ZCAS UNIVERSITY

MASTER'S DISSERTATION

The Effect of Delayed Delivery of Medicines and Medical Supplies on Health Service Delivery: The Case of Livingstone District

(State the complete research title exactly as approved by your supervisor)

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A dissertation submitted to ZCAS University in partial fulfilment of the requirements for the award of Master of Arts in Project Management

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I, Inonge Kabukabu, declare that this dissertation is a result of my own original research work, and that during the period of registered study, I have not used the information contained in this document for any other academic award or qualification, nor has any part of this material been submitted, solely or in part, for any other award. Where the work of other researchers has been used, it has been duly acknowledged and referenced.

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CERTIFICATE OF APPROVAL

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Date of Approval: _____

DEDICATION

To my mother for her inspiration and support accorded in my journey of education. I dedicate this also to myself for the perseverance and sacrifice that I have put in to make this a living document. To my children, this is an example fruits of hard work and perseverance.

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ABSTRACT

Keywords: Delayed Delivery, Medicines, Medical Supplies, Health Service Delivery, Livingstone

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LIST OF ABBREVIATIONS AND ACRONYMS

[List each abbreviation used in your dissertation in alphabetical order, e.g.: SPSS - Statistical Package for the Social Sciences; SMEs - Small and Medium Enterprises.]

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 Introduction

Three levels of care primary, secondary, and tertiary are used to structure service delivery in Zambia. The primary level, which includes health posts, health centers, and hospitals, is designed to save as the initial point of contact for many patients and to deliver basic health services, often without direct user fees. Despite these intentions, the health care system faces persistent challenges such as underfunding, frequent shortages of medicines and medical supplies, and disparities in access particularly in rural and underserved areas. As described by The Borgen Project (2019), while the healthcare systems aims to provide comprehensive primary care, capacity constraints and funding limitations usually prevent consistent implementation. These systemic issues explain why many Zambians may still have trouble getting proper treatment or medications even in areas like Livingstone, even in the presence of facilities. The Ministry of Health (2022) and The Borgen Project (2019) both published articles.

Access to essential medicines and medical supplies is not merely a logistical concern; it represents a lifeline that safeguards communities and strengthens health systems. When hospitals and clinics are adequately stocked, it ensures safe deliveries for mothers, continuous treatment for patients with chronic illnesses, and effective protection against preventable diseases. Beyond the immediate medical benefits, timely access to drugs restores public confidence in the healthcare system and upholds the principle that quality healthcare is a fundamental human right. For citizens, especially those in vulnerable or remote areas, the availability of medicines is not just a convenience, it is a matter of dignity, hope, and survival.

Livingstone's access issue is not exclusive, though. Supply chain problems have had a significant impact on the standard and timeliness of patient care. Following recent investigations that showed extensive theft of donated medical products, including life-saving antiviral drugs, international partners, including the United States have drastically cut back on aid as published by The Pan African Medical Journal (2025). These issues highlight the critical necessity for robust and transparent supply chain systems.

1.2 Background of The Study

Providing high-quality healthcare services requires having access to medications and medical supplies. Patient care has been severely hampered by delays in the delivery of these necessary medications, especially in areas like Livingstone and other parts of Zambia. Stock outs, treatment disruptions, poor patient care, a decline in patient trust, and more stress for medical staff are all possible outcomes of such delays. Additionally, patients with chronic diseases and those who need emergency care may experience higher rates of morbidity and mortality as a result of the delays. To guarantee the timely availability of necessary medications and supplies to enable high-quality healthcare services, supply chain management must be improved. Drug stock levels have increased in facilities, such as Livingstone University Teaching Hospital, which saw an increase of over 50% from 12% in 2020 to 60% in 2024, despite efforts to improve the situation being implemented and reviewed. However, systemic problems still make it difficult to supply medical supplies on a regular and timely basis.

The purpose of the study is to look into how the Livingstone District's healthcare system is affected by delayed deliveries of medications and medical supplies. We intend to offer helpful

suggestions to increase the capacity and reliability of medication and medical supply deliveries by addressing the underlying causes of these delays, such as logistical difficulties, administrative inefficiencies, and even bad management, which will ultimately result in improved District health outcomes.

1.3 Statement of Problem

Despite continued investment in Zambia's health sector, delays in the supply of medicines and medical supplies still weaken the health system's efficiency, especially areas outside Lusaka District(. The expected delivery of medicines is 80% or 12 times for the tertiary Hospital and 6 times in a year for the primary health centres, however the statistics from the Ministry of Health post and from ZAMMSA Medicine Availability Report (2025) reviews that the delivery rate is currently between 53% and 68.3% or 4 and 3 times in a year, respectively. These delays cause treatment interruptions, poor health outcomes and loss of public trust. Nevertheless, limited research exists on their full impact at the District level. This study seeks to fill that gap by examining supply chain inefficiencies in Livingstone and providing evidence-based recommendations for improvement.

1.4 Purpose of Study

According to UNICEF, weak healthcare supply chains contribute to service interruptions and reduced access to essential medicines, with approximately 5 million children worldwide missing basic vaccinations due to these challenges. In Zambia, ZAMMSA reported a national medicine availability rate of only 68.4% in 2025, indicating persistent gaps in the timely delivery of medicines and medical supplies to health facilities. The study Undertakes to resolve how these delays influences the availability of essential medicines, the efficiency of healthcare workers, patient outcomes, and the overall quality of care provided in public health facilities. This study also aims to examine the root causes of these delays of the supply chain system and to assess how they disrupt routine clinical services. By focusing on the Livingstone District, the research analyzes the fundamental causes of procurement inefficiencies, strengthen supply chain management, and Strengthen community care provision

1.5 General Research Objectives

To assess the impact of delayed delivery of medicines and medical supplies on healthcare delivery in Livingstone District, with emphasis on supply chain challenges.

1.5.1 Specific Research Objectives

- To examine the key factors contributing to logistical challenges in the supply chain of medicines and medical supplies within health facilities in Livingstone District,

- To analyse administrative process inefficiencies that result in delays in the supply chain of medicines and medical supplies to health facilities in Livingstone District.
- To assess the extent to which management policies shape staff performance in the supply chain of medicines and medical supplies in Livingstone District.

1.5.2 Research Questions

What factors contribute to logistical challenges in the supply chain of medicines and medical supplies within health facilities in Livingstone District?

How do administrative process gaps influence delays in the supply chain of medicines and medical supplies to health facilities in Livingstone District?

In what ways do management policies affect staff performance in the supply chain of medicines and medical supplies in Livingstone District?

1.6 Hypothesis

1.6.1 H_0 The provision of health services in Livingstone District is not significantly impacted by delays in the supply of medicine and medical supplies.

1.6.1.1 H_1 The provision of health services in Livingstone District is greatly impacted by delays in the delivery of medications and medical supplies.

1.7 Justification of The Study

For individuals working at the forefront of healthcare, such as legislators, supply chain managers, and medical professionals, comprehending the effects of delayed medical supplies is crucial. There is more to it than just a practical problem. These delays could mean the difference between life and death, especially in places where access to alternative treatment sources is limited or nonexistent. By examining how these delays affect the provision of healthcare services, this study seeks to generate practical insights that go beyond theory. The results will be helpful to stakeholders who want to improve the quality and dependability of treatment provided, lessen the health risks connected to frequent stock outs, and streamline supply chain procedures. In accordance with the real needs of healthcare professionals and the people they serve in the Livingstone District, this research can support targeted interventions, informed policy decisions, and long-lasting improvements and other settings dealing with comparable challenges.

1.8 Scope of The Study

The study focuses directly on public and private healthcare facilities in Livingstone District because these institutions are the main providers of primary health care to the local population, making them the most affected by delays in supply chains. Livingstone District has experienced recurring challenges in the timely delivery of medicines and medical supplies, which directly influence patient care, treatment outcomes, service efficiency, and stakeholder satisfaction.

Concentrating on medicine and medical supply chains is justified because these are critical operational components that determine whether healthcare facilities can respond to patient needs effectively. Examining these systems provides insight into both direct effects, such as stock outs and treatment delays, and indirect effects, such as increased congestion at service points, reduced staff morale, and strained patient–provider relationships. By narrowing the study to this context, the research allows for an in-depth investigation that generates findings specific to the district's realities, which can support targeted improvements and policy recommendations locally.

1.9 Research concepts

1.9.1 Stock Outs

The lack of necessary medications and medical supplies at the time of demand, particularly due to supply chain interruptions like delayed delivery or manufacturing problems, is referred to as a stock out or medicine shortage. Rural clinics waiting for vaccines or antibiotics demonstrate how these shortages directly risks access to treatment; each day of delay requires patients to either travel great distances in search of alternatives or remain untreated. As a result, accessibility is determined by the timely availability of medications at the time of highest need rather than just their availability in stock.

1.9.2 Last Mile Delivery

One of the main factors contributing to supply chain efficiency is last mile delivery, which is the last phase of the supply chain where medications are delivered from ZAMMSA to end users like clinics, hospitals, or patients. There are numerous obstacles to overcome, such as poor infrastructure, a lack of transportation choices, or administrative difficulties that directly cause delays in the delivery of necessary medications. Every pill or syringe network of manufacturers, distributors, and transportation systems has unreported factors. Any disruption in this chain, whether brought on by bad roads, delays at customs, or poor management, can disrupt the flow of life-saving supplies into hazardous consequences that leave shelves empty. As a result, last-mile delivery efficiency is crucial to guaranteeing on-time delivery.

1.9.3 Patient Outcome

The term "treatment interruption" describes a discontinuity in a patient's care plan that results from a lack of necessary medication and supplies, such as missed doses or delayed surgical operations. These disruptions have a direct impact on health outcomes, making them more than just an annoyance. For example, uncontrolled blood glucose levels can arise from delayed insulin delivery, and hospitals may have to postpone important procedures due to a lack of surgical gloves. Delays lead to worsening diseases, avoidable complications, and sometimes even fatalities. In that instance, treatment interruption emphasises how crucial supply chain inefficiencies are to patient safety and the general efficacy of healthcare delivery.

1.9.4 Healthcare System Resilience

Delays in medication and medical supplies have a direct impact on clinical results, particularly patient safety. These outcomes include greater morbidity, higher fatality rates, accelerated disease, and switching to subpar or alternative treatments. Weaker systems have frequently led to the pressure of supply chain interruptions, even though the health system may reduce such risks through backup stockpiles, other suppliers, or emergency processes. Whether patients continue to receive safe and effective care or are left vulnerable to avoidable complications and unfavorable outcomes depends on hospitals' and clinics' capacity to quickly adjust when shipments arrive late. Therefore, the ability of supply chains to protect therapeutic results and maintain patient safety is inextricably linked.

1.9.5 Emergency Preparedness

The ability of logistical systems to adapt to, tolerate, and mitigate disruptions, whether they result from pandemics, transportation breakdowns, or other crises is sometimes referred to as supply chain capability, or resilience. The ongoing availability of medical supplies must be guaranteed. Agility becomes crucial in emergency scenarios like epidemics, floods, or conflict zones since any delay in the delivery of medical supplies and medications during an outbreak or trauma kits following a disaster could turn manageable crises or situations into massive tragedies. Therefore, a system that is intended to quickly mobilise medications and medical supplies even in extreme situation needs to be prepared. The ability of health supply chains to remain agile in the face of pandemics or stock outs is not simply an operational advantage but a fundamental determinant of healthcare continuity and patient survival skills.

1.10 Dissertation Layout

1.10.1 Chapter 1: Introduction

Chapter One introduces the study and outlines the background, purpose, and overall focus of the research. It emphasises the main issues related to the delayed delivery of medicines and medical supplies and establishes the foundation for the study. The chapter also provides an overview of the expected findings, offers practical suggestions for improving the supply chain and reducing delivery delays, and suggests areas for future research.

1.10.2 Chapter 2: Literature Review

Chapter two reviews related literature on pharmaceutical and medical supply chains, logistical delays, and challenges within healthcare systems. It analyses findings from previous studies, identifies existing knowledge gaps, and positions the current research within the broader field.

1.10.3 Chapter 3: Methodology

The research design, population, sample techniques, data collection instruments, and data analysis are all explained in this chapter. It describes the methods used to guarantee trustworthiness and correctness.

1.10.4 Chapter 4: Data Analysis and Findings

The information regarding the reasons behind delayed supplies, administrative bottlenecks, and their effects on Livingstone's medical facilities will be shown here, together with the tables and graphs.

1.10.5 Chapter 5: Discussion and Recommendations

Chapter Five discusses the key findings in relation to existing literature and highlights their implications for healthcare service delivery. It provides practical recommendations aimed at

strengthening the medical supply chain and minimizing delivery delays. The chapter further explains how such delays impact patient care and overall service provision, and it concludes by suggesting areas for future research.

1.11 Chapter Summary

The background of the research, the problem statement, the research objectives, and the methodological approach that led the investigation have all been provided in this chapter. The chapter emphasized the need of an efficient healthcare supply chain system in guaranteeing the prompt availability of medications and medical supplies, which are necessary for the provision of high-quality healthcare services. It also described the current problems with delayed delivery of medications and medical supplies and how these problems have a detrimental impact on the study area's healthcare services.

The chapter also gave a summary of the techniques used to gather and evaluate data in order to solve the research problem, as well as a clear definition of the study's aim through the research objectives. By establishing the context and direction of the study, this chapter provides a strong basis for understanding the research focus and its significance.

The chapter also lays the groundwork for the subsequent literature study, which will critically analyze previous research, theories, and academic discoveries concerning healthcare supply chains, procurement systems, medication distribution, and their effects on the provision of healthcare services. Additionally, the literature analysis will assist pinpoint knowledge gaps and offer a context for contrasting this study's results with those of earlier studies.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the supply chain management of medicines and medical supplies, emphasizing logistical challenges, inefficiencies in administrative processes, and the impact of management policies on staff performance, which have been shown to adversely affect service delivery outcomes in health facilities (Musonda & Mutono-Mwanza, 2025). Delays in delivering medicines and medical supplies significantly affect health service delivery, especially in communities like Livingstone, resulting in higher morbidity and mortality rates and increased treatment costs, particularly in critical cases where timely antimicrobial administration is essential (Kashiouris et al., 2019).

The review includes studies from global, regional, and Zambian contexts, as well as policy documents from the Ministry of Health (MoH), ZAMMSA, and the National Health Strategic Plan (NHSP). The literature is organised thematically according to the study's research objectives to identify existing knowledge, highlight gaps, and justify the importance of the current study in Livingstone District. It draws upon relevant theories and presents a conceptual framework to guide this study.

2.1.1 Definitions of Key Words

2.1.1.1 Supply Chain

The supply chain is defined as the network of businesses, individuals, activities, data, and resources that are required to transfer a good or service from the supplier to consumer (Inbound Logistics, 2023). In the health sector, it involves procurement, production planning, inventory management, warehousing, and distribution, with the emphasis on timeliness, equity of access, and availability of essential medicines other than profit making (Musonda & Mutono-Mwanza, 2025). In Livingstone District, we have ZAMMSA, procurement authorities, transportation companies, District Health Offices, and health facilities involved in the health supply chain (Musonda & Mutono-Mwanza, 2025).

The supply chain is important in maintaining efficient health care delivery in public health systems like Zambia. Meanwhile effective procurement and distribution systems will guarantee prompt delivery of medicines and medical supplies to service locations, accurate demand forecasting also guarantees that healthcare institutions request the right amounts of medications that are based on illness burden and consumption trends.

Delays in the delivery of medicines and medical supplies can result from flaws at any point in the supply chain. For example, the flow of necessary commodities may be disrupted by inadequate transportation capacity, procurement constraints, or inefficient planning. The availability of medicines in Health facilities is directly impacted by such disruptions that making the supply chain a central determinant of health service continuity and quality. This study therefore considers the health supply chain as the foundational system through which timely medicine delivery and ultimately effective health service delivery is achieved.

2.1.1.2 Logistical Challenges

Logistical challenges refer to the operational constraints, inefficiencies, and risks that hinder effective planning, coordination, transportation, storage, and distribution of goods within a supply chain. Due to the urgency and necessity of medications and medical supplies for patient care, these issues are especially important in the health industry. The planning, execution, and effective movement of commodities and services from their point of origin to their destination are made possible by logistics. It minimises expenses while meeting client needs through resource management. Transportation, warehousing, and inventory management are the three primary facets of logistics.

Inaccurate demand forecasting, poor transportation infrastructure, a lack of storage space, shoddy logistics information systems, and order processing delays are common logistical issues that impact the supply of medications. The timely delivery of medical supplies is further complicated in low- and middle-income settings by extra obstacles such funding delays, inadequate road networks, and a lack of qualified logistics staff.

Delays in central store deliveries, erratic supply schedules, and a lack of coordination among supply chain participants are examples of logistical difficulties in the Livingstone District. These difficulties interfere with facility-level inventory management, which frequently leads to stock-outs or emergency purchases. As a result, logistical issues play a crucial role in explaining why medications and medical supplies do not arrive at healthcare institutions on schedule, thus connecting supply chain performance to the issue being studied.

2.1.1.3 Effect

Effect in the context of this study refers to the changes or Problems that arise from delayed delivery of medicines and medical supplies on health service delivery. These effects may be positive or negative, intended or unintended, and they mirror the availability of medicines, continuity of care, quality of services, and patient outcomes. Delays in medicine delivery can cause measurable outcomes such as stock-outs, interrupted treatment, increased patient waiting times, and reduced satisfaction with health services. Understanding these effects is very important in assessing how supply chain and logistical challenges influence overall health service delivery in Livingstone District.

Furthermore, persistent delays place ethical and professional burden on healthcare workers, reduces public trust in the health system, and attributes to poor health outcomes. In Livingstone District, where public health facilities serve a larger population with limited alternatives, such delays in medicine delivery can significantly weaken overall health service delivery. This study therefore wishes to examine the effect of delayed delivery as a critical outcome of supply chain and logistical challenges, and as a key determinant of health service performance.

2.2 Logistical Challenges in The Supply Chain of Medicines and Medical Supplies

The supply chain of medicines and medical supplies involves forecasting, procurement, storage, transportation, and distribution. Effective logistics management is essential to ensure continuous availability of essential medicines at health facility level. However, literature consistently shows that logistical challenges remain a major obstacle to efficient health service delivery in many developing countries, including Zambia.

It is therefore critical to ensure that every link of the supply chain is Strengthened so that essential medicines and medical supplies reach the healthcare providers and patients as and when needed most, without that in place even the best treatment plans and well-trained health workers can be left powerless and shocked in the face of preventable health crises (Rishi sagar, 2024).

2.2.1 Demand Forecasting and Quantification Challenges

Accurate demand forecasting is a cornerstone of uninterrupted medicine availability in public health systems (Lugada et al., 2022). Weak logistical information systems and poor consumption data often leads to inaccurate quantifications normally creates a mismatches between supply and demand (USAID GHSC-PSM, 2024). In Livingstone District, late submission of consumption data, use of unskilled staff, and inadequate feedback mechanisms leads to forecasting weaknesses (USAID GHSC-PSM, 2024).

While these studies provide valuable insights into systemic weaknesses, they mainly focus on national-level processes and do not really capture how incorrect forecasting will result into service disruptions in the whole District. Literature revels that despite Zambia's progress in strengthening the logistic system, gaps still remain at District-level data quality and reporting timeliness.

This study therefore, will build on the existing literature and examine how challenges of demand forecasting affect medicine delivery timelines and patient care in Livingstone District. It will also strive to provide evidence that complements national studies and then highlights the practical issues behind the forecasting weaknesses on health service delivery outcomes

2.2.2 Transportation and Distribution Constraints

Transportation has remains one of the most fragile components of Zambia's health system, with the inadequate transport fleets, poor road infrastructure, and recurring fuel shortages continue hindering the movement of medical supplies (Lugada et al., 2022). Limited and inflexible delivery schedules by ZAMMSA has further contribute to the transportation delays, especially in districts such as Livingstone that is geographically located far from central distribution hubs (Chopo & Mutono-Mwanza, 2024). These bottlenecks disrupt medicine availability and health service delivery and has lead to postponed treatments and compromised patient care (Mwansa et al., 2021; Chansa et al., 2020).

Although several studies have been undertaken at national-level and have acknowledged transportation and distribution challenges, they usually focus on system-wide efficiency rather than facility-level service implications. This has resulted in limited attention being given to how delayed deliveries of medicines and medical supplies affect the continuity of health services, including postponed treatments, reduced service hours, and compromised patient care at district health facilities as noted by (Mwansa et al. 2021), and (Chansa et al. 2020). This study therefore, investigates how transportation bottlenecks specifically disrupt medicine availability and health service delivery in Livingstone District, thereby addressing an important gap in existing literature (Chansa et al. 2020).

2.2.3 Storage and Inventory Management Limitations

Proper storage is vital to maintaining the capability, safety, and overall effectiveness of medicines within health facilities. Adequate storage conditions ensure that medicines remain within required quality standards from the point of delivery to the point of use. However,

evidence has shown that storage and inventory management remain weak spots of the medicines supply chain in many public health systems. (Musonda and Mutono-Mwanza 2025) .The inadequate storage space, lack of temperature-controlled environments, and weak inventory management practices have largely contributed to the wastage and expiring of medicines. These conditions not only result in financial losses but also reduce the availability of essential medicines for patient care.

In addition, the USAID Global Health Supply Chain – Procurement and Supply Management (GHSC-PSM, 2024) emphasises that without proper inventory control, timely order fulfillment becomes impossible. Even when medicines are delivered on schedule, weak stock management practices such as inaccurate stock records, poor stock rotation, and delayed updates to inventory systems will still lead to artificial stock-outs and misallocation of supplies within facilities. This suggests that timely delivery alone is insufficient to guarantee uninterrupted service delivery if storage systems are ineffective.

Although these studies offer insightful information about systemic storage issues, they primarily concentrate on national or system-wide evaluations and do not adequately represent how district-level health facilities manage inadequate equipment, inadequate infrastructure, and inadequate inventory management training. These restrictions can have a big effect on the availability of medications in areas like Livingstone, where medical facilities frequently operate under tight conditions. Therefore, even when supplies are made on schedule, this study looks at how district-level storage and inventory management issues lead to medication shortages and service interruptions.

2.3 Administrative Process Inefficiencies in The Supply Chain

The institutional framework for supply chain operations is guided by administrative procedures. Delays in the delivery of medicines and medical supplies have been extensively recorded as a result of inefficiencies in these procedures.

2.3.1 Procurement Procedures and Bureaucratic Bottlenecks

When purchasing medications and medical supplies, public procurement procedures seek to advance accountability, transparency, and value for money. Evidence indicates that stringent implementation of procurement rules frequently results in unforeseen delays, despite the fact that these principles are essential for safeguarding public resources. According to (Chopo and Mutono-Mwanza 2024), the public health sector's acquisition of necessary medications is significantly slowed down by lengthy procurement cycles, copious documentation, and numerous approval stages. In health systems that rely on centralized procurement, where institutions have little flexibility to satisfy urgent demands, these delays are particularly troublesome.

Procurement delays sometimes result in downstream distribution bottlenecks, according to further data from the USAID Global Health Supply Chain – Procurement and Supply Management (GHSC-PSM, 2024). Distribution timetables are thrown off when procurement delays are prolonged leading to delayed deliveries to health facilities. As a result, facilities are often unable to respond effectively to sudden increases in patient demand or public health emergencies, thereby compromising continuity of care and service quality.

Despite these insights, much of the existing literature examines procurement delays in isolation, with limited attention to how these bottlenecks interact with logistical constraints and human resource capacities at district level. In practice, procurement delays are often compounded by

transportation limitations, weak inventory management, and limited staff capacity to manage emergency procurement processes. This study addresses this gap by analysing how procurement delays, in combination with logistical and human resource challenges, affect medicine delivery timelines and health service delivery in Livingstone District.

2.3.2 Information Flow and Coordination Gaps

Effective supply chains depend on timely and accurate communication among stakeholders, yet evidence suggests that this remains one of the weakest links in many health systems. (Lugada et al. 2022) demonstrate that poor coordination between health facilities, District Health Offices, and (Medical Stores Limited MSL) often results in delayed order processing and distribution. These delays are not simply administrative inconveniences; they directly translate into medicine shortages and service interruptions at facility level. The (USAID GHSC-PSM 2024) further highlights that limited adoption of digital logistics systems compounds these challenges, as manual reporting and fragmented communication channels slow down the flow of critical information. In practice, this means that even when medicines are available at central warehouses, the lack of timely communication prevents them from reaching patients when they are most needed.

Despite these insights, little is known about how coordination gaps manifest at district level, where frontline health facilities interact directly with patients. National studies tend to generalise communication challenges without considering the unique realities of districts such as Livingstone, where reporting delays, inadequate feedback mechanisms, and limited ICT infrastructure may intensify supply chain inefficiencies. This study therefore investigates how communication breakdowns specifically affect supply planning and distribution schedules in Livingstone District. By focusing on the district context, it provides evidence that complements national findings and highlights the practical consequences of weak coordination on medicine availability and health service delivery outcomes.

2.3.3 Financial Management and Budgetary Constraints

Financial processes play a pivotal role in shaping the overall efficiency of supply chains, particularly in the health sector. (Musonda and Mutono-Mwanza 2025) emphasise, delayed disbursement of funds and budgetary limitations often stall procurement activities, creating bottlenecks that ripple across the entire system. When financial resources are not released on time, procurement officers face challenges in initiating tenders, negotiating contracts, and ensuring timely delivery of essential supplies. These inefficiencies not only slow down operations but also increase the risk of stockouts and inflated costs due to emergency purchases (USAID, 2020).

In Zambia, the situation is further complicated by the heavy reliance of health facilities on government allocations and donor support. This dependence means that any disruption in financial flows—whether from delayed government disbursements or donor funding gaps—directly affects ordering cycles and delivery timelines. For example, a delay in the release of quarterly funds can postpone the procurement of medicines, medical equipment, and other critical supplies, thereby undermining service delivery at the facility level. Such delays often force facilities to ration existing stock or seek alternative sources, which may be more expensive or less reliable (World Health Organisation [WHO], 2021).

This study seeks to address that gap by examining how funding delays in Livingstone District contribute to medicine shortages and service interruptions. Evidence shows that procurement

transitions and budget execution challenges have previously led to shortages of essential drugs in Zambia, highlighting the fragility of district-level supply chains (Ministry of Health Zambia, 2022). By focusing on district-level dynamics, the research highlights the real-world consequences of financial bottlenecks on frontline health service delivery. Medicine shortages not only compromise patient care but also erode public trust in the health system, while service interruptions can lead to increased morbidity and mortality. Understanding these localised challenges is therefore critical for designing interventions that strengthen financial management practices, improve procurement efficiency, and ultimately enhance the resilience of Zambia's health supply chain.

2.4 Influence of Management Policies On Staff Performance

Management policies shape how staff perform their duties within the supply chain. Literature suggests that human resource policies, training frameworks, supervision systems, and performance management mechanisms have a direct impact on supply chain effectiveness.

2.4.1 Human Resource Policies and Role Clarity

Clear policies on roles and responsibilities are essential to accountability and efficiency in health supply chains. (Musonda and Mutono-Mwanza 2025) highlighted that when roles are not clearly defined, staff usually lack ownership of logistics functions, which in turn leads to errors in ordering, storage, and reporting. These gaps reduce reliability and accountability and can cause delays in procurement cycles. (Chopo and Mutono-Mwanza 2024). since clinical staff members are already overburdened with patient care, giving them untrained logistics responsibilities impairs their effectiveness. Tasks may be repeated or omitted in the absence of specifics and clarity, which would reduce the system's overall efficacy. By ensuring that the right employees with the proper skills undertake logistics duties, role clarity and focused training improve responsibility and cut down on inefficiencies.
By investigating how role clarity or lack thereof affects employee performance in Livingstone District health institutions, this study expands on these findings. Uncertain responsibilities can have more serious repercussions because district-level facilities sometimes have a small staff. For example, employees may anticipate supply needs, manage inventories more efficiently, and react swiftly to interruptions when roles are well defined. This study emphasises how job clarity leads to better employee performance and more dependable service delivery by concentrating on the Livingstone District. The results are intended to guide policy changes that improve efficiency in Zambia's health supply chain and fortify accountability systems.

2.4.2 Training and Capacity Development Policies

Training is very important for strengthening supply chain competencies and ensuring reliable health service delivery. Literature reviews that continuous professional development improves forecasting accuracy, inventory control, and compliance with standard operating procedures (Musonda & Mutono-Mwanza, 2025). Noted that without regular training, staff may struggle to work with updated guidelines or to adjust to continuous changes in procurement systems, which can lead to inefficiencies and errors. (Chigunta 2023) also emphasises that capacity-building initiatives are necessary for frontline health workers, as it will help them enhance problem-solving skills and reduce delays in medicine distribution. In a similar manner, (Munsaka and Phiri 2022) argued that training staff in programs to do with logistics improve accountability and

reduce wastage, particularly in resource-constrained settings. Despite these many benefits, coverage remains uneven across Districts, Livingstone being one of them lacking refresher training opportunities, leaving staff underpowered to manage complex supply chain tasks.
This study will investigate how limited access to training affects staff effectiveness in managing medicines and medical supplies in Livingstone District. Evidenced by (Banda and Mwansa 2021) who suggested that inadequate training contributes to poor record-keeping and weak compliance with reporting standards, which in turn compromises supply chain transparency. The Districts often operate with minimal personnel, so a lack of refresher courses can simply mean challenges such as inaccurate forecasting, delayed procurement, and inconsistent stock management. Conversely. When staff receive regular training, they are better positioned to anticipate supply needs, maintain accurate inventories, and respond quickly to shortages. This study will focus on Livingstone District, and aims to highlights the link between training access and staff performance, offering insights into how targeted capacity-building can strengthen accountability and improve the resilience of Zambia's health supply chain.

2.4.3 Supervision, Motivation, and Performance Management

Supportive supervision and performance monitoring are widely recognised as crucial tools for improving staff motivation, accountability, and compliance in health supply chains. (Musonda and Mutono-Mwanza 2025) argue that weak supervision systems allow poor practices like inaccurate record-keeping, improper storage, and delayed reporting to continue unchecked. On the other hand, effective supervision—characterised by regular feedback, mentoring, and corrective guidance—helps staff follow standard operating procedures and encourages a culture of continuous improvement. Supervision also plays an important role in strengthening professional standards, ensuring staff stay motivated and dedicated to their responsibilities.
Despite these advantages, staffing shortages and resource constraints frequently hamper control in Zambia's health industry. Supervisors often oversee several facilities, which makes it challenging to make frequent inspections or give prompt feedback. According to (Chanda and Mwansa 2023), supervisory reach is further constrained by inadequate logistical and transportation support, especially in rural areas. Because of this, frontline employees could work with little supervision, which raises the possibility of mistakes in reporting, inventory control, and procurement. High patient numbers and a lack of human resources in the Livingstone District exacerbate these issues, making supervisors overworked and unable to offer regular direction. Performance gaps frequently remain undetected until they become supply chain interruptions due to the lack of organised monitoring methods.
This study investigates how staff performance is impacted by supervision gaps in the Livingstone District, which eventually affects supply chain outcomes. The study illustrates how insufficient supervision leads to medication shortages, delayed deliveries, and poor adherence to reporting requirements by analysing the connection between supervisory procedures and employee efficacy. (Phiri and Tembo's 2022) research, facilities with more robust supervision frameworks exhibit improved forecasting accuracy and fewer stockouts, highlighting the significance of regular monitoring. Facilities with inconsistent or nonexistent monitoring, on the other hand, find it difficult to uphold responsibility, which results in inefficiencies that jeopardise patient care. Designing interventions that improve resource allocation, bolster supervisory

ability, and increase the resilience of Zambia's health supply chain requires an understanding of these dynamics at the district level.

2.4.4 Health Worker Efficiency and Moral

Health professionals endure heavy emotional and moral burden when medications and medical supplies are delayed, whenever medicines and medical supplies are out of stock, Health workers are normally forced to make challenging clinical decisions that may not be accepted professionally. Even when these limitations are mostly out of their control, such circumstances raise the risk of medical errors and expose healthcare professionals to potential malpractice. Healthcare workers eventually experience increased stress, emotional tiredness, and burnout as a result of frequent exposure to these demands.UNICEF 2020) notes that persistent resource shortages in public health systems are associated with reluctant staff morale, reduced productivity, and increased turnover, all of which further weaken health service delivery at the District level.

In Livingstone District, where public health facilities serve both urban and nearby rural populations, delays in delivering medicines and medical supplies can worsen existing workload pressures on frontline workers. Health personnel often have to manage patient expectations without essential commodities, which can cause frustration, strain provider–patient relationships, and reduce job satisfaction. These challenges emphasise the importance of targeted interventions that support health workers beyond just making supplies available. One effective intervention is capacity building through focused training in inventory management, emergency preparedness, and crisis response. Giving healthcare providers and supply chain managers these skills can help them better anticipate shortages, optimise available resources, and respond more confidently during supply disruptions.

2.5 Synthesis of the Literature

The literature reviewed consistently establishes that the timely delivery of medicines and medical supplies is essential for effective health service delivery. Studies conducted in low- and middle-income countries reveal that weaknesses in procurement planning, financing, logistics, and health information systems frequently result in delayed deliveries and recurring stock-outs in public health facilities. These challenges disturb service continuity, compromises the quality of care, and force facilities to depend on emergency procurement or rationing practices. At District level, where operational capacity and resources are limited, such delays have more pronounced effects, undermining the ability of health facilities to meet patient needs efficiently and consistently.

In addition to service disruptions, the delayed delivery of medicines and medical supplies has significant implications on human resource. The literature indicates that persistent shortages expose health workers to ethical dilemmas, emotional stress and increased workload pressures that contribute to stress, reduced productivity and low morale. These conditions weaken the relationship between the health provider and patients, which further strain health systems that is already facing workforce shortages. Despite the extensive research on supply chain inefficiencies and health service delivery outcomes, there is still limited empirical evidence linking delayed delivery of medical supplies to service delivery performance at District level, particularly within the Zambian context. This study aims to address this gap by examining the effects of delayed delivery of medicines and medical supplies on health service delivery in Livingstone District,

which in turn will contribute to the evidence to inform supply chain management and policy interventions.

2.6 Gaps in the Literature

Literature showed that several studies have been done regarding the supply chain inefficiencies, but still only a few have empirically examined how these delays affect health service delivery at a District level in Zambia. Examples are as follows:

Insufficient Attention to Last Mile Delivery Delays

There is little attention paid to delays at the last mile, the last leg of delivery to rural or District level health institutions like those in Livingstone. Despite the fact that many studies look at overall supply chain issues, disruptions frequently have the most obvious and immediate impact on patient care here.

Not Enough Context Specific Studies

little research has been done specifically for low resource, decentralized systems, such as those seen in many sub Saharan African nations; the majority of the literature is from high-income or urban situations. Case studies that show local government, infrastructure and District health systems are needed.

Metrics for health services and the supply chain are not integrated.

Few studies directly link supply chain delays to service delivery outcomes like treatment continuity or efficiency, but many examine logistics performance (e.g., stock out rates, lead times) or health outcomes (e.g., patient satisfaction, mortality).

The role of mediating factors is understudied.

Although frequently acknowledged the effects of elements including supply chain capacity, policy enforcement, and technology adoption are not thoroughly examined. The way in which these factors mediate the connection between service quality and supply delays is not well understood.

Limited Application of Theoretical or Conceptual Frameworks

A conceptual or theoretical framework that systematically connects variables is absent from certain descriptive or operational investigations. Because of this, it is more difficult to extrapolate results or use them in larger policy contexts.

Poor Patient Cantered Viewpoint

Patients' opinions and experiences are frequently lacking, particularly when it comes to how delays impact their satisfaction, trust and continuity of care. The majority of studies ignore human influence in favor of focusing on the institutional aspect (such as supplier records and management procedures).

Dispersed or Outdated Information

It is challenging to monitor trends or gauge the extent to which delays have been reduced in some areas due to a lack of current or trustworthy data. Furthermore, nothing is known about the effects of more recent measures (such as digitisation or COVID-19 supply chain changes).

2.7 Theoretical Framework

Systems theory and supply chain management theory are two complementary theoretical frameworks that serve as the foundation for this investigation. These viewpoints offer a comprehensive framework for analysing and comprehending the intricacies of the health supply chain. The study is able to capture the management and operational practices that impact the

performance of supply chains in addition to their structural and functional dynamics by combining ideas from both theories.

The System theory developed by (Bertalanffy et al. 2022) traces its roots back to classical management theory, This theory viewed organisations as a machines, but now it has shifted to seeing the organization as a network where people, procedures and activities are interlinked. The system views health service delivery as a dynamic and interconnected system where each element such as inputs like medical supplies and skilled personnel, processes like diagnosis and treatment, and the resulting outputs and outcomes depends on the smooth functioning of the others. When there's a delay in one area, such as in the delivery of medical supplies through the supply chain, it disrupts the entire flow. Health workers may lack the tools they need, patients may experience longer waiting times or receive inadequate care, and overall trust in the healthcare system can diminish. These disruptions don't just affect operational efficiency; they can directly impact the quality of care and health outcomes for the district. In this sense, delays are not merely a logistical issue but a critical vulnerability in the entire system," Brian Harney, January 2024, noted.

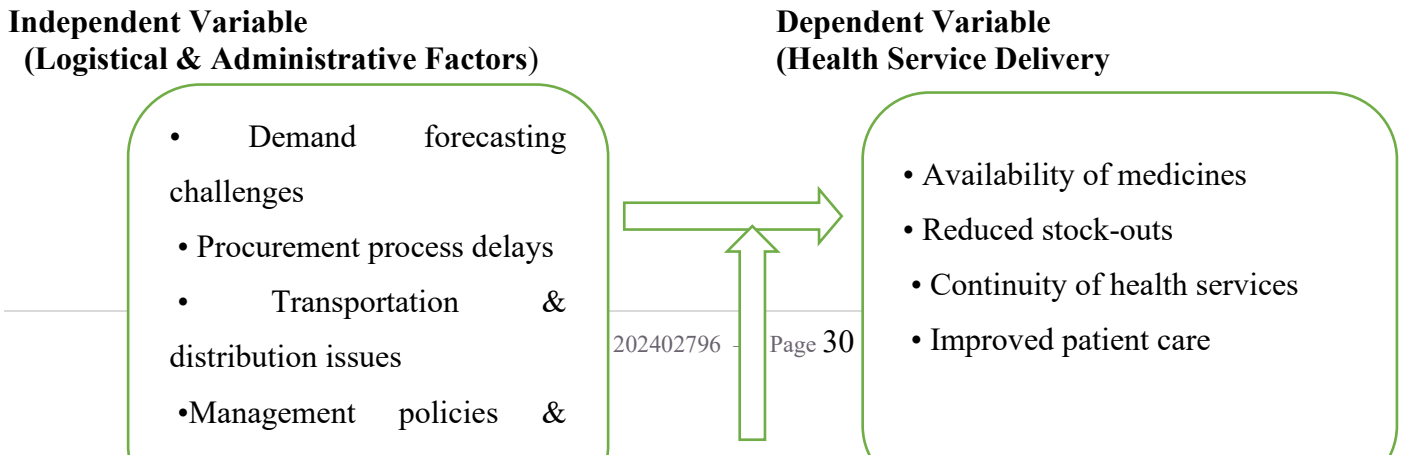
In contrast, Mannion R, et al. (2015) suggest that supply networks must be seen and managed as a whole. Supply chain management theory emphasises efficiency, integration, and coordination at every stage of the supply chain. It emphasises how important it is for all parties involved—including governmental organisations, distributors, suppliers, and healthcare providers—to work together seamlessly. In addition to technological efficiency, strategic alignment of resources, procedures, and policies is necessary for effective supply chain management. In order to reduce inefficiencies and guarantee the timely delivery of necessary medications, this theory highlights the significance of information sharing, demand forecasting, and performance monitoring.

When combined, these theories offer a solid framework for examining the various issues influencing the availability of medications and the provision of services. The study is able to investigate how logistical limitations, administrative inefficiencies, and management policies interact to affect results in the health sector by fusing the operational focus of supply chain management theory with the systemic perspective of systems theory. This dual-theoretical approach enables a nuanced view of the supply chain, acknowledging that the functioning of an interconnected and coordinated system, rather than a single element, determines the availability of medications.

2.8 Conceptual Framework

The conceptual framework illustrates how logistical, administrative, and management policy factors influence staff performance and ultimately affect the effectiveness of the supply chain. Weaknesses in forecasting, transportation, procurement, and supervision interact to delay medicine delivery

2.8.1 Conceptual Framework Diagram



Intervening Variable
(Staff performance)

Accuracy in ordering & reporting

Compliance with standard operations procedures

Timeliness in documentation

The relationship between adr elivery is depicted in this conceptual fr rection and strength of this interaction. D ment process, limitations on transportation ersight are examples of independent variables. These elements have a direct impact on the medical supply chain's effectiveness and the speed at which medications and medical supplies are delivered to healthcare facilities.

The paradigm also acknowledges the significance of intervening variables, which can either lessen or increase the impact of administrative and logistical difficulties on the provision of health services. The availability and promptness of funds, staff competence and capacity, the efficiency of health information systems, the sufficiency of transportation and infrastructure, and the degree of policy execution and compliance are some of these intervening elements. Changes in these variables can have a big impact on how supply chain delays affect facility-level service delivery results.

The availability of medications, fewer stock-outs, continuity of health services, and better patient care are examples of indicators that represent the dependent variable, health service delivery. In the Livingstone District, poor administrative and logistical procedures combined with unfavorable intervening circumstances are likely to cause service disruptions and lower care quality. On the other hand, improving intervening factors can improve overall health services and lessen the detrimental effects of supply chain delays.

2.9 Chapter Summary

The literature now in publication emphasises how important good pharmaceutical and medical supply chains are to the provision of high-quality healthcare services. Research has shown that treatment continuity, patient happiness, and overall service efficiency can all be negatively impacted by supply delivery delays. But there are still a number of significant holes. Most of the research, especially in low-resource or decentralised health systems, tends to concentrate on more general logistical problems without thoroughly investigating last-mile delivery constraints. Additionally, little is known about how mediating factors like supply chain capacity, technological adoption, and policy implementation affect the relationship between service outcomes and delivery delays. Additionally, previous research frequently ignores patient-centred viewpoints and lacks comprehensive conceptual frameworks that connect operational delays to actual health effects. This study fills these gaps by investigating the precise effects of delayed medication and medical supply delivery on the provision of health services in the Livingstone District. It does this by using a structured conceptual framework that takes into account both institutional and human-centred variables.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

The chapter presents the research methodology used and it includes the research philosophy, approach, design, population, sampling techniques, data collection methods, and data analysis procedures adopted to examine the impact of logistical challenges, administrative process inefficiencies, and management policy influences on the supply chain of medicines and medical supplies in Livingstone District. The chapter was also guided by the nature of explaining ethical considerations and concludes with a summary.

3.1 Research Onion

The study is guided by the research onion framework, which provides a systematic approach to research design. The framework assists in structuring the research process from philosophical assumptions to data collection and analysis techniques. Each layer of the research onion informed decisions regarding the research philosophy, approach, strategy, methodological choice, and time horizon for the study.

3.2 Research Philosophy

The study is grounded in a pragmatism research philosophy. Pragmatism focuses on practical solutions to real-world problems and it allows the use of multiple methods to gain a comprehensive understanding of the research problem. Given the applied nature of supply chain challenges in the healthcare system, pragmatism was considered appropriate as it supports the integration of both qualitative and quantitative data.

3.2.1 Philosophical Choice

The pragmatic philosophy enabled the researcher to draw insights from both objective data (such as frequencies of delays and supply challenges) and subjective experiences of healthcare workers involved in supply chain management. This approach aligns with the study's aim of generating practical recommendations for improving medicine and medical supplies delivery in Livingstone District.

3.3 Nature of The Research

The study adopted a descriptive and explanatory research nature. The descriptive aspect aimed to document existing logistical, administrative, and policy-related challenges in the supply chain, while the explanatory aspect sought to establish relationships between these factors and staff performance in health facilities.

3.4 Research Approach

A mixed-methods research approach was adopted in this study. The quantitative approach enabled to measure the patterns and prevalence of the supply chain challenges, while qualitative approach provided the in-depth insights of the experiences, perceptions, and institutional processes that affected supply chain performance.

A mixed method that integrated quantitative and qualitative techniques helped to investigate the impact of delayed delivery of medications and medical supplies on the provision of healthcare services in Livingstone District. The quantitative approach focused on the measurement of patterns and prevalence of supply chain challenges, such as patient wait times, frequency of delivery delays and the effect it has on patient care, meanwhile the qualitative approach provided a deeper insights into the experiences, perceptions, and institutional processes that affected the supply chain performance based on interviews with supply chain and health workers in order to offer a deeper understanding of the difficulties and everyday reality that underline these figures Additionally, this research adopted a pragmatic approach, that emphases not only the theory but also the collection of relevant and practical data that may guide in the actual world. In order to create a comprehensive evidence on how supply chain delays impact the provision of healthcare services locally, this method integrates both approaches to enhance the comprehensiveness of the analysis and strengthened the credibility of the findings through triangulation.

3.4.1 Deductive and Inductive Reasoning

The study employed hybrid methodology incorporating both deductive and inductive reasoning. Deductive reasoning was used to test concepts derived from existing theories and literature, like the presumption that delayed medical deliveries are associated with worse health outcomes. Similarly the study would be able to bridge the statistical data with practical experiences by integrating these two reasoning techniques in order to create a more thorough and significant grasp of the problem, while inductive reasoning allowed themes and patterns to emerge from qualitative data collected from respondents in health facilities by experienced staff.

3.5 Methodological Choice

A triangulation methodological choice was used, combining quantitative and qualitative methods to give the researcher a multifaceted perspective on the problem. This strengthened the credibility and validity of the findings by allowing cross-verification of data from different sources to improve the findings precision and comprehensiveness. The narratives and experiences of healthcare and supply chain employees would provide a context and meaning, while the data demonstrates distinct trends and quantifiable effects. When combined, these two types of data offer a more complete and trustworthy picture of the impact of medical delivery delays on health care.

3.6 Qualitative Data Collection Techniques

Qualitative data were collected using key informant interviews and open-ended questionnaire items. Key informants included health facility managers, Nurses, pharmacy personnel, Doctors and clinical officers, procurement officers, and District health officials involved in medicine and medical supply management. These techniques enabled the researcher to capture detailed explanations of administrative processes, management policies, and operational challenges within the supply chain.

3.7 Quantitative Data Collection Techniques

Quantitative data were collected using structured questionnaires administered to healthcare workers involved in logistics and supply chain activities. The questionnaires focused on factors

contributing to logistical challenges, administrative delays, and staff performance. Closed-ended questions were used to facilitate statistical analysis.

3.8 Sampling Plan

The sampling plan targeted a range of public and private health facilities within Livingstone District. These comprise of 2 hospitals, 2 private hospitals, 5 health centers, and 3 pharmacies, these play a critical role in the administering, delivery and distribution of medicines and medical supplies. Through the examinations of both the government-run and privately-owned institutions, the aim was to capture a broad and balanced perspective of the dynamics of the supply chain across different types of facilities. This inclusive approach ensured that the collected data reflected the varied operational environments and reveals challenges faced by healthcare providers in the District, thereby enhancing the comprehensiveness and relevance of the findings.

3.8.1 Sampling Plan – Qualitative Study

Purposive sampling was used to select key informants with direct involvement in supply chain activities. This ensured that participants possessed relevant knowledge and experience related to the study objectives.

3.9 Justification of The Sample Size

The study adopted a sample size of 154 participants based on accessibility of the respondentant, the time constraints and the need to obtain sufficient data for meaningful analysis. This sample size is drawn from a population of 250 for the study. In determining the sample size, the researcher considered that the population of Health workers in Livingstone District is relatively large and diverse. Therefore, selecting a manageable number of participants allowed for effective data collection while still ensuring that different perspectives were adequately represented.
To determine the appropriate sample size for the study, the Taro Yamane formula (1967) was used. This formula is a widely accepted statistical method for calculating sample sizes in finite populations and is expressed as:

Yamane's formula

$$n = \frac{N}{1 + N(e)}$$

Where
n = sample size
N = Total population area
e = margin of error (in decimal form 0.05 for 5%)

$$n = \frac{250}{1 + 250(0.05)}$$

$$n = \frac{250}{1 + 250(0.0025)}$$

$$n = \frac{250}{1 + 0.625}$$

$$n = \frac{250}{1.625}$$

$$n = 153.8$$

Sample size =154 respondent

Total number to be interviewed will be 154 staff

3.9.1 Quantitative Study

In order to assure representation across various healthcare facilities and professional positions, the researcher used a questionnaire to directly gather data from healthcare professionals for the quantitative component. Before taking part, respondents were given an explanation of the study's goal and a guarantee of confidentiality. This made it possible to generalize the results within the Livingstone District.

3.9.2 Qualitative Study

To enable in-depth investigation of problems impacting the supply chain, fewer key informants were chosen for the qualitative component. The appropriateness of the sample was assessed using data saturation as a guiding concept.

3.9.3 Research Design

Data for this study were collected simultaneously using a cross-sectional research design. The design was appropriate for evaluating the current supply chain procedures and the challenges faced by healthcare establishments in the Livingstone District.

3.10 Time Horizon

Since the study has a cross-sectional time horizon, collection of data must be done at once rather than over time. This method was chosen to provide a brief summary of the issues surrounding the distribution of medicines and medical supplies across the many healthcare facilities in the Livingstone District. By collecting data simultaneously from many places, the study also aimed to provide an accurate snapshot of the current state of affairs, that identifies any supply chain delays, and establish their immediate effects on the provision of healthcare services.
This method has been particularly effective in identifying patterns, building different facilities, and highlighting the issues that are prevalent in health care systems at any one time as well as the independent changes over time. based on the current information seen during the study period. It offers practical insights that can guide and drive policy decisions and responses.

3.11 Triangulation Design

Triangulation was achieved when integrating quantitative and qualitative data during analysis and interpretation. This enhanced the reliability of findings and allowed a comprehensive understanding of supply chain challenges from multiple perspectives.

3.12 Data Analysis

For the collected raw data to be understood and mean anything, It entails that raw data from the sites discovered, it must be organized first, Since nothing can be explained by raw data alone unless it is organized, the raw data from the sites found must first be organized, for the obtained raw data to be comprehended and have any meaning. For a project, both qualitative and quantitative data must be collected and examined. If it is quantitative data, it must also be examined, cleansed, and coded. The average of each variable was utilized to find the missing data. The quantitative data was appropriately coded and then analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0. The objective was to develop descriptive statistics. Descriptive statistics, such as frequencies, percentages, and tables, were used to analyze quantitative data in order to find patterns and trends.

3.13 Ethical Considerations

Official consent was acquired from a few hospitals and health facilities in the Livingstone District before data collection. In order to guarantee clarity, questionnaires with explanations were sent both in person and via email. Participants were given a week to independently complete the forms while upholding confidentiality in situations where time was of the essence. To guarantee the relevance and dependability of the data gathered, respondents were chosen according to certain criteria, such as their involvement in supply chain operations, length of service, understanding of the pharmaceutical and medical supply chain, and role in decision-making.
The ZCAS University Research Ethics Committee and other pertinent authorities granted ethical approval, guaranteeing that the study complied with accepted ethical norms and guidelines. Informed consent was obtained after each participant in the study received comprehensive information about the research and their role in it prior to participation. Participants were free to leave at any time without facing any repercussions, and participation was completely optional. Strict secrecy was maintained throughout the study, and the data was handled securely to preserve the respondents' privacy and dignity.

3.14 Chapter Summary

This chapter described the research methodology used in the study that included the research philosophy, approach, design, sampling procedures, data collection methods, and analysis techniques. Ethical considerations were also addressed. The next chapter represents the data analysis and findings of the study.

CHAPTER FOUR: RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

The chapter represents the findings and analysis of data collected from 154 participants, including nurses, pharmacists, doctors, procurement officers, and administrators of health facilities in Livingstone District. Data analysis was based on quantitative data collected from structured questionnaires, and qualitative data were collected through interviews, in line with the research design, sampling procedures, and data collection methods outlined in Chapter Three. The main objective of this chapter was to interpret the collected data and generate empirical evidence on the effect of delayed medicines and medical supplies on health service delivery in Livingstone District. Both descriptive and inferential statistical techniques were employed in analysing the data. Descriptive statistics were used to summarise respondents' demographic characteristics.

4.2 Background Information of the Respondents

4.2.1 Sex of Respondents

		Table 1: Sex of Respondents (author)

Category
Frequency (n)
Frequency (n)
Male
69
45%
Female
85
55%
Total
154
100%

Table 4.1 presents the distribution of respondents by sex. The results show that 69 respondents, representing 45% of the total sample, were male, while 85 respondents, which accounts for 55%, were female. The findings show that female respondents of (55%) formed the majority that reflected the gender composition typical of healthcare professions. This may be attributed to the fact that the healthcare sector, particularly nursing and some administrative roles, is often dominated by women. The higher participation of females suggests that women play a significant

role in healthcare service delivery and are therefore highly involved in issues about the management and utilisation of medicines and medical supplies within health facilities.
On the other hand, male respondents accounted for a slightly smaller proportion at 45%. Despite the lower representation compared to female representation, the percentage still reflects substantial male participation in the study. It also indicates that the perspectives of male healthcare workers and administrators were adequately captured as contributing to a balanced understanding of the challenges that are associated with delayed medical supplies. The relatively balanced gender distribution between male and female respondents is important because it enhances the credibility and reliability of the study findings. It demonstrates that the study considered views from both genders and thereby reduced gender bias in the collection and interpretation of data. Furthermore, the diversity in gender representation allows for a broader perspective on how delayed delivery of medicines and medical supplies affects healthcare workers and service delivery in different ways

4.2.2 Age group of Respondents

		Table 2: Age group of Respondents (author)

Category
Frequency (n)
Percentage (%)
20-30
34
22
31-40
62
40
41-50
38
25
Above 50
20
13
Total

154
100
Table 4.2 presents how the age distribution of respondents who participated in the study on the effects of delayed delivery of medicines and medical supplies on health service delivery. The respondents were grouped into four age categories: 20–30 years, 31–40 years, 41–50 years, and above 50 years.

The results indicate that the largest proportion of respondents fell within the age group of 31–40 years, which had 62 participants. This suggests that the majority of respondents were individuals in their most active and productive working years in the healthcare sector. Employees within this age bracket are likely to possess considerable professional experience and practical knowledge regarding the challenges associated with the delayed delivery of medicines and medical supplies. Their responses are therefore important in providing reliable information on how supply delays affect healthcare service delivery.

Respondents in the range of 41–50 years accounted for 38 participants, making them the second largest age group of the study. This category represents the experienced healthcare professionals and administrators who may have served in the health sector for many years. Their participation is significant because they are likely to have a deeper understanding of the long-term procurement challenges, policy implementation issues, and changes in the healthcare supply chain over time.

The age group of 20–30 years consisted of 34 respondents. This finding indicates that, the younger healthcare workers were also well represented in the study. Individuals of this age category are often energetic and actively involved in the daily healthcare operations. Their inclusion is very important because they may provide fresh perspectives on the operational challenges, technological improvements, and modern approaches to supply chain management within healthcare facilities.

Lastly but not the least, respondents above 50 years accounted for 20 participants, although, representing the smallest age category in the study. This group is very important because it includes highly experienced personnel who may have occupied senior positions in healthcare administration, procurement, or clinical services. Their responses are valuable in understanding the institutional challenges and strategic issues affecting the timely delivery of medicines and medical supplies.

Overall, the findings revealed that the study had included respondents from different age groups, thereby ensuring a diversity of experiences, opinions, and perspectives. The dominance of respondents within the age of 31–40 years suggests that the study largely captured views from mature and professionally active healthcare workers who are directly involved in service delivery. This diversity in age distribution enhances the reliability and comprehensiveness of the study findings**.**

4.2.3 Occupation of Respondents

Figure 1.1 shows the different occupations of the respondents that were involved in the study. The findings show that nurses had the largest share of respondents, which stood at 60%. This suggests that nurses play a central role in health service delivery and are directly affected by the delayed delivery of medicines and medical supplies in health facilities. This high representation also entails that they are likely to have extensive experience and knowledge regarding the operational challenges that are associated with the shortages and delays in medical supplies. Pharmacists represented at least 30 respondents in the study. Their involvement as pharmacists in

the study is very important because they are primarily responsible for the management, storage, and distribution of medicines within healthcare facilities. Their relatively strong representation suggests that the study captured critical information regarding stock management, procurement inefficiencies, medicine shortages, and supply chain challenges affecting healthcare service delivery in the district.

[Chart from original submission could not be auto-transferred — please re-insert.]
Figure 1: 1. Occupation of respondents (author)

Doctors and clinical officers accounted for 28 respondents. Their participation is significant because they are directly involved in diagnosing and treating patients and therefore experience the effects of inadequate or delayed medical supplies on patient care outcomes. Their involvement in the study provided valuable professional insight into how delays may compromise treatment effectiveness, may also increase workload, and affect the quality of healthcare delivery. In addition, administrators accounted for 20 of respondents in the study. Few in number, but they play a crucial role as they oversee the coordination and management of healthcare operations. Study findings indicate that administrators provided information on policies, budgeting, resource allocation, and administrative challenges related to the procurement and distribution of medicine and medical supplies. Procurement officers accounted for 16 respondents in the study as the district has a limited number of officers in the health care facilities. These represented the smallest category in the study. Despite their smaller number, their role is highly relevant because they are directly involved in sourcing, purchasing, and ensuring the timely delivery of medicines and medical supplies. Their responses are important in identifying procurement bottlenecks, supplier-related challenges, and logistical factors contributing to delays in the healthcare supply chain. Overall, the findings demonstrate that the study involved respondents from diverse professional categories within the healthcare sector, thereby enhancing the reliability and comprehensiveness of the data collected regarding the effects of delayed delivery of medicines and medical supplies on health service delivery in the district.

4.3 Logistical Challenges in the Supply Chain

Figure 2: 2. Frequency of delayed deliveries (author)

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Figure 4.2 shows the extent to which delayed deliveries are experienced within the supply chain. Respondents were asked to indicate whether such delays occurred very frequently, occasionally, or rarely. 65 (49%) reported very frequent engagement, 56 (40%) indicated occasional engagement, and 23 (16.6%) reported rare engagement. Very frequent engagement emerged as the dominant category, accounting for nearly half of the sample. This suggests that the phenomenon is not only widespread but also deeply embedded in the daily practices of a substantial proportion of respondents. The high prevalence points to structural or systemic factors that sustain such regular engagement.
The occasional category, representing approximately 40% of respondents, reflects intermittent or situational engagement. This group highlights variability in usage patterns, which may be influenced by contextual factors such as income cycles, seasonal needs, or specific triggers. Their presence underscores that while the phenomenon is common, its intensity varies across

households. The rare category, comprising 16.6% of respondents, represents a minority for whom engagement is limited. This group may reflect barriers such as lack of resources, awareness, or differing priorities. Their relatively small proportion indicates that while exclusion exists, it is not the dominant experience within the sample.

4.3.1 Causes of Logistical Delays

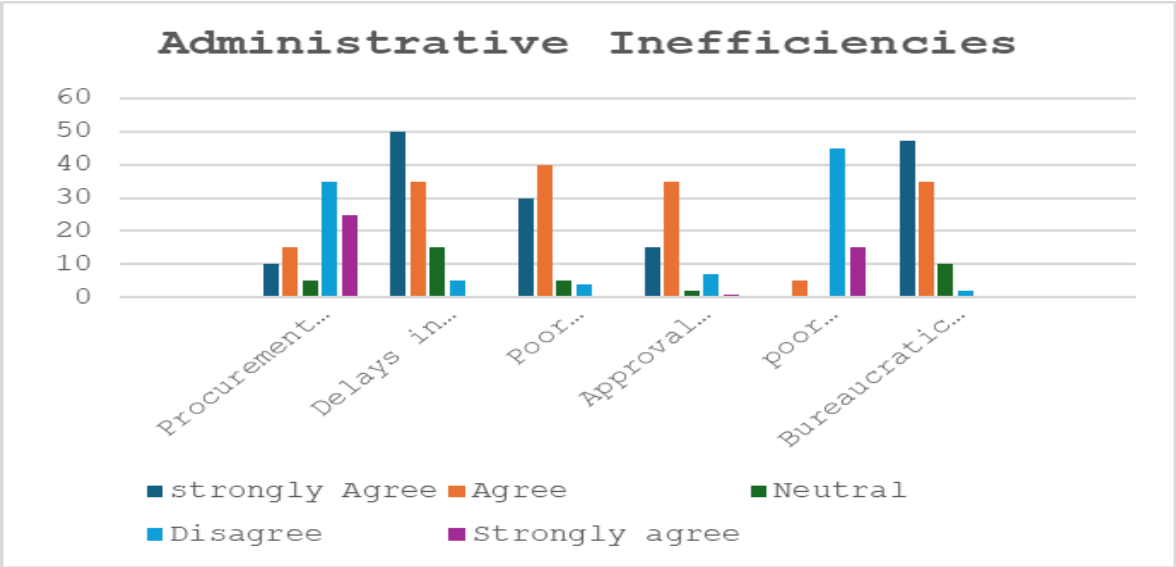
Figure 3: 3. causes of logistical delays (author)

Figure 4.3 shows respondents' perceptions regarding key operational and supply chain constraints using a five-point Likert scale ranging from *Strongly Agree* to Disagree Strongly. The findings reveal that transportation-related issues and supplier delivery delays are the most significant logistical challenges respondents face. The results indicate that poor transportation is perceived as the most critical challenge. A majority of respondents either strongly agreed or agreed that transportation difficulties negatively affect operations. The high proportion of agreement suggests that inadequate transport infrastructure, limited accessibility, or unreliable transport systems may significantly hinder the movement of goods and services. However, a minimal proportion of respondents expressed disagreement, demonstrating a strong consensus on the severity of this challenge.

[Chart from original submission could not be auto-transferred — please re-insert.]
In addition, findings show that delays in supplier delivery emerged as another major logistical concern, as most respondents strongly agreed or agreed that delays in receiving supplies adversely affect operational efficiency. This finding implies that disruptions in the supply chain may contribute to reduced productivity, inefficiencies, and possible interruptions in service delivery. The low level of disagreement further reinforces the widespread recognition of supplier delays as a critical operational issue. The chart above also indicates substantial agreement regarding the lack of emergency transport systems. A considerable number of respondents strongly agreed or agreed that inadequate emergency transport systems pose a challenge. This suggests that the absence of reliable emergency logistics and response mechanisms may limit organizations' or communities' ability to respond effectively to urgent situations.
In contrast, responses concerning inadequate storage facilities were more varied. A larger proportion of respondents disagreed or strongly disagreed with the statement, while relatively few agreed. This suggests that storage capacity may not be perceived as a major logistical constraint relative to transportation and delivery challenges. The findings suggest that existing storage facilities may be relatively sufficient for current operational demands. With regard to poor demand, the responses were relatively mixed. While some respondents agreed that demand-related issues constitute a challenge, a significant proportion disagreed or strongly disagreed. This variation in responses implies that demand fluctuations may affect some respondents differently depending on their operational context or level of market exposure.
Finally, inefficient inventory management received moderate agreement. Although a notable proportion of respondents agreed that inventory inefficiencies exist, fewer strongly agreed than on the transportation issue. This suggests that while inventory management challenges are present, they are not perceived as severe as transportation and supplier delivery problems.
Overall, the findings demonstrate that transportation inefficiencies, supplier delivery delays, and inadequate emergency transport systems are the predominant logistical challenges affecting respondents. These challenges may negatively influence operational efficiency, timely service delivery, and overall organizational performance. The study therefore highlights the need for

improved transport infrastructure, enhanced supplier coordination, and strengthened emergency logistics systems to mitigate these operational constraints.

4.4 Administrative Challenges



The table presents respondents' views on factors contributing to delays in the delivery of medicines and medical supplies in health institutions. The responses were measured using a Likert scale ranging from strongly agree to strongly disagree. The findings indicate that several procurement and administrative challenges significantly affect supply delivery and overall health service provision.

4.4.1 Procurement processes are Too Slow

The findings show that 10 respondents strongly agreed and 15 agreed that procurement processes are too slow. However, 35 respondents disagreed while 25 strongly disagreed, with only 5 remaining neutral. This suggests that the majority of respondents did not perceive procurement procedures themselves as excessively slow. The results imply that although some delays may exist within procurement systems, respondents believe that other factors may contribute more significantly to delayed delivery of medicines and supplies.

4.4.2 Delays in funding affect supply delivery

A large proportion of respondents acknowledged that delays in funding negatively affect supply delivery. About 50 respondents strongly agreed and 35 agreed, while only 5 disagreed and none strongly disagreed. Fifteen respondents were neutral. These findings demonstrate that financial constraints and delayed release of funds are major causes of disruptions in the supply chain. Inadequate or late funding limits timely procurement, transportation, and distribution of medicines and medical supplies to health facilities.

4.4.3 Poor Communication affects supply chain efficiency

The majority of participants agreed that poor communication affects supply chain efficiency. Specifically, 30 respondents strongly agreed and 40 agreed, while only 4 disagreed and none strongly disagreed. Five respondents remained neutral. This indicates that ineffective communication among suppliers, procurement officers, stores departments, and health personnel contributes significantly to inefficiencies in the delivery process. Poor communication may result in misinformation, delayed orders, stock shortages, and coordination problems within the health supply chain.

4.4.4 Approval Processes in Procurement take too Long

The study further revealed that lengthy approval procedures are another important challenge. A total of 15 respondents strongly agreed and 35 agreed that approval processes take too long. Only 7 disagreed and 1 strongly disagreed, while 2 were neutral. These findings suggest that bureaucratic approval systems slow down procurement activities, thereby delaying the acquisition and delivery of medicines and medical supplies. Multiple approval stages may increase administrative inefficiencies and prolong response time during urgent medical needs.

4.4.5 Poor Coordination between Departments Involved in Procurement

The findings indicate that poor coordination between departments is a major concern. Although no respondents strongly agreed, 5 agreed, while 45 disagreed and 15 strongly disagreed. This means that most respondents did not consider interdepartmental coordination to be a serious challenge in procurement processes. The results imply that departments may generally work together effectively, and coordination may not be the primary cause of delayed delivery in the studied institutions.

4.4.6 Bureaucratic Procedures Delay Supply Delivery

The results strongly indicate that bureaucratic procedures contribute to delays in supply delivery. A majority of respondents, 47 strongly agreed and 35 agreed, while only 2 disagreed and none strongly disagreed. Ten respondents were neutral. These findings suggest that excessive administrative procedures and rigid regulations significantly slow down the procurement and distribution of medicines and medical supplies. Bureaucracy may involve lengthy documentation, multiple approvals, and complex procurement requirements that hinder timely delivery.

4.5 Chapter Summary

Overall, the findings reveal that the major factors affecting timely delivery of medicines and medical supplies are delays in funding, poor communication, lengthy approval procedures, and bureaucratic procurement systems. These factors collectively weaken supply chain efficiency and negatively affect health service delivery. On the other hand, respondents generally did not perceive slow procurement procedures and poor departmental coordination as the main contributors to delayed delivery. The study therefore suggests that improving financial management, streamlining approval systems, reducing bureaucracy, and strengthening

communication channels could enhance the efficiency of medical supply delivery in health institutions.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents a comprehensive discussion of the study findings in relation to the research objectives and existing literature on supply chain management in the health sector. It critically analyses how the results align with or differ from previous studies, particularly on issues such as procurement efficiency, transportation challenges, forecasting systems, and stakeholder coordination. The discussion also interprets the implications of the findings on health service delivery, highlighting how delays in the supply of medicines and medical supplies affect patient outcomes, service quality, and the overall performance of health facilities in Livingstone District. By linking empirical evidence with established theoretical and practical perspectives, the chapter provides a deeper understanding of the underlying factors contributing to inefficiencies in the supply chain.

In addition, the chapter presents the key conclusions drawn from the study based on the analysed data, clearly outlining the major issues affecting timely delivery of medical supplies. It further offers practical and actionable recommendations aimed at improving procurement processes, strengthening logistics and distribution systems, enhancing staff capacity, and promoting the use of digital solutions in supply chain management. These recommendations are intended to support policymakers, health administrators, and other stakeholders in making informed decisions that can improve service delivery. The chapter concludes by proposing areas for further research, particularly in exploring advanced supply chain technologies, policy implementation challenges, and comparative studies across different districts to broaden understanding and support continuous improvement in the health sector.

5.2 Discussion of Findings

5.2.1 Logistical Challenges in the Supply Chain

The study established that logistical challenges play a major role in the delayed delivery of medicines and medical supplies within health facilities in Livingstone District. Key issues identified include poor transportation systems, inadequate storage facilities, and weak demand forecasting mechanisms. These challenges collectively disrupt the smooth flow of supplies from central stores to health facilities, ultimately affecting service delivery. The findings are consistent with existing literature, which emphasizes that logistics is a critical component of effective supply chain management in the health sector. When logistical systems are weak or inefficient, even well-funded procurement processes may fail to ensure the timely availability of essential medicines.

Among the logistical challenges, poor demand forecasting emerged as the most significant factor contributing to delays. This suggests that health facilities often struggle to accurately estimate their needs due to inadequate data systems, limited use of technology, or insufficient staff capacity. As a result, there are frequent mismatches between supply and demand, leading to stock-outs of essential medicines or, in some cases, overstocking of less critical items. In addition, transportation constraints were found to further compound the problem. Issues such as

limited delivery schedules, lack of dedicated transport, and poor road infrastructure make it difficult to distribute supplies efficiently, especially to facilities located in more remote or hard-to-reach areas.
In the specific context of Livingstone District, these logistical weaknesses have a direct and negative impact on the availability of medicines and medical supplies at health facilities. When essential drugs are not delivered on time, healthcare providers are unable to offer timely and effective treatment to patients, which can compromise the quality of care. This situation not only increases the workload for already strained healthcare workers but also affects patient satisfaction and trust in the health system. Therefore, addressing these logistical challenges is crucial for improving the reliability of supply chains and ensuring consistent access to essential medicines.

5.2.2 Administrative Process Inefficiencies

The study found that administrative inefficiencies are a major contributor to delays in the delivery of medicines and medical supplies in Livingstone District. Key issues identified include slow procurement processes, delays in the release of funds, and poor communication among stakeholders involved in the supply chain. These challenges create bottlenecks at various stages, from ordering to distribution, thereby affecting the overall efficiency of the system. Even when the need for supplies is clearly identified, administrative hurdles often prevent timely action, resulting in prolonged waiting periods before medicines reach the intended health facilities.
These findings are consistent with earlier studies, which highlight that bureaucratic procurement procedures and delayed financial disbursements are among the most significant barriers to effective supply chain operations in the health sector. Lengthy approval processes, excessive documentation requirements, and lack of streamlined systems contribute to slow procurement cycles. In addition, delays in funding limit the ability of institutions to place orders or pay suppliers on time. The study further confirms that poor coordination between health facilities, district offices, and central supply agencies leads to inefficiencies such as delayed order processing, duplication of efforts, and miscommunication, all of which negatively impact timely delivery.
This suggests that improving administrative efficiency is critical for strengthening the supply chain and ensuring the timely availability of medicines and medical supplies. Streamlining procurement procedures, ensuring timely disbursement of funds, and enhancing communication and coordination among stakeholders can significantly reduce delays. By addressing these administrative challenges, health systems can improve responsiveness, reduce stock-outs, and ultimately enhance the quality of healthcare service delivery in Livingstone District.

5.2.3 Influence of Management Policies on Staff Performance

The study found that management-related factors, particularly the lack of effective supervision and limited training opportunities, have a negative impact on staff performance within the supply chain system. Although some respondents reported having received moderate levels of training, this was often not continuous or comprehensive enough to address emerging challenges in supply chain management. In addition, the absence of regular supervision was identified as a

critical gap, as it limits accountability, reduces adherence to established procedures, and allows inefficiencies to persist without timely correction. These weaknesses affect how staff carry out key responsibilities such as inventory control, record keeping, and order management.
This finding is consistent with existing literature, which highlights the importance of strong management practices in ensuring efficient supply chain operations. Effective supervision helps to monitor performance, provide guidance, and enforce standards, while continuous training equips staff with the necessary skills and knowledge to adapt to changing systems and demands. The lack of clear role definition and limited oversight can result in confusion, duplication of tasks, and errors in decision-making. As a result, even when resources are available, the absence of strong management support can undermine the overall effectiveness of the supply chain.
In the context of Livingstone District, inadequate supervision and limited training contribute directly to inefficiencies in supply chain processes. This may lead to poor inventory management practices, such as inaccurate stock records and failure to track consumption patterns, as well as delayed reporting of stock levels and supply needs. Consequently, these issues contribute to delays in the delivery of medicines and medical supplies, affecting the ability of health facilities to provide timely and quality care. Strengthening supervision mechanisms and investing in continuous staff training are therefore essential steps toward improving performance and ensuring a more reliable supply chain system

5.2.4 Effects of Delayed Delivery on Health Service Delivery

The study established that delays in the delivery of medicines and medical supplies have a significant negative impact on health service delivery in Livingstone District. Respondents strongly indicated that such delays frequently result in stock-outs of essential medicines, which in turn disrupt the continuity of care provided to patients. These shortages were reported to negatively affect patient outcomes, as healthcare providers are often forced to delay treatment, prescribe alternative medications, or refer patients elsewhere. In addition, the absence of necessary supplies increases the workload of healthcare workers, who must spend extra time managing shortages, handling patient complaints, and finding temporary solutions to maintain service delivery. These findings are consistent with previous research, which shows that medicine shortages lead to treatment interruptions, reduced quality of care, and increased pressure on already strained health personnel.
The findings further support the application of systems theory, which emphasizes that a problem in one component of a system can significantly affect the functioning of the entire system. In this context, inefficiencies within the supply chain, particularly delays in procurement and distribution, directly affect the performance of health service delivery. When medicines are not available at the right time, the entire healthcare system becomes less effective and less responsive to patient needs. This results in poor health outcomes, reduced patient satisfaction, and inefficiencies in service provision. Therefore, ensuring a reliable and timely supply of medicines is critical not only for improving operational efficiency but also for enhancing the overall quality of healthcare services.

5.3 Conclusion

Based on the findings of the study, it can be concluded that delays in the delivery of medicines and medical supplies significantly affect health service delivery in Livingstone District. The study clearly demonstrated that when essential medicines are not delivered on time, health facilities struggle to provide timely and effective care to patients. This often leads to frequent

stock-outs, which disrupt treatment, force healthcare providers to use alternatives, and negatively impact patient outcomes. In addition, such delays place extra pressure on healthcare workers, increasing their workload and reducing their ability to operate efficiently within already constrained environments.

The study further established that logistical challenges, administrative inefficiencies, and management-related factors are the key contributors to these delays. Issues such as poor transportation systems, weak forecasting, slow procurement processes, delayed funding, inadequate supervision, and limited staff training all combine to weaken the supply chain. As a result, the study confirms that an effective, efficient, and well-coordinated supply chain system is essential for ensuring the consistent availability of medicines and medical supplies. Strengthening these systems is therefore critical for improving service delivery, enhancing patient care, and achieving better overall healthcare outcomes in Livingstone District.

5.4 Recommendations

Based on the findings of the study, several recommendations are proposed to address the challenges identified and improve the delivery of medicines and medical supplies in Livingstone District.

5.4.1 Improve Demand Forecasting Systems

There is a need to improve demand forecasting systems through the adoption of data-driven approaches that enhance accuracy in estimating medicine requirements. Improved forecasting will help reduce mismatches between supply and demand and ensure that essential medicines are available when needed. In addition, regular training should be provided to staff on forecasting and quantification to build their capacity in supply planning. Strengthening data collection and reporting systems is also essential, as reliable and timely data supports better decision-making and improves the overall efficiency of the supply chain.

5.4.2 Strengthen Transportation and Distribution Systems

Transportation and distribution systems should be strengthened to ensure the timely and reliable delivery of medicines, especially during emergencies. A well-coordinated transport system will reduce delays and improve access to essential supplies across all health facilities. It is also important to improve delivery scheduling and enhance coordination between supply agencies and health facilities to ensure consistency in distribution. Furthermore, contingency plans should be introduced to cater for

emergency deliveries and unexpected disruptions, thereby improving responsiveness within the supply chain.

5.4.3 Streamline Procurement Processes

Procurement processes need to be streamlined in order to reduce bureaucratic delays and improve efficiency in the acquisition of medical supplies. Simplifying procedures and minimizing unnecessary administrative steps will help speed up procurement cycles. In addition, efforts should be made to reduce bottlenecks in approval processes, which often contribute to delays. Enhancing transparency and accountability in procurement systems will further improve efficiency and ensure that resources are utilized effectively.

5.4.4 Improve Financial Management

Effective financial management is critical for ensuring the timely procurement and distribution of medicines. There is a need to ensure the timely disbursement of funds so that procurement activities are not delayed. Strengthening budget planning and allocation for medical supplies will help ensure that adequate resources are available to meet demand. In addition, improving financial accountability systems will promote proper utilization of funds and enhance trust and transparency within the supply chain.

5.4.5 Enhance Staff Training and Supervision

Continuous professional development should be provided to supply chain staff to equip them with the necessary skills and knowledge required for effective performance. Regular training programs will help staff adapt to changes and improve their competence in managing supply chain activities. Strengthening supervision and monitoring mechanisms is also essential to ensure accountability and adherence to established procedures. Additionally, clearly defining roles and responsibilities of staff will reduce confusion, improve coordination, and enhance overall efficiency.

5.4.6 Strengthen Communication and Coordination

There is a need to strengthen communication and coordination among key stakeholders, including user departments, accounts, procurement units, suppliers, and the Zambia Medicines and Medical Supplies Agency. Improved communication will reduce delays

caused by miscommunication and ensure that all parties are aligned in their operations. Furthermore, promoting the integration of digital systems will enable real-time information sharing, enhance transparency, and improve coordination across the supply chain.

5.5 Areas for Further Research

5.5.1 Role Of Digital Systems in Health Supply Chains

Further research should explore how digital technologies can improve efficiency in health supply chains. This includes examining how electronic systems can enhance forecasting, tracking of stock levels, and coordination among stakeholders.

5.5.2 Urban and Rural Comparative Studies

There is a need for comparative studies between urban and rural districts to better understand how different contexts influence supply chain performance. Such studies can help identify unique challenges and tailor appropriate solutions.

5.5.3 Impact of Supply Chain Delays on Health Outcomes

Future research should focus on examining the direct impact of supply chain delays on specific health outcomes. This will help quantify the effects of delays on patient recovery, treatment success rates, and overall healthcare quality.

5.5.4 Evaluation of Supply Chain Interventions

Further studies should evaluate the effectiveness of interventions introduced to improve medicine delivery systems. This will help determine which strategies work best in reducing delays and improving service delivery in the health sector.

5.6 Chapter Summary

Delays in the arrival of medications and medical supplies in Livingstone District greatly hinder the provision of health services, resulting in regular stock shortages, interrupted treatment, and adverse patient outcomes. The research pinpointed three primary factors: logistical issues (inaccurate forecasting, inefficient transport, insufficient storage), administrative shortcomings (prolonged procurement, postponed funding, ineffective communication), and management flaws (restricted training, absence of supervision). To tackle these challenges, the chapter suggests

enhancing forecasting systems, transportation and distribution, procurement methods, financial management, staff education, and stakeholder collaboration, with digital solutions being crucial. It highlights that a well-integrated supply chain is crucial for reliable access to medications and improved health outcomes, and urges further research into digital solutions, urban-rural disparities, health outcome effects, and the effectiveness of interventions.

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APPENDICES

Appendix: A

QUESTIONNAIRE AND INTERVIEW GUIDE

TITLE: THE EFFECT OF DELAYED DELIVERY OF MEDICINES AND MEDICAL SUPPLIES ON HEALTH SERVICE DELIVERY: THE CASE OF LIVINGSTONE DISTRICT.

Introduction and Instructions

Dear Respondent,

You are kindly invited to participate in this research study titled *"The Effect of Delayed Delivery of Medicines and Medical Supplies on Health Service Delivery in Livingstone District."* The purpose of this questionnaire is to collect information on your experiences and views regarding the supply of medicines and medical supplies and how it affects service delivery in your facility. Your responses are very important and will contribute to improving healthcare systems and supply chain management.

Please note the following:

Your participation is **voluntary**, and you may choose not to answer any question or withdraw at any time.

All information provided will be treated with **strict confidentiality** and will be used **for academic purposes only**.

You are not required to write your name anywhere on this questionnaire.

There are **no right or wrong answers**; please answer honestly based on your experience.

Instructions for completing the questionnaire:

Tick (✔) the option that best represents your answer.

For statements, use the following scale:

SA = Strongly Agree

A = Agree

N = Neutral

D = Disagree

SD = Strongly Disagree

For open-ended questions, please write your responses in the space provided.

The questionnaire will take approximately **15–20 minutes** to complete.

Thank you for your time and valuable contribution.

Researcher:

Inonge Kabukabu

Section A: Background Information

Gender

☐ Male ☐ Female

Age Group

☐ 20–30 ☐ 31–40 ☐ 41–50 ☐ 51+

Position

☐ Doctor ☐ Nurse ☐ Pharmacist ☐ Procurement Officer ☐ Administrators _____

Years of Experience

☐ 0–5 ☐ 6–10 ☐ 11–15 ☐ 16+

Section B: Logistical Challenges

(Strongly Agree = SA, Agree = A, Neutral = N, Disagree = D, Strongly Disagree = SD)

Poor transportation affects timely delivery of medicines

☐ SA ☐ A ☐ N ☐ D ☐ SD

Inadequate storage facilities contribute to supply delays

☐ SA ☐ A ☐ N ☐ D ☐ SD

Poor demand forecasting leads to stock-outs

☐ SA ☐ A ☐ N ☐ D ☐ SD

Delays in supplier delivery schedules affect availability of medicines

☐ SA ☐ A ☐ N ☐ D ☐ SD

Lack of emergency transport systems contributes to delays

☐ SA ☐ A ☐ N ☐ D ☐ SD

Inventory management systems are inefficient

☐ SA ☐ A ☐ N ☐ D ☐ SD

Section C: Administrative Inefficiencies
Procurement processes are too slow
☐ SA ☐ A ☐ N ☐ D ☐ SD
Delays in funding affect supply delivery
☐ SA ☐ A ☐ N ☐ D ☐ SD
Poor communication affects supply chain efficiency
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q11. Approval processes in procurement take too long
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q12. There is poor coordination between departments involved in procurement
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q13. Bureaucratic procedures delay supply delivery
☐ SA ☐ A ☐ N ☐ D ☐ SD

Section D: Management & Staff Performance
Staff are adequately trained in supply chain management
☐ SA ☐ A ☐ N ☐ D ☐ SD
Lack of supervision affects supply chain performance
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q14. Staff shortages affect supply chain performance
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q15. Staff have adequate knowledge of supply chain procedures
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q16. Management provides adequate support for supply chain activities
☐ SA ☐ A ☐ N ☐ D ☐ SD

Section E: Effects on Health Service Delivery
Delays lead to stock-outs of medicines
☐ SA ☐ A ☐ N ☐ D ☐ SD
Delays negatively affect patient care
☐ SA ☐ A ☐ N ☐ D ☐ SD
Delays increase workload for healthcare workers
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q17. Delays lead to patients seeking treatment elsewhere
☐ SA ☐ A ☐ N ☐ D ☐ SD

Q18. Delays increase the risk of complications for patients
☐ SA ☐ A ☐ N ☐ D ☐ SD
Q19. Delays reduce patient satisfaction with services
☐ SA ☐ A ☐ N ☐ D ☐ SD

Section F: Open-ended
What are the main causes of delays in your facility?

What solutions would you recommend?

Q18. What strategies do you think can improve timely delivery of medicines?

INTERVIEW GUIDE
What challenges do you face in the delivery of medicines and medical supplies?

How do procurement processes affect delivery timelines?

What logistical issues (transport, storage, etc.) affect supply?

How do delays impact patient care in your facility?

How do these delays affect staff performance and morale?

What measures are currently in place to manage delays?

What improvements would you recommend?

Can you share any real experiences related to supply delays?

			Appendix Project timelin

PROJECT TIMELINE
Activity
Dates
Duration
Responsible Person

Chapter One submission, feedback and corrections
05/11/25–05/12/25
30 days
Researcher and Supervisor
Chapter Two submission, feedback and corrections
05/12/25–25/01/26
51 days
Researcher and Supervisor
Chapter Three submission, feedback and correction
25/02/26–30/03/26
33 days
Researcher and Supervisor
Pretesting and possible review of research tools
30/03/26–05/04/26
5 days
Researcher
Data collection
05/04/26- 19/04/26
14 days
Researcher
Transcription & Data Analysis
19/04/26–28/04/26
10 days
Researcher
Writing of Results (Chapter 4)
28/04/26–05/05/26
7 days
Researcher
Corrections & Feedback (Ch. 4)
05/05/26–07/05/26
2 days
Researcher & Supervisor
Chapter Five (Discussion, Conclusion & Recommendations)
07/05/26–17/05/26
7 days
Researcher
Corrections & Final Editing (All Chapters)
17/05/26–27/05/26
10 days
Researcher
Printing & Binding
27/05/26-29/05/26
2 day
Researcher
Final Submission
30/05/26

1 day
Researcher

			Appendix C Budget

(a) Availability of financial support (requested or granted): Yes ☐ No ☐

BUDGET

Item

Unit Cost ZMW

Quantity

Total Cost ZMK

STATIONERY

Note Books

05

20

100

Reams of Paper

180

1

360
Pens
50
1 box
75
Pencils
5
2
10
Erasers
5
5
25
Tipex
10
5
50
Stapler
55
1
55
Perforator
60
1
60
Diary
200
3
600
Scientific Calculator
200
1
200
Staples
30
1 boxes
30
Box File
45
5
225
Folder Clips
1
20
20
Memory Sticks

220
1
220
SUBTOTAL ZMK
K 2,030.00
SECRETARIAL SERVICES
Research Proposal Printing
6
38 pages
228
Research Proposal Binding
50
1
50
Questionnaire Printing
5x6
5
150
Questionnaire photocopying
3x5
154
2,300
Research Report Printing
10x3
5
300
Photocopying Of Final Research Document
38x3
5
570
Binding Of Research Document
130
5
650
SUBTOTAL ZMK
K4,248
HUMAN RESOURCE EXPENSES
Lunch For Researcher and assistants
100x5 people
7 days
3,500
SUBTOTAL
K9,778.00
TOTAL ZMK
K 9,778.00
CONTINGENCY 10%

K 977.80
GRAND TOTAL ZMK
K10,755.80

Appendix D **CERTIFICATE OF APPROVAL**

ZCAS University

Office of the Director
Research and Innovation
P.O Box 35243, Lusaka.
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Phone: +260 979 024363

Serial no: 2026/3/0516

ETHICAL APPROVAL

Researcher's name: Inonge Kabukabu ID: 202402796

Title of research: THE EFFECT OF DELAYED DELIVERY OF MEDICINES AND MEDICAL SUPPLIES ON HEALTH SERVICE DELIVERY: THE CASE OF LIVINGSTONE DISTRICT

Dear Sir/Madam,

Thank you for applying for research ethics clearance by ZCAS University Ethics Review Committee for the above-mentioned research title.

Your application has been approved. You should ensure that the research project adheres to the ZCAS University Ethics Policy and applicable national legislation (NRHA), the professional code of conduct relevant to your specific field of study and adhere to the professional ethics of the institution. Uphold ethics in data collection, processing and ensure that the participants are protected.

This ethics approval is granted for the period of **One Year** from 16th April 2026 and on condition that the researcher will conduct the study according to the methods and procedures set out in the approved proposal. No field work activities may continue after the expiry date, unless this approval is renewed.

Regards,

Prof. Dewin Sikalumbi

Director - Research and Innovation

Producing Future Fit Leaders