Original Article

Journal of Hospital Administration
Volume 8 Number 2, July-December 2024

Exploratory Study of Electronic Hospital Information System in a Tertiary Care Hospital of Uttar Pradesh India

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How to cite this article:

Himanshi Narang, Mohit Wadhawan, Azad Kumar Bharti, Exploratory Study of Electronic Hospital Information System in a Tertiary Care Hospital of Uttar Pradesh India. RFP Journal of Hospital Administration. 2024;8(2):61-66.

Abstract

Information systems are crucial for modern businesses, particularly in the healthcare sector, as they improve data accuracy, accessibility, and usability. Hospital information management systems (HIMS) are popular computer programs used to support healthcare services, enabling quick access to patient records, facilitating report delivery, and facilitating departmental cooperation. HIS integrates various aspects of hospital operations, such as electronic health records (EHR), patient registration, appointment scheduling, billing, invoicing, laboratory administration, pharmacy inventory control, and radiology imaging systems. Implementing HIS can enhance operational effectiveness, improve patient experience, health outcomes, and organizational funds. However, many hospitals still rely on manual operations and must transition to computerized techniques. Paper-based medical records are ineffective in providing timely information, leading to delays in decision-making, time-consuming and inefficient medical diagnoses and prescriptions, and delays in organ transplants. This study aims to understand stakeholders' opinions on the existing system and identify areas for improvement.

Keywords: Stakeholders; Information systems; HIMS; HMIS; Electronic health record; Hospital information management.

INTRODUCTION

In the modern business world, up-to-date data is essential for better planning, decision-making, and overall outcomes.[1] Within an organisation, information systems work to improve the accuracy, accessibility, and usability of data. These systems gather, process, and store data, resulting in useful knowledge and improved databases.[2]

Recognising that information is incoherent and challenging to analyse, and acknowledging its significance is an essential organisational precept. To accomplish its goals and objectives, it should be handled well because it is a crucial component of an organisation.

Information systems are utilised extensively in many different businesses, particularly the healthcare sector, to oversee tasks, enable quick access to patient records, facilitate the delivery of reports, and facilitate departmental cooperation. In many ways, these systems are advantageous to both patients and medical practitioners.

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Received on: 10.10.2024

Accepted on: 13.11.2024

One of the most popular computer programmes used to support healthcare services is HIMS.

Modern healthcare organisations depend heavily on hospital information management systems (HIMS), which have completely changed how medical data is handled. These solutions are intended to improve patient care delivery and hospital efficiency overall by streamlining administrative and clinical processes. HIMS has evolved into an essential tool for healthcare providers thanks to the quick evolution of technology.[3]

Electronic health records (EHR), patient registration, appointment scheduling, billing and invoicing, laboratory administration, pharmacy inventory control, and radiology imaging systems are only a handful of the subsystems that make up the HIS and integrate numerous areas of hospital operations. A hospital's operational effectiveness can be enhanced through HIS, which will ultimately result in a better patient experience, better health outcomes, and more funds for the organisation.[4]

By consolidating these functionalities into a centralized platform, hospitals can achieve higher accuracy in data management while reducing manual errors. The primary objectives of implementing HIS are to enhance the quality of care provided to patients by facilitating real-time access to medical records across departments and ensuring seamless communication between healthcare providers.

Present-Day Management Framework

The majority of hospitals have many issues with the Hospital Management System since some still rely on manual operations, and those that do must also deal with the transition of switching to a computerised technique.

Problem Statement

Studies have shown that paper-based medical records are ineffective in providing timely information about a patient's medical history, which can significantly impact their life and death. This makes it difficult to coordinate and distribute accurate information between different medical teams, leading to delays in decision-making. Doctors often write patient diagnoses and prescriptions manually, which is time-consuming and inefficient. During emergencies or accidents, medical staff struggle to discover patients' medical history, resulting in delays in treatment. Patients must visit hospital pharmacies to purchase prescribed medicines, which is a time-consuming process. Medical tests at laboratories require patients to provide samples and collect reports multiple times.[3] Organ transplants are often a tedious task for serious illnesses, and there is no proper mechanism to register and notify organ donors. These observations highlight the need for a single software system that can cater to different hospital stakeholders. Thus, the aim of current study was to find out the opinion of the stakeholders regarding the existing system and scope for further improvement.

MATERIALS & METHODS

After clearance from the ethical committee vide letter no. Ref No. 40-28-06-2023 dated 22.06.2023, the study was conducted in the Government Medical College & Hospital, Saharanpur, Uttar Pradesh.

A. **Study design:** Hospital-Based Exploratory Study
B. **Study Participants:** Doctors & Nurses

Inclusion Criteria

1. Participants who were willing to participate in the study.
2. Doctors & Nurses registered with respective councils who presently work in Government Medical College & Hospital, Saharanpur.

Exclusion Criteria

1. Doctors and Nurses not willing to participate
2. Interns

Study Group: The study was conducted on Doctors & Nurses, and for analysis, the cases will be divided into the following two (2) groups 25 participants each.

Type of Sampling: Convenience Sampling

Study Procedure

Thematic, semi-structured interviews with open-ended questions were conducted to collect data on the experiences of the users. Semi-structured interviews were chosen as they allow for a more free-form interaction without being too rigid. User perceptions that the researchers wished to gain understanding main areas.

All interviews were conducted in person in Government Medical College & Hospital, Saharanpur during April and July in 2023.

The semi-structured interviews consisted of the same questions for each user. The interview questions were selected to understand the user experience of the hospital information system. There were inconsistencies in the interview data:

not all respondents answered all of the questions, which makes interpreting the results less reliable. Interview topics and questions are attached as Appendix I.

RESULTS & DISCUSSION

It requires a significant amount of commitment from all the stakeholders, including their understanding of the potential difficulties that the framework may provide and, more significantly, their readiness to address and overcome these difficulties.[5] Hospital management information system (HMIS This system should allow doctors who handle the majority of patient interactions to collaborate on patient care, synthesize and analyse data, and enhance the hospital's effectiveness in terms of care and economics.[6]

Table 1: Distribution of Participants According to Gender

Variables	Number (n)	Percentage (%)
Gender		
Female	21	42%
Male	29	58%

In our research, there was an unheard-of level of agreement among physicians regarding the necessity of formal training before the implementation of HMIS in order to fully comprehend its possibilities. In our study, 42% of those interviewed denied receiving formal training before the hospital implemented HMIS, which was evident in their lack of knowledge of some key elements. In one instance, just 66% of the respondents agreed when asked about feeling stressed while using the system. This significant study finding suggests that the technology hadn't been utilised to its full potential and that users weren't cognizant of all of its functions because there had never been any official training sessions, which is quite in line with the other research[7].

Table 2: Response of participants-I

Variables	Number (n)	Percentage (%)
Does your system have any error prevention mechanism?		
Agree	20	40%
Neutral	26	52%
Disagree	4	8%
The HIMS helps me in making decisions		
Agree	33	66%
Neutral	17	34%
Disagree	00	00%
The HIMS has provisions to compile reports of investigations		
Agree	48	96%
Neutral	2	04%
Disagree	00	00%
The HIMS is easy to use		
Agree	27	54%
Neutral	17	34%
Disagree	6	12%

In a hospital offering tertiary care, patient care has long been a diverse, unified endeavour where referrals to different departments are made often with the goal to obtain a comprehensive management plan. This method necessitates a quick evaluation of the history and findings at the physicians' discretion. In our study 80% participants agreed that reviewing a patient's medical history is much simpler than they had previously thought, which supports the collaborative approach to patient care and is also consistent with doctors' perceptions in earlier studies of a similar nature[8].

Additionally, research has demonstrated that HMIS has a wide range of drawbacks. In accordance to our study, 68% of participants agreed that it took more time—a frequently observed finding. We think that the skill and speed needed to operate a keyboard and a screen, which depends on individual skills and expertise, may be responsible[9].

In our study, 72% participants agreed to still doing manual paperwork. Due to lengthy paperwork and data entry, it may take more time for people who have less acclimatised to this technique, clogging clinics, outpatient departments, and slowing down daily ward operations[10].

Table 3: Response of participants-II

Variables	Number (n)	Percentage (%)
Reply of participants in regard to feeling stressed while working on HIMS system		
Agree	33	66%
Neutral	17	34%
Disagree	00	00%
The HIMS makes work faster, saves time		
Agree	00	00%
Neutral	16	32%
Disagree	34	68%
The HIMS aids in interdepartmental communication		
Agree	40	80%

Variables	Number (n)	Percentage (%)
Neutral	10	20%
Disagree	00	00%
The HIMS needs some changes		
Agree	30	60%
Neutral	18	36%
Disagree	2	04%

Long queues for patients, less doctor-patient interaction, and ultimately lower patient satisfaction would be a direct consequence of this. Although this is understandable given the lack of training and computer expertise, more than half of our respondents felt that HMIS did require a high level of computer proficiency and that there was no disadvantage in the event that data was lost due to technical glitches[10]wherever he is and whatever he is doing, so that he can apply timely interventions and set the things right and thereby take care of patient safety, quality improvement, and also minimize litigation problems in the hospitals.\n After the initial introduction of HIS into the organization, the key findings were that the entire hospital operations are HIS driven. From the registration and admission of the patient, to the discharge summary generation of an inpatient, the entire process is guided by the HIS. It was found that the HIS is billing-centric, i.e., the HIS use pathway begins only when the registration fee is billed and the unique health identification number (UHID.

Table 4: Response of participants - III

Variables	Number (n)	Percentage (%)
Did you get training to use the system?		
Agree	02	04%
Neutral	06	12%
Disagree	42	84%
Does someone respond frequently when you encounter problems with the system?		
Agree	03	04%
Neutral	17	34%
Disagree	30	62%
Does your system have interlinking/hyper linking facilities?		
Agree	32	64%
Neutral	16	32%
Disagree	02	4%
Do you still do some work manually on paper?		
Agree	36	72%
Neutral	13	26%
Disagree	1	02%
Is the system integrated to other systems relevant to you?		
Agree	27	54%
Neutral	23	46%
Disagree	00	0%
Are the current integrations sufficient and working?		
Agree	19	38%
Neutral	18	36%
Disagree	13	26%

Table 5: Response of participants-IV

Variables	Number (n)	Percentage (%)
Do you want to add any new features to existing HIMS?		
Agree	40	80%
Neutral	10	20%
Disagree	00	00%
Does your system provide online or offline help/guidance?		
Agree	26	52%
Neutral	22	44%
Disagree	02	4%
Do you ever get annoyed while using your system?		
Agree	28	56%
Neutral	20	40%
Disagree	2	4%
Is your system flexible, i.e., can you adjust your system according to your needs?		
Agree	15	30%
Neutral	26	52%
Disagree	9	18%
Is your system is familiar with your knowledge?		
Agree	31	62%
Neutral	19	38%
Disagree	09	00%

The foreseeable future of hospital information systems (HIS) has a lot of possibilities as technology develops further. System effectiveness, organisational support, and user input were the three primary areas where there was room for development. Along with expanding the number of computers available at the point of care, boosting the HIS's performance is essential for its continued achievement. User-friendliness and cutting-edge data entry techniques, including automated speech recognition, can reduce workload and increase the accuracy of the information. The organization's assistance is essential in ensuring that users have access to training and protected time during working hours to study and practise using HIS. To take customer concerns, recommendations, and contributions into consideration, better and more trustworthy avenues of dialogue and input are required.

CONCLUSION & RECOMMENDATION

Employees must adjust to new tools and operations as a result of the frequent changes that HIS implementation entails in existing procedures. Effective training programmes, transparent communication, and continual management assistance are necessary to overcome this resistance. likewise, it is crucial for an HIS deployment to provide data security and privacy. By adopting strong security measures and adhering to regulatory standards, healthcare organisations must prioritise the protection of patient information from breaches or unauthorised access & manipulation.

With training and establishment of new SOPs that define a new paperless method of doing the same work, this hurdle of a stringent work culture can be overcome with the active participation of the higher management. This barrier of a rigid organisational culture can be addressed with training and the formation of novel SOPs that specify a new digital manner of performing the same work, with the vocal backing of executives. Nevertheless, if the HIS is put in portable devices that end users can carry, additional mobility and connectivity can be piled on. End users like staff nurses and MOs frequently have to fill out paper forms before entering the same data again into the HIS. As a result, operations are currently in a repetitious, laborious juncture.

This problem can be solved if a portable device, such as an electronic tab, is offered with the HIS preinstalled. Overall, better management involvement and end users' commitment are what may result in a good shift and boost HIS module usage, ultimately striving towards paperless operations within the healthcare facility.

By automating operations like patient registration, appointment scheduling, and billing, HIS streamlines administrative procedures. In addition to reducing paperwork, this also increases efficiency and accuracy, freeing up employees to devote more time to patient care. Second, HIS makes it possible for healthcare personnel to view patient records, diagnostic reports, and test results in real-time, facilitating speedy decision-making processes. Therefore, the seamless exchange of patient data between various departments and healthcare providers, providing continuity of treatment and lowering medical errors brought on by inaccurate or missing data.

This encourages improved communication between interdisciplinary teams and raises the standard of treatment given to patients. Lastly, By tracking medical supplies and equipment in real-time, HIS enables effective inventory management by avoiding stockouts and overstocking problems.

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