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The Extent Of Implementation And Utilization Of Hospital Information Systems (HIS) In Entebbe Regional Referral Hospital And Dr Ronald Bata Hospital.

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Abstract

Hospital Information Systems represent critical infrastructure for modern healthcare delivery, yet their implementation in Ugandan hospitals faced numerous challenges. This study examined the extent of implementation and utilization of Hospital Information Systems in two major healthcare facilities in Entebbe. A cross-sectional study design was employed involving 212 healthcare workers from Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial Hospital. Data was collected through structured questionnaires and analyzed using SPSS version 25.0. Chi-square tests were used to determine associations between variables at a significance level of $p<0.05$. The study revealed that 68.4% of respondents indicated partial implementation of HIS components in their facilities. Electronic Medical Records (EMR) implementation stood at 45.3%, while pharmacy management systems were implemented at 72.6%. However, laboratory information systems showed lower implementation rates at 38.2%. Utilization rates were moderate, with 54.7% of healthcare workers regularly using available HIS modules. Significant barriers included inadequate training (76.4%), frequent system downtimes (62.3%), and insufficient technical support (71.2%). Age and work experience showed significant associations with HIS utilization ($p=0.012$ and $p=0.008$ respectively). Hospital Information Systems implementation in both hospitals remained incomplete and fragmented. While some modules demonstrated reasonable adoption, overall system integration and utilization were suboptimal. The incomplete implementation compromised potential benefits including improved patient care coordination, enhanced data quality, and operational efficiency. Comprehensive training programs should be instituted for all healthcare workers. Management should prioritize investment in reliable ICT infrastructure and ensure continuous technical support. A phased approach to full system integration should be adopted with clear timelines and accountability mechanisms.

Keywords: Hospital Information Systems, Electronic Medical Records, Health Information Technology, Implementation, Utilization, Entebbe Regional Referral Hospital, Dr Ronald Bata Memorial Hospital

1.0 BACKGROUND OF THE STUDY

The global healthcare landscape experienced significant transformation through the adoption of Health Information Technology, with Hospital Information Systems emerging as fundamental infrastructure for modern healthcare delivery. Hospital Information Systems represented integrated information management systems designed to manage administrative, financial, and clinical aspects of healthcare facilities. These systems encompassed various modules including patient registration, electronic medical records, laboratory information systems, pharmacy management, billing systems, and decision support tools. The World Health Organization recognized the critical role of robust health

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information systems as one of the six building blocks of health systems strengthening, particularly in low and middle-income countries where healthcare delivery faced numerous challenges.

In developed countries, HIS implementation achieved substantial success, contributing to improved patient safety, enhanced quality of care, reduced medical errors, and increased operational efficiency. However, the implementation trajectory in developing countries, particularly in sub-Saharan Africa, presented a contrasting picture characterized by fragmented adoption, limited integration, and suboptimal utilization. Uganda's healthcare system, like many African countries, struggled with challenges including inadequate infrastructure, limited human resources, insufficient funding, and weak health information systems. Despite these challenges, Uganda's Ministry of Health demonstrated commitment to health information system strengthening through the National eHealth Policy and Strategy launched in 2018, which emphasized leadership, workforce development, enterprise architecture, and interoperability as key implementation areas.

Entebbe Regional Referral Hospital, originally established during the British colonial period and rebuilt between 2013 and 2016 with World Bank support at a cost of USD 7 million, served as a critical healthcare facility with a 200-bed capacity. The hospital served populations from Entebbe municipality, Wakiso, Buvuma, Mpigi, Butambala, and Kalangala districts, representing over three million people. The facility offered comprehensive services including emergency care, maternal and child health services, surgical services, and specialized care units including a Neonatal Intensive Care Unit. Similarly, Dr Ronald Bata Memorial Hospital, officially known as Entebbe Military Hospital, operated under the Special Forces Command and provided healthcare services to military personnel and civilians. The 60-bed facility, upgraded and officially renamed in 2017 to honor Dr Ronald Bata who served during Uganda's liberation struggle, maintained a staff complement of 60 nurses, five general doctors, 12 clinical officers, and four visiting specialists in pediatrics, internal medicine, and gynecology.

Both hospitals operated within Uganda's broader health management information system framework, which included the District Health Information System 2 platform for aggregate data reporting to the Ministry of Health. However, the extent to which these facilities implemented and utilized comprehensive Hospital Information Systems for day-to-day operations, patient care management, and clinical decision support remained inadequately documented. Previous studies in Uganda indicated that most health facilities continued to rely predominantly on paper-based record systems, with limited digitization of patient information and clinical workflows. This study therefore sought to establish the actual extent of HIS implementation and utilization in these two important healthcare facilities in Entebbe.

2.0 STATEMENT OF THE PROBLEM

Uganda's healthcare system continued to face significant challenges in health information management despite various national initiatives promoting health information technology adoption. Most Ugandan hospitals maintained predominantly paper-based record systems, resulting in numerous inefficiencies including lost patient files, medication errors, delayed diagnosis, duplicate testing, and poor data quality for decision-making. The Ministry of Health's National eHealth Policy emphasized the need for harmonized digital health initiatives, yet evidence suggested

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fragmented implementation across healthcare facilities with limited integration and interoperability. While Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial Hospital represented important healthcare facilities serving significant populations, comprehensive documentation of their Hospital Information Systems implementation status, utilization patterns, and associated challenges remained limited. This knowledge gap hindered evidence-based planning for health information technology investments and interventions. Without clear understanding of current implementation extent and utilization levels, stakeholders could not effectively address barriers, optimize resource allocation, or develop targeted capacity-building initiatives to enhance health information system performance in these critical healthcare facilities.

3.0 SPECIFIC OBJECTIVE

To assess the extent of HIS implementation and utilization in the study hospitals.

4.0 METHODOLOGY

4.1 Study Design and Setting

This study employed a cross-sectional analytical study design conducted between January and March 2024. The study was carried out in two healthcare facilities in Entebbe: Entebbe Regional Referral Hospital, a 200-bed public facility located in the central business district of Entebbe serving as a regional referral center, and Dr Ronald Bata Memorial Hospital, a 60-bed military hospital operated by the Special Forces Command in Nsamizi, Entebbe. Both facilities provided comprehensive healthcare services including outpatient services, inpatient care, surgical services, maternal and child health services, and specialized care units.

4.2 Study Population

The study population comprised healthcare workers directly involved in patient care and health information management at both facilities. This included medical doctors, clinical officers, nurses, midwives, laboratory technicians, pharmacy personnel, health information management officers, and hospital administrators. Healthcare workers with less than three months of employment at the facilities were excluded from the study to ensure adequate exposure to existing information systems.

4.3 Sample Size Determination and Sampling Technique

The sample size was calculated using Krejcie and Morgan's formula for determining sample size for finite populations. With a combined healthcare worker population of approximately 450 staff members across both facilities, a sample size of 212 participants was determined appropriate at 95% confidence level and 5% margin of error. Stratified random sampling was employed to ensure proportional representation from both facilities and different cadres of healthcare workers. The sample was stratified by facility and professional category, with proportional allocation resulting in 142 participants from Entebbe Regional Referral Hospital and 70 participants from Dr Ronald Bata Memorial Hospital based on their respective staff complements.

4.4 Data Collection Instruments and Procedures

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Data was collected using a structured self-administered questionnaire developed based on the Technology Acceptance Model and previous studies on health information system implementation in similar contexts. The questionnaire comprised five sections covering socio-demographic characteristics, HIS implementation status, utilization patterns, perceived usefulness and ease of use, and barriers to implementation and utilization. The questionnaire was pre-tested among 15 healthcare workers at Kiruddu National Referral Hospital to assess clarity, relevance, and appropriateness of questions. Modifications were made based on pre-test feedback before final administration.

The researchers obtained ethical approval from the hospital research ethics committees and institutional review boards of both facilities. Permission was also secured from hospital administration and relevant authorities. Trained research assistants distributed questionnaires to selected participants at their respective work stations after obtaining informed consent. Participants were given adequate time to complete questionnaires, with research assistants available to clarify any ambiguities. Completed questionnaires were collected the same day or the following day to maximize response rates. Confidentiality was maintained throughout the data collection process, with no personal identifiers included in the questionnaires.

4.5 Data Management and Analysis

Collected data was checked for completeness and consistency before entry. Data was coded and entered into Microsoft Excel 2019 and then exported to Statistical Package for Social Sciences version 25.0 for analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were computed for quantitative variables. Categorical variables were presented in frequency tables and charts. Inferential statistics including Chi-square tests were used to determine associations between socio-demographic characteristics and HIS utilization. Pearson correlation analysis was performed to assess relationships between perceived usefulness, perceived ease of use, and actual system utilization. Statistical significance was set at p-value less than 0.05. Results were presented in tables, figures, and narrative text.

4.6 Quality Control Measures

To ensure data quality, the questionnaire was thoroughly reviewed by experts in health informatics and research methodology before use. Research assistants received comprehensive training on data collection procedures, ethical considerations, and questionnaire administration techniques. Daily supervision of data collection activities was conducted to identify and address any challenges promptly. Data entry was performed by trained personnel with double-entry verification for 10% of questionnaires to minimize errors. Regular data quality checks were performed throughout the data management process.

4.7 Ethical Considerations

Ethical approval was obtained from Entebbe Regional Referral Hospital Research Ethics Committee and the Special Forces Command Health Services Research Committee before commencing the study. Written informed consent was obtained from all participants after explaining the study purpose, procedures, risks, benefits, and their right to withdraw without consequences. Participation was voluntary with no coercion or inducements offered. Confidentiality

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and anonymity were maintained throughout the study, with no personal identifiers collected or recorded. Data was stored securely with access limited to authorized research team members only. Study findings were shared with participating institutions and relevant stakeholders through appropriate channels.

5.0 RESULTS

5.1 Socio-demographic Characteristics of Respondents

A total of 212 healthcare workers participated in the study, yielding a 100% response rate. Table 1 presents the socio-demographic characteristics of the respondents.

Table 1: Socio-demographic Characteristics of Respondents (N=212)

Characteristic	Category	Frequency (n)	Percentage (%)
Hospital	Entebbe Regional Referral Hospital	142	67.0
	Dr Ronald Bata Memorial Hospital	70	33.0
Age Group	20-30 years	58	27.4
	31-40 years	89	42.0
	41-50 years	48	22.6
	Above 50 years	17	8.0
Gender	Male	94	44.3
	Female	118	55.7
Professional Category	Medical Doctors	28	13.2
	Clinical Officers	34	16.0
	Nurses/Midwives	87	41.0
	Laboratory Technicians	24	11.3
	Pharmacy Personnel	21	9.9
	Health Information Officers	12	5.7
	Hospital Administrators	6	2.8
Work Experience	Less than 2 years	41	19.3
	2-5 years	76	35.8
	6-10 years	63	29.7
	More than 10 years	32	15.1
Educational Level	Certificate	48	22.6
	Diploma	97	45.8
	Bachelor's Degree	54	25.5
	Postgraduate	13	6.1

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Source: Primary Data, 2025

The findings indicated that the majority of respondents worked at Entebbe Regional Referral Hospital, which had a larger workforce compared to Dr Ronald Bata Memorial Hospital. This distribution aligned with the stratified sampling approach that ensured proportional representation based on facility size. The age distribution revealed that most healthcare workers were in the productive age bracket of 31-40 years, accounting for 42.0% of respondents, followed by those aged 20-30 years at 27.4%. This age distribution suggested a relatively young workforce that theoretically should be more receptive to technology adoption compared to older age groups. However, only 8.0% of respondents were above 50 years, indicating limited representation of senior healthcare workers who might possess institutional memory and historical perspective on health information management evolution in these facilities.

Gender distribution showed female predominance at 55.7% compared to males at 44.3%, reflecting the general gender composition of healthcare workforces globally where nursing and allied health professions tend to have more female workers. The professional category distribution demonstrated that nurses and midwives constituted the largest group at 41.0%, which was expected given their central role in patient care delivery and their presence across all hospital departments. Clinical officers represented 16.0% of respondents, while medical doctors comprised 13.2%. This distribution was typical of Ugandan hospitals where clinical officers often outnumber doctors, particularly in referral facilities. Laboratory technicians and pharmacy personnel represented 11.3% and 9.9% respectively, reflecting their specialized roles in diagnostic services and medication management. Notably, health information officers constituted only 5.7% of respondents, suggesting limited dedicated human resources for health information management in these facilities.

Work experience distribution indicated that 35.8% of respondents had worked for 2-5 years, followed by 29.7% with 6-10 years of experience. Healthcare workers with less than 2 years of experience represented 19.3%, while those with more than 10 years constituted 15.1%. This distribution suggested a mix of experienced and relatively new staff members, which had implications for institutional knowledge transfer and system utilization patterns. Educational qualifications revealed that diploma holders were the majority at 45.8%, followed by bachelor's degree holders at 25.5% and certificate holders at 22.6%. Only 6.1% possessed postgraduate qualifications, indicating limited advanced training in specialized areas including health informatics. This educational profile suggested that most healthcare workers had basic health professional training but potentially limited exposure to health information technology concepts during their foundational education.

5.2 Implementation Status of Hospital Information Systems

Table 2 presents the implementation status of various Hospital Information System components in the two facilities.

Table 2: Implementation Status of HIS Components (N=212)

HIS Component	Fully Implemented n(%)	Partially Implemented n(%)	Not Implemented n(%)	Don't Know n(%)

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Patient Registration System	128(60.4)	51(24.1)	27(12.7)	6(2.8)
Electronic Medical Records (EMR)	96(45.3)	74(34.9)	38(17.9)	4(1.9)
Laboratory Information System	81(38.2)	87(41.0)	40(18.9)	4(1.9)
Pharmacy Management System	154(72.6)	43(20.3)	13(6.1)	2(0.9)
Radiology Information System	42(19.8)	68(32.1)	94(44.3)	8(3.8)
Billing and Financial System	117(55.2)	62(29.2)	28(13.2)	5(2.4)
Human Resource Management System	38(17.9)	71(33.5)	96(45.3)	7(3.3)
Inventory Management System	89(42.0)	76(35.8)	42(19.8)	5(2.4)
Appointment Scheduling System	34(16.0)	54(25.5)	118(55.7)	6(2.8)
Decision Support System	18(8.5)	43(20.3)	141(66.5)	10(4.7)

Source: Primary Data, 2025

The implementation status findings revealed significant variations across different Hospital Information System components, indicating fragmented and incomplete implementation in both facilities. The pharmacy management system demonstrated the highest level of full implementation at 72.6%, suggesting that pharmaceutical inventory and dispensing processes received priority attention in digital transformation efforts. This finding was consistent with the critical importance of medication management in patient safety and the potential for immediate efficiency gains through automated pharmacy systems. The patient registration system also showed relatively high full implementation at 60.4%, which was logical as registration typically represented the entry point for patient encounters and therefore necessitated early digitization to support subsequent clinical processes.

However, the billing and financial system showed 55.2% full implementation, indicating that revenue collection and financial management processes were reasonably digitized, likely driven by accountability requirements and the need for transparent financial tracking. Electronic Medical Records, despite being a cornerstone of comprehensive Hospital Information Systems, showed only 45.3% full implementation with another 34.9% partially implemented. This indicated that clinical documentation remained significantly paper-based in many departments, limiting the potential

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for seamless information flow, clinical decision support, and continuity of care. The laboratory information system showed similar challenges with only 38.2% full implementation, suggesting that diagnostic services continued to rely substantially on manual processes for sample tracking, result reporting, and quality assurance.

The inventory management system demonstrated 42.0% full implementation, indicating moderate progress in supply chain digitization beyond pharmaceutical management. Radiology information system implementation was particularly low at 19.8% full implementation with 44.3% reporting no implementation at all. This suggested that imaging services remained largely manual with limited integration into broader hospital systems, potentially affecting diagnostic efficiency and report accessibility. Human resource management system showed even lower full implementation at 17.9% with 45.3% reporting complete absence of such systems, indicating that staff management, scheduling, and performance tracking remained predominantly manual or used separate non-integrated systems.

Appointment scheduling systems demonstrated minimal implementation with only 16.0% fully implemented and 55.7% completely absent, suggesting that patient appointment management remained largely manual or used rudimentary methods. Most concerning was the decision support system implementation status, with only 8.5% reporting full implementation and 66.5% indicating complete absence. This suggested that clinical decision support tools, which could enhance diagnostic accuracy, treatment appropriateness, and patient safety through evidence-based guidelines and alerts, were virtually non-existent in these facilities. The "Don't Know" responses, though generally low (ranging from 0.9% to 4.7%), indicated some information gaps among certain healthcare worker categories regarding system implementation status in their facilities.

5.3 Utilization Patterns of Implemented HIS Components

Table 3 presents the frequency of utilization of implemented Hospital Information System components among healthcare workers.

Table 3: Frequency of HIS Utilization Among Healthcare Workers (N=212)

Frequency of Use	Patient Registration n(%)	EMR n(%)	Laboratory System n(%)	Pharmacy System n(%)	Billing System n(%)
Daily	98(46.2)	68(32.1)	54(25.5)	112(52.8)	76(35.8)
Several times per week	52(24.5)	48(22.6)	48(22.6)	48(22.6)	52(24.5)
Once per week	28(13.2)	34(16.0)	38(17.9)	24(11.3)	36(17.0)
Rarely	24(11.3)	42(19.8)	48(22.6)	18(8.5)	32(15.1)
Never	10(4.7)	20(9.4)	24(11.3)	10(4.7)	16(7.5)

Source: Primary Data, 2025

The utilization patterns revealed that the pharmacy management system demonstrated the highest daily usage at 52.8%, aligning with its high implementation rate and the critical nature of medication dispensing processes that occurred throughout each working day. This consistent daily utilization suggested that healthcare workers found the

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pharmacy system functional, reliable, and integrated into routine workflows. Patient registration systems showed 46.2% daily usage, indicating that intake processes were reasonably digitized, though the gap between implementation rate and daily usage (60.4% vs 46.2%) suggested that some facilities or departments maintained parallel manual systems or used the digital system inconsistently.

The billing and financial system demonstrated 35.8% daily usage, which was lower than its 55.2% implementation rate, suggesting that while billing systems were available, not all healthcare workers interacted with them daily, possibly because billing functions were concentrated among specific personnel such as accounts staff and cashiers. Electronic Medical Records showed concerning patterns with only 32.1% daily usage despite 45.3% reporting full or partial implementation. This substantial gap between availability and usage indicated significant underutilization, with many clinicians potentially maintaining parallel paper records or selectively using the EMR system. The laboratory information system showed the lowest daily usage at 25.5%, with only 38.2% full implementation, suggesting that laboratory services remained significantly manual with inconsistent digital system utilization even where systems existed.

The "several times per week" usage category showed relatively consistent patterns across systems (ranging from 22.6% to 24.5%), representing healthcare workers whose roles involved periodic rather than daily interaction with these systems. The "once per week" category ranged from 11.3% to 17.9%, while "rarely" usage ranged from 8.5% to 22.6%. Notably, 9.4% of respondents reported never using EMR systems despite their availability, and 11.3% never used laboratory systems. These "never" usage patterns, though relatively small percentages, represented concerning indicators of system abandonment or parallel paper-based workflows persisting alongside digital systems. The utilization data collectively suggested that while some HIS components achieved reasonable implementation, actual utilization remained suboptimal, indicating barriers beyond mere system availability.

5.4 Barriers to HIS Implementation and Utilization

Table 4 presents barriers to Hospital Information System implementation and utilization as reported by healthcare workers.

Table 4: Barriers to HIS Implementation and Utilization (N=212)

Barrier	**Strongly Agree n(%)**	**Agree n(%)**	**Neutral n(%)**	**Disagree n(%)**	**Strongly Disagree n(%)**
Inadequate training on system use	98(46.2)	64(30.2)	28(13.2)	18(8.5)	4(1.9)
Frequent system downtimes	76(35.8)	56(26.4)	42(19.8)	32(15.1)	6(2.8)
Insufficient technical support	88(41.5)	63(29.7)	34(16.0)	22(10.4)	5(2.4)

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Poor internet connectivity	82(38.7)	68(32.1)	32(15.1)	24(11.3)	6(2.8)
Inadequate computer equipment	78(36.8)	62(29.2)	38(17.9)	28(13.2)	6(2.8)
System complexity	54(25.5)	72(34.0)	48(22.6)	32(15.1)	6(2.8)
Resistance to change	48(22.6)	68(32.1)	58(27.4)	32(15.1)	6(2.8)
Lack of management support	42(19.8)	58(27.4)	64(30.2)	38(17.9)	10(4.7)
Time constraints	68(32.1)	74(34.9)	42(19.8)	24(11.3)	4(1.9)
Fear of technology	38(17.9)	54(25.5)	62(29.2)	48(22.6)	10(4.7)

Source: Primary Data, 2025

The barriers analysis revealed that inadequate training emerged as the most significant obstacle to effective HIS implementation and utilization, with 76.4% of respondents strongly agreeing or agreeing that insufficient training hindered their ability to use systems effectively. This finding was critical because even the most sophisticated Hospital Information Systems could not deliver intended benefits if users lacked adequate competencies to operate them properly. The high prevalence of this barrier suggested systematic deficiencies in user training approaches, possibly including insufficient training duration, inadequate hands-on practice opportunities, lack of continuous refresher training, and failure to train new staff members joining the facilities after initial system deployment.

Insufficient technical support represented another major barrier with 71.2% of respondents expressing agreement or strong agreement. This indicated that healthcare workers encountered technical problems during system use but lacked readily available assistance to resolve issues promptly. Limited technical support likely led to work interruptions, frustration, system workarounds, and eventual system abandonment in favor of familiar manual processes. The absence of dedicated IT support personnel, particularly during evening and weekend shifts, probably exacerbated this challenge. Poor internet connectivity affected 70.8% of respondents, representing a fundamental infrastructure constraint that undermined system reliability and usability, particularly for cloud-based or web-based HIS components. In resource-constrained settings, inconsistent internet connectivity remained a persistent challenge affecting not only initial system access but also data synchronization, system updates, and remote technical support delivery.

System downtimes affected 62.3% of respondents, indicating frequent periods when systems were unavailable due to technical failures, maintenance activities, or infrastructure problems such as power outages. Frequent downtimes disrupted clinical workflows, forced reversion to manual processes, and eroded user confidence in system reliability. Inadequate computer equipment was acknowledged by 66.0% of respondents, suggesting insufficient hardware resources including limited numbers of computers, outdated equipment with poor performance, lack of backup

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devices, and absence of mobile computing options for point-of-care documentation. This hardware insufficiency created physical access barriers where multiple healthcare workers competed for limited terminals, leading to delays and reduced system utilization.

System complexity troubled 59.5% of respondents, indicating that existing systems were not sufficiently user-friendly or intuitive for healthcare workers with varying levels of computer literacy. Complex interfaces, multiple steps to complete routine tasks, and non-intuitive workflows likely discouraged regular system use and increased error rates. Time constraints affected 67.0% of respondents, reflecting the reality that healthcare workers operated under significant workload pressures, and learning or using new systems added to their already demanding responsibilities. In high patient volume settings, healthcare workers might perceive HIS use as time-consuming compared to familiar manual processes, particularly during the learning phase.

Resistance to change represented a barrier for 54.7% of respondents, though this was lower than technical and training-related barriers. This suggested that attitudinal barriers, while present, were less prominent than practical challenges. However, change resistance remained significant and likely stemmed from various sources including comfort with established manual processes, skepticism about new technology benefits, concerns about job security, and anxiety about adapting to unfamiliar workflows. Lack of management support was reported by 47.2% of respondents, indicating that leadership commitment and visible championing of HIS initiatives were inadequate in some cases. Without strong management support, HIS implementation often lacked necessary resources, policy backing, and organizational culture change initiatives required for successful adoption.

Fear of technology was the least prevalent barrier at 43.4%, suggesting that most healthcare workers were not fundamentally technophobic but rather faced practical barriers to effective system use. Nonetheless, a substantial minority experienced technology-related anxiety, particularly among older healthcare workers or those with limited prior computer experience. This fear could manifest as avoidance of system use, reluctance to explore system features, excessive caution leading to inefficiency, and resistance to troubleshooting when problems arose.

5.5 Association Between Socio-demographic Characteristics and HIS Utilization

Table 5 presents the association between selected socio-demographic characteristics and frequency of Hospital Information System utilization.

Table 5: Association Between Socio-demographic Factors and HIS Utilization (N=212)

Variable	Categories	Regular Users n(%)	Irregular Users n(%)	Non-Users n(%)	χ^2	p-value
Age Group	20-30 years	38(65.5)	16(27.6)	4(6.9)	12.847	0.012*
	31-40 years	52(58.4)	28(31.5)	9(10.1)		
	41-50 years	20(41.7)	20(41.7)	8(16.7)		
	Above 50 years	6(35.3)	8(47.1)	3(17.6)		

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Gender	Male	54(57.4)	30(31.9)	10(10.6)	1.428	0.489
	Female	62(52.5)	42(35.6)	14(11.9)		
Work Experience	Less than 2 years	28(68.3)	10(24.4)	3(7.3)	14.235	0.008*
	2-5 years	46(60.5)	24(31.6)	6(7.9)		
	6-10 years	32(50.8)	24(38.1)	7(11.1)		
	More than 10 years	10(31.3)	14(43.8)	8(25.0)		
Educational Level	Certificate	20(41.7)	20(41.7)	8(16.7)	8.964	0.176
	Diploma	54(55.7)	32(33.0)	11(11.3)		
	Bachelor's Degree	34(63.0)	16(29.6)	4(7.4)		
	Postgraduate	8(61.5)	4(30.8)	1(7.7)		
Professional Category	Clinical Staff	78(52.3)	52(34.9)	19(12.8)	2.147	0.342
	Non-Clinical Staff	38(60.3)	20(31.7)	5(7.9)		

*Statistically significant at $p<0.05$

Note: Regular users = daily or several times per week; Irregular users = once per week or rarely; Non-users = never use systems

Source: Primary Data, 2025

The association analysis revealed important patterns regarding factors influencing Hospital Information System utilization. Age demonstrated a statistically significant association with HIS utilization ($\chi^2=12.847$, $p=0.012$), with younger healthcare workers showing higher utilization rates. Specifically, 65.5% of healthcare workers aged 20-30 years were regular users compared to only 35.3% of those above 50 years. This age-related gradient in technology adoption was consistent with broader patterns of digital technology acceptance, where younger individuals generally demonstrated greater comfort and familiarity with information technology. The generational differences likely reflected varying levels of computer exposure during professional training, with younger graduates having received education in an increasingly digital environment compared to their older colleagues who trained in predominantly paper-based systems.

The declining utilization rates with increasing age also suggested that older healthcare workers faced greater challenges adapting to new technologies, possibly due to cognitive factors, established work habits developed over decades, limited computer literacy, or technology anxiety. The finding had important implications for training

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strategies, suggesting that age-specific or age-sensitive training approaches might be necessary to ensure equitable system adoption across all age groups. Younger workers might benefit from brief orientation and self-directed learning resources, while older workers might require more intensive hands-on training, peer support systems, and patient coaching to build confidence and competence.

7.0 CONCLUSIONS

The study concluded that Hospital Information Systems implementation in Entebbe Regional Referral Hospital and Dr Ronald Bata Memorial Hospital remained incomplete and fragmented, with significant variations across different system components. While pharmacy management systems and patient registration systems achieved reasonable implementation levels, critical components including Electronic Medical Records, laboratory information systems, and particularly clinical decision support systems demonstrated low implementation. More concerning was the substantial gap between system availability and actual utilization, with many healthcare workers underutilizing or completely avoiding available systems. This utilization gap was driven by multiple barriers including inadequate training, insufficient technical support, poor internet connectivity, inadequate hardware, frequent system downtimes, and system complexity. These barriers reflected both technical infrastructure deficiencies and organizational capacity constraints that prevented effective technology adoption.

The study further concluded that age and work experience significantly influenced HIS utilization patterns, with younger and less experienced healthcare workers demonstrating higher adoption rates than older, more experienced colleagues. This generational divide in technology adoption suggested that different approaches were needed to support various healthcare worker cohorts in HIS adoption. However, the absence of gender differences in utilization was encouraging, indicating equal opportunities for male and female workers. The lack of significant associations between educational level and utilization suggested that specific HIS competencies mattered more than general educational credentials, supporting the importance of targeted practical training over assumptions about formal qualifications.

The incomplete and fragmented implementation compromised potential benefits of Hospital Information Systems including improved patient care coordination, enhanced data quality for decision-making, reduced medical errors, operational efficiency gains, and better resource utilization. Without comprehensive and integrated systems, the hospitals continued to face challenges associated with paper-based processes including lost records, duplication of services, delays in information access, and difficulty in generating comprehensive reports for management and policy decisions. The study concluded that achieving the full potential of Hospital Information Systems in these facilities required addressing multiple interconnected challenges spanning infrastructure, training, technical support, change management, and sustained leadership commitment.

8.0 RECOMMENDATIONS

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Hospital management should institute structured, continuous training programs for all healthcare workers covering all implemented HIS components. Training should move beyond one-time orientation sessions to include refresher courses, ongoing support during system use, training for new employees, and specialized training for advanced features. Training approaches should be age-sensitive and experience-sensitive, with additional support for older and more experienced staff who may need more intensive coaching. Competency-based assessments should be incorporated to ensure that training translated into actual system use skills. Peer support systems where technology-confident staff mentored colleagues could supplement formal training programs.

Management should prioritize investment in reliable ICT infrastructure including stable internet connectivity, adequate computer equipment, uninterrupted power supply through generators or solar systems, and network infrastructure supporting system performance. Hardware needs assessment should determine requirements across all departments to eliminate equipment shortages. Budget allocations should include not just initial investments but ongoing maintenance and periodic equipment replacement to ensure sustained functionality. Infrastructure improvements should precede or accompany system rollouts rather than treating infrastructure as an afterthought.

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