UGANDA CHRISTIAN UNIVERSITY

SCHOOL OF BUSINESS

THE IMPACT OF LOGISTICS MANAGEMENT PRACTICES ON SERVICE DELIVERY IN THE PUBLIC HEALTH SECTOR

A CASE OF NATIONAL MEDICAL STORES.

BY

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DECLARATION

I MATSIKO WILLIAM, hereby declare that this research presented in herein is entirely original, conducted in accordance with the required standards. The information contained in this report has not been previously presented at any educational institution or for any academic recognition. Thus, it is devoid of duplication or reproduction of any other research work.

Signature ..... Date 11th/09/2023

MATSIKO WILLIAM.

CERTIFICATION

I hereby certify that **MATSIKO WILLIAM** conducted and compiled this research under my guidance as the University Supervisor.

Signature ..... Date 11th/09/2023

JENNIFER ABIYAR N. (Mrs.)

DEDICATION

I dedicate this research report to my parents, relatives and friends for their tireless financial, physical and moral support given to me towards my education and to the completion of this research work in general.

ACKNOWLEDGEMENT

I extend a vote of thanks to a number of people who unreservedly, contributed towards the accomplishment of this research work. I also would like to acknowledge the assistance and role played by the following personalities to the successful completion of this study. I cannot say exactly how grateful I am to my supervisor, **JENNIFER ABIYAR N. (Mrs.)** her guidance in this study was beyond measure. Thank you also for providing me with professional advice, encouragement and your time that has spurred me to success.

In the same way, I would like to thank all the staff members at National Medical Stores for the time they gave me. They honestly filled the questionnaires, surely without their input, this study would not have come to fruition. I cannot forget the efforts of the staff of Uganda Christian University especially the lecturers at The School of business for their input and effort that made me acquire the invaluable knowledge. Your contribution can never be quantified but will always be reminiscent whenever I look through this book.

Lastly, I thank my family for sacrificing the little they had, in thick and thin and invested in my education. This sacrifice that you made failed in other peoples' homes. Thank you for looking after me and enabling me to acquire a lifelong investment.

ABSTRACT

This study titled "The Impact of Logistics Management Practices on Service Delivery in the Public Health Sector" focuses on the National Medical Stores (NMS) of Uganda. Its specific objectives are to identify inventory management practices at NMS, assess the role of information technology in logistics management, and identify distribution channels used. A mixed-methods approach was employed, with qualitative interviews and some quantitative data. The primary data sources were NMS and Katabi Health Center III, along with retrospective data from archives, conducted as a cross-sectional study.

The study involved 65 relevant stakeholders, with a sample size of 52 determined using Krejcie and Morgan's method. Stratified and purposive sampling methods were used, and data were collected through questionnaires. Findings were presented using tables. The study found that NMS has effective inventory management procedures but needs improvement in mobile medical supply units, technology integration, and distribution channel optimization.

In examining the impact of logistics management practices on Uganda's public health sector, several key findings emerged. NMS exhibited robust inventory management practices, including clear procedures and effective stock replenishment. Information technology adoption significantly improved logistics management, offering real-time visibility of inventory. However, gaps existed in emergency response and access to remote areas within the distribution channels.

Overall, information technology enhanced logistics management but raised concerns about its impact on service delivery. Gaps in distribution channels were identified, emphasizing the need for organized emergency response, dedicated remote area channels, and regional distribution centers. In conclusion, this research highlights the vital role of logistics management in healthcare service delivery and offers recommendations for NMS to enhance logistics strategies and improve healthcare accessibility and quality in Uganda.

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LIST OF ABBREVIATIONS

3PL	Third Party Logistics
EDI	Electronic Data Interchange
EOQ	Economic Order Quantity
ERP	Enterprise Resource Planning
FIFO	First in First Out
GPOs	Group Purchasing Organizations
JIT	Just-In-Time
LMIS	Logistics Management Information System

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CHAPTER ONE

1.0 Introduction

This chapter presents the background of the study, the statement of the problem, purpose of the study, specific objectives, research questions, scope of the study, significance of the study and lastly the conceptual framework.

1.1 Background of the Study

Logistics management involved planning, implementing, and controlling the movement and storage of finished goods, services and related information from the point of origin to the point of consumption. This includes activities such as transportation, warehousing, and distribution through appropriate channels to the ultimate consumer. *(Chopra, S., & Meindl, P. (2016). Supply chain management: Strategy, planning, and operation. Pearson*)

According to Gornley (2008), Logistics management encompasses many aspects such as cost cutting, keeping prices low, reaching many customers, flexibility and building sustainable agendas that they value most and focusing on them.

The delivery of quality healthcare services is a critical challenge faced by governments around the world. In many countries, especially in the developing countries, the public healthcare sector is the primary provider of healthcare services, which makes logistics management a crucial factor in the successful delivery of healthcare services. Effective logistics management ensures the efficient and effective distribution and movement of essential medicines and medical supplies, reducing the costs of healthcare services, improving access to healthcare, and enhancing patient outcomes.

Service delivery is a discipline that concentrates on the proactive services that must be delivered to provide adequate support to users. Some delivery involves four key areas that combine to ensure good service delivery, these include the following customers, resources, project and program

Basing on National Medical Stores (NMS), which was founded in 1993 30 years ago being the nation's custodian of many of the human medicines. It is located at 4-12 Nsamizi Road, in Entebbe. The goal of national medical stores is to effectively deliver and procure high-quality medical supplies to the people of Uganda.

Since its implementation on December 3rd, 1993, it has been charged with the following tasks: drug procurement, storage, value addition (Packaging and labeling) and transportation.

Despite of government's initiatives to enhance the provision of healthcare at public hospitals and health facilities. Logistics management in the public sector faces many challenges, including limited resources, inadequate infrastructure, inadequate infrastructure, and inadequate funding. These challenges can negatively impact the timely delivery of healthcare services, causing long waiting times, stocks-outs of essential medicines and supplies, hence poor service delivery to the public.

Therefore, the study of the effect of logistics management on service delivery in the public sector aims to examine the extent to which logistics management practices affect the delivery of healthcare services in the public sector. This study will explore the current state of logistics management in the public sector, identify the challenges that hinder the delivery of quality healthcare services, and propose recommendations for improving logistics management practices to enhance healthcare service delivery. The findings will help policymakers and healthcare professionals to develop effective strategies

1.2 Statement of the Problem.

The Daily Monitor on, June 24, 2020, reported that National Medical Stores (NMS) recalled over 200,000 boxes of expired drugs and medical supplies that had been distributed to more than 1,000 health facilities across Uganda. This was not the first recall of expired drugs by NMS, as a similar incident had occurred in 2017. In a more recent article published by The Observer Uganda on August 6, 2021, it was reported that there were still frequent stockouts of essential medicines in public health facilities, despite efforts by NMS to maintain adequate stocks. The article suggests that inadequate planning, budgeting, and coordination efforts by NMS have contributed to the persistent issue of stockouts in public health facilities.

It is concerning that logistics management practices at NMS have failed to address the issue of stocks in public health facilities, as this has had a negative impact on healthcare service delivery in the country.

Therefore, it is necessary to explore the effects of logistics management on service delivery in the public sector, identify challenges, and propose effective solutions to improve healthcare service delivery in public health facilities in Uganda.

The lack of proper inventory management by NMS has raised concerns about the delivery of quality healthcare services to the public. As a government firm, NMS has a responsibility to ensure that essential medical supplies are delivered promptly to public health facilities to enhance service delivery in the sector

1.3 Purpose of the Study.

The impact of logistics management techniques on the service delivery in the public healthcare sector.

1.3.1 Specific Objectives of the Study

1. To identify the inventory management practices used at National Medical Stores.
2. To assess the role of information technology adoption in logistics management.
3. To identify the distribution channels adopted at National Medical Stores.

1.4 Research Questions

1. What are the inventory management practices used at National Medical Stores?
2. What is the role of information technology in logistics management?
3. What are distribution practices adopted at National Medical Stores?

1.5 Scope of the Study

1.5.1 Content scope

The study included a comprehensive examination of National Medical Stores logistics management practices, including procurement, inventory management and distribution of medical supplies to health facilities. The study also examined how these logistics practices impact the availability, accessibility, and quality of healthcare services provided by the public health sector.

1.5.2 Geographical Scope

The research was carried out at National Medical Stores, located on plot 4-12 in Nsamizi Entebbe, Wakiso District and Katabi Health Centre III.

1.5.3 Time Scope

The research looked at approximately 5 (2019 – 2023) years back how NMS has been conducting its logistics in regards to service delivery.

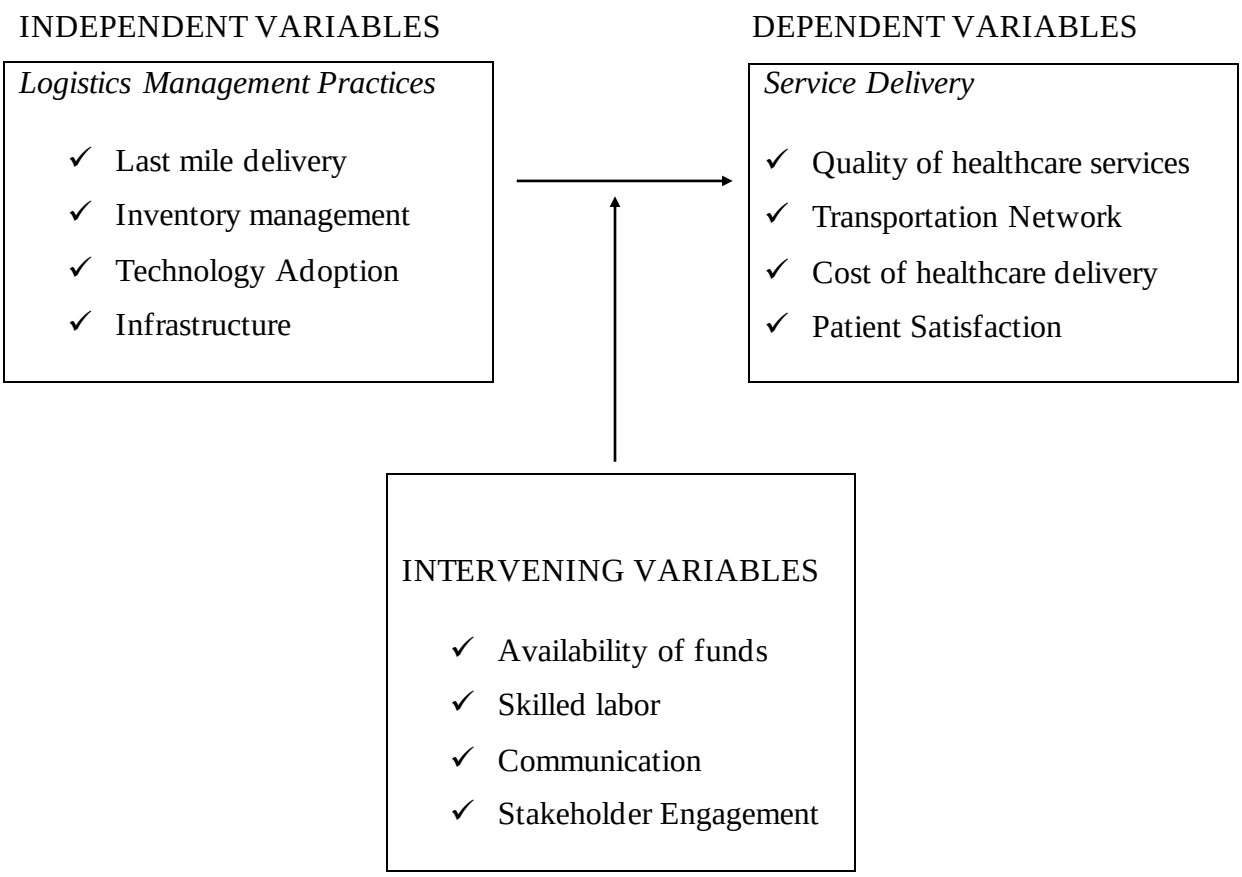
1.6 Significance of the Study

The study provided insights into the impact the of logistics management on service delivery in the public health sector, which could help policy makers identify areas where improvements are needed.

The study increased on the literature, knowledge and understanding on how logistics management affects service delivery on the context of the public health sector. For the organization, the study would help identify areas of self-improvement on its logistics management practices to enhance service delivery

1.7 Conceptual Framework.

Figure 1.



Source: Self Developed.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction.

This chapter contains definitions of key terms that is inventory management practices, the role of information technology in logistics management, the distribution channels adopted at National Medical Stores on the review of relevant literature on every specific research objective.

2.1 Definition of key terms

2.1.2 Logistics Management Practices.

Chopra and Meindl (2021) define logistics management practices as the set of activities involved in in efficiently coordinating and controlling the flow of goods, services, and information from the point of origin to the point of consumption to meet customer requirements

Transportation is the process of moving goods from one location to another. (Bowersox, D. J., Closs, D. J., & Cooper, M. C. (2011). This involves the use of various modes such as road rail, air or sea. It involves planning, execution, and control of the physical movement of goods throughout the supply chain.

Inventory Management is a set of activities and techniques employed in managing the flow of inventory within a supply chain, encompassing aspects such as order placement, stock control and information among stakeholders (Lee, H. L., Padmanabhan, V., & Whang, S. 2018). It involves replenishment strategies, tracking stock levels, conducting regular inventory audits, and implementing control mechanisms to prevent stockouts, excess inventory, or obsolete items.

Information systems are sets of interrelated components that collect, process, store and distribute information to support decision making, coordination, control, analysis, and visualization in an organization. (Pearlson and Saunders, 2016). Some examples here include the Enterprise Resource Planning (ERP), Warehouse Management Systems (WMS), and Transportation Management System (TMS), These support data management, communication, and decision-making processes.

2.1.3 Service Delivery

Zeithaml, Parasuraman, and Malhotra (2000) define service delivery as the process of creating, communicating, delivering, and exchanging offerings, clients, partners, and society at large.

Service delivery is a discipline that concentrates on the proactive services that must be delivered to provide adequate support to users. Some delivery involves four key areas that combine to ensure good service delivery, these include the following customers, resources, project and program

2.2 The inventory management practices used at National Medical Stores.

Forouzani, M., Kheiri, A., & Babazadeh, R. (2019). Hospital inventory management practices: Iranian Journal of Nursing and Midwifery, defined inventory management practices as "the systematic planning, control, and monitoring of all activities involved in managing healthcare inventory, including demand forecasting, stock replenishment, inventory control and monitoring stock levels."

Furthermore, scholars like (Gupta, M., Angurala, R., & Bansal, P. 2017). Inventory management practices in primary health centers: A study of district Kangra, Himachal Pradesh. International Journal of Health Sciences and Research, 7(4), 134-142. Described inventory management practices as "the processes and strategies implemented to ensure the availability of essential medicines and supplies in healthcare facilities, including activities such as stock recording, monitoring, and supplier management. To achieve the first objective of Identifying the inventory management practices used at National Medical Stores (NMS), a comprehensive literature review can provide valuable insights into the topic. Inventory management is a critical aspect of logistics management, especially in the healthcare sector, where timely delivery of medicines and medical supplies is crucial to ensuring quality service delivery. Despite its importance, inventory management has been a significant challenge for National Medical Stores (NMS) in Uganda, affecting the organization's ability to provide quality healthcare services to the public. To achieve an effective service delivery there has to be the effective and efficient warehouse management, this component deals with effective management of physical storage facilities and distribution centers where inventory is stored.

Warehouse management is the effective planning, organizing, and controlling of activities within a warehouse or distribution center, including layout design, inventory management, and operational optimization. *(Waters, D. 2018).*

NMS has been struggling with inventory management challenges, including stockouts and overstocking of medicines and medical supplies, leading to inefficient supply chain management and poor service delivery.

According to the National Medical Stores Annual Report (2020), NMS experienced stockouts of essential medicines and medical supplies in various health facilities across the country, leading to delayed or interrupted services to patients.

According to *(Lee, H. L., Padmanabhan, V., & Whang, S. 2018)* defined, demand forecasting as the component that involve predicting future demand for products or items based on historical data, market trends, and other relevant factors. Accurate demand forecasting helps in determining optimal inventory levels and avoiding stockouts or overstocking.

A study carried out by Dr. David Taremwa, a health systems researcher at Makerere University School of Public Health found out that poor demand forecasting by NMS led to frequent stockouts of essential medicines and supplies in most health facilities in Uganda. Another area where NMS has been criticized for its inventory management practices is the management of expired medicines and supplies. According to a report by the Auditor General's office (2019), NMS had accumulated expired medicines and supplies worth over UGX 1 billion between 2016 and 2018. This suggests that NMS may not be effectively monitoring its inventory levels and may not be disposing of expired items in a timely manner.

The push inventory demand system is one system in which inventory replenishment decisions are based on forecasts or predetermined production schedules without immediate customer demand. Nahmias, S. (2015) while the pull inventory demand system is one system in which inventory replenishment decisions are triggered by actual customer demand, often through a just-in-time (JIT) or a demand-driven approach. (Monczka, R. M., Handfield, R. B., Giunipero, L. C., & Patterson, J. L.2018) The inventory management practices used at NMS has not been optimal, leading to inefficiencies and wastage in the supply chain. For instance, a study by Mugabi et al. (2019) identified various inefficiencies in NMS's inventory management practices, including poor forecasting, inadequate inventory control, and suboptimal distribution strategies. Mugabi et al. (2019) found that NMS was using a push-based inventory management system, where medicines and medical supplies were stocked based on historical demand patterns, leading to overstocking and wastage. In contrast, a pull-based inventory management system, where inventory is replenished based on actual demand, is considered more efficient and cost-effective. This approach minimizes wastage and ensures that medicines and medical supplies are available when needed, leading to improved service delivery.

Information Systems and Technology is a practice widely adopted and has been in use through use of different technology to monitor the inventory levels and also monitor expiration dates of different items.

This practice focuses on the use of technology and information systems to support inventory management activities, such as inventory tracking, demand forecasting, and order management. (Chopra and Meindl 2021). It includes utilizing inventory management software, barcode systems to improve accuracy, efficiency, and real time visibility of inventory data. Information systems and technology also take part in the Inventory planning and Control**,** this is the determining of appropriate level of inventory to be maintained based on demand forecasts, lead times, and service level target. (Saghiri, S., Haeri, A., & Ghezavati, V. 2017). It involves tracking stock levels, conducting regular inventory audits, and implementing control mechanisms to prevent stockouts, excess inventory, or obsolete items.

However, NMS has adopted the use of the Economic Order Quantity (EOQ) model, the EOQ is a widely used inventory management model that calculates the optimal order quantity to minimize total inventory costs. According to Nahmias, S. (2015)., the Economic Order Quantity is a classical deterministic inventory model that seeks to determine the order quantity that minimizes the sum of holding costs and ordering costs. This model is based on the assumption that demand is constant, and inventory holding costs and ordering costs are known. NMS uses this model to calculate the optimal order quantity for each item and to ensure that it maintains adequate inventory levels without incurring unnecessary costs. With this model NMS does the inventory planning and control effectively. This is the determining of appropriate level of inventory to be maintained based on demand forecasts, lead times, and service level target. (Saghiri, S., Haeri, A., & Ghezavati, V. 2017). It involves tracking stock levels, conducting regular inventory audits, and implementing control mechanisms to prevent stockouts, excess inventory, or obsolete items.

The ABC Analysis is a method of categorizing inventory items based on their value or importance, it involves dividing inventory items into different categories to prioritize management efforts and resources. The categorization is typically done based on the Pareto principle, also known as the 80/20 rule, which states that a small percentage of items (typically around 20%) account for a large percentage (usually around 80%) of the total value or usage (Gupta, P. K., & Choudhury, A. 2017). A-items; are high-value items that contribute significantly to the overall inventory value or sales volume. They require closer attention, tighter control, and more frequent monitoring. Efforts are focused on efficient management and maintaining adequate stock levels to meet consumer demand. B-items; are moderate-value items that have moderate level of monitoring and management compared to A-items.

The focus is on maintaining reasonable stock levels and ensuring timely replenishment. C-items: are low-value items that have relatively low usage or value.

They generally constitute a large portion of the inventory items but contribute a smaller percentage to the total value or sales volume. They require minimal attention and management effort. The focus is on maintaining basic stock levels while minimizing costs. ABC Analysis helps organizations prioritize their inventory management activities by allocating resources and attention based on the value and significance of each item. It enables better control over high-level items while optimizing inventory levels for low-value items, resulting in improved efficiency and cost-effectiveness in inventory management.

Therefore, the first research objective of identifying the inventory management practices used at NMS is crucial in addressing the challenges faced by the organization in delivering quality healthcare services to the public. By identifying the most effective inventory management practices, NMS can optimize its supply chain operations, minimize wastage, and enhance service delivery in the public health sector.

2.3 The Role of Technology in Logistics Management.

The role of technology in logistics management refers to the use of advanced technological tools and systems to improve the efficiency, effectiveness, and visibility of logistics processes. It involves the application of technologies such as barcode scanning, RFID, GPS tracking warehouse management systems and transportation management systems to streamline operations, enhance decision making, and optimize the flow of goods and information. (Bowersox, D.J., Closs, D. J., & Cooper, M. B. 2013. Supply chain Logistics Management. McGraw-Hill Education.)

In recent years, there has been an increasing focus on the role of technology in logistics management, with the aim of improving service delivery in various industries. This review examines the existing research on the role of technology in logistics management practices and its potential to improve service delivery in the public health sector. The role of technology logistics management has brought about significant changes in the way organizations manage their operations. According to Balcik and Beamon (2008), technology adoption can help organizations achieve better visibility, control and coordination in their supply chains. In the healthcare sector, the role of technology has been shown to improve inventory management, reduce stockouts, and increase the availability of medicines and medical supplies (Lu and Huang, 2014).

Logistics management information systems integrate technology, processes, and data to facilitate the efficient effective management of logistics activities. These systems provide capabilities such as demand forecasting, order processing, inventory management, transportation planning, and performance measurement, contributing to improved visibility, collaboration, and decision-making in the logistics function. (Murphy, P. R., & Knemeyer, A. M. 2017, Contemporary Logistics. Pearson.) Logistics management information systems include the Enterprise Resource Planning (ERP) Systems: ERP systems integrate various functions within an organization, including logistics, to enable efficient management of resources, data, and processes. Examples of popular ERP systems used in logistics management include SAP, Oracle, and Microsoft dynamics. The other system is the Warehouse Management System (WMS): WMS is a software application that manages and controls warehouse operations, such as inventory tracking, order processing and resource allocation.

Examples of WMS software include Manhattan Associates, JDA Warehouse Management, and HighJump. Transportation Management System (TMS): TMS is a software solution that streamlines transportation operations, including carrier selection, route optimization, freight consolidation, and shipment tracking. Examples of TMS software include Descartes, MercuryGate, and BluJay Solutions. Inventory Management System is also another type of the logistics management systems, these systems are designed to optimize inventory levels, track stock movements, and facilitate accurate demand forecasting. Examples of these systems include; Fishbowl Inventory, Zoho Inventory and TradeGecko. Supply Chain Analytics Systems, designed to utilize data analytics and business intelligence tools to provide insights into supply chain performance, demand forecasting, inventory optimization, and logistics cost analysis. Examples of supply chain analytics software include; Tableau, and SAS.

Electronic Data Interchange (EDI), this is a communication protocol that enables the electronic exchange of business documents, such as purchase orders, invoices and shipping notifications between trading partners. It facilitates seamless data integration and collaboration in logistics processes.

A study conducted by Mutambi Robert "Factors affecting implementation of the logistics management information system (LMIS) in Uganda's public health sector: a qualitative study" published in BMC Health Services Research in 2019. This study aimed to identify the factors affecting the implementation of the Logistics Management information System (LMIS) in Uganda's public health sector and provides recommendations for improving the LMIS system to enhance the effectiveness and efficiency of the supply chain. The study found out that technology helped to streamline the supply chain processes, reduce stockouts and overstocking of drugs, and improve inventory management. According to the study, the implementation of the Logistics Management Information System (LMIS) helped to streamline the supply chain processes by providing real time information on the availability and movement of drugs and other medical supplies. This information allowed health facilities to plan their orders better and avoid stockouts and overstocking of drugs. The system also enabled health workers to monitor the expiry dates of drugs and prioritize their usage, thus reducing wastage and increasing efficiency in the supply chain.

Furthermore, LMIS improved communication and coordination among stakeholders in the supply chain by the help of the Electronic Data Interchange (EDI), this is a communication protocol that enables the electronic exchange of business documents, such as purchase orders, invoices and shipping notifications between trading partners. It facilitates seamless data integration and collaboration in logistics processes, system allowed for the sharing of information and data between different levels of the supply chain, from the central medical stores (NMS) to the health facilities, which helped minimize delays and improve the speed of delivery of drugs and medical supplies. In the context of Inventory management technology played a major role in tracking and monitoring of inventory levels in real time for the fact that it provides accurate and up to date information on stock levels, delivery times and consumption rates. The study further notes that the system has facilitated the implementation of a First Expiry First Out (FEFO) system for inventory management. The FEFO system involves the use of expiration dates to prioritize the use of drugs and medical supplies, with those that have a shorter shelf-life span being used first.

A study by Yih and Chen (2013) investigated the adoption of mobile computing technology in the public health supply chain management system. The study found that the adoption of mobile computing technology improved data accuracy; mobile devices with built in validation and data verification mechanisms help reduce errors and ensure data accuracy. Automated data capture minimizes manual data entry mistakes, leading to improved inventory management and service delivery. The study further showed mobile computing technology aided in enhancement of communication and collaboration through facilitating seamless communication and collaboration among different stakeholders in the supply chain. Healthcare providers, logistics personnel, and administrators can share information, coordinate activities, and respond to challenges more efficiently, leading to better service delivery.

The adoption of mobile computing technology showed increased efficiency and productivity through it streamlining workflows, eliminated paper-based processes, and automated repetitive tasks. This improved operational efficiency, reduced administrative burden, and allowed more time for frontline healthcare workers to focus on patient care.

In modern conditions, effective management of the transportation process is impossible without up-to-date information about commodity and materials flow. The digitalization process covers almost all areas of production and services, including transport. (Lobanova and Evtiukov 2020, Novikov and Shevtsova 2020) in the transport industry, various technologies are used to track the movement of goods and transport, and optimize the operation of warehouse complexes. One of these technologies is the radio frequency identification technology, or RFID (Zeleny 2002). This technology makes it possible to minimize the influence of human factor and automate inventory management. The RFID technology ensures automatic identification of a product using RFID tags. An RFID tag consists of a microchip that stores information, and a miniature antenna used by the tag to transmit and receive data. Each tag has a unique number and user information stored in memory. With this unique number, objects marked with tags can be distinguished from each other. User information may contain the date of manufacture, the shelf life, and the batch number (Anikina and Rodkina 2011, Bhuptani and Moradpour 2011). A special device equipped with antennas a reader receives and records this information. One of the main differences between RFID and systems that existed before is the possibility of rewriting. Unlike a barcode reader, an RFID reader can receive information from several tags at once. The RFID technology is used in various situations at all stages of goods movement, when rapid and accurate control, tracking, and accounting for numerous movements of various objects are required. The introduction of this technology makes it possible to optimize business processes as follows (Anikina and Rodkina 2011):

- To carry out electronic control of access and movement of commodity and material flows on the corporate premises.
- To manage warehouses (especially large ones), delivery and movement of goods and material values.
- To perform automatic data collection and billing during the transportation of commodity and material flows.
- To control, plan, and manage the schedule and movements select optimal routes.

In warehouse complexes, it becomes possible to facilitate the process of preparing, processing and sending orders, as well as increase the accuracy of inventory control. The main goal of implementing the RFID technology in a house is to reduce costs through automatic data collection. (Ivanov and Kireeva 2016, Vlasov 2015)

2.4 The distribution channels adopted at National Medical Stores.

Distribution practices play a significant role in logistics management towards efficient and effective service delivery in the public health sector, the success of the distribution process is dependent on the adopted practices. According to Philip Kotler and Gary Armstrong, distribution channels are sets of interdependent organizations involved in the process of making a product or service available for use or consumption, they emphasize the collaboration and interdependence of organizations within the channel.

In a study “Health supply chain system in Ugandan: assessment of status and of performance of health facilities: a multimethod study" Journal of Pharmaceutical Policy and Practice, conducted by Eric Lugada, Moses Sembatya et al. (2022), it was found that poor distribution practices were a major challenge affecting the delivery of healthcare services in Uganda. The study highlighted issues such as the use of inappropriate transport means, lack of standardized distribution routes leading to late deliveries and stockouts, and inadequate monitoring systems, which led to inefficient delivery of medical supplies. The authors recommended that NMS should adopt more efficient and standardized distribution practices, including the use of reliable transport means, developing a standard distribution route system, and implementing proper monitoring and evaluation systems. The study further evaluated the distribution practices of NMS in the rural areas of Uganda and found that NMS mainly used third party logistics providers (3PLs) to transport medicines and supplies from the central warehouse to regional and district stores. The 3PLs used a combination of delivery vehicles such as trucks and motorcycles to reach remote health facilities. The study revealed that the distribution system was characterized by long lead times, irregular delivery schedules, frequent stockouts and inadequate transport and storage facilities.

National Medical Stores distributes essential medicines and medical supplies to health sub-districts, which are responsible for the distribution of these products to lower-level health facilities. The health sub-districts receive their orders through the LMIS and are responsible for ensuring that the products reach the intended health facilities in their area of responsibility. It is noted that NMS also considers the Group Purchasing Organizations (GPOs), these are entities that negotiate purchasing contracts on behalf of multiple healthcare facilities.

They aggregate the purchasing power of their members to secure competitive prices and favorable terms from suppliers, furthermore authors Chopra and Meindl emphasize that GPOs enable healthcare organizations to benefit from economies of scale, standardization of products, and expertise in contract negotiation.

Direct delivery, the most common distribution channel used in medical supplies distribution. In this channel, the supplier delivers the medical supplies directly to the end user, such as a hospital or clinic. The supplier may use their own fleet of vehicles or contract with a third-party logistics provider to make the deliveries. Chopra and Meindl in "Supply Chain Management: Strategy, Planning, and Operation" further define direct delivery as a strategy that eliminates the need for intermediaries and allows for a closer connection between producers and customers. They note that direct delivery can be particularly beneficial when dealing with high-value or perishable products, as it reduces handling and storage time. A study conducted by Jolayemi, J. K., & Tariq, M. A. (2017), they cited a study by Tucker and Edmondson (2003), who analyzed the supply chain performance of the United States Department of Defense's Military Health System.

Tucker and Edmondson found that direct delivery of medical supplies from the supplier to the end user resulted in faster delivery times, reduced inventory costs, and fewer stockouts compared to other distribution channels, such as wholesalers and distributors. National Medical Stores uses such a channel within the regional health facilities.

National Medical Stores uses the 3PLs as a way of distributing medical supplies in the faraway places. John Mangan, Chandra Lalwani, and Tim Butcher: in "Global Logistics and Supply Chain Management" the authors define 3PLs as the use of external organization to manage the logistics functions that have traditionally been performed within an organization. The authors highlighted that 3PLs providers assume responsibility for various logistics activities, allowing companies to focus on their core competencies. A study by Kondo and Tawara (2013) focused on developing a disaster relief logistics model that uses third party logistics in Japan, with a specific focus on the 2011 Tohoku earthquake and Tsunami. The study proposed a two-stage relief supply chain model, comprising procurement and distribution stages, with the involvement of 3PLs in the distribution stage.

The two-stage relief supply chain starts from the First-stage or centralized distribution, this stage involves the coordination and management of relief supplies at a central location, typically referred to as a Distribution Center or Hub. The centralized distribution stage is responsible for activities such as receiving, sorting and storing relief goods and medical supplies, as well as conducting initial assessments of needs and allocating resources accordingly. The primary objective is to efficiently manage and coordinate the overall relief supply chain. The second-stage or Decentralized distribution, once the supplies are received and sorted at the central distribution center, they are dispatched to various sub-distribution points located closer to the areas of interest. These sub-distribution points can be regional centers, local warehouses, or even distribution points within the areas of interest themselves. The decentralized distribution stage focuses on the last-mile delivery of supplies to the intended beneficiaries, ensuring timely and efficient distribution to the areas of interest. The authors demonstrated the effectiveness of using 3PLs in disaster relief operations to overcome logistical challenges, such as transportation and storage transportation and storage of medical supplies in faraway areas.

The study also proposes a mathematical model to optimize the distribution of medical supplies to faraway areas using 3PLs. The model considers demand for medical supplies, transportation capacity, and inventory holding costs to determine the optimal allocation of medical supplies. Optimization is the process of finding the best solution among a set of feasible alternatives, considering multiple objectives, constraints, and decision variables (Chopra & Meindl, 2016). Optimizing the distribution of supplies using third-party logistics (3PLs) involves developing mathematical models that aim to find the most efficient and cost-effective allocation and routing strategies. These models help determine the optimal distribution plans, considering various factors such as transportation costs, inventory holding costs, delivery time windows, and capacity constraints. While there are different approaches and techniques available, one common mathematical model used for supply chain optimization is the Vehicle Routing Problem (VRP)-(Pinedo, 2019).

The VRP is a combinatorial optimization problem that seeks to find the best routes and schedules for a fleet of vehicles to deliver goods toa set of locations while minimizing costs or maximizing efficiency, when applied to the context of supply chain distribution with 3PLs, the VRP can be extended to incorporate additional constraints and objectives specific to the situation. (Michael Gendreau, Gilbert Laporte, Paolo Toth and Daniellé Vigo).

These may include factors such as time windows for delivery, vehicle capacities, multiple depots or distribution centers, customer demand patterns, and service level requirements. Other scholars like (Eilon Solow and Fred Glover) suggested other optimization techniques and algorithms, such as linear programming integer programming, or metaheuristic algorithms like genetic algorithms or simulated annealing, can also be employed to solve the optimization problem. These techniques help find the best possible solutions within a given set of constraints and objectives.

A hybrid distribution channel is a combination of direct and indirect distribution channels that allows companies to leverage the advantages of both approaches. It involves using a mix of company-owned channels and third-party intermediaries to reach consumers effectively. (Kotler, Keller, Koshy, & Jha 2016). In this distribution channel, companies utilize a mix of company-owned channels, such as physical stores or online platforms, along with third-party intermediaries, such as wholesalers, distributors, or retailers. Partnering with third-party intermediaries can expand market reach, enhance product availability, and reduce distribution costs. Kotler, Keller, Koshy and Jha suggested that the key idea behind the hybrid distribution channel is to create a balanced distribution strategy that optimizes efficiency and effectiveness. Companies can choose the most suitable mix of channels based on factors like target market, product characteristics, industry dynamics, and customer preferences. This flexibility allows businesses to adapt to changing market conditions and consumer behavior.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents a comprehensive understanding of the approaches and methods that were employed to investigate the research design, study population, Sampling design, data sources data collection techniques, research instruments, validity and reliability, research procedure, data analysis methods, and limitations.

3.1 Research Design

The primary objective of this research was to examine the impact of logistics management practices on service delivery in the public health sector, to address the research objective, a mixed-methods research approach was used to obtain a comprehensive understanding of the topic, the study was conducted using qualitative and to a lesser extent with quantitative approach. The main source of data is National Medical Stores as a reference and Katabi Health Center III. The study was conducted by interviewing National Medical Stores together with Katabi health III key staff to the study, it will also consider retrospective data that was retrieved from the archives. This was a cross sectional study.

3.2 Study Population

The study targeted a total population of 65 respondents comprising of 5 doctors at Katabi Health Centre III and 60 employees of NMS, (ZoomInfo, 2023.)

3.4 Sample Size

The sample size was 56 (Krejcie and Morgan 1970), employees of NMS was 52 and the sample size at Katabi Health Center III was 4

3.4.1 Sampling Methods.

Stratified sampling method was used since it consists of the different subgroups or strata, such as different departments, levels of service. This sampling method ensured representation from each stratum allowing comparisons and analysis across different segments.

Purposive Sampling method was used during the study because the method allowed intentional selection of participants who possess the expertise, experiences, or characteristics.

3.4 Data Sources

3.4.1 Primary Data Sources

Primary data was collected through conducting surveys and administering of questionnaires among healthcare professionals, logistics managers, and stakeholders involved in the supply chain. Conducting interviews was carried with key informants, such as logistics managers, healthcare administrators, and staff involved in the delivery of healthcare services.

Furthermore, observational data was collected through observing how certain activities are being done by different parties, Analyzing relevant documents such as organizational reports, policies, guidelines, and records from the National Medical Stores.

3.4.2 Secondary Data Sources

Secondary data was got from different sources which included the reviewing and analyzing published research articles, academic journals, conference proceedings and dissertations related to logistics management practices and service delivery in the public health sector. Assessing government reports and publications, databases from international organizations like the World Health Organization (WHO), United Nations Development Program (UNDP), and non-governmental organizations (NGOs) working in the field of public health.

3.5 Data Collection Methods.

Data was collected through using questionnaire surveys which were administered to gather quantitative data on logistics management practices, service delivery indicators and perceptions of healthcare professionals or other stakeholders.

Conducting direct observations of logistics activities such as inventory management, transportation processes.

Interviews were carried out with key informants such as healthcare administrators and logistics managers.

3.6 Research Instruments.

Questionnaires were administered with structured questions.

Interview Guides were developed with a set of questions or prompts designed to guide the researcher during interviews with key informants.

Observation protocols that outline the specific details of what needs to be observed during data collections

3.7 Validity and Reliability of the Research instrument.

Before administering the instruments, pilot testing and pretesting was carried out to ensure that it is both reliable and valid.

To ensure the validity of the questionnaire, a Content Validity Index (CVI) was performed.

$$\text{CVI} = \frac{\text{Correct Items in the Instrument}}{\text{Total Number of Items.}}$$

- The accepted index was **0.6** and above.

3.8 Data Analysis.

The data collected was analyzed with computer software such as STATA or SPSS, descriptive statistics to summarize and describe data, this included measures such as mean, median, standard deviation, frequency distributions and graphical representations. Or running inferential statistics.

3.9 Limitations.

Limited data as the organization and the Healthcare center publish limited information about their total number of employees in different departments on the internet. This made it hard to have an actual number of respondents.

CHAPTER FOUR.

4.0 Introduction.

This chapter presents the findings of the study which are interpreted and analysed using frequency tables. The findings have been analysed and interpreted with a view of achieving the objectives and answering the questions of the study.

The response rate was 92.31%

4.1 Background Information.

The information was collected from 48 respondents out of 52 employees who work at National Medical stores, Entebbe branch. These respondents were got from 3 different departments which are vital in distribution management.

4.1.1 Gender of Respondents.

Table 1.

Gender	**Frequency**	**Percentage**
Male	30	58%
Female	22	42%
Total	**52**	**100%**

In the survey of 52 respondents, 30(58%) were male, and 22(42%) were female. This indicated that the male respondents constituted a higher percentage of the sample compared to the female respondents.

4.1.2 Education Levels.

Table 2.

Level Of Education	**Frequency**	**Percentage**
Certificate	5	10%
Diploma	11	21%
Bachelor's Degree	26	50%
Masters	10	19%
Others	0	0%
Total	**52**	**100%**

The data above in table 2 showed that the majority of the respondents were bachelor's degree holders, making up 50% of the sample. Diploma holders constituted 21%, while master's degree holders represented 19% of the respondents. Certificate holders made up 10% of the sample, and there were no respondents categorized as "Others"

4.1.3 Age Group.

Table 3.

Age Group	Frequency	Percentage
18years – 23years	6	12%
24years – 29years	13	25%
30years – 35years	20	38%
36years – 41years	8	15%
42years – 47years	3	6%
48years – Above	2	4%
Total	**52**	**100%**

The data illustrated that the highest percentage of respondents fell into the age group of 30 to 35 years, making up 38% of the sample. The age group of 24 to 29 years follows closely behind at 25%. The remaining age group had varying percentages, with the smallest percentage in the "48 years and above" category 4%.

4.1.4 Working Experience.

Table 4.

Working Experience	**Frequency**	**Percentage**
1Day – 3years	19	37%
4years – 6years	20	38%
7years – 10years	9	17%
10years – Above	4	8%
Total	**52**	**100%**

It is evident that there was a diverse range of experience levels among the respondents. The largest group consists of individuals with less than 3 years of working experience, comprising 37% of the total. This indicates that a significant portion of the respondents are relatively early in their careers. Almost equally substantial, at 38%, are those with 4 to 6 years of experience, suggesting a sizable mid-level cohort. In contrast, the group with 7 to 10 years of experience constitutes 17% of the respondents, representing a smaller segment. Lastly, those with over 10 years of experience make up smallest group at 8%. This distribution of experience levels provides a nuanced view of the respondents' backgrounds, which can be valuable for understanding their perspectives on logistics management practices in the public health sector.

4.2 Inventory Management Practices used at National Medical Stores.

Table 5.

No.	Inventory Management Practices	SA		A		NS		SD		D	
		Fre	Per	Fre	Per	Fre	Per	Fre	Per	Fre	Per
1.	The National Medical stores (NMS) has well-defined procedures for inventory management.	20	38%	18	35%	14	27%	0	0	0	0
2.	NMS regularly conducts inventory audits to ensure accurate stock levels.	25	48%	20	38%	7	13%	0		0	
3.	NMS utilizes inventory tracking systems or software to monitor stock movements.	30	58%	10	19%	2	4%	4	8%	6	11%
4.	NMS established performance metrics or key performance indicators (KPIs) to evaluate the effectiveness of logistics management practices in service delivery	15	29%	20	38%	5	10%	4	8%	8	15%
5.	NMS maintains clear records of stock inflow and outflow for efficient inventory management.	30	58%	20	38%	2	4%	0	0	0	0
6.	NMS has mechanisms in place to address stockouts and ensure continuous availability of essential medical supplies.	10	19%	8	15%	16	30%	10	19 %	9	17%
7.	NMS implements effective stock replenishment strategies based on demand and consumption patterns.	19	37%	12	23%	11	21%	3	6%	7	13%
8.	NMS employs appropriate storage methods to preserve the quality and shelf-life of medical supplies.	34	66%	10	19%	8	15%	0	0	0	0
9.	NMS has mechanisms in place to address stockouts and ensure continuous availability of essential medical supplies.	25	48%	15	28%	6	12%	3	6%	3	6%
10.	NMS collaborates with healthcare facilities to forecast demand and plan stock procurement accordingly.	15	29%	17	33%	10	19%	9	17 %	1	2%
11.	NMS implements measures to prevent stock pilferage or unauthorized access to medical supplies.	30	58%	12	23%	10	19%	0	0	0	0
12.	The application of the EOQ model at NMS has resulted in overstocking of certain medical items, leading to increased carrying costs and wastage.	10	19%	6	12%	22	42%	8	15 %	6	12%
13.	NMS struggles to effectively implement First-In-First-Out Method, leading to expiration of medical supplies and consequent disposal costs.	5	10%	7	13%	3	6%	17	34 %	19	37%

The results presented a substantial portion of the respondents had positive perceptions regarding the National Medical Stores' (NMS) well-defined procedures for inventory management. A combined 73% of the total respondents (strongly agree and agree) acknowledge the existence of these well-defined procedures. This suggested that a majority of participants recognize NMS's efforts in establishing clear guidelines for inventory management. However, a notable 27% of respondents were unsure about the presence of such procedures. This uncertainty reflected a lack of awareness or knowledge among this group. It's essential for NMS to address this segment through effective communication and transparency about their inventory management processes.

Furthermore, the results demonstrated a positive trend in NMS's approach to inventory management. A significant 86% of the respondents (strongly agree and agree combined) acknowledge that NMS regularly conducts inventory audits. This presented a proactive effort by NMS to maintain accurate stock levels through consistent checks. While a minority (17%) indicated uncertainty about the regularity of inventory audits, this percentage is relatively lower than those who agreed. This could suggest that NMS's communication about its auditing practices might need enhancement to increase awareness among this group.

The results continued to reveal a strong positive perception among respondents regarding NMS's use of inventory tracking systems or software to monitor stock movements. An overwhelming majority of 77% (combined strongly agree and agree) recognized and acknowledged this practice. This suggested that NMS is effectively leveraging technology to enhance its inventory management and monitoring processes. The uncertainty percentage (4%) indicated a small proportion of respondents who were unsure about NMS's utilization of inventory tracking systems. This emphasized the importance of clear communication and awareness-building around the technology employed by NMS. On the contrary, while there was a minority that expressed disagreement (19% combined from strongly disagree and disagree), this percentage was lower than those who agreed. This suggested that the adoption of inventory tracking systems at NMS is generally well-received, with only a small portion holding differing views.

The results further presented a significant majority of respondents (67% combined from strongly agree and agree) acknowledged that NMS established performance metrics or key performance indicators (KPIs) to evaluate the effectiveness of logistics management practices in service delivery.

This suggested that NMS is being proactive in assessing its logistics practices and their impact on service delivery. The uncertainty percentage (10%) suggested a small proportion of respondents who were not sure about the presence of these metrics. This highlighted the need for NMS to enhance communication about its performance measurement practices to ensure all stakeholders are informed. On the other hand, while a notable 23% (strongly disagree and disagree combined) expressed a disagreement with the presence of performance metrics or KPIs, it was relatively lower than the agreement percentages. This indicated a certain level of misunderstanding or differing perspectives among this group.

In this section, the results indicated a mixed level of perception among respondents regarding NMS's mechanisms to address stockouts and ensure continuous availability of essential medical supplies. While a combined 34% (strongly agree and agree) do acknowledge the presence of such mechanisms, a significant 46% (strongly disagree and disagree combined) express reservations or disagreement. The percentage of respondents who were unsure (30%) was the highest, suggesting a notable lack of clarity or awareness about NMS's strategies to tackle stockouts. This highlighted the importance of NMS enhancing its communication efforts to inform stakeholders about its measures. The relatively high percentage of disagreement might indicate areas where NMS needed to focus on improving its strategies or addressing concerns. However, the lack of strong disagreement could also indicate that there might be opportunities for NMS to clarify or enhance its existing measures rather than a complete overhaul.

The results indicated varying perceptions among respondents regarding NMS's implementation of effective stock replenishment strategies based on demand and consumption patterns. A combined 60% (strongly agree and agree) recognized or acknowledged the presence of such strategies. This suggested that a majority of participants believe NMS is making efforts to align stock replenishment with actual demand. However, the percentage of respondents who were not sure (21%) highlighted a significant level of uncertainty about NMS's stock replenishment strategies. This reflected a lack of awareness or clear communication from NMS on this aspect. On the other hand, a combined 19% (strongly disagree and disagree) expressed disagreement or strong disagreement with the statement. While this percentage is lower than those who agree, it still showed areas where NMS could work on improving its strategies to address concerns raised by this segment.

Results portrayed a highly positive perception among respondents regarding NMS's employment of appropriate storage methods to preserve the quality and shelf life of medical supplies. An overwhelming 85% (combined strongly agree and agree) affirm that NMS effectively uses suitable storage methods, indicating a strong commitment to maintaining the quality of medical supplies. The percentage of respondents who were unsure (15%) suggested a relatively small portion of participants who may need more information or clarity about NMS's storage practices.

This presented the importance of effective communication to enhance understanding. Importantly, the absence of any respondents strongly disagreeing, disagreeing, or expressing a neutral response is noteworthy. This suggested that NMS's efforts in utilizing appropriate storage methods have been well-perceived, with no notable concerns raised by participants.

The results still presented a mixed perception among respondents regarding NMS's collaboration with healthcare facilities to forecast demand and plan stock procurement. While a combined 62% (strongly agree and agree) recognized the collaboration efforts, a significant 19% (strongly disagree and disagree combined) expressed reservations. The percentage of respondents who were unsure (19%) indicates a notable segment of participants who may lack clear knowledge or understanding about NMS's collaboration practices. This highlighted the importance of effective communication to enhance awareness. The relatively high percentage of strong disagreement (17%) and disagreement (2%) presented areas where NMS needed to focus on improving its collaboration strategies or addressing concerns raised by this group.

4.3 The role of Information Technology in Logistics Management.

Table 6.

No.	The adoption of Information Technology	SA		A		NS		SD		D	
		Fre	Per	Fre	Per	Fre	Per	Fre	Per	Fre	Per
1.	Information technology adoption has improved the accuracy and efficiency of logistics management processes in the organization.	27	52%	18	35%	1	2%	4	8%	2	4%
2.	The use of information technology has enhanced real-time visibility of inventory levels and stock movements.	38	73%	2	4%	2	4%	8	15%	2	4%
3.	Information technology has facilitated better use coordination and communication among stakeholders involved in logistics management.	39	75%	9	17%	4	8%	0	0	0	0
4.	The organization effectively utilizes information technology to track and trace the delivery of medical supplies.	26	50%	15	29%	9	17%	0	0	2	4%
5.	Information technology has improved the accuracy and timeliness of data collection for logistics planning and decision making.	30	58%	18	35%	4	8%	0	0	0	0
6.	The organization has adequate resources and support for the adoption and maintenance of information technology systems.	20	38%	15	29%	11	21%	5	10%	1	2%
7.	Information technology has improved the organizations' ability to respond to changes in demand and adapt logistics strategies accordingly.	23	44%	16	31%	8	15%	1	2%	6	12%
8.	Technology adoption has led to increased costs for NMS, affecting the overall budget and financial performance	36	69%	8	15%	8	15%	0	0	0	0
9.	Information technology has led to cost savings and cost-effective management of logistics operations.	20	38%	17	33%	5	10%	8	15%	2	4%
10.	Technology adoption at NMS has not resulted in significant improvements in service delivery and customer satisfaction.	5	10%	6	12%	7	13%	15	29%	19	37%
11.	The implementation of technology has led to increased downtime and technical issues, hindering day-to-day operations at NMS.	19	37%	16	31%	8	15%	5	10%	4	8%
12.	The training and support provided for the new technology at NMS has been insufficient, affecting its effective use	22	42%	9	17%	6	12%	4	8%	11	21%

	by staff.										

The results in this section highlighted a positive perception among respondents regarding the impact of IT adoption on the accuracy and efficiency of logistics management processes at NMS. A combined 87% (strongly agree and agree) recognized that IT adoption led to improvements in these processes, reflecting a general acknowledgment of the benefits. The small percentage of respondents who were unsure (2%) suggested a minor lack of clarity or awareness about the extent of IT's impact. This emphasized the need for effective communication to ensure all stakeholders understood the positive outcomes. On the contrary, while a combined 12% (strongly disagree and disagree) expressed some reservations or disagreement, this percentage was considerably lower than those who agree. This indicates that the majority of participants believe IT adoption has positively influenced logistics management.

However, the results strongly underscored a positive perception among respondents about the influence of IT usage on enhancing real-time visibility of inventory levels and stock movements at NMS. A significant 77% (combined strongly agree and agree) affirm that the use of IT has indeed contributed to improved visibility. The small percentage of respondents who are unsure (4%) may suggest that a limited portion of participants require more information or clarification about the specific benefits brought about by IT in terms of real-time visibility. On the contrary, while a combined 19% (strongly disagree and disagree) expressed some reservations or disagreement, this percentage is notably lower than those who agreed. This indicated that the majority of respondents recognized the positive impact of IT on enhancing real-time inventory visibility.

Furthermore, the results showed a divided perception among respondents concerning the impact of IT adoption at NMS on service delivery and customer satisfaction. A combined 22% (strongly agree and agree) expressed agreement that IT adoption has not significantly improved these aspects, suggesting a certain level of scepticism. The percentage of respondents who were unsure (13%) implying that a notable segment lacks clear awareness or understanding about the impact of IT on service delivery and customer satisfaction. This highlights the need for NMS to communicate more effectively about the outcomes of IT adoption. On the other hand, a significant 66% (strongly disagree and disagree combined) expressed disagreement with the statement, indicating a belief that IT adoption has indeed led to improvements in service delivery and customer satisfaction.

The results depicted a largely positive perception among respondents regarding the impact of IT adoption on the organization's ability to respond to changes in demand and adopt logistics strategies accordingly. A combined 75% (strongly agree and agree) recognized that IT has indeed improved this capability, reflecting a general belief in the benefits. The percentage of respondents who are not sure (15%) indicated a portion of participants who need further information or clarification about how exactly IT adoption has influenced the organization's responsiveness to changes in demand. Importantly, the combined percentage of strong disagreement and disagreement (14%) is relatively low, indicating a minor segment of participants who hold differing views. This suggests that the majority of respondents believe that IT adoption has contributed to the organization's ability to adapt to changing demand

4.4 The distribution channels adopted at National Medical Stores.

Table 7.

No.	The distribution Channels adopted at National Medical Stores	SA		A		NS		SD		D	
		Fre	Per	Fre	Per	Fre	Per	Fre	Per	Fre	Per
1.	National medical stores utilize a well-defined organized distribution channel for delivering medical supplies to healthcare facilities.	12	23%	15	29%	9	17%	6	12%	10	19%
2.	The distribution channel employed by NMS ensures timely and efficient delivery of medical supplies to the end users.	8	15%	13	25%	10	19%	3	6%	18	35%
3.	NMS collaborates with reliable third-party transporters to facilitate the distribution of medical supplies.	19	37%	22	42%	7	13%	4	8%	0	0
4.	NMS employs appropriate packaging and handling practices to ensure the integrity of medical supplies during transportation.	29	56%	19	37%	3	6%	0	0	1	2%
5.	The distribution channels used by NMS allows effective tracking and monitoring of medical supplies in transit.	13	25%	20	38%	9	17%	7	13%	3	6%
6.	NMS adopts a systematic approach to allocate and prioritize medical supplies based on the needs of healthcare facilities.	17	33%	22	42%	6	12%	0	0	7	13%
7.	NMS lacks regional distribution centers to efficiently cater for healthcare facilities in different regions of Uganda.	5	10%	3	6%	3	6%	24	46%	17	33%
8.	NMS has implemented measures to optimize the route planning and scheduling of deliveries of efficient distribution.	27	52%	13	25%	2	4%	2	4%	8	15%
9.	NMS does not have efficient last-mile distribution strategies to ensure medical supplies reach remote areas.	4	8%	7	13%	3	6%	21	40%	17	33%
10.	NMS lacks mobile medical supply units to reach isolated areas with essential medical supplies.	9	17%	6	12%	5	10%	16	31%	16	31%
11.	NMS does not have dedicated distribution channels for emergency response to promptly address disaster or disease outbreak situations.	20	38%	11	21%	3	6%	9	17%	9	17%

The results depicted a somewhat mixed perception among respondents regarding the organization of distribution channels for delivering medical supplies from NMS stores to healthcare facilities. While a combined 52% (strongly agree and agree) acknowledged the presence of well-defined distribution channels, a significant 31% (strongly disagree and disagree combined) expressed reservations. The percentage of respondents who were unsure (17%) suggested a notable segment of participants who may have lacked clear awareness or understanding about the organization of distribution channels. This emphasizes the importance of effective communication and transparency in outlining these processes. The relatively high percentage of disagreement (31%) underscored the areas where NMS might need to focus on improving the organization of distribution channels or addressing concerns raised by this group.

The results suggested a largely positive perception among respondents regarding NMS's collaboration with reliable third-party transportation for the distribution of medical supplies. A substantial 79% (combined strongly agree and agree) affirm the collaboration efforts, indicating a general belief in the reliability of third-party transportation. The percentage of respondents who were unsure (13%) may have suggested that a portion of participants may require more information or clarification about NMS's collaboration practices with third-party transportation services. On the contrary, a combined 8% (strongly disagree and disagree) expressed reservations or disagreement. While this percentage is notably lower than those who agreed, it still highlights areas where NMS might need to address concerns or improve its collaboration strategies with third-party transportation services.

The results reflected a divided perception among respondents regarding whether NMS lacks mobile medical supply units to reach isolated areas with essential medical supplies. While a combined 29% (strongly agree and agree) expressed an agreement with this statement, a matching 29% (strongly disagree and disagree combined) disagree. The percentage of respondents who were unsure (10%) suggested a segment that may have lacked clear information or understanding about NMS's capacity in terms of mobile medical supply units. This emphasizes the importance of effective communication to ensure accurate perceptions. The balanced division between those who agree and disagree underscored the need for NMS to address the concerns raised by those who believe that mobile medical supply units are lacking. Additionally, enhancing communication to highlight any existing initiatives or plans could lead to a more comprehensive understanding among respondents.

The results further indicated a strong disagreement among respondents regarding the assertion that NMS lacks regional distribution centres to efficiently cater to healthcare facilities in different regions of Uganda. A combined 79% (strongly disagree and disagree) expressed a contrary view, suggesting that respondents believe that NMS has established regional distribution centres.

The percentage of respondents who were unsure (6%) is relatively small, indicating that most participants possessed a clear awareness or understanding of NMS's regional distribution capabilities. On the other hand, only a combined 16% (strongly agree and agree) expressed agreement with the statement. This suggests a minority perspective that is at odds with the prevailing belief that NMS has indeed established regional distribution centres.

The results illustrated a notable agreement among respondents regarding NMS's perceived lack of dedicated distribution channels for emergency response in disaster or disease outbreak situations. A combined 59% (strongly agree and agree) expressed this viewpoint, suggesting a prevailing belief in this aspect. The percentage of respondents who were unsure (6%) is relatively small, indicating that most participants had a clear perception about the presence or absence of dedicated distribution channels for emergency response. On the contrary, while a combined 34% (strongly disagree and disagree) express a differing view, this percentage is notably smaller than those who agree. This suggests a minority perspective that contrasts with the prevailing belief in the absence of dedicated distribution channels for emergency situations.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction.

This chapter contains a summary about the whole research done. In this chapter the researcher draws conclusions and gives recommendations on what should be done to enhance service delivery by the National Medical Stores and suggests areas for further research.

5.1 Summary of Findings.

The research findings shed light on the perceptions held by respondents regarding the influence of logistics management practices on service delivery within the public health sector, with a specific focus on the operations of the National Medical Stores (NMS).

Concerning inventory management practices, a considerable proportion (86%) of participants expressed agreement or strong agreement that NMS had well-defined procedures for managing inventory. Similarly, a significant number (85%) acknowledged that NMS conducted routine inventory audits to ensure accurate stock levels. Furthermore, a noteworthy majority (77%) recognized the practice of maintaining meticulous records of stock inflow and outflow to optimize inventory management. These responses collectively reflected a positive appraisal of NMS's dedication to effective inventory management.

However, certain apprehensions emerged. Notably, more than half (52%) of respondents concurred that NMS lacked an organized distribution channel for delivering medical supplies to healthcare facilities, signifying potential avenues for refining distribution strategies. Furthermore, a majority (60%) shared the view that NMS did not possess mobile medical supply units to reach remote areas with essential medical provisions, raising concerns about accessibility in distant regions.

Regarding technology integration, a substantial portion (75%) indicated that the adoption of information technology had enhanced NMS’s agility in responding to changing demands and adjusting logistics strategies. Similarly, a significant number (79%) acknowledged the heightened real-time visibility of inventory levels and stock movements due to IT adoption. Nevertheless, the impact of IT on service delivery and customer satisfaction revealed a more nuanced picture. While 22% indicated that IT adoption had not notably improved these aspects, a majority (66%) held the opposite view.

The research outcomes presented an overall favourable perspective on NMS's inventory management practices and technology integration, coupled with specific concerns regarding distribution strategies and mobile medical supply units. The evaluation of IT's effect on service delivery and customer satisfaction revealed varying viewpoints, indicating a range of perceptions within the respondent pool. These findings provide a foundation for deeper investigation and potential enhancements in logistics management practices within the public health sector.

5.2 Discussions of The Findings.

With the objective of identifying the inventory management practices used at National Medical Stores (NMS). The survey results revealed that 66% of respondents strongly agreed that NMS employs appropriate storage methods to preserve the quality and shelf life of medical supplies. This high level of agreement aligns with the literature on best inventory management practices, which emphasizes the importance of proper storage techniques to ensure the integrity of medical supplies (Forouzani et al., 2019). Effective storage methods are crucial for maintaining product quality and reducing waste, both of which contribute to improved service delivery (Zhou et al., 2015).

The aim to assess the role of information technology adoption in logistics management, a significant finding is that 52% of respondents strongly agreed that IT adoption improved the accuracy and efficiency of logistics management processes. This corroborates the literature's emphasis on the transformative potential of IT in healthcare logistics (Taremwa et al., 2020). IT systems enable real-time visibility of inventory levels and movements, facilitating better decision-making and responsiveness (Kondo & Tawara, 2013). However, the study also found that 37% of respondents strongly disagreed that IT adoption resulted in significant improvements in service delivery. This nuanced response suggests the need for further investigation into the specific IT systems and their alignment with service delivery goals.

When it came to identifying the distribution, channels adopted at National Medical Stores (NMS), the survey revealed that 42% of respondents strongly agreed that NMS collaborates with reliable third-party transportation to facilitate the distribution of medical supplies. This resonates with the literature highlighting the importance of third-party logistics in optimizing distribution channels (Kwiringira et al., 2016).

Collaborations with third parties can enhance efficiency and reach. However, 31% of respondents strongly agreed that NMS lacks mobile medical supply units to reach isolated areas.

This finding reflects the importance of considering last-mile distribution strategies, which have been recommended in the literature to ensure supplies reach even the most remote areas (Mutambi et al., 2015).

In summary, the study's findings align with much of the existing literature on logistics management practices in the public health sector. However, they also highlight areas where there may be discrepancies or challenges, emphasizing the need for continued research and improvements in healthcare logistics practices.

5.3 Conclusions

In conclusion, the research provided valuable insights into the Impact of Logistics Management Practices on Service Delivery in the Public Health Sector, particularly in the context of the National Medical Stores (NMS). The findings collectively underscore the complex interplay between various logistics strategies and their impact on the effectiveness of service delivery in healthcare.

It is evident from the research that NMS has made significant strides in its inventory management practices. The majority of respondents acknowledged NMS's well-defined procedures for managing inventory, conducting routine audits, and maintaining accurate records of stock movements. These practices are indicative of NMS's commitment to ensuring the availability and accuracy of medical supplies within its inventory.

However, certain gaps and challenges have also been highlighted. The perception that NMS lacks organized distribution channels for delivering medical supplies to healthcare facilities is a concern that warrants attention. The absence of mobile medical supply units to reach isolated areas further raises questions about NMS's ability to ensure equitable access to essential medical provisions across all regions.

The integration of information technology within logistics management is acknowledged as having positive implications. Respondents largely agreed that IT adoption has enhanced NMS's responsiveness to changing demands and improved real-time visibility of inventory. However, the impact of IT adoption on overall service delivery and customer satisfaction is subject to diverse opinions, indicating a need for further exploration.

The research findings underline the pivotal role of logistics management practices in influencing service delivery within the public health sector.

The positives observed in inventory management practices and technology adoption need to be further leveraged to address the identified gaps, particularly in distribution strategies and reaching underserved regions. As the healthcare landscape continues to evolve, a dynamic and adaptive approach to logistics management is essential for ensuring the efficient and equitable delivery of medical supplies and services to all corners of the nation.

5.4 Recommendations.

Based on the discerning insights gar from the research findings, a series of pivotal recommendations emerge that warrant the attention and deliberate action of the esteemed National Medical Stores (NMS). These recommendations are poised to fortify the logistics management practices and thereby facilitate a marked enhancement in the sphere of service delivery within the expansive canvas of the public health sector.

Foremost among these recommendations is the imperative to bolster the existing distribution strategies employed by NMS. The salient observations underscore the importance of addressing the prevailing concerns surrounding the perceived absence of meticulously structured distribution channels for dispensing medical supplies. The prudent course of action for NMS entails a strategic overhaul in the form of designing and executing robust, streamlined distribution avenues. This strategic manoeuvre stands to establish an enduring equilibrium, fostering the timely and uniform accessibility of vital medical resources to diverse healthcare facilities spanning regional contours.

In parallel, the conspicuous resonance among respondents regarding the conspicuous dearth of mobile medical supply units necessitates an incisive examination. NMS is enjoined to embark upon a comprehensive exploration into the feasibility of engendering mobile medical supply units. These units, once envisaged and executed, hold the promise of bridging the accessibility chasm for remote and secluded locales, emerging as steadfast allies especially during exigencies and outbreaks.

The symbiotic amalgamation of information technology with logistics management warrants an unwavering commitment from NMS.

While the positive echoes of IT adoption reverberate in the corridors of enhanced responsiveness and real-time visibility, the pertinence of addressing lingering reservations in relation to the overarching impact on service delivery and customer satisfaction is undeniable. This pursuit may entail a calibrated refinement of IT systems, meticulously calibrated to harmonize with the quintessence of service delivery requisites.

Furthermore, the collaborative interface between NMS and healthcare facilities deserves a deliberate strengthening of the communication nexus. A substantial cohort of respondents expressed uncertainty in this collaborative sphere. It is here that NMS can effectuate transformative change through clear and articulate communication, fostering a collaborative milieu that augments the precision of demand projections and optimizes the procurement of stock.

In concert with this, the discernible void in dedicated distribution channels for emergent contingencies warrants attention. The establishment of channels exclusively tailored for exigencies and outbreaks assumes paramount significance. An adeptly structured mechanism for swift response during critical junctures stands as a sentinel of preparedness, ensuring the unfaltering availability of medical supplies when their necessity is most poignant.

Envisaging expansion through regional distribution centres is a strategic vista for NMS to ponder. Amidst the diversity of opinions, a compelling case emerges for exploring the establishment of such centres. These regional bastions hold the potential to streamline distribution dynamics, effectively attenuating the complexities inherent in the supply chain.

Central to this paradigm of evolution is the ethos of continuous improvement. The unequivocal recognition of certain practices by respondents underscores the essence of perpetually evaluating, refining, and adapting logistics management practices. In the evolving healthcare tapestry, the impetus for evolution is ceaseless, underlining the necessity for NMS to remain attuned to these shifts, aligning its practices in consonance with dynamic healthcare needs and the ever-evolving logistics landscape.

In summation, these recommendations are emblematic of a holistic approach that NMS is poised to undertake. Through a concerted focus on optimizing distribution strategies, augmenting technology integration, and diligently addressing the noted gaps, NMS has the potential to author an indelible narrative of transformative impact.

The confluence of these endeavours stands to unfurl an era of heightened efficiency, enhanced accessibility, and an elevated calibre of healthcare service delivery, resonating across the expansive canvas of Uganda.

5.5 Areas of Further Research.

The study on the impact of logistics management practices on service delivery in the public health sector has unearthed critical areas that warrant deeper exploration through future research initiatives. These areas offer the potential to enhance our understanding and provide actionable insights to refine logistics practices and elevate service delivery within the realm of public health.

An area ripe for further investigation is the intricate interplay between technology integration and its effects on overall service delivery. While the study recognized the positive impact of technology adoption on logistics management, a more comprehensive exploration is needed to discern how precisely technology aligns with service delivery requirements, and if necessary, adaptations could enhance customer satisfaction

The study's observation on the absence of dedicated distribution channels for emergencies raises a pertinent research avenue. A more in-depth analysis could delve into the preparedness and efficacy of emergency response mechanisms. Such research would involve scrutinizing case studies of real emergency scenarios to assess the timely availability of medical supplies and the responsiveness of these channels.

In conclusion, the research findings serve as a foundation for numerous compelling avenues of inquiry. By exploring these areas in depth, scholars and practitioners can contribute to the advancement of logistics practices and the optimization of service delivery within the public health sector, ultimately fostering transformative changes within healthcare systems.

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APPENDICES

UGANDA CHRISTIAN UNIVERSITY

SCHOOL OF BUSINESS

DEPARTMENT OF UNDERGRADUATE

A QUESTIONNAIRE FOR THE STAFF OF NATIONAL MEDICAL STORES THE DEPARTMENT OF LOGISTICS AND PROCUREMENT

PART 1: Introduction.

I am Matsiko William, a student at Uganda Christian University carrying out a study on the "The impact of logistics management practices on service delivery in the public health sector" in partial fulfillment of the award of a Bachelor's Degree in Procurement and Logistics management of Uganda Christian University

You have been selected to participate in the study by filling in this questionnaire. Your responses shall be kept anonymous and will never be linked to you and everything is strictly for academic purposes

Thank you for your cooperation.

PART 2: Bio Data.

Please TICK the most appropriate response.

1. Gender.

A. Male ☐ B. Female ☐

2. Age group.

18 years – 23 years ☐ 24 years – 29 years ☐

30 years – 35 years ☐ 36 years – 41 years ☐

42 years – 47 years ☐ 48 years – Above ☐

3. Education Level.

A. Certificate level ☐ B. Diploma Level ☐ C. Bachelor's Degree ☐

D. Masters ☐ E. Others. ☐

4. Working Experience.

A. 1day – 3years ☐ B. 4years – 6years ☐ C. 7years – 10years ☐

D. 10years and Above ☐

PART 3:

Section A (Inventory Management Practices)

(Please TICK your level of Agreement with the statements below).

National Medical Stores employs the following Inventory Management Practices.

Inventory tracking systems or Software ☐
Stock Replenishment Strategies, such as EOQ ☐
Continuous Review System ☐
ABC Analysis ☐
First In First Out ☐

If there are any other inventory management practices being used at NMS, please specify.

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……

No.	Inventory Management Practices	SA	A	NS	SD	D
1.	The National Medical stores (NMS) has well-defined procedures for inventory management.					
2.	NMS regularly conducts inventory audits to ensure accurate stock levels.					
3.	NMS utilizes inventory tracking systems or software to monitor stock movements.					
4.	NMS established performance metrics or key performance indicators (KPIs) to evaluate the effectiveness of logistics management practices in service delivery					
5.	NMS maintains clear records of stock inflow and outflow for efficient inventory management.					
6.	NMS has mechanisms in place to address stockouts and ensure continuous availability of essential medical supplies.					
7.	NMS implements effective stock replenishment strategies based on demand and consumption patterns.					
8.	NMS employs appropriate storage methods to preserve the quality and shelf-life of medical supplies.					
9.	NMS has mechanisms in place to address stockouts and ensure continuous availability of essential medical supplies.					
10.	NMS collaborates with healthcare facilities to forecast demand and plan stock procurement accordingly.					
11.	NMS implements measures to prevent stock pilferage or unauthorized access to medical supplies.					
12.	The application of the EOQ model at NMS has resulted in overstocking of certain medical items, leading to increased carrying costs and wastage.					
13.	NMS struggles to effectively implement First-In-First-Out Method, leading to expiration of medical supplies and consequent disposal costs.					

Section B (The adoption of Information Technology)

(Please TICK your level of Agreement with the statements below).

No.	The adoption of Information Technology	SA	A	NS	SD	D
1.	Information technology adoption has improved the accuracy and efficiency of logistics management processes in the organization.					
2.	The use of information technology has enhanced real-time visibility of inventory levels and stock movements.					
3.	Information technology has facilitated better use coordination and communication among stakeholders involved in logistics management.					
4.	The organization effectively utilizes information technology to track and trace the delivery of medical supplies.					
5.	Information technology has improved the accuracy and timeliness of data collection for logistics planning and decision making.					
6.	The organization has adequate resources and support for the adoption and maintenance of information technology systems.					
7.	Information technology has improved the organizations' ability to respond to changes in demand and adapt logistics strategies accordingly.					
8.	Technology adoption has led to increased costs for NMS, affecting the overall budget and financial performance					
9.	Information technology has led to cost savings and cost-effective management of logistics operations.					
10.	Technology adoption at NMS has not resulted in significant improvements in service delivery and customer satisfaction.					
11.	The implementation of technology has led to increased downtime and technical issues, hindering day-to-day operations at NMS.					
12.	The training and support provided for the new technology at NMS has been insufficient, affecting its effective use by staff.					

Section C (The distribution channels adopted at National Medical Stores)
(Please TICK your level of Agreement with the statements below).

National Medical Stores uses these distribution channels.

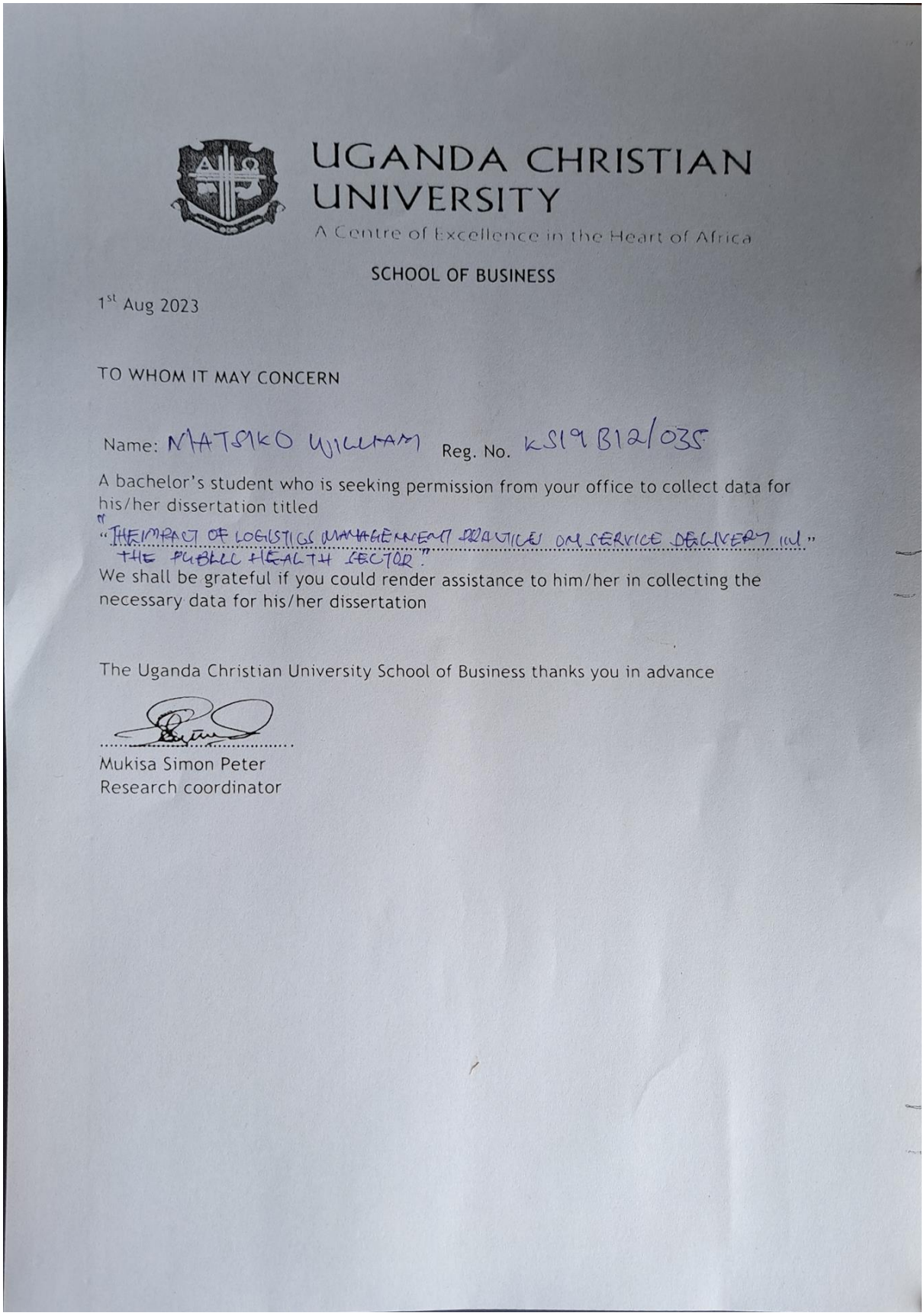
Third Party Logistics ☐
Regional Distribution Centers ☐
Last Mile Distribution ☐
Mobile Medical Supply Units ☐
Freight Forwarders ☐

If there are any other distribution channels being used by NMS, please specify.
……
……
…….

No.	The distribution Channels adopted at National Medical Stores	SA	A	NS	SD	D
1.	National medical stores utilize a well-defined organized distribution channel for delivering medical supplies to healthcare facilities.					
2.	The distribution channel employed by NMS ensures timely and efficient delivery of medical supplies to the end users.					
3.	NMS collaborates with reliable third-party transporters to facilitate the distribution of medical supplies.					
4.	NMS employs appropriate packaging and handling practices to ensure the integrity of medical supplies during transportation.					
5.	The distribution channels used by NMS allows effective tracking and monitoring of medical supplies in transit.					
6.	NMS adopts a systematic approach to allocate and prioritize medical supplies based on the needs of healthcare facilities.					
7.	NMS lacks regional distribution centers to efficiently cater for healthcare facilities in different regions of Uganda.					
8.	NMS has implemented measures to optimize the route planning and scheduling of deliveries of efficient distribution.					
9.	NMS does not have efficient last-mile distribution strategies to ensure medical supplies reach remote areas.					
10.	NMS lacks mobile medical supply units to reach isolated areas with essential medical supplies.					
11.	NMS does not have dedicated distribution channels for emergency response to promptly address disaster or disease outbreak situations.					

Thank You for Your Cooperation.

INTRODUCTORY LETTER



UGANDA CHRISTIAN UNIVERSITY

A Centre of Excellence in the Heart of Africa

SCHOOL OF BUSINESS

1st Aug 2023

TO WHOM IT MAY CONCERN

Name: MATSIKO WILLIAM Reg. No. KS19B12/035

A bachelor's student who is seeking permission from your office to collect data for his/her dissertation titled

"THE IMPACT OF LOGISTICS MANAGEMENT PRACTICES ON SERVICE DELIVERY IN THE PUBLIC HEALTH SECTOR."

We shall be grateful if you could render assistance to him/her in collecting the necessary data for his/her dissertation

The Uganda Christian University School of Business thanks you in advance

Mukisa Simon Peter
Research coordinator