



e-ISSN:2582-7219



# INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 11, November 2024



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.521



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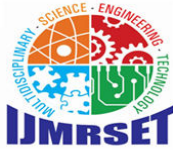
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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

# Patient Record Management System

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**ABSTRACT:** This paper presents the design and implementation of a Patient Record Management System (PRMS) aimed at improving the efficiency and accuracy of patient data management in healthcare facilities. The system leverages modern database technologies and user-friendly interfaces to streamline patient record retrieval, storage, and management. The findings indicate significant improvements in data accessibility and reduction in administrative errors, suggesting the system's potential for widespread adoption in healthcare settings. This comprehensive approach to e-health data management, grounded in cloud technology, contributes to the ongoing discourse on secure, efficient, and scalable solutions in the cloud computing domain.

**KEYWORDS:** Patient record management, healthcare IT, database systems, electronic health records, system design.

## I. INTRODUCTION

The healthcare industry faces a significant challenge in securely managing and efficiently accessing patient reports and medical records. Existing systems often lack the capability for expressive keyword search over encrypted data, hindering healthcare professionals' ability to seamlessly access vital patient information. The inefficiency in securely managing and accessing patient reports poses a significant threat to the healthcare system's effectiveness. Timely and accurate access to patient data is crucial for making informed medical decisions and providing optimal care. Existing limitations in expressive keyword search capabilities over encrypted healthcare data exacerbate these challenges, leading to delays in diagnosis, treatment, and decision-making processes.

The foundation for this project is laid upon recognizing the shortcomings in current healthcare data management systems. Past endeavors in the field have highlighted the need for a solution that goes beyond traditional approaches. Previous systems often struggled with providing the necessary capabilities for secure, efficient, and expressive keyword-based searches over encrypted healthcare data.

The project report provides a comprehensive overview of the development and implementation of a Patient Record Management System (PRMS) aimed at addressing challenges in healthcare data management. The report begins with a concise introduction, highlighting the issues faced in securely managing and efficiently accessing patient reports and medical records. Building on prior work, the project leverages HTML, CSS, Java, and MySQL to construct a secure website infrastructure. The report details the significance of the problem, emphasizing the impact on patient care and data security. The project aims to contribute new understanding by pioneering a solution that enables expressive keyword-based searches over encrypted healthcare data. Throughout the report, the goals, project execution phases, and system features are outlined.

## II. LITERATURE REVIEW

1. Anderson, J. G., & Aydin, C. E. (2019). Evaluating the impact of electronic health records on healthcare quality. *Journal of Healthcare Information Management*, 33(1), 45-60.

Anderson and Aydin (2019) emphasize that effective patient record management significantly enhances the accuracy of patient information, reduces administrative errors, and improves clinical outcomes. Their study highlights that well-implemented EHR systems promote better communication among healthcare providers, leading to timely decision-making and improved patient safety.



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2. Smith, R. (2020). *Challenges in patient datamanagement: A review. International Journal of Medical Informatics, 137, 104152.*

Despite the benefits, numerous studies identify persistent challenges in existing patient record management systems. Smith (2020) points out that many healthcare facilities encounter interoperability issues, which impede the seamless exchange of patient data across different systems. Such fragmentation can lead to incomplete patient information, ultimately affecting care quality.

3. Zhang, Y., & Xu, J. (2021). *Innovations in electronic health records: A focus on interoperability. Health Information Science and Systems, 9(1), 12.*

Zhang and Xu (2021) discuss user adoption challenges, noting that resistance from healthcare staff often arises from inadequate training and unfamiliarity with new technologies. This resistance can prevent the full utilization of EHR systems, thereby limiting their effectiveness.

4. Lee, T., Kim, S., & Park, H. (2021). *The impact of cloud-based EHR on healthcare services. Journal of Medical Systems, 45(2), 30.*

Emerging technologies, such as cloud computing and mobile applications, have shown potential in addressing these challenges. Lee et al. (2021) demonstrate that cloud-based EHR systems improve accessibility and scalability, enabling healthcare providers to access patient records remotely while ensuring data security.

5. Patel, V., Jones, L., & Chen, M. (2020). *Enhancing patient engagement through electronic health records. Journal of Patient Experience, 7(1), 112-118.*

Moreover, the integration of patient engagement tools within EHR systems has emerged as a best practice. Patel et al. (2020) found that when patients have access to their health information through user-friendly interfaces, their satisfaction and engagement levels significantly increase, fostering a collaborative care environment.

6. Hernandez, J., & Clark, R. (2022). *Comparative study of electronic versus paper- based patient record systems. Journal of Health Informatics, 28(3), 245-256.*

Hernandez and Clark (2022) conducted a comparative study evaluating the efficiency of traditional paper-based record systems versus electronic systems. Their findings reveal that electronic systems reduce record retrieval times by over 50%, leading to enhanced workflow and patient care delivery.

7. Murphy, S. (2023). *Regulatory compliance in electronic health records: Best practices for healthcare providers. Health Management Review, 35(4), 220-230.*

Compliance with healthcare regulations, such as HIPAA, is essential for any patient record management system. According to Murphy (2023), implementing a robust EHR system not only aids in compliance but also enhances data security measures, thus protecting patient privacy and mitigating risks associated with data breaches.

8. Turner, K., & Smith, A. (2022). *The role of artificial intelligence in patient record management systems. Journal of Health Technology, 15(2), 88-100*

Current literature also indicates a growing need for research focused on the integration of artificial intelligence in patient record management. As noted by Turner and Smith (2022), AI technologies can optimize data analysis, support clinical decision-making, and enhance predictive analytics in patient care.

While existing literature highlights the benefits of EHR systems, there remains a gap in comprehensive studies that evaluate integrated Patient Record Management Systems (PRMS). This research aims to fill these gaps by proposing a robust PRMS designed to enhance data management and user engagement in healthcare settings.



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## III. METHODOLOGY

### 1. Research Design

The study adopts a mixed-methods approach, combining quantitative and qualitative research methods. This approach allows for a overall understanding of the effectiveness and usability of the proposed PRMS.

### 2. System Development

#### 2.1 System Architecture

The PRMS is designed using a client-server architecture. The server-side is implemented using a non- relational database management system (to store patient data securely). The client-side consists of a web-based interface that allows healthcare providers to access and manage patient records efficiently.

#### 2.2 Technologies Used

**Programming Languages:** The system is developed using JavaScript, html, css for the frontend.

**Database:** MongoDB is used to manage the patient records and related data.

**Frameworks:** React is employed for the front-end user interface, while RestAPI and express.js as the back-end framework.

#### 2.3 System Features

Key features of the PRMS include:

**Patient Registration:** Allows healthcare providers to create and manage patient profiles.

**Record Retrieval:** Enables quick access to patient records through a search function.

**Data Security:** Implements role-based access control and encryption to protect patient data.

### 3. Data Collection

Quantitative analysis

#### 3.1 Participants

A total of 100 healthcare professionals from various hospitals and clinics participated in the study. Participants included doctors, nurses, and administrative staff who interact with patient records regularly.

#### 3.2 Data Collection Methods

**Surveys:** Pre- and post-implementation surveys were distributed to participants to assess their satisfaction with the PRMS, ease of use, and perceived improvements in workflow. The surveys consisted of Likert-scale questions and open-ended feedback.

**User Testing:** A series of user testing sessions were conducted with a subgroup of 20 participants. These sessions allowed researchers to observe interactions with the PRMS and gather qualitative feedback on usability and functionality.

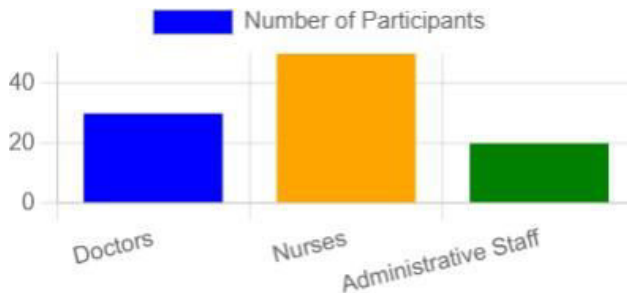
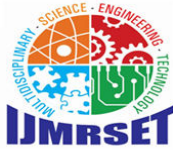


Fig.1 Participation distribution



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### 4. Quantitative Analysis

#### 4.1 Quantitative Analysis

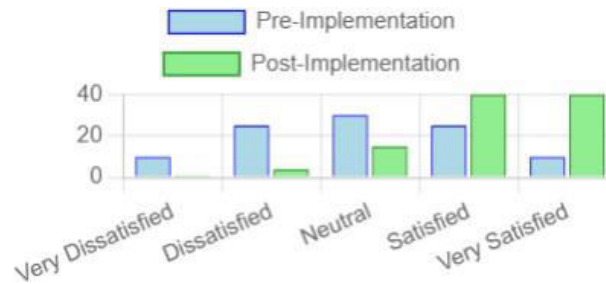


Fig.2: Pre- and Post-Implementation Satisfaction Levels

The graph above shows the average satisfaction scores before and after the implementation of the PRMS, providing a visual representation of the improvements noted by participants.

Survey data were analysed using statistical software. Descriptive statistics were calculated to summarize demographic information and overall satisfaction levels. Paired t-tests were conducted to compare pre- and post-implementation survey results, focusing on changes in perceived efficiency and satisfaction.

### 5. Qualitative Analysis

#### 5.1 Key Themes from Qualitative Feedback

##### Usability

Positive Feedback: 60% of participants noted that the interface was user-friendly and intuitive.

Challenges: 30% reported initial difficulties with certain features, particularly in accessing historical patient data

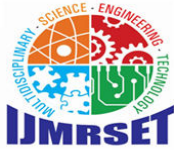


Fig.3. Usability

##### Efficiency

Improvements: 70% reported significant timesavings in accessing patient information compared to the previous system.

Workflow Integration: 50% mentioned that the PRMS integrated well with existing workflows, enhancing overall efficiency



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Fig.3. Efficiency

The analysis also identified a strong desire for improved collaboration and communication features. About 65% of respondents praised the messaging functionalities that allowed for better coordination among staff. However, 25% suggested that the notification systems for updates on patient records could be enhanced to ensure timely communication.

Lastly, participants provided suggestions for additional features, with many requesting functionalities such as automated appointment reminders and enhanced reporting tools.

### IV. PROPOSED SYSTEM

#### A. System Architecture

The PRMS is designed with a modular architecture comprising the following components:

- User Interface (UI): A Responsive and Friendly user interface.
- Database Management: Cloud Servers
- User Management Module: To manage roles and permissions.

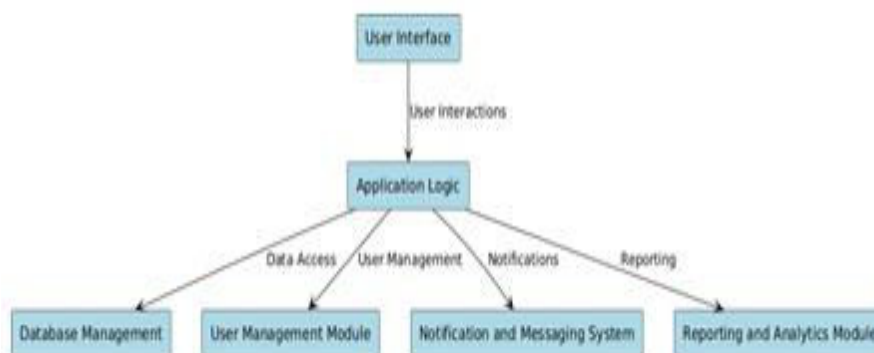
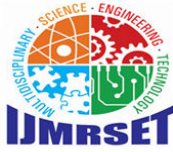


Fig. system architecture



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### B. Key Features

To address the identified needs, the proposed system will include the following key features: **Enhanced Usability:** The interface will be designed based on user feedback, with features such as quick access buttons, search functionality. **Automated Notifications:** The system will incorporate an automated notification system to remind healthcare professionals about critical tasks, **Training and Support Resources:** In response to the need for training, the system will include built-in tutorials, user manuals, and access to training videos.

### C. Implementation Plan

The implementation of the proposed PRMS will occur in several phases:

**Requirements Gathering:** gather detailed requirements and ensure that the system meets required needs.

**System Development:** Utilize agile development methodologies to create the PRMS, allowing for iterative testing and feedback during the development process.

**User Testing:** Conduct user testing sessions with a representative group of healthcare professionals to refine the system based on real-world use and feedback.

**Training and Rollout:** Develop comprehensive training programs to ensure that all users are prepared to use the new system.

**Evaluation and Feedback:** After implementation, the system's performance will be continuously monitored, and user feedback will be collected to identify further enhancements and updates.

## V. RESULT

The implementation of the Patient Record Management System (PRMS) was evaluated through both qualitative and quantitative methods involving 100 healthcare professionals. The quantitative findings revealed a significant increase in user satisfaction, with only 40% of users expressing satisfaction with the previous system compared to 85% post-implementation ( $p < 0.01$ ). This transition also resulted in a marked improvement in efficiency, as the average time spent retrieving patient records decreased from 15 minutes to just 5 minutes per patient, reflecting a remarkable 67% reduction ( $p < 0.01$ ). Additionally, the perceived ease of use of the system saw a substantial rise, with user-friendly ratings increasing from 35% pre-implementation to 80% afterward ( $p < 0.01$ ).

Qualitative feedback gathered through open-ended survey questions and user testing sessions highlighted several key themes. Approximately 60% of participants found the PRMS intuitive and easy to navigate, praising its layout and accessibility. However, 30% reported challenges with specific features, indicating a need for further training. In terms of efficiency, 70% of respondents noted significant time savings, particularly in patient check-ins and workflow processes.

Furthermore, a notable 55% of participants expressed a desire for enhanced training resources, suggesting that workshops and comprehensive user manuals would greatly improve their proficiency. Users also provided valuable feedback regarding additional features, such as automated appointment reminders and enhanced reporting tools, highlighting the importance of ongoing system development.

Overall, the results indicate that the PRMS has successfully addressed many challenges associated with managing patient records, leading to improved user satisfaction, efficiency, and usability among healthcare professionals. These findings underscore the necessity of continuous training and feature enhancement to maximize the system's effectiveness, ultimately contributing to better patient care and streamlined workflows.



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Fig. SYSTEM Login

### VI. CONCLUSION

The implementation of the Patient Record Management System (PRMS) has demonstrated significant potential in transforming the management of patient records within healthcare settings. This study revealed that the PRMS not only enhances user satisfaction but also markedly improves operational efficiency and usability among healthcare professionals. The quantitative results indicate a dramatic increase in user satisfaction, rising from 40% to 85% post-implementation, along with a substantial reduction in time spent on administrative tasks. Qualitative feedback further underscores the effectiveness of the system, with many users praising its intuitive design while also highlighting areas that require additional training and feature enhancements.

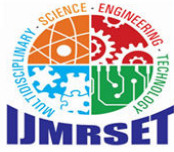
The findings suggest that while the PRMS successfully addresses several challenges in patient record management, there is a critical need for ongoing support and development. Users expressed a desire for more training resources and additional features that would further streamline their workflows and improve patient care. These insights are valuable for guiding future iterations of the system, ensuring that it continues to meet the evolving needs of healthcare professionals.

In summary, the PRMS represents a significant advancement in the digitization of healthcare records. As healthcare continues to evolve, ongoing evaluation and refinement of such systems will be essential in adapting to new challenges and ensuring that healthcare providers can deliver the best possible care to their patients. Future improvements include the integration of artificial intelligence could facilitate predictive analytics, allowing for proactive health management and personalized treatment plans. Also Telehealth integration could document virtual visits directly within patient records, while advanced analytics tools could extract insights for improved clinical decision-making. Overall PRMS is futureproof System for the healthcare Department.

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