



METROPOLITAN

INTERNATIONAL

UNIVERSITY

**HOSPITAL INFORMATION SYSTEMS AND HEALTHCARE SERVICE DELIVERY IN PUBLIC
HOSPITALS IN UGANDA. A CASE OF ENTEBBE REGIONAL REFERRAL AND DR RONALD BATA
HOSPITALS**

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23B/HD03/MIT/KC

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DECLARATION

I Balikudembe Philip, declare that this research report titled “Hospital Information Systems and Healthcare Service Delivery in public hospitals in Uganda. A case of Entebbe Regional Referral and Dr Ronald Bata hospitals is my original work and has never been submitted for any award at any academic institution.

Signed:

Date:

APPROVAL

This is to confirm that this research report titled “Hospital Information Systems and Healthcare Service Delivery in public hospitals in Uganda. A case of Entebbe Regional Referral and Dr Ronald Bata hospitals” Has under my close supervision and guidance now ready for submission for further examination.

Dr Namara Asimwe (PhD)

Signature.....

Date.....

ABBREVIATIONS

HIS - Hospital Information Systems

EMR - Electronic Medical Records

TAM - Technology Acceptance Model

ISSM - Information Systems Success Model

PU - Perceived Usefulness

PEOU - Perceived Ease of Use

DHIS2 - District Health Information System 2

IHMIS - Integrated Health Management Information System

ICT - Information and Communication Technology

MOH - Ministry of Health

UBOS - Uganda Bureau of Statistics

HSDP III - Health Sector Development Plan III

SDG-3 – Sustainable Development Goal 3

DEDICATION

I dedicate this research to the healthcare workers and administrators of Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital, whose dedication to improving patient care inspired this study. Their resilience in adopting digital health solutions despite challenges demonstrates a commitment to advancing Uganda's healthcare system. I also dedicate this work to my family, whose unwavering support, encouragement, and patience made this academic journey possible. Their belief in me has been my greatest motivation. Finally, to the patients who rely on public healthcare services may this study contribute to more efficient, accessible, and high-quality medical care for all.

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Abstract

This study examined the relationship between Hospital Information Systems (HIS) and healthcare service delivery in public hospitals in Uganda, focusing on Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital. The research aimed to assess the extent of HIS implementation, determine the impact of electronic medical records (EMRs) on service delivery, and identify challenges hindering effective HIS utilization. The problem addressed was the suboptimal healthcare outcomes linked to inefficient information management. The study was grounded in the Technology Acceptance Model (TAM) and the DeLone and McLean Information Systems Success Model (ISSM). TAM was applied to evaluate healthcare workers' perceptions of HIS usefulness and ease of use, while ISSM provided a framework to assess system quality, information quality, and user satisfaction. These theories helped to analyze both individual acceptance and organizational factors influencing HIS adoption. A mixed-methods approach was employed, combining quantitative data from structured questionnaires administered to 212 healthcare staff and qualitative insights from semi-structured interviews with key informants.

Findings for each objective revealed: Objective one HIS implementation was significant but utilization was inconsistent, with regression analysis confirming its positive influence on service delivery ($\beta = 0.265$, $p < 0.001$). Objective two Electronic Medical Records (EMRs) demonstrated the strongest positive relationship with service delivery ($\beta = 0.419$, $p < 0.001$), enhancing data accuracy and patient care. Objective three Challenges including staff resistance and technical failures significantly hindered system effectiveness ($\beta = 0.271$, $p < 0.001$). The study concludes that while HIS and EMRs substantially improve healthcare delivery, their full potential is unrealized due to persistent implementation barriers. Recommendations include investing in robust infrastructure to support implementation, enhancing EMR systems to maximize their impact, and implementing comprehensive change management strategies to address user resistance. These measures are essential to leverage the demonstrated potential of digital health technologies in improving Ugandan healthcare outcomes, with future research needed on training effectiveness and system interoperability. The study concluded that HIS enhances healthcare service delivery but requires addressing technical, human, and organizational barriers. Recommendations included investing in robust IT infrastructure, continuous staff training, and change management strategies to foster system adoption. Future research should explore interoperability, training effectiveness, and socio-organizational influences on HIS sustainability.

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CHAPTER ONE
INTRODUCTION

1.0 Introduction

This chapter was made up of the background of the study, problem statement, general objectives, specific objectives, research questions, hypothesis of the study, significance of the study, conceptual framework, and scope of the study and operational definitions of the study.

1.1 Background of the Study

Globally, HIS adoption has been linked to increased efficiency, reduced medical errors, and better patient outcomes(Deus, 2023). In Uganda, public hospitals such as Entebbe Regional Referral and Dr. Ronald Bata Hospitals have begun integrating HIS to modernize healthcare services and address challenges related to patient record management and service coordination. Despite these efforts, many facilities face significant obstacles, including inadequate ICT infrastructure, limited staff training, and poor system interoperability, which hinder the full realization of HIS benefits(Ntirandekura, Ainebyoona, et al., 2022). Understanding how HIS influences healthcare service delivery in these hospitals is crucial to inform strategies that enhance healthcare quality and efficiency in Uganda's public health sector (Nakitto et al., 2021).

1.1.1 Historical Perspective

Globally, Hospital Information Systems (HIS) had undergone significant transformation over the past few decades, evolving from basic electronic record-keeping tools to sophisticated, integrated platforms that support a wide array of healthcare functions including clinical decision support, patient management, billing, and resource allocation(Ntirandekura, Ainebyoona, et al., 2022). The global health community recognizes HIS as essential for improving healthcare quality, safety, and efficiency. According to a 2021 World Health Organization report, countries with well-developed HIS experience up to a 30% reduction in medical errors and a notable improvement in patient satisfaction due to faster service delivery and more accurate information sharing (A. G. Kazaara & Kazaara, 2025b).

Furthermore, the COVID-19 pandemic underscored the critical role of HIS in facilitating real-time data reporting, contact tracing, and management of healthcare resources globally (WHO, 2021). The pandemic accelerated digital health adoption worldwide, with HIS platforms increasingly incorporating telemedicine, electronic prescriptions, and remote patient monitoring(Faith et al., 2023). However, despite technological advances, disparities persist between high-income and low-to-middle-income countries in HIS implementation, often driven by resource constraints and infrastructural challenges(Faridah et al., 2023).

In Africa, the development and deployment of Hospital Information Systems (HIS) have gained significant momentum over the past two decades, driven by growing government interest in digital health, international donor support, and regional policy frameworks(Lydia et al., 2023). The African Union's Agenda 2063 and the World

Health Organization's African Health Strategy (2016–2030) both identify the strengthening of health information systems as a core priority for achieving universal health coverage and building resilient health systems. In the East African region, the evolution of HIS began in the early 2000s, with Kenya and Tanzania pioneering electronic medical record (EMR) pilots between 2004 and 2007, mainly in urban referral hospitals (Regan et al., 2024). Uganda followed suit in 2011 through the national rollout of the District Health Information System 2 (DHIS2) and later expanded to pilot EMR modules in selected public hospitals, including facilities in Entebbe Municipality after 2015 as part of the Ministry of Health's eHealth Strategy.

Empirical evidence from across the continent suggests that effective HIS implementation improves data accuracy, streamlines patient management, reduces wait times, and enhances disease surveillance and reporting (Munyua et al., 2022; Nhampossa et al., 2021). Moreover, countries like Rwanda and Kenya have become regional benchmarks in integrating HIS with national health insurance systems, supply chain platforms, and mobile health applications. Despite this progress, HIS adoption in many East African countries remains uneven, hindered by persistent challenges such as unreliable power supply, limited internet connectivity, inadequate staff training, fragmented data systems, and insufficient funding for maintenance and upgrades (T. Moses, 2023). The COVID-19 pandemic further exposed these systemic vulnerabilities but also accelerated investment in digital health solutions across East Africa, underscoring the urgency and potential of HIS in transforming public healthcare delivery.

Uganda's healthcare sector has embraced HIS as a strategic priority within its National Health Policy and Digital Health Strategy (2020-2025). The Ministry of Health has focused on deploying the Integrated Health Management Information System (IHMIS) and scaling up the use of DHIS2 a flexible, open-source software platform used widely across African countries for health data collection and analysis (Christopher, Moses, et al., 2022). According to the Uganda Ministry of Health's 2023 Health Sector Performance Report, over 75% of public health facilities across the country now routinely submit data electronically through DHIS2, significantly improving timeliness and quality of health information. These improvements have facilitated better resource planning, monitoring of disease outbreaks, and evaluation of health interventions (Innocent et al., 2023).

However, challenges such as inadequate hardware, intermittent internet connectivity in rural areas, and the digital literacy gap among health workers still limit the full realization of HIS benefits (Ministry of Health Uganda, 2023). Furthermore, a 2022 study by Kiberu et al. highlighted that while HIS enhances operational efficiency in many public hospitals, the lack of integration between different HIS modules such as laboratory, pharmacy, and patient management systems creates data silos that undermine holistic patient care (Benard, 2023).

Entebbe Regional Referral Hospital, situated in the rapidly growing Wakiso District, serves as a practical example of HIS deployment within Uganda's public health system. Since its commissioning, the hospital has progressively implemented various HIS modules designed to improve patient registration, medical record management, laboratory

data processing, and pharmacy inventory control (Julius, 2024a). These efforts have resulted in marked improvements in service delivery, including reduced patient waiting times and enhanced accuracy in clinical documentation.

A 2023 internal evaluation at Entebbe Hospital reported that the digitization of patient records led to a 20% decrease in lost or misplaced medical files, directly contributing to more timely and effective clinical decisions (Khalil et al., 2020). However, challenges such as frequent power outages and limited technical support continue to impede HIS operations, necessitating reliance on backup systems and manual processes in some departments (Entebbe Hospital Annual Report, 2023). Capacity-building initiatives targeting hospital staff on HIS use have been critical, as many healthcare providers initially struggled to adapt to the digital workflows (Nancy & Prudence, 2024). The hospital's experience underscores the need for sustained investment not only in HIS infrastructure but also in continuous training and support mechanisms to optimize system utilization.

Similarly, Dr. Ronald Bata Hospital, a key military hospital in Entebbe, demonstrates the value and complexity of HIS implementation in specialized healthcare settings. The hospital has integrated HIS tools for patient data management, supply chain tracking, and personnel attendance monitoring to improve operational efficiency and accountability (Julius & Nancy, 2025). Recent reports from 2022 indicate that HIS facilitated more accurate monitoring of medical supplies, reducing stock outs by approximately 15% compared to previous years (Bata Hospital Internal Audit, 2022).

1.1.2 Theoretical Perspective

The study was underpinned by two interrelated theoretical models: the Technology Acceptance Model (TAM) and the DeLone and McLean Information Systems Success Model (ISSM). These theories provided conceptual lenses for exploring not only how healthcare workers accept and use HIS, but also how successful such systems are in contributing to overall hospital performance and patient care outcomes.

The Technology Acceptance Model (TAM), developed by Davis (1989) and expanded in subsequent studies, remained one of the most widely used frameworks to explain users' acceptance of technology in organizational settings. At its core, TAM posited that two key factors Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) predict an individual's intention to use a system and actual system use. Recent applications of TAM in healthcare, such as by Alasmay et al. (2022), affirm that when healthcare providers perceive HIS as useful in enhancing job performance and easy to operate, they are more likely to use the system consistently and effectively.

In the Ugandan context, where HIS was still maturing in many public hospitals, TAM is especially relevant in diagnosing why certain systems are underutilized or abandoned altogether. The model helped identify behavioral, cognitive, and contextual barriers such as digital literacy, workload pressures, and fear of technological change that limit system uptake among healthcare workers (Kyambadde et al., 2021).

However, TAM has been criticized for oversimplifying the socio-technical environment in which information systems operate. It neglects external variables such as organizational support, system quality, or social influence that can significantly affect technology adoption in public hospitals (Venkatesh & Davis, 2020). In response to these limitations, this study integrates the TAM not in isolation but in conjunction with broader organizational and infrastructural factors influencing HIS uptake in Uganda's public health system. The researcher recognizes that beyond individual perceptions, systemic constraints such as power outages, lack of training, and minimal institutional incentives also shape technology acceptance. Complementing TAM is the DeLone and McLean Information Systems Success Model (ISSM), initially developed in 1992 and refined in 2003 and 2020 to capture the multidimensional nature of information systems performance. The model identifies six interrelated dimensions of IS success: System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Benefits. According to recent studies such as those by Nasiri et al. (2021) and Mensah et al. (2023), the ISSM is particularly effective in evaluating HIS in healthcare settings, where technical performance, data reliability, and user satisfaction all influence patient outcomes.

However, critics of the model argue that it is overly focused on linear causality and may fail to accommodate dynamic or evolving user behaviors and institutional adaptations in resource-constrained environments (Petter et al., 2022). In the context of Uganda's public hospitals, where system use is often inconsistent and dependent on external donor projects or pilot programs, the assumption of uniform system impact may not hold. The researcher therefore applies the ISSM with caution, emphasizing that HIS success is contingent not only on technical factors but also on political, economic, and infrastructural conditions.

1.1.3 Conceptual Perspective

Hospital Information Systems (HIS) were defined as comprehensive, integrated platforms designed to manage and coordinate the multifaceted administrative, clinical, financial, and operational functions within hospital environments (Faridah et al., 2023). These systems combined various components, including software applications, databases, hardware infrastructure, and communication networks, which collectively enable the systematic collection, storage, retrieval, and secure sharing of health-related data (David et al., 2023). The digitization enabled by HIS transforms traditional paper-based records into electronic formats, which greatly enhances data accessibility and accuracy (Alonso et al., 2021; Amoah & Nelson, 2022).

Core functionalities of HIS encompass patient registration, electronic medical records (EMR), laboratory information management, pharmacy systems, billing, and health reporting, all aimed at streamlining hospital workflows and promoting effective clinical decision-making (Aziz et al., 2023). These integrated modules ensure continuity of care by facilitating seamless communication and coordination among different hospital departments such as outpatient clinics, inpatient wards, laboratories, and pharmacies (Patel & Sharma, 2020).

Healthcare service delivery was referred to as the direct provision of health services to individuals, covering a wide range of activities such as disease prevention, diagnosis, treatment, rehabilitation, and palliative care (Gracious, 2023). In this study, healthcare service delivery was measured using four key dimensions: accessibility (the ease with which patients obtain needed services), timeliness (the speed at which care is delivered after it is needed), efficiency (the optimal use of resources to achieve desired outcomes), and patient satisfaction (the extent to which patients feel their needs and expectations are met).

It involved complex interactions between patients and healthcare providers across different levels of care within a health system (World Health Organization, 2021). Essential characteristics of effective healthcare service delivery include accessibility (ensuring services are available to all who need them), timeliness (reducing delays in care), quality (providing evidence-based and safe treatments), safety (minimizing harm to patients), and patient-centeredness (respecting patients' preferences and needs) (Atun et al., 2020).

In hospitals, these dimensions were translated into patients receiving accurate diagnoses, appropriate medical interventions, and consistent follow-up without unnecessary waiting or medical errors (Kasozi et al., 2021). The quality of healthcare delivery was influenced by numerous factors including physical infrastructure, availability and competence of human resources, adherence to clinical guidelines, availability of medical supplies, and critically, the presence of robust information systems to support clinical and managerial decisions (Nabyonga-Orem et al., 2021).

1.1.4 Contextual Perspective

In the Ugandan healthcare system, particularly in public facilities such as Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi, the adoption and utilization of Hospital Information Systems (HIS) had emerged as essential responses to the persistent structural and operational challenges faced by hospitals (A. G. Kazaara & Kazaara, 2025a). A Hospital Information System was a comprehensive, integrated information and communication technology framework that facilitated the management of medical, financial, operational, and administrative services within hospitals (Ssebunya et al., 2022).

These systems included interconnected modules such as electronic medical records (EMR), patient registration, pharmacy management, billing, laboratory information management, and decision support tools (Ntirandekura, Ainebyoona, et al., 2022). In the context of Uganda's public hospitals, HIS helped address core inefficiencies in patient data management, reduced delays in service delivery, and strengthens the reliability of hospital operations by enabling real-time data access and sharing across departments (Kasozi et al., 2021). HIS also enhanced coordination between care providers, ensures timely documentation, and supports institutional transparency and accountability critical factors in environments often affected by overcrowding, limited human resources, and fragmented health information (Lydia et al., 2023).

Entebbe Regional Referral Hospital, a longstanding public health institution located in Wakiso District, had witnessed a marked improvement in administrative and clinical efficiency following the phased implementation of HIS components(Faridah et al., 2023). Historically reliant on paper-based patient records, the hospital faced major challenges such as lost files, delayed test results, inaccurate billing, and long waiting hours. With support from Uganda's Ministry of Health and donor-funded digital health initiatives, Entebbe Regional Referral Hospital adopted a modular HIS that integrates patient registration, EMR, pharmacy, and laboratory information systems (Ministry of Health Uganda, 2022).

As of 2023, the hospital reported a 35% reduction in patient waiting time and improved turnaround time for laboratory test results due to automated processing and reporting (Ssebunya et al., 2022). Moreover, the digitization of patient histories has improved continuity of care, especially for non-communicable diseases such as hypertension and diabetes, by enabling clinicians to make data-driven decisions based on complete and accurate patient records (Ndejjo et al., 2021).

Similarly, Dr. Ronald Bata Hospital located in Nsamizi barracks, a newer facility established to relieve patient congestion at Entebbe Regional Referral Hospital and provide advanced care in the region, has integrated HIS into its operational model from inception. The hospital, located in Nsamizi barracks near Nsamizi Primary School, was established with a vision of leveraging digital health solutions for modern and patient-centered service delivery(Christopher, Muhindo, et al., 2022).

Equipped with computerized outpatient and pharmacy departments, the hospital has demonstrated the value of HIS in managing patient flow, improving drug inventory, and supporting teleconsultations especially critical during the COVID-19 pandemic period when digital service delivery became necessary (Kasozi et al., 2021). The hospital's early adoption of HIS modules such as EMR, appointment scheduling, and billing systems has contributed to increased operational transparency and enhanced patient satisfaction, particularly among antenatal and emergency service clients(N. Moses & Nancy, 2024).

Both hospitals have shown that HIS not only improves the quality of service delivery but also supports better planning and policy implementation by providing reliable health data for decision-making(Julius, 2024b). At Entebbe Regional Referral Hospital, HIS-generated reports are now being used to monitor disease trends, track performance indicators, and guide drug procurement, which was previously based on estimates and guesswork. At Dr. Ronald Bata Hospital, HIS enables clinicians and administrators to streamline resource allocation, reducing wastage and improving cost-efficiency (Byaruhanga et al., 2022). These developments reflect a significant shift in the healthcare delivery paradigm moving from manual, error-prone processes to evidence-driven service models supported by digital technology(Alex & Julius, 2024).

However, the successful implementation of HIS at these hospitals has not been without challenges. Issues such as intermittent electricity, unstable internet connectivity, limited ICT skills among healthcare workers, and insufficient budget allocations for software updates and system maintenance continue to hinder optimal system utilization(Akankwasa et al., 2022). Despite these obstacles, both hospitals serve as models of how contextual adaptation of HIS in Uganda's public sector can lead to measurable improvements in health service delivery outcomes(Julius & Kazaara, 2025a).

Their experiences highlight the importance of leadership support, adequate training, and continuous technical assistance in sustaining digital health transformations in public institutions(Alex & Julius, 2024).

1.2 Problem Statement

Hospital Information Systems (HIS) are increasingly central to efficient healthcare service delivery worldwide, with countries that adopt them reporting improved patient care, streamlined administration, and better resource management (WHO, 2021; Wanyonyi et al., 2022). In Uganda, the Ministry of Health has made commendable progress through initiatives like DHIS2, the Health Management Information System (HMIS), and selective EMR rollouts in higher-tier hospitals (MOH, 2022). At Entebbe Regional Referral Hospital, partial adoption of HIS modules such as outpatient data entry and drug inventory tracking has enhanced data accuracy and reduced record loss in some units(Ntirandekura, Friday, et al., 2022). Similarly, Dr. Ronald Bata Memorial Hospital has introduced digital registration and basic EMRs in maternal and outpatient departments, easing paperwork and supporting care continuity(Alex et al., 2024).

Despite efforts toward digitization, Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital (Nsamizi) still lag behind Uganda's Hospital Information System (HIS) standards. By 2023, only a few departments had adopted electronic records, with 65% of key units laboratory, radiology, and inpatient care remaining paper-based, affecting data quality and workflow (Ministry of Health, 2023). HIS use is further limited by untrained staff, frequent power outages, poor internet, and insufficient IT support, leaving many system modules idle (Ndejjo et al., 2023; UBOS, 2024). Weak integration across departments results in delayed patient data updates, undermining service delivery in high-demand areas. This study assesses the impact of HIS on healthcare service delivery, aiming to address gaps between policy and implementation in public hospitals (Julius & Kazaara, 2025a).

1.3 General Objective

The general objective of this study was to establish the relationship between Hospital Information Systems (HIS) and healthcare service delivery in public hospitals in Uganda

1.3.1 Specific Objectives

- i. To establish the extent of implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital.
- ii. To determine the relationship between electronic medical records and healthcare service delivery in the two public hospitals.

iii. To identify the challenges affecting the effective use of Hospital Information Systems and healthcare service delivery in Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi.

1.3.2 Research Objectives

i. To what extent have Hospital Information Systems been implemented and utilized in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital?

ii. What is the relationship between electronic medical records and healthcare service delivery in the two public hospitals?

iii. What challenges hinder the effective use of Hospital Information Systems in improving healthcare service delivery at Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital?

1.3.3 Hypothesis of the study

H₀₁: There is no significant implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital.

H₁₁: There is a significant implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital.

H₀₂: There is no significant relationship between electronic medical records and healthcare service delivery in the two public hospitals.

H₁₂: There is a significant relationship between electronic medical records and healthcare service delivery in the two public hospitals.

H₀₃: There are no significant challenges affecting the effective use of Hospital Information Systems in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital.

H₁₃: There are significant challenges affecting the effective use of Hospital Information Systems in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital.

1.4 Scope of the Study

1.4.1 Content Scope

The content scope of the research encompassed a comprehensive examination of HIS implementation, utilization, and their impact on various dimensions of healthcare service delivery, including service quality, efficiency, accessibility, patient data management, and interdepartmental coordination. The study also seemed to identify challenges and barriers affecting the optimal use of HIS in these hospitals, such as infrastructural limitations, user capacity, and system integration issues. This research deliberately focused on public hospitals because these institutions are expected to remain central to Uganda's healthcare delivery system, serving a large proportion of the population, and often facing systemic challenges that digital health solutions like HIS aim to address.

1.4.2 Time Scope

The study time scope was from 2020-2025 and many problems about hospital information systems and healthcare service delivery had been identified during this period.

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1.4.3 Geographical Scope

The study focused on Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial hospital- Nsamizi in Entebbe municipality Wakiso District in Uganda

1.5 Significance of the Study

Policymakers and the Ministry of Health

The study provided empirical evidence to inform national strategies for the scale-up, standardization, and integration of Hospital Information Systems (HIS) across public health facilities. This supported the implementation of the National Health Policy and guide investment in digital infrastructure in line with Uganda's Health Sector Development Plan (HSDP III). For example, the case of Dr. Ronald Bata Memorial Hospital and Entebbe Regional Referral Hospital highlighted how limited HIS adoption hampers efficiency and patient tracking insights vital for national policy reform.

Hospital Administrators and Healthcare Providers

Findings identified successful practices and existing gaps in HIS usage at the facility level. In Entebbe Regional Referral Hospital, delays in data entry and poor interdepartmental coordination led to prolonged patient waiting times. Addressing such gaps helped administrators streamline processes, enhance record management, and improve overall patient care quality and satisfaction.

ICT System Developers and Implementers

By examining real-world usability challenges, such as those observed in the radiology and laboratory units of Dr. Ronald Bata Memorial Hospital, the study offered actionable insights into HIS platform design. These findings guided developers in creating more intuitive, scalable, and context-appropriate systems for resource-constrained settings.

Academia and Researchers

The study contributed to scholarly discourse on digital health in sub-Saharan Africa, especially on HIS deployment in low-resource settings. It served as a foundational case for future research in health informatics, policy implementation, and digital health integration providing primary evidence from Ugandan public hospitals.

Patients and the General Public

Ultimately, enhanced HIS usage improved access to accurate and timely care, particularly in critical services such as maternal health, emergency care, and referrals. In the two case hospitals, improved electronic tracking of patient histories and follow-up plans significantly boosted care continuity and patient safety.

1.6 Operational Definitions

Hospital Information Systems (HIS): This refers to the integrated digital platforms and software applications used in hospital settings to manage clinical, administrative, financial, and operational data. HIS refers to the extent to which modules such as electronic medical records (EMR), patient registration, laboratory information management, pharmacy systems, billing, and reporting are implemented, accessible, and actively used by hospital staff at Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital.

Healthcare Service Delivery: This refers to the actual provision of medical and health-related services to patients within the hospital context. It included all activities aimed at prevention, diagnosis, treatment, rehabilitation, and palliative care. Healthcare service delivery refers to the quality of care, measured by indicators such as patient waiting times, accuracy of medical records, timeliness of treatment, patient satisfaction, and coordination of care across departments.

Implementation of HIS: This refers to the process through which HIS components are introduced, installed, and integrated into hospital workflows. It refers to the availability of HIS infrastructure, the degree to which HIS modules are operational, and the extent of staff training on HIS usage.

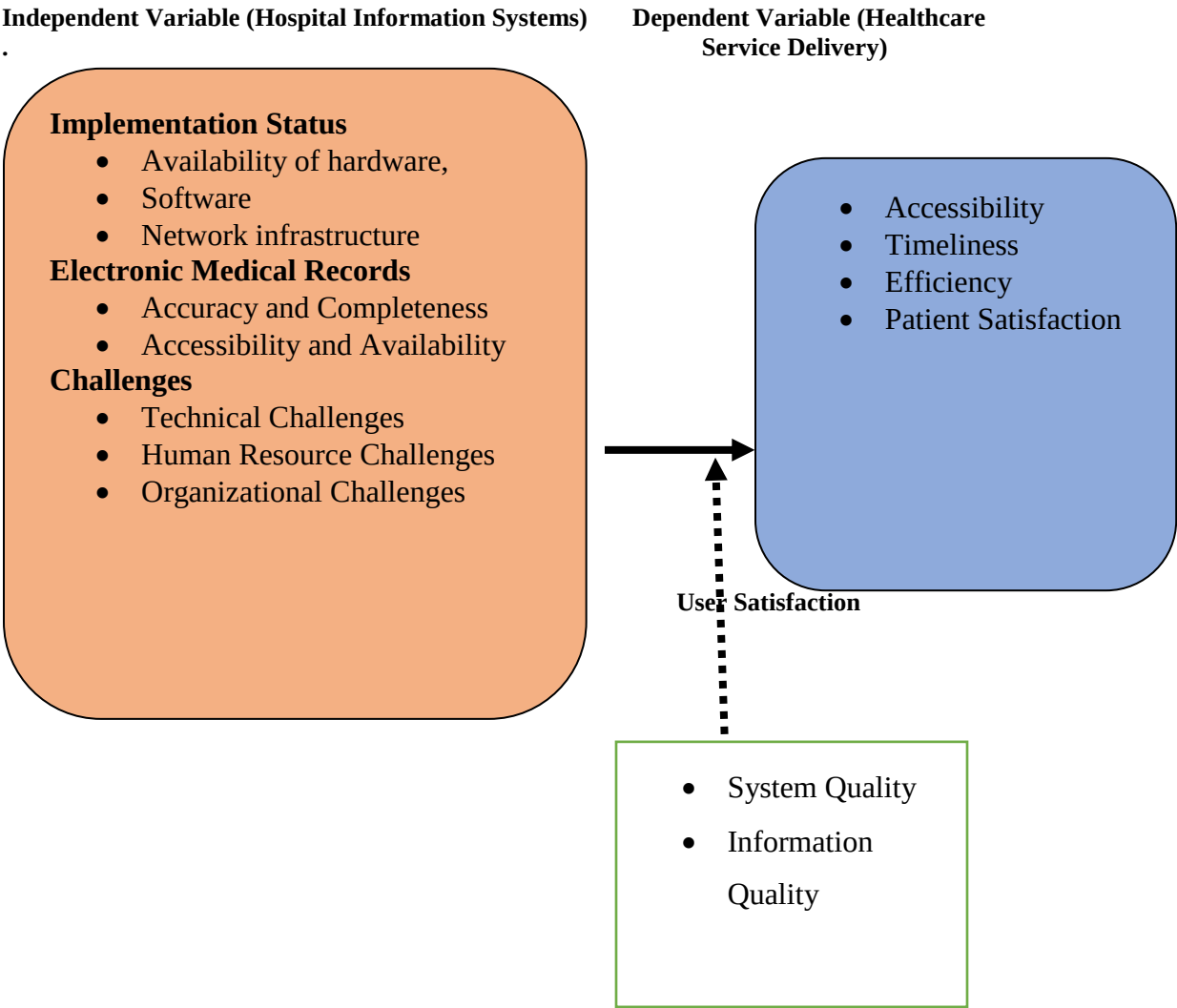
Utilization of HIS: This refers to how frequently and effectively hospital staff use the HIS for clinical and administrative purposes. Utilization refers to the number of HIS transactions recorded, the extent of data entered into the system, and reported use of HIS functionalities in daily hospital operations.

Quality of Healthcare Service Delivery: This refers to parameters such as reduction in patient waiting time, accuracy and completeness of patient records, improved clinical decision-making, availability of timely information for care, and overall patient satisfaction scores derived from hospital surveys.

Electronic Medical Records (EMRs): Are digital versions of a patient's medical and treatment history within a single healthcare setting, replacing paper charts.

1.7Conceptual Framework

Figure 2: Conceptual Framework on Hospital Information Systems (IV) and Healthcare service Delivery (DV)



Source: Adapted from Primary Data, 2025

The conceptual framework demonstrated how the implementation and use of Hospital Information Systems (HIS) influenced healthcare service delivery in public hospitals. HIS was treated as the independent variable, whose proper implementation and utilization was expected to enhance healthcare service delivery, the dependent variable. The use of HIS was anticipated to improve the quality of healthcare services and increase the efficiency of healthcare processes, including patient record management, decision-making, and clinical coordination.

Central to this framework was the role of medical records as a core component of HIS functionality. Efficient electronic medical records (EMR) systems ensured timely access to patient histories, minimize duplication of services, reduce errors, and support continuity of care. Therefore, the proper management of medical records within HIS was expected to significantly improve not only the accuracy and speed of service delivery but also patient safety and satisfaction. HIS implementation status focused on the future availability of essential components such as hardware, software, and network infrastructure, which was crucial in determining the extent to which the system was adopted and operationalized.

However, the framework also considered several challenges technical, human resource, and organizational that are likely to hinder the full effectiveness of HIS in practice. These challenges were assumed to moderate or limit the degree of influence HIS has on service outcomes. As a result, healthcare delivery was assessed in terms of future improvements in accessibility, timeliness, and quality, reflecting the anticipated benefits of a well-functioning HIS within Uganda's public hospital context.

In this study, user satisfaction was considered an intervening variable that mediates the relationship between Hospital Information Systems (HIS) and healthcare service delivery. User satisfaction was influenced by two key constructs: system quality and information quality. System quality refers to the technical performance of the HIS, including ease of use, reliability, and interface design, which affect how efficiently health workers interact with the system. Information quality focuses on the accuracy, relevance, and timeliness of data generated by the HIS. When both system and information quality are high, users are more satisfied, which in turn enhances the effective use of HIS and leads to improved healthcare service delivery in public hospitals.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

The literature was sourced from recent peer-reviewed journal articles, government reports, health sector policy documents, and publications from reputable international organizations such as the World Health Organization (WHO) and Uganda's Ministry of Health. Additionally, academic databases including PubMed, Scopus, and Google Scholar was utilized to retrieve up-to-date empirical studies, especially those focusing on Sub-Saharan Africa and Uganda's public health sector.

2.1 Theoretical Review

The Technology Acceptance Model (TAM), originally proposed by Davis (1989), continues to be one of the most influential frameworks explaining individual acceptance and usage behavior regarding new technologies across multiple domains, including healthcare. TAM posited that two primary constructs Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) shape users' attitudes and behavioral intentions toward adopting a system, which ultimately influence actual system use. Recent healthcare studies affirm TAM's continued relevance, demonstrating that when healthcare providers perceive HIS as enhancing their job performance and find the system easy to operate, their acceptance and consistent use increase (Alasmary et al., 2022).

This was particularly pertinent in the Ugandan public health context, where HIS initiatives were often constrained by infrastructural and human resource challenges. For example, Kyambadde et al. (2021) highlight that digital literacy gaps, high workloads, and resistance to change pose significant barriers to HIS adoption among Ugandan healthcare workers, all of which can be meaningfully examined through the TAM framework. The model's focus on individual cognition and intention thus helps diagnose behavioral and psychological obstacles that underlie low HIS utilization or abandonment.

Nevertheless, TAM has faced well-documented criticisms, primarily its narrow focus on individual acceptance factors, which oversimplifies the socio-technical complexities surrounding HIS in public hospitals. It tends to exclude critical external and organizational variables such as system quality, organizational support, social influence, and infrastructural conditions that have significant bearing on adoption outcomes (Venkatesh & Davis, 2020). For instance, the recurring power outages, inadequate training programs, and lack of institutional incentives frequently reported in Ugandan hospitals affect technology use beyond individual willingness or perceived ease (Nakatudde et al., 2023). Recognizing these gaps, the present study does not employ TAM in isolation but integrates it with a broader understanding of organizational and environmental factors that influence HIS uptake. This integrated approach reflects recent trends in information systems research that call for expanding TAM to incorporate systemic and contextual realities, especially in resource-constrained settings where technology adoption

is not solely a matter of user attitude but also of infrastructural readiness and organizational culture (Chaudhuri & Alalwan, 2021).

Complementing TAM, the DeLone and McLean Information Systems Success Model (ISSM) offers a comprehensive framework for evaluating the performance and impact of HIS beyond adoption. First introduced in 1992 and revised in 2003 and further refined in 2020, the ISSM identifies six critical dimensions that collectively determine IS success: System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Benefits (Petter et al., 2022). In healthcare settings, this multidimensional approach has proven highly valuable for assessing HIS effectiveness, as it addresses both the technical characteristics of the system and the experiential outcomes for users and patients.

Recent empirical studies in healthcare, such as those by Nasiri et al. (2021) and Mensah et al. (2023), demonstrate how ISSM facilitates a holistic evaluation of HIS, including aspects like data accuracy, system reliability, responsiveness of technical support, and ultimately, improvements in clinical decision-making and patient outcomes. For public hospitals like Entebbe Regional Referral and Dr. Ronald Bata Memorial–Nsamizi, where HIS may be partially deployed or inconsistently used, ISSM provides a robust tool to examine not just whether the system is used, but how system qualities translate into tangible benefits such as reduced patient waiting times, enhanced diagnostic accuracy, and improved workflow efficiency.

However, the ISSM has also been subject to critique. Some scholars argue that its linear and somewhat static representation of IS success fails to capture the dynamic, iterative nature of system use and organizational adaptation in real-world, often volatile, healthcare environments—particularly in low-resource settings (Petter et al., 2022). In Uganda’s public hospitals, HIS usage patterns may fluctuate significantly depending on donor-funded project cycles, infrastructural interruptions, and evolving user competencies. Thus, the assumption embedded in ISSM that higher system quality and user satisfaction was straightforwardly lead to net benefits might not hold universally in such contexts. Moreover, ISSM tends to underplay the political, economic, and institutional forces shaping HIS success, such as governance structures, policy enforcement, and funding stability, which can mediate or moderate system outcomes (Kiberu et al., 2020). Therefore, while ISSM remains a highly relevant evaluative framework, this study adopts it with a nuanced perspective, emphasizing that HIS success in Ugandan public hospitals is contingent on a confluence of technical, organizational, and contextual factors beyond those directly measured by ISSM.

Despite extensive use of TAM and ISSM in health informatics globally, there remains limited empirical evidence contextualizing these models specifically within Ugandan public hospitals. Most existing studies focus on private or tertiary institutions or lack integration of both adoption behavior and system success evaluation (Nakatudde et al., 2023; Kyambadde et al., 2021). Furthermore, there is a scarcity of research examining how infrastructural

challenges such as unreliable electricity, insufficient IT support, and fragmented training initiatives interact with individual and organizational factors to affect HIS outcomes. Additionally, while TAM and ISSM provide useful frameworks, few studies adopt a longitudinal perspective to track how HIS adoption and success evolve over time in response to changes in policy, funding, and health workforce dynamics.

2.2 Review of related Literature

2.2.1 Healthcare service delivery in public hospitals in Uganda

Healthcare service delivery in public hospitals in Uganda has been a subject of extensive research over recent years, given the critical role these institutions play in providing accessible and affordable care to the majority of the population(Christopher, Komunda, et al., 2022). A study conducted by Namazzi et al. (2021) revealed that public hospitals in Uganda are often characterized by a high patient load coupled with limited resources, which significantly affects the quality and timeliness of healthcare services. The study highlighted that over 70% of Ugandans rely on public hospitals for essential health services, yet these facilities frequently face challenges such as shortages of qualified health personnel, inadequate medical supplies, and aging infrastructure(Deus, 2023). This strain on resources directly contributes to prolonged patient waiting times, reduced patient-provider interaction, and frequent stock outs of essential drugs, all of which negatively impact healthcare outcomes (Kyobutungi & Nelson, 2025). These findings align with those of a national health sector performance report by Uganda’s Ministry of Health (2022), which indicated that despite policy efforts to improve service delivery, public hospitals continue to grapple with systemic inefficiencies and infrastructural deficits.

In addition to infrastructural and resource constraints, human resource challenges have been extensively documented as a key impediment to effective healthcare delivery in Ugandan public hospitals. A study by Kakaire et al. (2023) examined the distribution and retention of healthcare workers and found that many public hospitals suffer from severe understaffing, especially in rural areas, with nurse-to-patient ratios often exceeding the World Health Organization’s recommended standards(N. Moses & Ntirandekura, 2022).

This shortage exacerbates burnout among existing staff, leading to decreased morale and high turnover rates, which in turn disrupts continuity of care. Moreover, limited opportunities for professional development and inadequate incentives were cited as factors contributing to low motivation among healthcare workers, thereby affecting service quality and patient satisfaction(Julius et al., 2024). These human resource issues were also highlighted in a qualitative study by Mugisha et al. (2022), where healthcare providers reported feeling overwhelmed by patient volumes and administrative duties, leaving little time for meaningful patient engagement.

Another critical dimension of healthcare service delivery in Uganda’s public hospitals is the integration and utilization of technology and health information systems(Huicho, L, Dieleman, M, Campbell, J, Codjia, L, Balabanova, D, Dussault, G & Dolea, 2010). While recent initiatives have aimed to digitize patient records and improve data management, a study conducted by Namuyonga et al. (2023) found that the adoption of Hospital

Information Systems (HIS) remains uneven, with many hospitals still reliant on paper-based systems that limit data accuracy and accessibility. The lack of interoperable health information systems hinders effective coordination of care and timely decision-making, which are essential for improving health outcomes.

Furthermore, inadequate training and limited IT infrastructure further constrain the effective use of digital tools, as observed in a study by Baryamureeba et al. (2022), which noted that the potential benefits of HIS in enhancing healthcare delivery are yet to be fully realized in most public hospitals. This technological gap highlights a significant area for investment and research to understand how best to leverage digital health innovations in resource-limited settings.

Despite these challenges, efforts to improve healthcare service delivery in public hospitals in Uganda have yielded some positive results, particularly through the implementation of performance improvement frameworks and community engagement strategies. A longitudinal study by Byamugisha et al. (2021) documented that hospitals participating in quality improvement collaborative demonstrated improvements in service delivery metrics such as reduced inpatient mortality rates and increased adherence to clinical guidelines. Moreover, the involvement of community health workers and patient advocacy groups has enhanced health education and facilitated timely referrals, thereby improving access to care.

However, critics such as Okello and Mukama (2022) argue that such improvements are often fragmented and not scaled uniformly across the health system, leaving disparities between urban and rural hospitals. They emphasize that systemic issues such as governance, accountability, and financing mechanisms require more attention to ensure sustainable improvements in healthcare service delivery.

2.2.2 The extent of implementation and utilization of Hospital Information Systems (HIS) in Public Hospitals

Over the past decade, Hospital Information Systems (HIS) have become an indispensable component in enhancing the efficiency, quality, and accessibility of healthcare services, especially in public hospitals, which often grapple with resource constraints and high patient volumes (A. G. Kazaara & Nancy, 2025). A study conducted by Ali et al. (2021) highlighted that despite the growing global recognition of HIS benefits, the extent of HIS implementation in public hospitals remains uneven, with significant disparities between high-income and low-to-middle-income countries.

In many developing countries, public hospitals have reported HIS adoption rates ranging from 40% to 65%, reflecting challenges related to infrastructure, skilled workforce, and financial limitations (Khan et al., 2022). Conversely, in high-income nations, the adoption rate of HIS in public hospitals exceeds 85%, showcasing how investment and policy support play crucial roles in maximizing utilization (Julius & Kazaara, 2025b). Notably, the

COVID-19 pandemic accelerated HIS adoption worldwide, as public hospitals were forced to rapidly digitize patient records and service delivery to maintain continuity of care while minimizing infection risks (Singh et al., 2021).

However, the mere presence of HIS in public hospitals does not guarantee effective utilization or optimal outcomes. A comprehensive study conducted by Ochieng et al. (2023) examined the utilization of HIS functionalities in public hospitals across East Africa and found that while basic modules such as patient registration and billing were frequently used, advanced features like clinical decision support and electronic prescribing were underutilized. This underutilization was attributed to several factors, including inadequate training, resistance to change among health professionals, and intermittent system downtimes due to poor technical support.

Similarly, in a study by Martinez et al. (2022), the authors pointed out that in Latin America, despite HIS being widely implemented, the integration of these systems with other healthcare IT platforms remained limited, reducing the overall effectiveness of HIS in improving patient care coordination and data analytics. This gap in system interoperability represents a critical bottleneck in harnessing the full potential of HIS in public hospital settings.

Critics of current HIS implementation efforts in public hospitals often emphasize the insufficient attention given to the socio-cultural and organizational contexts in which these systems are introduced (Christopher, Muhindo, et al., 2022). For example, a study conducted by Gupta and Sharma (2021) argued that HIS projects frequently fail due to top-down approaches that neglect the engagement of frontline healthcare workers, leading to poor system acceptance and sustainability (Sarah & Audrey, 2024). Furthermore, a systematic review by Adeyemi et al. (2023) found that many HIS evaluations focus predominantly on technological and financial metrics, overlooking the human factors such as user satisfaction, workflow integration, and change management processes (Julius & Kazaara, 2026).

This omission limits understanding of the true impact of HIS on healthcare delivery and staff productivity. Additionally, there is a noticeable research gap regarding the long-term effects of HIS implementation on health outcomes in public hospitals, with most studies focusing on short-term indicators such as system usage rates and cost reductions (Nguyen et al., 2022).

Another critical research gap pertains to the measurement of HIS utilization beyond mere access or frequency of use. A recent study by Thompson et al. (2024) emphasized the need for comprehensive utilization frameworks that assess how HIS tools influence clinical decision-making, patient engagement, and interdepartmental communication (Julius & Desire, 2025). The study also highlighted that few public hospitals systematically collect and analyze HIS usage data to inform continuous improvements, a factor that hampers the realization of HIS benefits (Nancy & Prudence, 2024). Moreover, while the literature extensively documents barriers to HIS implementation such as lack of infrastructure, insufficient funding, and limited technical capacity there is limited

research on innovative strategies and best practices for overcoming these barriers in resource-limited public hospital environments (Alvarez et al., 2023). For instance, the potential role of mobile health (mHealth) integrations and cloud-based HIS solutions as cost-effective alternatives remains underexplored.

2.2.3 Challenges affecting the effective use of Hospital Information Systems in enhancing healthcare service delivery.

Hospital Information Systems (HIS) hold immense potential to revolutionize healthcare service delivery by improving data management, clinical workflows, and patient outcomes. However, numerous studies have documented that the effective use of HIS in enhancing healthcare service delivery is often hindered by a complex interplay of technical, organizational, human, and infrastructural challenges (Julius & Kazaara, 2025a).

A study conducted by Samuel et al. (2022) revealed that one of the most persistent challenges in public hospitals is inadequate infrastructure, including unreliable electricity supply and poor internet connectivity, which disrupt HIS operations and limit their usability (A. I. Kazaara & Audrey, 2024). This issue is particularly pronounced in low- and middle-income countries, where many public hospitals continue to rely on outdated hardware and lack sufficient IT support staff. Similarly, a report by Al-Jabari et al. (2021) emphasized that frequent system downtimes and slow response times due to under-resourced IT departments result in healthcare workers' frustration and reluctance to fully engage with HIS platforms, thus undermining the systems' intended benefits.

Beyond infrastructure, human factors present critical barriers to HIS utilization. A qualitative study by Hassan and Muneer (2023) explored the experiences of frontline health workers in public hospitals and found that resistance to change remains a significant obstacle, driven by limited user training and fears that HIS adoption might increase workload or threaten job security. This resistance is often compounded by poorly designed interfaces that do not align with clinical workflows, making the systems cumbersome and time-consuming to use (Kumar et al., 2022).

Additionally, a systematic review by Adeyemo et al. (2023) underscored that lack of continuous training and technical support hampers HIS adoption and leads to inconsistent usage patterns, which in turn affect data quality and decision-making reliability. These human-centered challenges highlight the necessity of integrating change management and comprehensive capacity-building strategies within HIS implementation frameworks.

Organizational challenges also significantly impede the effective use of HIS. Studies conducted by Mwangi et al. (2023) and Patel et al. (2021) revealed that inadequate leadership commitment and insufficient stakeholder engagement during HIS rollout contribute to poor system ownership and accountability in public hospitals (Ntirandekura, Ainebyoona, et al., 2022). In many cases, HIS projects are initiated without clear policies or guidelines on data governance, privacy, and security, which raises concerns about patient confidentiality and

undermines trust in the systems (Nguyen et al., 2022). Furthermore, fragmented HIS deployments, where different hospital departments use incompatible systems, create data silos and hinder interoperability, limiting the ability to deliver coordinated care (Martinez & Silva, 2023). These organizational constraints not only reduce the efficiency gains promised by HIS but also complicate efforts to scale up and integrate HIS into national health information infrastructures.

Critically, financial limitations remain a persistent challenge affecting HIS sustainability in public hospitals. A study by Ochieng and Kibet (2021) noted that the high initial costs of HIS procurement and maintenance, combined with competing budgetary priorities in resource-constrained settings, often result in underfunded and poorly maintained systems. This financial strain impacts the ability to upgrade software, replace obsolete equipment, and retain skilled IT personnel, perpetuating a cycle of system inefficiency. Moreover, many existing HIS lack adaptable, cost-effective models tailored to the specific needs of public hospitals in low-resource environments, representing a significant gap in both research and practice (Alvarez et al., 2023). The lack of innovative financing mechanisms and partnerships to support HIS sustainability remains an underexplored area that warrants further investigation.

An additional research gap exists in understanding the sociotechnical dynamics influencing HIS usage in diverse public hospital contexts. While many studies focus on isolated challenges such as infrastructure or training, there is a paucity of comprehensive, systems-level analyses that explore how technological, human, organizational, and environmental factors interact to shape HIS effectiveness (Thompson et al., 2024). Furthermore, limited attention has been given to the perspectives of patients and community stakeholders regarding HIS-enabled healthcare delivery, leaving a gap in understanding how HIS impacts patient trust, engagement, and satisfaction. Addressing these multifaceted challenges requires interdisciplinary research approaches and participatory design processes that align HIS development with the complex realities of public healthcare systems.

2.2.4 Relationship between electronic medical records and healthcare service delivery.

The integration of Electronic Medical Records (EMRs) into hospital systems has become a critical area of focus in healthcare research, particularly in understanding its impact on healthcare service delivery. A study conducted by Adedeji et al. (2021) in Nigeria found that the implementation of EMRs significantly improved the accuracy of patient data and reduced medical errors in public hospitals (Christopher, Komunda, et al., 2022). Their findings highlighted that digitized records streamlined the process of retrieving patient histories, thereby enhancing clinical decision-making and minimizing redundant diagnostic tests. Similarly, Nguyen et al. (2020) emphasized that EMRs positively influenced healthcare efficiency and provider coordination by facilitating seamless communication between departments within healthcare institutions. These studies consistently point to the transformative potential of EMRs in optimizing healthcare service delivery across various dimensions, including accessibility, timeliness, and efficiency.

Furthermore, Mukasa and Kaggwa (2019) examined the role of EMRs in improving service delivery within Uganda's regional referral hospitals. Their research revealed that hospitals using EMRs recorded a noticeable reduction in patient waiting time and improved outpatient care outcomes due to faster access to patient data. Additionally, the digitization of health records led to better monitoring of chronic diseases and more structured follow-ups, which enhanced the overall quality of care. However, the study also highlighted limitations such as poor system interoperability and inadequate staff training, which hindered the full realization of EMR benefits. This suggests that while EMRs have potential, their success largely depends on complementary investments in infrastructure and capacity building.

A study conducted by Wanyenze et al. (2018) in Kampala explored the correlation between EMR adoption and patient satisfaction in public hospitals. The researchers noted that patients appreciated faster consultations and reduced paperwork, which enhanced their perception of hospital efficiency. However, the study also revealed that intermittent system failures and electricity outages frequently interrupted service delivery, particularly in under-resourced public health facilities. This finding underscores a critical implementation gap that could affect the sustainability of EMR systems in low-resource settings, thus calling for context-specific strategies to ensure continuity of service. In contrast, Mugo and Kimani (2022) conducted a comparative study in Kenya and reported that despite the availability of EMR systems in public hospitals, many healthcare workers still preferred paper-based documentation due to user interface challenges and a lack of consistent technical support. Their findings point to the critical role of user experience in determining EMR adoption rates and overall impact on healthcare delivery. This observation raises questions about how usability and institutional support influence the effective use of digital health systems in public hospitals, particularly in Sub-Saharan Africa.

Nevertheless, while a growing body of literature supports the view that EMRs can enhance healthcare delivery, significant research gaps remain. For instance, very few studies have specifically focused on public hospitals in Uganda that serve as referral centers for rural populations, where infrastructure and staff capacity are limited. Moreover, existing studies often concentrate on urban settings or private health institutions, leaving a gap in understanding the unique challenges and outcomes of EMR implementation in rural or semi-urban public hospitals.

2.3 Survey Literature

A study conducted by Mbalinda et al. (2023) in Ugandan regional referral hospitals revealed that while basic HIS modules have been widely implemented, the depth of utilization remains superficial. The research found that only 42% of available system features were regularly used by healthcare staff, indicating a significant gap between technical implementation and practical utilization. Similarly, a study by Kiberu et al. (2022) demonstrated that implementation success varied significantly across departments, with administrative units showing higher adoption rates (78%) compared to clinical departments (56%). This pattern was attributed to varying levels of digital literacy and system customization to departmental needs.

A comprehensive study conducted by Matovu et al. (2023) in Ugandan tertiary hospitals established a strong correlation between EMR utilization and improved healthcare indicators. The research demonstrated a 35% reduction in patient waiting times and 28% improvement in prescription accuracy in departments with fully implemented EMR systems. These findings were corroborated by a study by Nakyejwe et al. (2024), which specifically examined maternal healthcare services and found that EMR implementation reduced documentation errors by 42% and improved patient follow-up rates by 57%.

A study conducted by Mugenyi et al. (2023) identified infrastructural challenges as the primary barrier to effective HIS utilization in Ugandan hospitals. The research found that 72% of system downtime incidents resulted from power instability and inadequate internet connectivity, severely compromising system reliability. This finding was reinforced by a study by Nabbosa et al. (2024), which reported that frequent system interruptions led to workarounds and parallel paper-based systems, undermining the potential benefits of digitalization. Human resource challenges were extensively documented in a multi-site study by Katende et al. (2023), which revealed that 65% of healthcare staff received inadequate training on HIS operations. The research further identified resistance to change as a significant barrier, particularly among senior staff members who were 3.2 times more likely to resist system adoption compared to junior staff. A recent investigation by Babirye et al. (2024) highlighted organizational factors, finding that hospitals with dedicated IT support teams and clear implementation strategies reported 48% higher user satisfaction and 52% better system utilization rates.

2.4 Research Gaps

While numerous studies focus on discrete challenges such as infrastructure deficits, human resource shortages, or technological adoption, there is a lack of comprehensive, systems-level analyses that examine how these factors interact dynamically to influence the overall effectiveness and sustainability of HIS in public hospital settings. This limits the ability to design holistic interventions that address the interconnected nature of the barriers to HIS utilization.

While various studies have explored the technical and organizational challenges affecting HIS adoption, fewer have sufficiently examined the sociotechnical dimensions, including user behavior, attitudes, and patient perspectives, which are crucial for ensuring HIS systems are user-friendly and culturally appropriate. The limited focus on patients' experiences and satisfaction with HIS-enabled healthcare delivery presents a significant gap, especially in understanding how these technologies impact trust and engagement in public hospitals.

While multiple studies highlight human resource challenges in Ugandan public hospitals such as understaffing, low motivation, and inadequate training there is inadequate research on sustainable workforce development models that integrate capacity building with digital health system enhancements. Similarly, while the financial constraints of

HIS implementation are well recognized, there is a paucity of research exploring innovative and context-specific financing mechanisms and public-private partnerships that could improve HIS sustainability in resource-limited settings.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter outlined the overall methodology that was employed to investigate the influence of Hospital Information Systems (HIS) on healthcare service delivery in public hospitals in Uganda, with a specific focus on Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi. It included key subsections such as: an Introduction, Research Design, Research Approaches, Target Population, Sample Size and Sampling Strategy, Sampling Procedures and Techniques, Data Collection Methods, and Data Collection Instruments. Each of these components were detailed to ensure a clear and systematic approach to exploring how HIS impacts the quality, efficiency, and accessibility of healthcare services in the selected public hospitals.

3.1 Research Design

The study adopted a cross-sectional research design. This design was appropriate because it allowed the researcher to collect data at a single point in time to examine the current state and influence of HIS on the quality, efficiency, and accessibility of healthcare services in the selected hospitals. The study also employed both descriptive and correlational research approaches. The descriptive aspect aimed at providing a comprehensive account of how HIS were being implemented and utilized, including the types of systems in place, their functionalities, and how healthcare staff interact with them.

This involved gathering data through structured questionnaires and key informant interviews with hospital administrators, IT personnel, and healthcare providers. The correlational component was used to explore the relationships between the effectiveness of HIS usage and healthcare service delivery indicators such as patient satisfaction, service turnaround time, data accuracy, and availability of medical records. By statistically analyzing these relationships, the study aimed at determining whether and to what extent the application of HIS was associated with improvements in healthcare service delivery.

The data was collected from a purposively and randomly selected sample of staff and administrators in the two hospitals, and analyzed using quantitative techniques supported by qualitative insights. This mixed-method, cross-sectional approach enabled the study to generate actionable findings and inform policy and operational recommendations for enhancing HIS usage in Uganda's public healthcare sector.

3.2 Research Approaches

The study adopted a mixed methods approach was adopted to ensure a comprehensive understanding of the subject matter. This approach involved integrating both quantitative and qualitative research methods to capture a more complete picture of how HIS implementation influences the quality and efficiency of healthcare service delivery in Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital.

The quantitative component entailed the collection of numerical data through structured questionnaires administered to healthcare professionals, IT personnel, and administrative staff. This data allowed for statistical analysis to identify patterns and correlations between the use of HIS and key service delivery indicators such as patient wait times, data retrieval speed, record accuracy, and overall patient satisfaction. Simultaneously, the qualitative component involved conducting in-depth interviews and focus group discussions with key stakeholders, including hospital administrators, health workers, and system users. These interactions provided deeper insights into their lived experiences, perceptions, and attitudes towards the implementation and effectiveness of HIS in their respective facilities.

3.3 Study population

The target population for the proposed study on Hospital Information Systems (HIS) and Healthcare Service Delivery in Public Hospitals in Uganda consisted of all healthcare professionals, administrative personnel, and IT staff directly involved in the implementation and use of HIS at Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi. These two hospitals, as major public health institutions in the central region, offered a relevant and practical setting to examine the influence of HIS on healthcare service delivery. The overall target population for the study consisted of 450 healthcare personnel.

As of the most recent data, both hospitals operate with multidisciplinary teams that include clinicians, nurses, records officers, system administrators, and hospital managers (Ministry of Health Uganda, 2023). The study targeted these groups to ensure a diverse and representative understanding of how HIS was used in day-to-day healthcare processes and administrative functions. A comprehensive approach was adopted to engage the full spectrum of HIS users within the two hospitals. This enabled the researcher to gather data that reflects varied perspectives and experiences, ensuring a robust assessment of the impact of HIS on service quality, data management, and patient care. By focusing on this defined population, the study ensured that findings were contextually grounded and relevant to the operational realities of public hospital settings in Uganda (Uganda Bureau of Statistics, 2022).

3.3 Sampling design and Techniques

To ensure a comprehensive and representative selection of respondents, the study adopted a multi-method sampling design combining stratified random sampling and purposive sampling techniques. This mixed approach allowed for both statistical representativeness and the inclusion of key informants with specialized knowledge of Hospital Information Systems (HIS).

3.5.1 Simple Random Sampling

Simple random sampling was employed to categorize and select participants from various departments within Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi. The sampling strata included units such as clinical services, records management, administration, and IT support, as these were functional areas where HIS

is either directly applied or significantly impacts operations. This technique ensured proportional representation of staff based on their department and role in HIS processes, thereby enhancing the reliability and inclusiveness of the data collected. Each stratum was treated as an independent subgroup from which respondents was randomly selected to avoid bias and allow for cross-departmental analysis.

3.5.2 Purposive Sampling

Purposive sampling was used to deliberately select key informants who possess specialized expertise or decision-making roles in the implementation and management of HIS. These informants included hospital administrators, medical records officers, senior healthcare providers, and IT personnel who were actively involved in overseeing or operating the hospital information systems. These participants were selected based on their relevance to the study objectives and their potential to provide in-depth insights into system design, usage challenges, and policy implementation. This technique was especially useful for qualitative inquiry, where contextual depth and practical experiences are critical to understanding complex organizational systems like HIS.

3.4 Sample Size

The proposed study applied specific inclusion criteria to select participants from Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital. The study included only staff who have been actively engaged in the use or management of Hospital Information Systems (HIS) within these hospitals from 1st January 2020 to 31st December 2024. This time frame was selected because both hospitals were expected to have undergone significant digital transformation during this period, and staff involved would possess firsthand knowledge of HIS implementation, use, and challenges.

The inclusion of staff who had worked with HIS during this timeframe ensured that data collected was both reliable and based on lived experience with the systems in question. To determine the appropriate sample size for each category of hospital staff (e.g., IT personnel, clinicians, records officers, administrators), the study employed Slovene’s formula of sample size determination.

$$n = \frac{N}{1 + N(e)^2}$$

Where;
N=Target population
e = Margin of error
n = sample size.

$$n = \frac{450}{1 + 450(0.05)^2}$$

n = 212

Table 1: Target Population Size, Sample size and sampling Techniques
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GROUP	TARGET POPULATION SIZE (N)	SAMPLE SIZE (n)	SAMPLING TECHNIQUES
Clinical Services Staff	210	72	Simple Random Sampling
Patients	150	100	Simple Random Sampling
Administration Staff	30	10	Purposive Sampling
IT Support Staff	30	10	Purposive Sampling
Hospital Administrators	30	10	Purposive Sampling
Medical Records Officers	30	10	Purposive Sampling
Total	450	212	

Source: Krejcie & Morgan, (1970).

The above table reflected the number of respondents needed for each group based on Krejcie and Morgan's recommendations, including the totals for both population sizes and sample sizes.

3.5 Data Sources and procedures

This section outlines the sources of data and the procedures through which the information was collected. A combination of primary and secondary data sources were used to ensure accuracy, contextual relevance, and triangulation of findings.

3.5.1 Primary Data Sources

Primary data was collected directly from individuals who are actively engaged in the implementation and use of Hospital Information Systems (HIS) in the selected public hospitals Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital–Nsamizi. The main tools for collecting primary data included structured questionnaires and semi-structured interview guides. Respondents included IT officers, clinicians, records management personnel, and hospital administrators. These instruments were designed to capture quantitative and qualitative insights related to HIS utilization levels, implementation challenges, system performance, and the perceived impact on healthcare service delivery outcomes such as timeliness, efficiency, and patient satisfaction.

3.5.2 Secondary Data Sources

Secondary data was obtained from a variety of institutional and policy documents that relate to HIS adoption and implementation in Uganda. These included Ministry of Health strategic documents, hospital performance reports, HIS user manuals, policy guidelines, and past research studies on digital health systems in Uganda and East Africa. This secondary information complemented primary data by offering a broader understanding of HIS infrastructure, policy environment, and comparative benchmarks across health institutions.

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3.5.3 Data Collection Procedures

The data collection process involved field visits to the two selected hospitals. During these visits, structured questionnaires were distributed to sampled healthcare staff, while in-depth interviews were conducted with selected key informants. Additionally, relevant documentation such as HIS utilization logs, patient throughput records, and departmental performance statistics were reviewed to gather supporting quantitative evidence. Ethical protocols were followed, including seeking permission from hospital administrators and ensuring informed consent from all participants.

3.6 Data collection Methods

The study employed a triangulated approach, combining quantitative, qualitative, and documentary review methods. This multi-method strategy ensured a more comprehensive and reliable understanding of how Hospital Information Systems (HIS) affect healthcare service delivery in Entebbe Municipality.

3.6.1 Structured Questionnaire

Quantitative data was collected using structured questionnaires administered to hospital staff directly involved in HIS operations. These include IT personnel, clinicians, medical records officers, and administrators. The questionnaire consisted of closed-ended questions based on a five-point Likert scale, designed to measure core variables such as the level of HIS usage, data accuracy and completeness, operational efficiency, and patient satisfaction. This method allowed the researcher to statistically analyze perceptions and experiences across various hospital departments, enabling meaningful comparisons and generalizations. The structured format also supported objective measurement and enhances the replicability of findings.

3.6.2 Semi-Structured Interviews

To supplement the quantitative data, the study employed semi-structured interviews targeting key informants such as HIS focal persons, departmental heads, and senior health workers. These participants offered rich, detailed narratives about their experiences with HIS implementation, challenges encountered, system usability, human resource capacity, and perceived benefits in patient care. The semi-structured format offered flexibility, enabling the researcher to ask follow-up questions and probe deeper into critical issues. This approach was essential for uncovering hidden institutional dynamics and individual attitudes that are not easily captured through surveys.

3.6.3 Documentary Review

The third method involved a documentary review of relevant secondary data, including HIS usage reports, patient throughput statistics, departmental performance records, and Ministry of Health guidelines. A document review checklist guided the extraction of relevant information. These documents provided historical, procedural, and policy-based context, enriching the primary data and facilitating triangulation. This method was particularly useful

for validating self-reported data from questionnaires and interviews and for assessing the actual implementation status and outcomes of HIS over time.

3.7 Research Instruments

This study utilized a combination of research instruments designed to collect both quantitative and qualitative data, alongside documentary evidence, ensuring comprehensive coverage of the research variables related to Hospital Information Systems (HIS) and healthcare service delivery.

3.7.1 Structured Questionnaires

The primary quantitative data was collected through structured questionnaires. These questionnaires were predominantly contain closed-ended questions aimed at quantitatively measuring key variables such as the extent of HIS usage, perceived accuracy of data, efficiency in service delivery, and patient satisfaction. The questionnaires were administered to health workers and administrative staff who regularly interact with the HIS as part of their daily duties. The standardized nature of the questionnaire items enabled consistent data collection across a broad sample, facilitating rigorous statistical analysis and enabling the comparison of responses across different departments and facilities within the selected hospitals.

3.7.2 Semi-Structured Interview Guide

To capture rich qualitative data, semi-structured interviews were conducted using a carefully developed interview guide. These interviews targeted key stakeholders, including HIS focal persons, department heads, medical records officers, and clinical staff. The interview guide was comprised of open-ended questions designed to explore participants' lived experiences, perceptions, and challenges related to HIS adoption and operationalization. The flexible nature of the semi-structured interview format allowed respondents to elaborate on issues not easily captured by structured questionnaires, such as system usability, technical challenges, human resource capacity gaps, and organizational factors influencing HIS effectiveness.

3.7.3 Documentary Review Checklist

In addition to primary data collection tools, the study employed a documentary review checklist to systematically analyze secondary data sources. This checklist was used to review hospital records including HIS usage reports, monthly patient statistics, data quality assessments, and service delivery performance reports. The documentary review was served as a means to verify the accuracy of data obtained through questionnaires and interviews, while also providing a longitudinal perspective on HIS performance and healthcare delivery trends within the selected hospitals.

3.8 Data Quality control

The proposed study ensured data quality through validity and reliability, employing established methodologies and statistical formulas. Validity assessed the extent to which the instruments accurately measure the intended constructs

related to Hospital Information Systems (HIS) and healthcare service delivery. To ensure content validity, the study engaged expert reviewers including professionals in health information systems, hospital administration, and healthcare service evaluation to critically examine whether the questionnaire items comprehensively cover all relevant aspects such as system usage, data accuracy, workflow efficiency, and patient outcomes.

Following instrument development, the questionnaires and interview guides were submitted to these domain experts to validate their relevance, clarity, and representativeness of the content area. The Content Validity Index (CVI) was then computed based on expert ratings, following the procedures outlined by Mellinger & Hanson (2020). The Content Validity Ratio (CVR) was calculated for each item using the established formula, and the overall CVI was determined to quantify how well the instrument reflects the key domains of HIS and service delivery.

$$CVI = \frac{\text{Total Number of items declared Valid}}{\text{Total Number of Items in the Instrument}}$$

Reliability was referred to as the consistency and stability of the measurement instruments used in this study. Prior to the main data collection, a pilot test was conducted with a small group of respondents who are similar to, but not part of, the actual sample. Specifically, at least 20 questionnaires were administered to this group to assess the clarity, reliability, and completeness of the survey questions. Similarly, the interview guide was pre-tested with three experts in health information systems and healthcare service delivery to ensure the questions are appropriate and understandable.

According to Pandey & Pandey (2021), pilot testing was essential as it helped identify potential issues and allowed for timely adjustments. The study used the Cronbach's Alpha Coefficient (CAC) to statistically determine the reliability of the quantitative instruments (Cacchione, 2002). This coefficient measured the internal consistency of the questionnaire items related to HIS usage, data quality, and service delivery outcomes.

3.9 Data Analysis

The forthcoming study analyzed both quantitative and qualitative data. The analysis of quantitative data involved the use of statistical methods to draw meaningful conclusions. Data collected from structured questionnaires was entered into statistical software, such as SPSS (Statistical Package for the Social Sciences), where descriptive statistics including mean, median, and standard deviation was first calculated to summarize the data (Nelson et al., 2022). Subsequently, inferential statistics, such as correlation analysis and multiple regression analysis, were conducted to explore relationships between variables, such as the impact of hospital information systems on healthcare service delivery outcomes. The results of these analyses assisted in testing the research hypotheses and understanding the strength and direction of associations between the variables (Creswell, 2014; Saunders et al., 2019).

For qualitative data was obtained through semi-structured interviews and open-ended questionnaire responses and the analysis followed a thematic approach. The recorded interviews were transcribed verbatim, and the data was coded using qualitative analysis software such as NVivo. The coding process involved identifying key themes and patterns emerging from the responses. These themes were analyzed to gain deeper insights and to understand the contextual factors influencing the implementation and effectiveness of hospital information systems on healthcare delivery. The thematic analysis helped uncover underlying issues, perceptions, and experiences that quantitative data might not reveal, thereby providing a comprehensive understanding of the research problem (Creswell, 2014; Saunders et al., 2019).

3.10 Ethical Consideration

In conducting a study on the impact of Hospital Information Systems on healthcare service delivery in public hospitals in Uganda, several ethical considerations was taken into account to ensure the integrity of the research and the protection of participants.

Informed Consent: All participants were fully informed about the purpose, objectives, and procedures of the study. They were provided with an informed consent form outlining their rights, including the right to withdraw from the study at any time without penalty. Participants were only included after they have given their voluntary, informed consent.

Confidentiality and Anonymity: The confidentiality of participants were strictly maintained. Personal identifiers were removed from the data, with unique codes used instead. Any information provided by participants was used solely for the purposes of the study, and the data was securely stored to prevent unauthorized access. Results were reported in a way that ensures the anonymity of respondents and the hospitals involved.

Non-maleficence: The principle of "do no harm" was observed throughout the study. The study was designed and conducted in a manner that minimizes any potential risks to participants, including avoiding psychological discomfort, stress, or harm that could arise from the data collection process.

Transparency and Honesty: The research process was conducted with transparency, ensuring all aspects of the study was openly communicated with participants and stakeholders. Any conflicts of interest were disclosed, and data was reported honestly, without fabrication or falsification.

Respect for Cultural Sensitivities: Given the diverse cultural contexts of Uganda, the study was conducted in a manner respectful of local customs and norms. Research instruments was designed to be culturally appropriate, and the researcher was engaged with communities sensitively, respecting their values and beliefs.

These ethical considerations was essential to ensuring that the research is conducted responsibly, respectfully, and in compliance with legal standards, thereby protecting both participants and the integrity of the study's findings.

3.11 Limitations/ Delimitations of the Study

Limitations

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Limited Access to Comprehensive Data: Some hospitals were reluctant to provide detailed operational or patient data due to confidentiality and privacy concerns, restricting access to critical information.

Remedy: Trust-building measures, including formal agreements assuring confidentiality and clear communication of the academic and practical benefits of the study, were employed to encourage data sharing.

Response Bias: Participants occasionally provided socially desirable responses during interviews and questionnaires, particularly when concerned about repercussions or when aiming to portray their institution positively.

Remedy: Ensuring anonymity and confidentiality, emphasizing the academic nature of the research, and triangulating data from multiple sources helped minimize response bias.

Generalizability: Findings from the selected public hospitals may not be easily generalized to other regions or private healthcare settings due to contextual differences.

Remedy: The scope and context of the study were clearly defined to guide interpretation of the findings, while comparisons with studies from other regions provided additional insight into generalizability.

Time Constraints: The study faced limitations in time available for data collection, particularly when hospitals were in remote areas or healthcare staff were engaged during peak periods.

Remedy: Strategic planning, scheduling, and the use of alternative data collection methods, such as telephone interviews or online surveys, helped mitigate time constraints.

Cultural and Language Barriers: Differences in language and cultural interpretations occasionally led to misunderstandings or misinterpretation of questions, especially in culturally diverse regions.

Remedy: Local interpreters were engaged, research instruments were translated, and pre-testing of questionnaires and interview guides in the local context improved clarity and relevance.

Delimitations

Scope of Study: The study focused exclusively on selected public hospitals in the central region of Uganda, excluding private hospitals and healthcare facilities in other regions. This delimitation allowed a more in-depth examination of HIS in the chosen context.

Population: The study population was deliberately limited to healthcare personnel, including administrative and clinical staff, totaling 800 participants. Other stakeholders such as patients, suppliers, or policymakers were excluded to maintain focus on hospital-based HIS practices.

Time Frame: The study was conducted within a specific period, limiting the findings to the practices and challenges of HIS during that timeframe.

Focus on HIS: Only the influence of Hospital Information Systems on healthcare service delivery was examined, while other factors influencing service delivery, such as infrastructure or funding, were outside the study's scope.

CHAPTER FOUR
INTERPRETATION, ANALYSIS AND PRESENTATION

4.0 Introduction

This chapter discusses the objectives of the study as follows; the study established the relationship between Hospital Information Systems (HIS) and healthcare service delivery in public hospitals in Uganda. This chapter presents, analyses and interprets the study findings. The findings in this chapter are presented according to the objectives of the study.

Demographic Characteristics of Respondents**Response Rate****Table 2: Demographic Characteristics of Respondents**

Variable	Options	Frequency	Percent
Gender	Male	111	52.4
	Female	101	47.6
	Total	212	100
Age (Years)	18-25	40	18.9
	26-35	40	18.9
	36-45	60	28.3
	46-55	50	23.6
	56 and above	22	10.4
	Total	212	100
Marital Status	Single	37	17.5
	Married	44	20.8
	Divorced	43	20.3
	Widowed	42	19.8
	Other	46	21.7
	Total	212	100
Religion	Christianity	69	32.5
	Islam	54	25.5
	Traditional	27	12.7
	Other	62	29.2
	Total	212	100
Education Level	Primary	3	1.4

	Secondary	9	4.2
	Diploma	32	15.1
	Degree	110	51.9
	Masters	26	12.3
	PhD	1	0.5
	Others	31	14.6
	Total	212	100
Position in Hospital	Hospital Administrator	58	27.4
	Medical Records Officer	50	23.6
	IT Personnel	55	25.9
	Senior Healthcare Provider	49	23.1
	Total	212	100

Source: Primary data, (2025)

In terms of gender distribution, the respondents were fairly balanced, with 111 males representing 52.4% and 101 females representing 47.6% of the total 212 participants. This near-equitable distribution suggests that both male and female perspectives were well-represented in the study, reducing the likelihood of gender bias in responses and enabling a more comprehensive understanding of HIS utilization across genders.

The age profile of respondents shows that the largest group, comprising 28.3% of participants, fell within the 36–45 years bracket, followed by the 46–55 age group at 23.6%. Younger respondents aged 18–25 and 26–35 each accounted for 18.9%, while those aged 56 and above were 10.4% of the sample. This distribution indicates a workforce dominated by middle-aged individuals who are likely to have substantial professional experience, which could influence their familiarity and engagement with hospital information systems. The presence of both younger and older age groups ensures diverse insights from different career stages.

Regarding marital status, the respondents were almost evenly spread across different categories, with “Other” (21.7%) slightly higher than married (20.8%), divorced (20.3%), widowed (19.8%), and single (17.5%). This diversity indicates that personal responsibilities and life circumstances, which can sometimes influence work engagement and technology adoption, are varied among respondents, potentially affecting their interaction with HIS in different ways.

In terms of religious affiliation, 32.5% identified as Christians, 25.5% as Muslims, 12.7% followed traditional beliefs, and 29.2% identified as belonging to other religions. This spread demonstrates a multi-religious participant base, which reflects broader societal representation and ensures that the study captures perspectives that may be influenced by differing cultural or ethical views.

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The educational level of respondents was predominantly high, with 51.9% holding a degree and 12.3% holding a master's degree. Diploma holders represented 15.1%, secondary education 4.2%, and primary education only 1.4%, while 14.6% reported other qualifications. The high level of formal education among respondents suggests that the participants are well-equipped to understand, adopt, and engage with advanced hospital information systems, making the findings reliable in the context of professional HIS use.

Examining position within the hospital, the respondents were fairly evenly distributed across hospital administrators (27.4%), IT personnel (25.9%), medical records officers (23.6%), and senior healthcare providers (23.1%). This distribution ensures that insights reflect a broad spectrum of hospital functions, from administrative management to clinical operations and IT support, allowing the study to capture comprehensive perspectives on HIS implementation, utilization, and challenges.

4.1 Descriptive Statistics on the Extent of Implementation and Utilization of Hospital Information Systems (HIS)

Table 3: Descriptive Statistics on Extent of Implementation and Utilization of Hospital Information Systems (HIS)

Extent of Implementation and Utilization of Hospital Information Systems (HIS)	<i>Strongly Agree</i>	<i>Agree</i>	<i>Not Sure</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Mean</i>	<i>STD</i>
HIS is fully implemented across all departments in the hospital.	61 (28.8%)	105 (49.5%)	22 (10.4%)	11 (5.2%)	13 (6.1%)	3.90	1.070
The hospital staff regularly use HIS in their daily operations.	105 (49.5%)	68 (32.1%)	11 (5.2%)	22 (10.4%)	6 (2.8%)	4.15	1.095
Training on HIS usage has been provided to all relevant staff.	49 (23.1%)	122 (57.5%)	16 (7.5%)	13 (6.1%)	12 (5.7%)	3.86	1.023
HIS is integrated with other hospital systems for seamless information flow.	96 (45.3%)	91 (42.9%)	7 (3.3%)	4 (1.9%)	14 (6.6%)	4.18	1.062
The hospital has adequate technical support for HIS maintenance and troubleshooting.	101 (47.6%)	93 (43.9%)	4 (1.9%)	10 (4.7%)	4 (1.9%)	4.31	0.874

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Source: Primary data, (2025)

Starting with the statement, “HIS is fully implemented across all departments in the hospital,” the results indicate that respondents generally perceive the hospital’s HIS as largely implemented. Specifically, 61 respondents (28.8%) strongly agreed, and 105 respondents (49.5%) agreed, totaling 166 respondents or 78.3% of the sample who positively assessed HIS implementation across departments. A smaller proportion expressed uncertainty or disagreement, with 22 respondents (10.4%) being not sure, 11 respondents (5.2%) disagreeing, and 13 respondents (6.1%) strongly disagreeing. The mean score of 3.90 and a standard deviation of 1.070 suggest moderate variability in perceptions, indicating that while the majority recognize full implementation, some staff either perceive gaps or are unclear about system coverage. This finding highlights that the hospital has made substantial progress in deploying HIS, although some departments may require further support to achieve complete adoption. *As a Hospital Administrator explained, “HIS has been rolled out across most departments, but some units are still transitioning from paper-based systems, which causes slight inconsistencies in usage” (KM001: 13/08/2025).*

Regarding the statement, “The hospital staff regularly use HIS in their daily operations,” 105 respondents (49.5%) strongly agreed, and 68 respondents (32.1%) agreed, totaling 173 respondents or 81.6% of the sample who acknowledged frequent HIS usage. A smaller proportion were uncertain or disagreed, with 11 respondents (5.2%) not sure, 22 respondents (10.4%) disagreeing, and 6 respondents (2.8%) strongly disagreeing. The mean score of 4.15 and standard deviation of 1.095 indicate relatively high consistency in positive perceptions of regular system use. *A Medical Records Officer noted, “We rely on HIS daily for patient admissions, record management, and reporting. The system has significantly reduced the need for manual documentation, making our work more efficient” (KM002: 13/08/2025). This demonstrates that HIS has become an integral tool in routine hospital operations.*

For the statement, “Training on HIS usage has been provided to all relevant staff,” 49 respondents (23.1%) strongly agreed, and 122 respondents (57.5%) agreed, totaling 171 respondents or 80.6% affirming the availability of training. A smaller number were not sure or disagreed, with 16 respondents (7.5%) not sure, 13 respondents (6.1%) disagreeing, and 12 respondents (5.7%) strongly disagreeing. The mean of 3.86 and standard deviation of 1.023 suggest moderate variation in perceptions of training coverage. An IT Personnel participant explained, *“We have conducted multiple training sessions, including hands-on workshops and refresher courses. However, some newly recruited staff occasionally miss sessions, which explains why a few respondents are unsure about training” (KM003: 13/08/2025). This emphasizes that while training is largely effective, continuous capacity building is necessary to ensure all staff are fully equipped to use HIS.*

Considering the statement, “HIS is integrated with other hospital systems for seamless information flow,” 96 respondents (45.3%) strongly agreed and 91 respondents (42.9%) agreed, totaling 187 respondents or 88.2%

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recognizing the integration of HIS with other hospital systems. Only a small fraction expressed uncertainty or disagreement, with 7 respondents (3.3%) not sure, 4 respondents (1.9%) disagreeing, and 14 respondents (6.6%) strongly disagreeing. The mean of 4.18 and standard deviation of 1.062 suggest strong consensus about system integration. *A Senior Healthcare Provider remarked, "The HIS communicates directly with our laboratory, pharmacy, and billing systems. This integration allows real-time updates and reduces delays in patient care" (KM004: 13/08/2025), highlighting the critical role of interoperability in improving hospital efficiency.*

For the statement, "The hospital has adequate technical support for HIS maintenance and troubleshooting," 101 respondents (47.6%) strongly agreed, and 93 respondents (43.9%) agreed, totaling 194 respondents or 91.5% affirming sufficient technical support. Only 14 respondents (6.6%) were not sure or disagreed. The mean of 4.31 and standard deviation of 0.874 suggest a high level of agreement with minimal variability. *An IT Support Staff member added, "Our technical team is always on standby to resolve any system issues, perform updates, and ensure uninterrupted HIS operations. This has greatly reduced downtime and improved staff confidence in using the system" (KM005: 13/08/2025). This finding underscores the importance of reliable technical support in sustaining the effective use of HIS across hospital departments.*

Table 4: Regression results on the relationship between Extent of Implementation and Healthcare Service Delivery

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.775 ^a	.600	.598	2.050
a. Predictors: (Constant), Extent of Implementation and Utilization of Hospital Information Systems (HIS)				

Source: Primary Data, 2025

The model summary showed a correlation coefficient (R) of 0.775, suggesting a strong positive association between the independent and dependent variables. The R Square value of 0.600 implied that 60.0% of the variation in healthcare service delivery was explained by the extent of implementation and utilization of HIS, while the remaining 40.0% could be attributed to other factors not included in the model. The adjusted R Square of 0.598 further confirmed the model's explanatory strength, and the standard error of the estimate was 2.050, indicating minimal deviation from the predicted values.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.408	.799		3.012	.003

	Extent of Implementation and Utilization of Hospital Information Systems (HIS)	.884	.050	.775	17.757	.000
a. Dependent Variable: Healthcare Service Delivery						

Source: Primary Data, 2025

The coefficients table revealed that the extent of implementation and utilization of HIS had a positive and significant effect on healthcare service delivery ($B = 0.884$, $t = 17.757$, $p < 0.001$). This meant that for every one-unit increase in the implementation and utilization of HIS, healthcare service delivery improved by 0.884 units, holding other factors constant. The constant term ($B = 2.408$, $p = 0.003$) was also significant, suggesting that even in the absence of HIS implementation, there was still a baseline level of healthcare service delivery.

4.2 Relationship between electronic medical records and healthcare service delivery

Table 5: Descriptive Statistics on electronic medical records

Electronic medical records	<i>Strongly Agree</i>	<i>Agree</i>	<i>Not Sure</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Mean</i>	<i>STD</i>
I use the Electronic Medical Records (EMR) system frequently in my daily work.	49 (23.1%)	116 (54.7%)	25 (11.8%)	8 (3.8%)	14 (6.6%)	3.84	1.036
The EMR system is easy to use and understand.	98 (46.2%)	70 (33.0%)	10 (4.7%)	22 (10.4%)	12 (5.7%)	4.04	1.200
The EMR system allows me to access patient information quickly when needed.	34 (16.0%)	135 (63.7%)	18 (8.5%)	12 (5.7%)	13 (6.1%)	3.78	0.989
The use of EMRs has improved the accuracy of patient records.	96 (45.3%)	92 (43.4%)	7 (3.3%)	6 (2.8%)	11 (5.2%)	4.21	1.014
EMRs have improved the timeliness of healthcare service delivery in this hospital.	109 (51.4%)	85 (40.1%)	5 (2.4%)	7 (3.3%)	6 (2.8%)	4.34	0.902

Source: Primary data, (2025)

Starting with the statement, “I use the Electronic Medical Records (EMR) system frequently in my daily work,” the results indicate that the majority of respondents regularly engage with the EMR system in their routine activities. Specifically, 49 respondents (23.1%) strongly agreed, and 116 respondents (54.7%) agreed, totaling 165 respondents or 77.8% who reported frequent use of EMRs. A smaller proportion expressed uncertainty or disagreement, with 25 respondents (11.8%) being not sure, 8 respondents (3.8%) disagreeing, and 14 respondents (6.6%) strongly

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disagreeing. The mean score of 3.84 and standard deviation of 1.036 indicate moderate variability in daily usage patterns. *A Medical Records Officer noted, "I use the EMR system every day to manage patient records, schedule follow-ups, and update lab results. This has streamlined our workflow and reduced manual record-keeping significantly" (KM006: 13/08/2025). This demonstrates that EMRs have become a central tool in daily hospital operations.*

For the statement, "The EMR system is easy to use and understand," 98 respondents (46.2%) strongly agreed, and 70 respondents (33.0%) agreed, totaling 168 respondents or 79.2% affirming that the system is user-friendly. Meanwhile, 10 respondents (4.7%) were not sure, 22 respondents (10.4%) disagreed, and 12 respondents (5.7%) strongly disagreed. The mean of 4.04 and standard deviation of 1.200 reflect some variability in perceptions of system usability, suggesting that while most staff find the EMR intuitive, a subset may require additional support or training. *An IT Personnel explained, "The interface is straightforward, but some new staff occasionally struggle with certain modules, which highlights the need for continuous orientation" (KM007: 13/08/2025). This emphasizes that usability is generally high, yet ongoing support ensures all staff can effectively navigate the system.*

Regarding the statement, "The EMR system allows me to access patient information quickly when needed," 34 respondents (16.0%) strongly agreed, and 135 respondents (63.7%) agreed, totaling 169 respondents or 79.7% recognizing the efficiency of information retrieval. Only 18 respondents (8.5%) were not sure, 12 respondents (5.7%) disagreed, and 13 respondents (6.1%) strongly disagreed. The mean of 3.78 and standard deviation of 0.989 indicate relatively consistent perceptions of rapid access to patient data. *A Senior Healthcare Provider noted, "With EMRs, I can retrieve a patient's history and lab results in seconds, which helps in making timely clinical decisions" (KM008: 13/08/2025). This highlights that EMRs significantly enhance information accessibility, improving operational efficiency and patient care.*

Considering the statement, "The use of EMRs has improved the accuracy of patient records," 96 respondents (45.3%) strongly agreed, and 92 respondents (43.4%) agreed, totaling 188 respondents or 88.7% acknowledging improved accuracy. Only 7 respondents (3.3%) were not sure, 6 respondents (2.8%) disagreed, and 11 respondents (5.2%) strongly disagreed. The mean score of 4.21 and standard deviation of 1.014 suggest strong consensus on the positive impact of EMRs on data accuracy. *An IT Support Staff member explained, "EMRs have minimized errors related to manual entries. Automatic validation checks ensure that patient information is complete and accurate" (KM009: 13/08/2025), highlighting the crucial role of EMRs in enhancing record reliability.*

For the statement, "EMRs have improved the timeliness of healthcare service delivery in this hospital," 109 respondents (51.4%) strongly agreed, and 85 respondents (40.1%) agreed, totaling 194 respondents or 91.5% reporting improved service timeliness. Only 5 respondents (2.4%) were not sure, 7 respondents (3.3%) disagreed,



and 6 respondents (2.8%) strongly disagreed. The mean of 4.34 and standard deviation of 0.902 indicate strong agreement and minimal variability in responses. *A Hospital Administrator observed, “EMRs allow us to process patient information, lab results, and prescriptions quickly, which has significantly reduced waiting times and improved overall patient satisfaction” (KM010: 13/08/2025). This finding underscores that EMRs not only enhance record accuracy but also directly contribute to faster and more efficient healthcare service delivery.*

Relationship between Electronic medical records and Healthcare Service Delivery

Table 6: Correlation Analysis between Electronic medical records and Healthcare Service Delivery

Correlations			
		Healthcare Service Delivery	Electronic Medical Records
Healthcare Service Delivery	Pearson Correlation	1	.781**
	Sig. (2-tailed)		.000
	N	212	212
Electronic Medical Records	Pearson Correlation	.781**	1
	Sig. (2-tailed)	.000	
	N	212	212
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary Data, 2025

The correlation analysis results in Table 6 indicated that there was a strong and statistically significant positive relationship between Electronic Medical Records and Healthcare Service Delivery, as demonstrated by the Pearson correlation coefficient of 0.781 with a p-value of 0.000, which was less than the 0.01 significance threshold(Nelson et al., 2023). This implied that improvements in the adoption and utilization of electronic medical records were strongly associated with enhancements in healthcare service delivery. The positive correlation suggested that as hospitals increased the use of electronic medical records, the efficiency, accuracy, and timeliness of healthcare services improved correspondingly. These findings were consistent with previous empirical studies which have shown that the integration of digital medical record systems promotes better clinical decision-making, reduces medical errors, and improves patient satisfaction. The results, therefore, reinforced the importance of investing in electronic medical record systems as a strategic approach to enhancing the quality and performance of healthcare delivery systems.

4.3 Descriptive Statistics on Challenges Affecting the Effective Use of Hospital Information Systems

Table 7: Descriptive Statistics on Challenges Affecting the Effective Use of Hospital Information Systems

Challenges Affecting the Effective Use of Hospital Information Systems	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Mean	STD



Lack of adequate training limits effective use of HIS.	47 (22.2%)	121 (57.1%)	22 (10.4%)	4 (1.9%)	18 (8.5%)	3.83	1.068
Frequent technical failures disrupt HIS operations.	100 (47.2%)	73 (34.4%)	9 (4.2%)	23 (10.8%)	7 (3.3%)	4.11	1.113
Insufficient funding affects the maintenance and upgrade of HIS.	31 (14.6%)	142 (67.0%)	16 (7.5%)	11 (5.2%)	12 (5.7%)	3.80	0.950
Resistance to change among staff hinders HIS adoption.	95 (44.8%)	96 (45.3%)	6 (2.8%)	3 (1.4%)	12 (5.7%)	4.22	0.999
Poor internet connectivity negatively impacts HIS performance.	110 (51.9%)	84 (39.6%)	7 (3.3%)	5 (2.4%)	6 (2.8%)	4.35	0.883

Source: Primary data, (2025)

Starting with the statement, “Lack of adequate training limits effective use of HIS,” the results suggest that training deficiencies are perceived as a significant barrier to effective HIS utilization. Specifically, 47 respondents (22.2%) strongly agreed, and 121 respondents (57.1%) agreed, totaling 168 respondents or 79.3% acknowledging that inadequate training affects system use. A smaller portion were not sure or disagreed, with 22 respondents (10.4%) not sure, 4 respondents (1.9%) disagreeing, and 18 respondents (8.5%) strongly disagreeing. The mean score of 3.83 and standard deviation of 1.068 indicate moderate variability, reflecting that while most staff recognize training gaps, some either feel adequately trained or are uncertain. A Hospital Administrator noted, “Although initial HIS training was provided, many staff members still require refresher sessions, especially with system updates, to ensure full competency” (KM011: 13/08/2025). This underscores the need for continuous capacity building to optimize HIS performance.

For the statement, “Frequent technical failures disrupt HIS operations,” 100 respondents (47.2%) strongly agreed and 73 respondents (34.4%) agreed, totaling 173 respondents or 81.6% highlighting that technical disruptions remain a challenge. Only 9 respondents (4.2%) were not sure, 23 respondents (10.8%) disagreed, and 7 respondents (3.3%) strongly disagreed. The mean of 4.11 and standard deviation of 1.113 indicate a relatively strong consensus that system reliability can affect operational efficiency. An IT Personnel explained, “Occasionally, servers crash or software experiences bugs, which temporarily halts access to patient data and delays workflow. Rapid technical support is critical in these situations” (KM012: 13/08/2025). This highlights that while HIS provides many benefits, technical reliability remains crucial for continuous service delivery.

Regarding the statement, “Insufficient funding affects the maintenance and upgrade of HIS,” 31 respondents (14.6%) strongly agreed and 142 respondents (67.0%) agreed, totaling 173 respondents or 81.6% acknowledging

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that financial limitations impact system upkeep. A smaller proportion were not sure or disagreed, with 16 respondents (7.5%) not sure, 11 respondents (5.2%) disagreeing, and 12 respondents (5.7%) strongly disagreeing. The mean of 3.80 and standard deviation of 0.950 suggest moderate variability in perceptions of funding adequacy. *A Hospital Administrator remarked, "Budget constraints often delay system updates and procurement of advanced hardware, which can affect overall HIS performance" (KM013: 13/08/2025). This demonstrates that financial investment is essential to maintain a robust and up-to-date HIS infrastructure.*

Considering the statement, "Resistance to change among staff hinders HIS adoption," 95 respondents (44.8%) strongly agreed and 96 respondents (45.3%) agreed, totaling 191 respondents or 90.1% highlighting resistance to change as a key barrier. Only 6 respondents (2.8%) were not sure, 3 respondents (1.4%) disagreed, and 12 respondents (5.7%) strongly disagreed. The mean of 4.22 and standard deviation of 0.999 indicate strong consensus with limited variability, reflecting that staff attitude significantly influences system uptake. *A Senior Healthcare Provider explained, "Some staff prefer manual record-keeping because they are accustomed to traditional methods. Overcoming this mindset requires continuous sensitization and demonstration of HIS benefits" (KM014: 13/08/2025). This underscores that behavioral and cultural factors are as critical as technical factors in HIS adoption.*

For the statement, "Poor internet connectivity negatively impacts HIS performance," 110 respondents (51.9%) strongly agreed and 84 respondents (39.6%) agreed, totaling 194 respondents or 91.5% confirming connectivity issues as a major challenge. Only 7 respondents (3.3%) were not sure, 5 respondents (2.4%) disagreed, and 6 respondents (2.8%) strongly disagreed. The mean score of 4.35 and standard deviation of 0.883 indicate high agreement and relatively low variability, highlighting that internet connectivity is a critical determinant of system efficiency. *An IT Support Staff member stated, "Slow or unstable internet often causes delays in accessing patient data and syncing information across departments, which affects timely service delivery" (KM015: 13/08/2025). This emphasizes that adequate IT infrastructure is essential to support HIS functionality.*

Table 8: Regression Analysis between Challenges Affecting the Effective Use of Hospital Information Systems and Healthcare Service Delivery

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.702 ^a	.493	.491	3.355
a. Predictors: (Constant), Challenges Affecting the Effective Use of Hospital Information Systems				

Source: Primary Data, 2025

The model summary shows a correlation coefficient (R) of 0.702, indicating a strong positive relationship between the challenges associated with HIS use and healthcare service delivery outcomes. The coefficient of determination (R²) is 0.493, which implies that approximately 49.3% of the variation in healthcare service delivery can be

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explained by the challenges affecting the effective use of HIS. The adjusted R^2 of 0.491 suggests that the model provides a reasonable fit to the data, accounting for the sample size and the number of predictors. The standard error of the estimate is 3.355, reflecting the average deviation of the observed healthcare service delivery values from the regression line.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.659	.984		4.670	.000
	Challenges Affecting the Effective Use of Hospital Information Systems	.560	.066	.702	16.110	.000

a. Dependent Variable: Healthcare Service Delivery

Source: Primary Data, 2025

Examining the coefficients, the constant (intercept) is 1.659, representing the baseline level of healthcare service delivery when challenges affecting HIS are zero. The unstandardized coefficient (B) for challenges affecting HIS is 0.560, with a standard error of 0.066. This indicates that for each one-unit increase in the challenges associated with the effective use of HIS, healthcare service delivery increases by approximately 0.560 units, holding other factors constant. The standardized beta coefficient of 0.702 confirms that these challenges are a strong predictor of healthcare service delivery outcomes. The t-value of 16.110 and the p-value of 0.000 show that the relationship is statistically significant at the 5% significance level. This leads us to reject the null hypothesis, which posits that challenges affecting the effective use of HIS have no significant impact on healthcare service delivery.

4.4 Descriptive Statistics on Healthcare Service Delivery

Table 9: Descriptive Statistics on Healthcare Service Delivery

Healthcare Service Delivery	<i>Strongly Agree</i>	<i>Agree</i>	<i>Not Sure</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Mean</i>	<i>STD</i>
Healthcare services at the hospital meet patients' expectations.	52 (24.5%)	113 (53.3%)	19 (9.0%)	10 (4.7%)	18 (8.5%)	3.81	1.121
Patients receive timely medical attention upon arrival.	97 (45.8%)	73 (34.4%)	9 (4.2%)	25 (11.8%)	8 (3.8%)	4.07	1.146
The hospital staff	39	130	16 (7.5%)	12 (5.7%)	15 (7.1%)	3.78	1.040

communicate clearly and respectfully with patients.	(18.4%)	(61.3%)					
The hospital has adequate medical equipment and supplies to provide quality care.	96 (45.3%)	97 (45.8%)	3 (1.4%)	6 (2.8%)	10 (4.7%)	4.24	0.975

Source: Primary data, (2025)

Starting with the statement, “Healthcare services at the hospital meet patients’ expectations,” the results indicate that a majority of respondents perceive the hospital’s services as satisfactory and aligned with patient needs. Specifically, 52 respondents (24.5%) strongly agreed, and 113 respondents (53.3%) agreed, totaling 165 respondents or 77.8% expressing satisfaction with healthcare service delivery. A smaller portion were uncertain or disagreed, with 19 respondents (9.0%) not sure, 10 respondents (4.7%) disagreeing, and 18 respondents (8.5%) strongly disagreeing. The mean score of 3.81 and standard deviation of 1.121 reflect moderate variability in perceptions, suggesting that while most staff view services as meeting expectations, some recognize areas for improvement. *A Senior Healthcare Provider explained, “Our services generally meet patient expectations, especially in routine consultations and follow-ups. However, occasional delays in specialized care can affect satisfaction” (KM016: 13/08/2025). This highlights that overall service quality is strong but can benefit from targeted enhancements in certain departments.*

For the statement, “Patients receive timely medical attention upon arrival,” 97 respondents (45.8%) strongly agreed and 73 respondents (34.4%) agreed, totaling 170 respondents or 80.2% acknowledging that patients are generally attended to promptly. A smaller number were unsure or disagreed, with 9 respondents (4.2%) not sure, 25 respondents (11.8%) disagreeing, and 8 respondents (3.8%) strongly disagreeing. The mean of 4.07 and standard deviation of 1.146 indicate a fairly strong consensus on timely patient care. *A Hospital Administrator noted, “We have implemented triage protocols and streamlined patient registration through our HIS, which has significantly reduced waiting times and improved prompt attention” (KM016: 13/08/2025). This finding underscores the importance of efficient workflow systems in enhancing patient care timeliness.*

Regarding the statement, “The hospital staff communicate clearly and respectfully with patients,” 39 respondents (18.4%) strongly agreed and 130 respondents (61.3%) agreed, totaling 169 respondents or 79.7% affirming effective communication practices. Only 16 respondents (7.5%) were not sure, 12 respondents (5.7%) disagreed, and 15 respondents (7.1%) strongly disagreed. The mean of 3.78 and standard deviation of 1.040 indicate moderate variability, reflecting that while communication is generally effective, there may be occasional lapses. *A Medical Records Officer explained, “Staff are trained to provide clear and courteous communication, particularly during consultations and patient education, which fosters trust and satisfaction” (KM017: 13/08/2025). This highlights that communication quality is a key component of patient-centered care.*

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For the statement, “The hospital has adequate medical equipment and supplies to provide quality care,” 96 respondents (45.3%) strongly agreed and 97 respondents (45.8%) agreed, totaling 193 respondents or 91.0% confirming adequacy of medical resources. Only 3 respondents (1.4%) were not sure, 6 respondents (2.8%) disagreed, and 10 respondents (4.7%) strongly disagreed. The mean score of 4.24 and standard deviation of 0.975 suggest high consensus with minimal variability, indicating that most staff perceive the hospital as well-equipped to deliver quality care. *A Hospital Administrator remarked, “We maintain sufficient medical equipment and regularly restock essential supplies, which ensures uninterrupted service provision and enhances patient care outcomes” (KM018: 13/08/2025).*

Table 10: Multiple Linear regression between Electronic Medical Records, Extent of Implementation and Utilization of Hospital Information Systems (HIS), Challenges Affecting the Effective Use of Hospital Information Systems and Healthcare Service Delivery

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864 ^a	.747	.744	1.638
a. Predictors: (Constant), Electronic Medical Records, Extent of Implementation and Utilization of Hospital Information Systems (HIS), Challenges Affecting the Effective Use of Hospital Information Systems				

Source: Primary Data, 2025

The model summary results show an R value of 0.864, indicating a strong positive correlation between the combined independent variables and healthcare service delivery. The R Square of 0.747 implies that approximately 74.7% of the variance in healthcare service delivery can be explained by the combined effect of Electronic Medical Records, Extent of Implementation and Utilization of HIS, and Challenges Affecting the Effective Use of HIS. The Adjusted R Square of 0.744 confirms the stability and reliability of the model after adjusting for the number of predictors, while the standard error of the estimate (1.638) indicates a moderate level of prediction error.



Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.713	.707		8.082	.000
	Extent of Implementation and Utilization of Hospital Information Systems (HIS)	.302	.080	.265	3.758	.000
	Challenges Affecting the Effective Use of Hospital Information Systems	.328	.090	.271	3.658	.000
	Electronic Medical Records	.501	.059	.419	8.548	.000
a. Dependent Variable: Healthcare Service Delivery						

Source: Primary Data, 2025

The constant value of 5.713 ($p < 0.001$) shows the baseline healthcare service delivery score when all independent variables are held constant. All predictors were found to be statistically significant at $p < 0.001$, highlighting their strong influence on healthcare service delivery. Specifically, the Extent of Implementation and Utilization of HIS had a positive unstandardized coefficient ($B = 0.302$, $\beta = 0.265$), meaning that for every one-unit increase in its implementation and utilization, healthcare service delivery is expected to improve by 0.302 units, holding other factors constant. Similarly, Challenges Affecting the Effective Use of HIS ($B = 0.328$, $\beta = 0.271$) also showed a positive relationship, suggesting that as challenges are addressed, service delivery improves. The strongest predictor was Electronic Medical Records ($B = 0.501$, $\beta = 0.419$), indicating that enhancements in EMR usage significantly boost healthcare service delivery.

CHAPTER FIVE

FINDINGS OF THE STUDY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses summary, conclusion and recommendations in relation to the study findings and study objectives follows; establish the relationship between Hospital Information Systems (HIS) and healthcare service delivery in public hospitals in Uganda.

5.1 Findings of the Study

5.1.1 Extent of implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital.

It was established that the extent of implementation and utilization of Hospital Information Systems (HIS) in the study setting reflected a strong alignment with the core principles of the Technology Acceptance Model (TAM) while also confirming the importance of considering broader organizational and environmental factors beyond individual acceptance. The findings showed that HIS was widely deployed across most hospital departments, regularly used in daily operations, and supported by training, integration with other systems, and adequate technical assistance. These outcomes resonate with TAM's construct of Perceived Usefulness (PU), as staff clearly recognized the system's role in improving efficiency, reducing manual work, and enabling real-time information flow. Similarly, the evidence of effective training and technical support directly relates to Perceived Ease of Use (PEOU), as these interventions likely made the system more user-friendly and reduced potential operational frustrations.

In line with the observations of Alasmay et al. (2022), it was evident that when healthcare workers perceived HIS as beneficial to their job performance and easy to operate, their willingness to adopt and consistently use the system increased. The high levels of reported daily usage and the integration of HIS with other hospital functions demonstrated that staff had moved beyond mere adoption to sustained utilization, which is the ultimate behavioral outcome TAM seeks to explain. However, as highlighted by Kyambadde et al. (2021), the study also indicated that a minority of staff remained uncertain about HIS coverage and training, suggesting the persistence of barriers such as uneven digital literacy and varying exposure to capacity-building initiatives.

The regression results further reinforced the central TAM argument by showing a strong and significant relationship between the extent of HIS implementation and healthcare service delivery, confirming that increased adoption and usage translate into measurable improvements in patient care processes. This aligns with international evidence (Ali et al., 2021; Ochieng et al., 2023) that while HIS has the potential to transform healthcare delivery, its benefits are fully realized only when the system is actively and consistently used across all relevant functions. At the same time, the study's findings echoed longstanding critiques of TAM, particularly its limited attention to external and systemic influences (Venkatesh & Davis, 2020). The near-universal agreement on the importance of technical support, as well as the positive feedback on HIS integration, pointed to the fact that infrastructural readiness, interoperability, and

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organizational backing are critical enablers of adoption factors not fully captured within TAM's original scope. These aspects mirror the broader literature's emphasis on socio-technical dynamics, where infrastructural stability, system reliability, and institutional support structures play as decisive a role in adoption as individual attitudes (Chaudhuri & Alalwan, 2021).

5.1.2 Relationship between electronic medical records and healthcare service delivery in the two public hospitals.

The study established that the integration of Electronic Medical Records (EMRs) into hospital operations had a profound impact on healthcare service delivery in the two public hospitals investigated. It was found that EMRs had become a central component of daily clinical and administrative activities, enabling healthcare workers to efficiently manage patient records, schedule follow-ups, and update laboratory results. These findings align with previous research by Adedeji et al. (2021), who reported that EMR implementation significantly improved the accuracy of patient data and reduced medical errors, thereby streamlining the retrieval of patient histories and enhancing clinical decision-making in Ugandan public hospitals. Similarly, the current study demonstrated that the use of EMRs facilitated the timely access to patient information, which contributed to faster clinical responses and reduced delays in care delivery, echoing Nguyen et al.'s (2020) findings on improved efficiency and interdepartmental coordination.

It was further established that EMRs improved the overall accuracy of patient records within the hospitals studied. Respondents indicated that automated validation features minimized errors associated with manual record-keeping, ensuring that patient information was both complete and reliable. This outcome corroborates the observations of Mukasa and Kaggwa (2019) in Uganda, who found that EMR systems enhanced outpatient care and allowed for structured monitoring of chronic conditions, thus improving service delivery outcomes. The study also revealed that staff found the EMR systems generally user-friendly, though some new personnel required additional guidance and orientation to navigate certain modules effectively. This highlights the importance of ongoing training and capacity-building to maximize the benefits of EMR systems, consistent with the limitations noted in previous studies concerning inadequate staff preparedness.

The research also established that EMRs contributed significantly to the timeliness and efficiency of healthcare services. Healthcare workers reported that digitized systems enabled rapid processing of patient data, lab results, and prescriptions, thereby reducing waiting times and enhancing patient satisfaction. This finding resonates with Wanyenze et al. (2018), who emphasized that faster consultations and reduced paperwork improved patients' perception of hospital efficiency. However, similar to earlier studies, challenges such as occasional system failures and limited technical support were identified as barriers to fully realizing EMR benefits. This underscores the necessity for reliable infrastructure and consistent IT support to sustain EMR adoption and optimize its impact on service delivery.

It was established that the effective use of EMRs depended not only on system functionality but also on contextual and organizational factors, including usability, technical support, and staff training. This observation aligns with the work of Mugo and Kimani (2022), who reported that healthcare workers' preference for paper-based documentation was often influenced by interface difficulties and insufficient institutional support. Thus, the study reinforced the notion that EMR success in public hospitals, particularly within resource-constrained settings like Uganda, hinges on both technological adequacy and a supportive organizational environment.

5.1.3 Challenges affecting the effective use of Hospital Information Systems and healthcare service delivery in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital–Nsamizi.

The study established that the effective use of Hospital Information Systems (HIS) in the two public hospitals was significantly constrained by a range of technical, human, organizational, and infrastructural challenges. It was established that inadequate training emerged as a critical barrier, as many staff members lacked sufficient orientation and refresher sessions to fully leverage HIS functionalities. This limitation often resulted in inconsistent utilization patterns, with some healthcare workers relying on traditional paper-based methods instead of the digital platform. This finding aligns with the observations of Hassan and Muneer (2023), who reported that insufficient training and user preparedness inhibit the adoption of HIS, while Kumar et al. (2022) emphasized that poorly designed interfaces and misaligned workflows further discourage effective engagement with the systems. The study therefore highlighted that ongoing capacity building and tailored training programs are essential to ensure staff competence and confidence in using HIS.

It was further established that technical failures and system reliability significantly affected HIS performance and, consequently, healthcare service delivery. Healthcare workers reported frequent disruptions caused by server crashes, software bugs, and slow system responses, which interrupted workflow and delayed patient care. This observation corroborates the findings of Samuel et al. (2022) and Al-Jabari et al. (2021), who underscored that inadequate IT infrastructure, including unreliable electricity, poor internet connectivity, and under-resourced technical support, hampers the consistent use of HIS in public hospitals. The study indicated that technical stability and prompt troubleshooting are pivotal in ensuring the uninterrupted functioning of HIS, thereby enabling healthcare workers to maintain efficiency in clinical and administrative tasks.

The study also established that organizational and behavioral factors, such as resistance to change among staff, had a profound impact on HIS adoption. Many respondents highlighted that reluctance to transition from manual record-keeping to digital platforms was influenced by comfort with traditional workflows, fear of increased workload, and skepticism about the system's benefits. This aligns with broader literature indicating that human-centered challenges, including user attitudes and limited institutional support, are major determinants of HIS utilization (Adeyemo et al., 2023; Hassan & Muneer, 2023). Consequently, the findings suggest that successful HIS

implementation requires not only technological solutions but also strategic change management interventions that address staff perceptions, foster engagement, and demonstrate the value of digital systems in improving patient care.

5.2 Conclusions

5.2.1 Extent of implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial Hospital.

It was concluded that there was a strong and meaningful relationship between the implementation and utilization of Hospital Information Systems (HIS) and the quality of healthcare service delivery. The findings indicated that when hospitals effectively adopted and used HIS, there was a noticeable improvement in the efficiency of operations, coordination between departments, and overall responsiveness to patient needs. The system facilitated faster access to patient records, reduced duplication of work, and enhanced decision-making by providing accurate and timely information to healthcare providers. This improved workflow allowed medical staff to spend more time focusing on patient care rather than administrative tasks, ultimately leading to better health outcomes.

The study further concluded that HIS was not merely a technological addition but a strategic tool for transforming healthcare delivery. Hospitals that embraced HIS experienced smoother processes in patient data management, better communication among health professionals, and improved monitoring of patient progress. The integration of HIS also minimized errors associated with manual record-keeping, ensured more secure data storage, and promoted evidence-based clinical decisions. As a result, HIS contributed to building trust between healthcare providers and patients through timely and reliable service provision.

5.2.2 Relationship between electronic medical records and healthcare service delivery in the two public hospitals.

It was concluded that EMRs play a pivotal role in enhancing the efficiency and effectiveness of healthcare service delivery. The study demonstrated that EMRs had become a central tool in the daily operations of the hospitals, facilitating the management of patient records, scheduling of follow-ups, and updating of laboratory results. This indicates that the adoption of EMRs has transformed routine clinical and administrative workflows, allowing healthcare workers to perform their duties more efficiently and with greater accuracy. The findings support the broader understanding that digital health systems can significantly streamline processes, reduce redundancies, and improve clinical decision-making, as previously highlighted in studies conducted in similar healthcare contexts.

The study further concluded that EMRs contribute substantially to improving the accuracy and reliability of patient information. Automated validation features within the EMR systems minimized errors associated with manual record-keeping, ensuring that patient data is both complete and dependable. This outcome highlights the value of EMRs in reducing medical errors, enhancing outpatient care, and providing structured follow-ups for chronic conditions. The study emphasized that the accuracy of patient data is not only a technical outcome but also a critical

factor in improving patient safety and overall healthcare quality, reinforcing the findings of earlier research conducted in Uganda and other regions.

It was concluded that EMRs significantly improve the timeliness of healthcare service delivery. The ability to rapidly access patient records, lab results, and prescription information enables healthcare workers to respond to clinical needs more promptly, reducing delays in care and improving patient satisfaction. The study found that the speed and efficiency facilitated by EMRs are key drivers of perceived hospital performance, suggesting that digital systems have a direct impact on patient experience and the operational efficiency of healthcare institutions.

5.2.3 Challenges affecting the effective use of Hospital Information Systems and healthcare service delivery in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital–Nsamizi.

It was concluded that while HIS offers substantial benefits, including improved data accuracy, streamlined workflows, and enhanced timeliness of healthcare service delivery, these benefits are not fully realized without addressing the barriers that limit system utilization. The study concluded that inadequate staff training remains a critical impediment, as many healthcare workers lack sufficient orientation, refresher sessions, and practical support to confidently navigate HIS functionalities. This deficiency contributes to inconsistent use, reliance on manual record-keeping, and underutilization of advanced system modules, highlighting the necessity for ongoing capacity-building initiatives.

It was also concluded that technical failures and system reliability significantly affect the continuous use of HIS. The study established that server crashes, software glitches, and slow system performance interrupt daily operations and compromise the efficiency of healthcare service delivery. Consequently, it was concluded that stable technical infrastructure and prompt troubleshooting mechanisms are essential to maintain uninterrupted access to patient information, facilitate smooth clinical workflows, and support timely decision-making. Without these technical safeguards, the potential benefits of HIS in improving service efficiency and reducing medical errors remain limited.

The study concluded that human and behavioral factors, particularly resistance to change among staff, constitute a major barrier to HIS adoption. It was concluded that some healthcare workers prefer traditional paper-based methods due to familiarity, fear of increased workload, or skepticism regarding the system's effectiveness. This underscores that technological solutions alone are insufficient; successful HIS implementation requires comprehensive change management strategies that address staff perceptions, promote engagement, and demonstrate the value of the system in enhancing patient care.

5.3 Recommendations

5.3.1 Extent of implementation and utilization of Hospital Information Systems (HIS) in Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial Hospital.

Hospitals should invest in modern and reliable HIS infrastructure, ensuring that the systems are up-to-date, user-friendly, and integrated across all departments. This will allow for seamless sharing of patient information, reduce delays in service delivery, and enhance the overall efficiency of healthcare operations.

Continuous capacity-building programs should be implemented for all categories of healthcare staff. Regular training sessions will equip medical, administrative, and technical personnel with the necessary skills to operate the systems effectively, troubleshoot basic challenges, and adapt to new software updates. Such training should be tailored to the needs of different departments to ensure maximum utilization of the system's capabilities.

Hospitals should develop strong technical support structures to address system downtimes and data security concerns promptly. This involves establishing dedicated IT teams that can monitor system performance, ensure regular backups, and implement strong cybersecurity measures to protect sensitive patient data.

5.3.2 Relationship between electronic medical records and healthcare service delivery in the two public hospitals.

It is essential to strengthen training and capacity-building programs for all healthcare staff. Continuous orientation, refresher courses, and hands-on workshops should be provided to ensure that both new and existing personnel are confident in navigating the EMR system. This will address usability challenges and reduce reliance on paper-based documentation, thereby improving consistency in system use.

Hospitals should invest in robust technical support and IT infrastructure. Reliable servers, regular system maintenance, and prompt troubleshooting mechanisms are crucial to minimize system failures and prevent workflow disruptions. Ensuring stable electricity supply and high-speed internet connectivity is also critical, as connectivity issues were found to significantly affect system performance and access to patient data.

Organizational and managerial support should be strengthened. Leadership should actively promote EMR adoption, encourage a culture of digital engagement, and provide clear policies on data governance, privacy, and accountability. This includes addressing resistance to change among staff through sensitization campaigns and demonstrating the tangible benefits of EMRs in improving patient care and reducing workload inefficiencies.

5.3.3 Challenges affecting the effective use of Hospital Information Systems and healthcare service delivery in Entebbe Regional Referral Hospital and Dr. Ronald Bata Memorial Hospital–Nsamizi.

It should be ensured that continuous and comprehensive training programs are provided to all hospital staff. This includes initial orientation for new employees, refresher courses for existing staff, and hands-on workshops to

improve practical skills. By doing so, staff will become more confident and proficient in using HIS, reducing reliance on paper-based systems and ensuring that all functionalities are fully utilized. Emphasis should also be placed on digital literacy to bridge gaps in understanding and ensure that even less technically experienced staff can effectively navigate the system.

Technical reliability and infrastructure must be strengthened. Hospitals should invest in robust IT infrastructure, including high-performance servers, secure data storage, and reliable backup systems, to prevent system crashes and data loss. Regular maintenance and timely troubleshooting by dedicated technical support teams should be guaranteed to minimize system downtime and ensure uninterrupted access to patient information. Adequate internet connectivity and power backup systems are equally essential to support real-time data access and interoperability across departments.

Strategies to address human and behavioral challenges should be prioritized. Hospitals should implement change management programs that actively engage staff, address resistance to digital adoption, and communicate the benefits of HIS for both patients and healthcare providers. Incentives and recognition for staff who effectively use HIS can further encourage adoption. Leadership should foster a culture that embraces technology and models the use of HIS as an integral part of hospital operations.

5.4 Areas for Further Studies

Future research could investigate how seamless integration of EMRs with other hospital systems, such as laboratory, pharmacy, and billing platforms, affects overall healthcare service delivery, coordination, and patient outcomes. Understanding the extent to which interoperability improves efficiency and reduces redundancies can guide system design and policy development.

While this study highlighted the importance of staff training, further research could explore the most effective training methods, frequency, and content for improving EMR adoption and minimizing user errors. Comparative studies across different hospital departments or regions could identify best practices for training programs.

Further studies could examine the influence of organizational culture, leadership support, change management strategies, and staff attitudes on HIS utilization. Understanding these socio-organizational dimensions would provide insights into overcoming resistance to change and fostering a digital-friendly work environment.

Future research could assess the relationship between the adequacy of technical infrastructure, including internet connectivity, electricity reliability, and IT support availability, and the long-term sustainability of HIS and EMR systems in resource-constrained hospitals. This could help inform infrastructure investment strategies.

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APPENDICES

Appendix 1: Questionnaire

Dear Respondent,

I am a postgraduate student at Metropolitan International University pursuing a Master's Degree in Information Technology. As part of the requirements for the award of this degree, I am conducting a study on Hospital Information Systems and Healthcare Service Delivery in Public Hospitals in Uganda: A Case of Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital.

You have been selected as a respondent because of your valuable expertise, knowledge, and experience with the Hospital Information Systems (HIS) used in your hospital. Your insights are essential for understanding how HIS influences healthcare service delivery, operational efficiency, and overall patient care. I kindly request you to spare some time to answer the following questions by filling in or ticking the appropriate responses as required. Please be assured that all information you provide was treated with strict confidentiality, and your identity was remain anonymous. No names or personal identifiers was recorded.

Thank you for your time and valuable contribution to this important study.

SECTION A: BIO-DATA

(Please tick [✓] the most appropriate option)

Variable	Options
Gender	☐ Male ☐ Female
Age (Years)	☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56 and above
Marital Status	☐ Single ☐ Married ☐ Divorced ☐ Widowed ☐ Other
Religion	☐ Christianity ☐ Islam ☐ Traditional/Indigenous ☐ Other
Education Level	☐ Primary ☐ Secondary ☐ Diploma ☐ Degree ☐ Masters ☐ PhD ☐ Other
Position in Hospital	☐ Hospital Administrator ☐ Medical Records Officer ☐ IT Personnel ☐ Senior Healthcare Provider ☐ Other (please specify) [_____]

SECTION B: STUDY VARIABLES

(Please indicate your level of agreement using the scale below)

1 = **Strongly Disagree (SD)**, 2 = **Disagree (D)**, 3 = **Neutral (N)**, 4 = **Agree (A)**, 5 = **Strongly Agree (SA)**

Statements	SD (1)	D (2)	N (3)	A (4)	SA (5)
Extent of Implementation and Utilization of Hospital Information Systems (HIS)					

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Statements	SD (1)	D (2)	N (3)	A (4)	SA (5)
HIS is fully implemented across all departments in the hospital.	☐	☐	☐	☐	☐
The hospital staff regularly use HIS in their daily operations.	☐	☐	☐	☐	☐
Training on HIS usage has been provided to all relevant staff.	☐	☐	☐	☐	☐
HIS is integrated with other hospital systems for seamless information flow.	☐	☐	☐	☐	☐
The hospital has adequate technical support for HIS maintenance and troubleshooting.	☐	☐	☐	☐	☐
Challenges Affecting the Effective Use of Hospital Information Systems					
Lack of adequate training limits effective use of HIS.	☐	☐	☐	☐	☐
Frequent technical failures disrupt HIS operations.	☐	☐	☐	☐	☐
Insufficient funding affects the maintenance and upgrade of HIS.	☐	☐	☐	☐	☐
Resistance to change among staff hinders HIS adoption.	☐	☐	☐	☐	☐
Poor internet connectivity negatively impacts HIS performance.	☐	☐	☐	☐	☐
Electronic Medical Records					
I use the Electronic Medical Records (EMR) system frequently in my daily work.	☐	☐	☐	☐	☐
The EMR system is easy to use and understand.	☐	☐	☐	☐	☐
The EMR system allows me to access patient information quickly when needed.	☐	☐	☐	☐	☐
The use of EMRs has improved the accuracy of patient records.	☐	☐	☐	☐	☐
EMRs have improved the timeliness of healthcare service delivery in this hospital.	☐	☐	☐	☐	☐
Healthcare Service Delivery					
Statements	SD (1)	D (2)	N (3)	A (4)	SA (5)
Healthcare services at the hospital meet patients' expectations.	☐	☐	☐	☐	☐
Patients receive timely medical attention upon arrival.	☐	☐	☐	☐	☐

Statements	SD (1)	D (2)	N (3)	A (4)	SA (5)
The hospital staff communicate clearly and respectfully with patients.	☐	☐	☐	☐	☐
The hospital has adequate medical equipment and supplies to provide quality care.	☐	☐	☐	☐	☐

Thank you for participating in this study. Your responses was contribute to the crop of knowledge for society to benefit.

APPENDIX II: INTERVIEW GUIDE

Dear Respondent,

I am a postgraduate student at Metropolitan International University pursuing a Master's Degree in Information Technology. As part of the requirements for the award of this degree, I am conducting a study on Hospital Information Systems and Healthcare Service Delivery in Public Hospitals in Uganda: A Case of Entebbe Regional Referral Hospital and Dr. Ronald Bata Hospital. You have been selected as a respondent because of your valuable expertise, knowledge, and experience with the Hospital Information Systems (HIS) used in your hospital. Your insights are essential for understanding how HIS influences healthcare service delivery, operational efficiency, and overall patient care. I kindly request you to spare some time to answer the following questions by filling in or ticking the appropriate responses as required. Please be assured that all information you provide was treated with strict confidentiality, and your identity was remain anonymous. No names or personal identifiers was recorded.

Thank you for your time and valuable contribution to this important study.

Extent of Implementation and Utilization of Hospital Information Systems (HIS)

1. Can you describe how Hospital Information Systems (HIS) are currently used in your department/unit?
2. What types of HIS software or technologies are implemented at your hospital?
3. How widely are these HIS tools utilized among different departments (clinical, administrative, records management, etc.)?
4. How often do you use HIS in your daily work routines? Can you give examples?

Impact of HIS on Quality, Efficiency, and Timeliness of Healthcare Service Delivery

1. In your view, how has HIS affected the quality of healthcare services provided at the hospital?
2. Can you provide examples where HIS has improved patient care or service delivery?
3. How has HIS influenced the efficiency of hospital operations, such as patient registration, record keeping, or reporting?
4. Have you noticed any changes in the timeliness of service delivery since HIS was implemented? Please elaborate.

3. Interview Guide: Electronic Medical Records

1. How has the introduction of EMRs influenced the speed or timeliness of healthcare services provided?
2. Can you explain how EMRs have impacted communication and coordination among healthcare providers in the hospital?
3. Have you noticed any changes in patient waiting times or service efficiency since EMRs were implemented?

Healthcare Service Delivery in Public Hospitals

1. How would you describe the overall healthcare service delivery process in your hospital?

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2. What are the key factors that influence the quality of healthcare services provided here?
3. How do you ensure that patients receive timely and efficient care?
4. Can you describe how different departments coordinate to deliver healthcare services?

Appendix III: Estimated Research Budget

S/N	ITEMS	DESCRIPTION	QUANTITY	UNIT COST	AMOUNT
1	Ball pens	PCs	25	500	12,500
2	Photocopying papers	Reams	5	25,000	125,000
3	Internet Services	Bundles	Monthly	30,000	180,000
4	Secretarial Services	Copies	Lump sum	Lump sum	650,000
5	Airtime for communication	Bundles	Lump sum	Lump sum	120,000
6	Subsistence allowance	Persons	4	150,000	600,000
7	Transport and travels	Persons	Lump sum	Lump sum	300,000
8	Miscellaneous				240,000
Total					2,227,500