**Hospital Management System**

**Documentation**

**Abstract**

The hospital management system (HMS) is a software application that manages a hospital's daily operations and administrative tasks, including patient information management, appointment scheduling, medical records management, billing and financial management, and reporting and analytics. Implementing an effective HMS is crucial in improving the quality of care, reducing medical errors, and increasing efficiency and productivity in healthcare organizations. This research paper investigates the current state of HMS, including its benefits, challenges, and best practices for implementation and maintenance. The report explores the different phases of the HMS development methodology. It provides valuable insights to healthcare organizations, researchers, and policymakers interested in improving healthcare services' quality through effective hospital management systems. This literature review examines different studies on implementing HMS in hospitals and their impacts on patient care, financial performance, and healthcare value. The findings suggest that implementing an HMS positively impacts hospital operations, financial management, and patient care and enhances organizational goals' achievement. The success of information systems depends on understanding management information systems, computer technology, and the design and implementation of information systems, and timely access to and use of information is necessary for institutional growth and development.

**Introduction**

In recent years, healthcare organizations have faced numerous challenges related to managing their resources, information, and services. One of the critical components in healthcare delivery is the hospital management system (HMS), a software application that manages a hospital's daily operations and administrative tasks. The HMS plays a significant role in improving the quality of care, reducing medical errors, and increasing efficiency and productivity. However, implementing and maintaining an effective HMS can be complex and challenging, requiring careful planning, design, and implementation.

This paper investigates the current state of hospital management systems, including their benefits, challenges, and best practices for implementation and maintenance. The report will explore the different phases of the HMS development methodology, including requirements gathering, design, development, testing, deployment, training, and support.

This paper is significant as it contributes to the growing body of literature on HMS and can provide valuable insights to healthcare organizations, researchers, and policymakers interested in improving healthcare services' quality through effective hospital management systems.

**Literature review**

Essential hospital management involves coordinating and organizing various hospital functions such as patient care, administrative tasks, and financial management. A hospital management system (HMS) is a computerized system designed to support and manage hospital operations, including patient information management, appointment scheduling, medical records management, billing and financial management, and reporting and analytics (Vyas & Patel, 2017). The primary goal of an HMS project is to automate key hospital processes, reduce administrative workload, and improve patient care. Several studies have shown that the implementation of an HMS can have a positive impact on hospital operations, including improved patient satisfaction, reduced administrative workload, increased efficiency, and enhanced service quality (Al-Hajj et al., 2019; Muzira & Tusabe, 2020; Teimouri et al., 2019; Yerima & Rabiu, 2019). Effective hospital management is critical for providing high-quality patient care, optimizing resource utilization, and achieving organizational goals.

McKinsey & Company proposes five strategic ways to improve healthcare value by balancing patient outcomes and healthcare costs. These five ways include encouraging patients to take an active role in their health, providing timely and appropriate treatment to patients, ensuring that healthcare providers have vital performance records and the necessary skills to achieve the best results, looking for ways to expand value while maintaining or improving healthcare quality, and focusing on new therapies and approaches to healthcare delivery. By implementing these strategies, it is believed that healthcare can be transformed to become more suitable and effective for patients(P. Groves, 2013)

Several studies have been conducted on the implementation of HMS in different hospitals. The results have shown a positive impact on hospital operations and found that implementing an HMS in a large hospital in India improved patient satisfaction, reduced administrative workload, and increased efficiency. (Vyas, 2017)

The impact of an HMS on patient care and financial performance was investigated in two different studies. In a study, a Nepalese hospital found that implementing an HMS improved the quality of patient care, increased efficiency, and reduced administrative workload (Baral, 2015). Another study by Wang and Chen (2013) in a Taiwanese hospital found that an HMS improved financial performance by reducing the risk of errors and improving the accuracy of billing and financial management processes. These findings suggest that implementing an HMS can positively impact hospital operations and financial management (Al-Hajj, 2019).

The success of information systems relies on understanding management information systems, computer technology, and the design and implementation of information systems. Globalization and the use of technology for business information exchange necessitate access to information in and outside the organization for institutional growth and development. To achieve the goals of an institution, Managers must analyse conditions, identify variables, and take appropriate measures to deal with different circumstances and achieve an institution's goals while considering circumstantial variables. Therefore, timely access to and use of information is necessary for success. (Mirkamali M, 2014)

Ahmadian et al. conducted a study on requesting and receiving test results from the perspective of nurses before and after installing a health information system (HIS). They collected data by interviewing nurses and found that the HIS reduced workload by 85%, increased speed and accuracy by 85% and 90%, respectively, facilitated work, and decreased the total time of the application process and receiving test results by 70%. (Ahmadian L, 2014) Amiresmaili et al. conducted cross-sectional research to determine the evaluation indicators of HIS. They collected data using designed forms and interviews and found that all human, technical, and organizational aspects should be considered in each evaluation, despite the complexity of information system evaluation. (Amiresmaili M, 2013)

In another study where the focus was on investigating how the implementation of a hospital information system (HIS) affected the performance of management units in public hospitals located in Ahvaz, Iran, and was designed to facilitate hospital operations on practical, tactical, and strategic levels by linking patient care and administrative information across all hospital activities (Yerima, 2019) The study found that using modern technologies can help hospitals provide better and faster services to patients. To improve hospital performance, they suggest using different methods to get patient feedback, evaluating performance based on input, and being flexible in procedures. Training staff with specialized courses and motivating them to do their jobs better is also essential. Updating staff knowledge with modern technology and equipment can also be helpful. Lastly, they recommend enhancing the quality of activities and improving proficiency in using modern technology at work. (Moradipour M, 2022)

According to a study by Hsiao et al. (2016), implementing a hospital management system (HMS) can improve financial performance by reducing errors and improving accuracy in billing and financial management processes. The study also found that the system could generate reports and track revenue and expenses more effectively, thus improving economic efficiency. (Hsiao et al., 2016. However, a study by Lee et al. (2017) found that compatibility issues with existing systems and a lack of technical support and training for hospital personnel can pose challenges to successful HMS implementation, leading to increased administrative workload and decreased efficiency (Poon, 2006).

**Problem**

According to many reports, there has been a notable increase in the number of people getting diagnosed with life-threatening diseases such as:

1) Cancer

2) Heart attacks

3) Strokes

5) Respiratory disorders etc.

If we compare the past and present statistics, the pressure on hospitals has rapidly increased, especially after the Covid-19 pandemic. And also, with an increase in the number of data theft, there is a requirement that the patient's records are kept safely so that they can't be misused.

Despite the potential benefits of hospital management systems (HMS) in improving healthcare quality and organizational efficiency, many healthcare organizations struggle with implementing and maintaining effective HMS. This research aims to identify the key challenges and best practices in HMS implementation and maintenance and develop recommendations for improving the success and impact of HMS in healthcare organizations.

We find that there is a need to establish, update and maintain HMS in all the hospitals in today's era.

**Methodology**

This research paper aims to comprehensively analyse the current state of Hospital Management Systems (HMS) through a secondary research methodology approach. The report explores various aspects of HMS, including the challenges and best practices related to implementing and maintaining these systems and their benefits and impact on healthcare organizations. By conducting an in-depth analysis of the existing literature, this paper aims to develop a problem statement that can lead to developing a hospital management system that addresses the challenges faced by healthcare organizations. Overall, this paper provides valuable insights to healthcare organizations, policymakers, and researchers interested in improving healthcare services' quality through effective hospital management systems. The development of a hospital management system (HMS) involves a structured approach to creating software that will manage the daily operations of a healthcare facility. The HMS development methodology includes a set of steps to ensure that the system is designed, developed, implemented, and maintained effectively. The procedure aims to align the system with the organization's goals, enhance the quality of care, and optimize operational efficiency. The steps are described below:

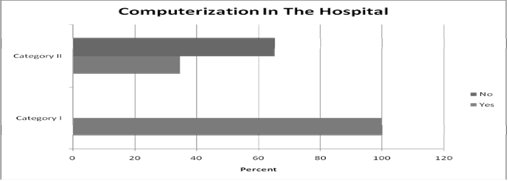
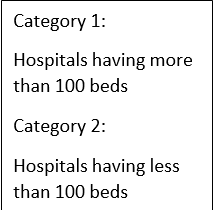
* Requirements Gathering: Identify key features and functionalities of the HMS that meet the needs of hospital stakeholders, including administrators, medical personnel, and patients.
* Design and Planning: Create a plan for the HMS development and implementation, including defining the system architecture, data models, and user interface design.
* Development: Build the HMS according to the design and plan, which may involve coding from scratch or using pre-built software components.
* Testing: Perform various types of testing to ensure the HMS is functioning correctly and meets the requirements identified in the first phase.
* Deployment: Install the HMS on hospital servers and workstations, configuring it to work with existing systems.
* Training and Support: Provide training for hospital personnel on how to use the HMS and ongoing support and maintenance to ensure the system is being used effectively and any issues are addressed on time.

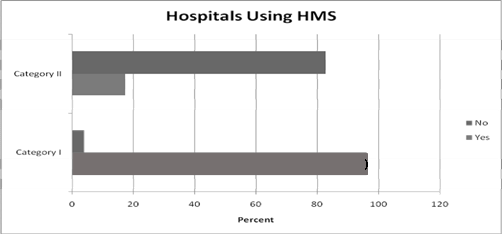
**Scope of the Project**

"Hospital Management System" is an integrated project that provides relevant and updated information across the hospital admin and staff for decision-making, better patient care, utilization of resources, and critical financial accounting. A hospital management system is designed with general hospital requirements. It is very flexible software and can be adopted by any hospital with little or no changes. Any change in the project can easily be managed.

The system will be used as the application that serves hospitals, clinics, dispensaries, or other health institutions. The system intends to increase the number of patients that can be treated and managed correctly. If the hospital management system is file-based, the hospital's management must put much effort into securing the files. Fire, insects, and natural disasters can easily damage them. Also, it could be misplaced by losing data and information.

**Figures**

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It was found that all bigger-size hospitals are computerized, and almost everyone is using some HMS (Hospital Management System). In contrast, hospitals of smaller sizes are rarely computerized and do not use any HMS, but they look forward to such solutions. The HMS market is quite potent, and many hospitals look forward to IT solutions for their operational needs, so it is the right time to enter the market.

**Functionalities**

* Patient Registration: This module allows patients to register and provide their personal and contact information.
* Appointment Scheduling: This module allows patients to schedule appointments with healthcare providers and view upcoming meetings.
* User Management: This module allows the creation and management of user accounts and permissions to ensure the security and privacy of patient data.
* Customizable Dashboard: This module allows users to customize their dashboard to view the necessary information and data.
* Billing and Insurance: This module manages the financial aspects of a patient's visit, including insurance claims and billing processes.
* Reporting and Analytics: This module allows hospital administrators to generate reports and analyse data to improve overall performance.

**Benefits**

* Improved patient care: HMS provides real-time access to patient data, including medical history, lab results, and prescriptions, which can help healthcare providers make more informed decisions about diagnosis and treatment.
* Better patient engagement: Advanced HMS include a patient portal to access their health records and communicate with healthcare providers, improving patient engagement and satisfaction.
* Better data management: HMS provides a central repository for storing patient data, making it easy to access and share information between healthcare providers.
* Better compliance: HMS can help hospitals comply with regulatory requirements by maintaining accurate and up-to-date records of patient data and treatment plans.

**Results**

In this paper, we reviewed the existing literature on Hospital Management Systems, examining their prospects, challenges, implementation methodologies, and design considerations. Our analysis suggests that while larger hospitals have well-established HMS, smaller and remote hospitals often lack such systems, creating a critical need for developing an effective HMS that meets the unique needs of such facilities.

In response to this need, we propose a theoretical model of an HMS based on an Entity-Relationship Diagram (ERD) that we have developed. Our ERD provides a visual representation of the system's design, including the key components and their relationships, intending to help healthcare organizations develop and implement an effective HMS that improves operational efficiency, enhances the quality of patient care, and drives financial performance. This paper aims to provide valuable insights and practical guidance for healthcare organizations, policymakers, and researchers interested in developing and implementing effective Hospital Management Systems.