. It urges all concerning bodies within the healthcare fraternity to collaborate to address the major challenges confronting healthcare organizations within the context of inventory management and control. The study suggests that further studies can focus on investigating the challenges faced by suppliers of healthcare facilities. This will enable healthcare organizations to address several challenges linked with their procurement and supply chain activities.

Research Highlights

What Is Already Known?

- An inventory management system comprises policies monitoring inventory levels, determining replenishment needs and order sizes.
- Inventory management, a material management branch, plans and controls inventories from raw materials to final consumers.
- An effective inventory management and control plays an important role in improving upon organizational performance and competitive advantage.

What Does This Study Add?

- The most mentioned management and inventory control practices were the First-In-First Out, Last-In-Last-Out and First-Expiry-First-Out.
- Availability of necessary medical supplies, minimizing waste, improving upon patients' safety in the health facility were the impacts of the management and control of inventory on healthcare delivery.
- The major challenges facing healthcare facilities with respect to their management and control of inventory include limited resources to invest in inventory management, delays in supply of goods from suppliers, insufficient funds and the misuse or mismanagement of medical supplies.

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Author Contributions

Design of Study: COAB and OAK. Analysis and or Interpretation of Data: COAB, OAK, and MA. Drafting the Manuscript: OAK, MA, and FAOM. Revising and Proofreading of Manuscript: COAB and FAOM. All authors read and approved the published version of the manuscript.

Conflict of Interest Disclosures

All authors declared that they have no conflict of interest.

Ethical Approval

The study was approved and conducted in accordance with relevant guidelines and regulations for conducting research by the Department of Health Administration and Education, University of Education, Winneba, Winneba Municipal Hospital and Trauma and Specialist Hospital. Written consent was obtained from the study participants through acceptance and approval letters from the two facilities used as the study settings. The researchers duly explained the objectives of the study to the participants. Participants were informed of their voluntary participation in the study and their right to withdraw from the study at any point in time. The anonymity of participants was maintained throughout the study, and only authorised persons had access to data collected from the participants. All books and articles used in this study were duly referenced.

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