International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 06 | June - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

A Study on Impact of Electronic Health Record (EHR) Implementation on Efficiency and Accuracy in Select Hospitals

Author 1: Nashib Sharma
Designation: MBA Student, NIMS University, Jaipur, Rajasthan
Author 2: Dr. Radhakrishna M.
Designation: Associate Professor, NIMS University, Jaipur, Rajasthan

ABSTRACT

This study investigates the effects of Electronic Health Record (EHR) implementation on efficacy and accuracy within selected hospitals. The implementation of Electronic Health Records (EHR) has been widely adopted in the healthcare sector with the promise of enhancing efficiency and accuracy in medical practice. This study investigates the impact of EHR systems on operational efficiency and diagnostic accuracy in select hospitals. Utilizing a mixed-methods approach, the research combines quantitative data analysis from hospital records and qualitative insights from staff interviews and patient surveys. The study's findings indicate a significant improvement in efficiency, marked by reduced patient wait times and streamlined administrative processes. Additionally, the accuracy of patient records and diagnostic procedures has shown considerable enhancement, leading to better patient outcomes and reduced error rates. However, the study also identifies challenges such as the initial high cost of implementation and the need for continuous staff training. These insights provide valuable implications for hospital management and policymakers aiming to optimize healthcare delivery through advanced technological systems.

INTRODUCTION

An Electronic Health Record (EHR) is a digital version of a patient's paper chart. It contains the patient's medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory test results. EHRs are designed to be accessed and shared by authorized healthcare providers, making patient information more accessible and improving coordination of care.

An Electronic Health Record (EHR) is a comprehensive digital version of a patient's medical history. It contains all pertinent health information that a healthcare provider might need to know when treating a patient. Here's a detailed breakdown of what an EHR typically includes:

1. **Patient Demographics:** Basic information about the patient, such as name, date of birth, gender, address, contact details, and insurance information.
2. **Medical History:** This section includes a thorough overview of the patient's medical history, including past illness, surgeries, hospitalizations, and major medical events.
3. **Medication History:** A list of medications the patient is currently taking, as well as past prescriptions and any known drug allergies or adverse reactions.
4. **Allergies and Adverse reactions:** Information about any known allergies or sensitives the patient has to medications, food, or other substances.
5. **Clinical Notes:** Detailed notes prepared by healthcare providers during patient visits, including symptoms, diagnoses, treatment plans, and progress updates.
6. **Vital Signs:** Records of the patient's vital signs such as blood pressure, heart rate, temperature, and respiratory rate over time.

7. **Laboratory and Diagnostic Test Results:** Results of laboratory tests, imaging studies (such as X-rays, MRIs, and CT scans), and other diagnostic procedures performed on the patient.
8. **Immunization History:** A record of the vaccines the patient has received, including dates and types of vaccines.
9. **Care Plans:** Plans developed by healthcare providers outlining the patient's treatment goals, interventions, and ongoing care management.
10. **Referral History:** Information about specialist referrals, consultations, and communications with other healthcare providers involved in the patient's care.
11. **Insurance and Billing Information:** Details about the patient's insurance coverage, billing statements, and payment history.
12. **Consent Forms and Authorizations:** Documentation of the patient's consent for treatment, release of information, and participation in research studies or clinical trials.

A. IMPORTANCE OF EHR

The importance of Electronic Health Records (EHRs) in healthcare cannot be overstated. Here are some key reasons why EHRs are crucial:

1. **Centralized Information:** EHRs provide a single, centralized source of a patient's medical information, accessible to authorized healthcare providers. This ensures that all members of the healthcare team have access to up-to-date and accurate information, leading to more informed decision-making and improved patient care.
2. **Improved Coordination of Care:** EHRs facilitate better coordination of care among different healthcare providers and settings. With access to a patient's complete medical history, specialists, primary care physicians, hospitals, and other providers can collaborate more effectively, leading to smoother transitions of care and reduced chances of medical errors.
3. **Enhanced Patient Safety:** EHRs help improve patient safety by reducing the risk of errors related to illegible handwriting, incomplete information, or misplaced paper records. Features such as medication reconciliation, allergy alerts, and decision support tools help healthcare providers make safer and more informed clinical decisions.
4. **Efficiency and Productivity:** EHRs streamline administrative tasks and workflows, reducing the time and resources spent on paperwork, documentation, and record-keeping. Automated processes, such as electronic prescribing and results reporting, save time for healthcare providers and support staff, allowing them to focus more on patient care.
5. **Accessibility and Portability:** Electronic health records can be accessed securely from anywhere with an internet connection, making them readily available to authorized users when and where they are needed. This accessibility is particularly valuable in emergencies, when quick access to critical patient information can be lifesaving.
6. **Data Analysis and Population Health Management:** EHRs enable healthcare organizations to collect, analyze, and leverage large amounts of data to improve population health outcomes. By tracking trends, identifying high-risk patients, and monitoring quality metrics, EHRs support population health management initiatives aimed at preventing disease, managing chronic conditions, and optimizing healthcare delivery.
7. **Patient Engagement and Empowerment:** Many EHR systems include patient portals that allow patients to access their own health information, communicate with their healthcare providers, schedule appointments, refill

prescriptions, and participate in their own care management. This promotes patient engagement, empowerment, and collaboration in the healthcare decision-making process.

Overall, Electronic Health Records play a vital role in modern healthcare delivery by improving efficiency, safety, quality, and patient outcomes while also supporting better communication and collaboration among healthcare providers.

B. IMPLEMENTATION OF EHR IN HOSPITALS

Implementing Electronic Health Records (EHR) in hospitals involves several steps:

1. **Planning and Assessment:** Determine the hospital's needs, goals, and budget for implementing EHR. Assess current workflows and IT infrastructure.
2. **Vendor Selection:** Research and choose an EHR system that aligns with the hospital's requirements. Consider factors like usability, scalability, interoperability, and vendor support.
3. **Customization and Integration:** Customize the EHR system to fit the hospital's workflows and integrate it with existing systems such as laboratory, pharmacy, and billing systems.
4. **Training:** Provide comprehensive training to staff on how to use the EHR system effectively. This includes physicians, nurses, administrative staff, and IT personnel.
5. **Pilot Testing:** Conduct a pilot test of the EHR system in a specific department or unit to identify any issues and make necessary adjustments before full implementation.
6. **Rollout and Go-Live:** Gradually implement the EHR system across all departments and units of the hospital. Monitor closely during the transition period to address any challenges that arise.
7. **Continuous Improvement:** Continuously evaluate the EHR system's performance and gather feedback from users to make improvements and optimize workflows.
8. **Compliance and Security:** Ensure compliance with regulations such as HIPAA (Health Insurance Portability and Accountability Act) and implement robust security measures to protect patient data.
9. **Support and Maintenance:** Provide ongoing technical support and maintenance for the EHR system to ensure smooth operation and address any issues promptly.
10. **User Adoption and Change Management:** Implement strategies to promote user adoption of the EHR system and manage any resistance to change among staff members.

Successful implementation of EHR can improve patient care, streamline workflows, reduce errors, and enhance communication and collaboration among healthcare providers. However, it requires careful planning, investment, and ongoing commitment from hospital leadership and staff.

LITERATURE REVIEW

1. **Afeldt (1980)** started surveying hospitals and other care facility on regular basis to check the quality of the medical care by using medical record as a tool. With these initiatives greatest improvement started in the hospital for standardizing the medical record section with the defined regulations.
2. **Wright (2017)** initiated the use of standards for the hospitals in United States and Canada for enhancing the clinical care setting.

3. **Mohan, P., and Kumar, S. (2021)** provide a comprehensive examination of current landscape and future potential of digital health in India. They analyse the penetration of technologies highlighting both successes and areas for improvement.
4. **Jaroudi and Payne (2019)** stated that the SOAP (Subjective, Objective, Assessment, and Plan) is a technique used to capture the patient data in POMR. SOAP improves the patient care and helps healthcare professionals to provide structured care and treatment. It clearly shows what is happening to the patient in an organized way.
5. **Sharma (2018)** discussed about All India Institute of Medical Sciences (AIIMS) and the Postgraduate Institute of Medical Education and Research (PGIMER) being major public hospitals which have Electronic Medical Record (EMR) in place to share the patient data with other departments of the same group of hospitals.
6. **Ministry of health and family welfare (2013)** said that with the EHR, it is possible to capture and store distinct patient health data and be made accessible at point of care including Primary Healthcare Centre, Secondary Healthcare Centre and Tertiary Healthcare Centre. EHR contains health information about patient history, laboratory test reports, and diagnosis images stored in a digital format which is available to healthcare providers through computer network.
7. **Guo et al. (2012)** stated that Cloud computing has emerged as a main role in providing healthcare IT solution. Therefore, healthcare organizations can largely benefit from cloud infrastructure which could be an excellent solution for the country's needs to have improved healthcare in all levels of healthcare system.
8. **Kruse et al. (2018)** has stressed that to design and develop a new IT application requires assessment of the utilization pattern of the existing system among the end users. The data on the assessment helps in understanding the end user's satisfaction level with the existing system and assist the planner in planning of better system.
9. **Takeda (1999)** said that the medical records are documented in several ways and one such concept used for documentation of the patient health information is Problem Oriented Medical Record (POMR), which mainly focuses on specific problems that patients have.
10. **Bahga and Madisetti (2013)** discussed about Veterans Health Information Systems and Technology Architecture (VistA) which is the traditional health record system used in United States and covers roughly 25% of the nation's population. VistA is a collection of 168 application packages /modules.

OBJECTIVES OF STUDY

1. To Study the importance of Electronic Health Record
2. To analyze the factors influencing the EHR in hospitals
3. To assess the efficiency and accuracy after the implementation of EHR in select Hospitals

RESEARCH METHODOLOGY

Primary Data – Primary data is the data collected firsthand by researchers directly from the original source for specific research purpose. These data are usually gathered through methods such as surveys, interviews, experiments, observations, and questionnaires.
Amongst all these I have used questionnaire method.

Sample Size – 150

Analysis Technique – Simple random sampling and questionnaire technique selected by researchers to collect the data from respondents.

Analysis Tools –

a) **Google Forms –** Versatile tool for creating surveys, quizzes, and feedback forms, with options for various types of questions and automatic data analysis.
b) **Microsoft Excel –** Used for simple data analysis, including descriptive statistics, pivot tables, and basic statistical functions.

DATA ANALYSIS AND INTERPRETATION:

TABLE 1: Name of Hospitals

Hospital	Frequency
NIMS Super speciality Hospital Jaipur	50
Manipal Hospitals Jaipur	50
Narayana Multi speciality Hospital	50
Total	150

Interpretation: The table displays the frequencies of three different hospitals: NIMS Super Speciality Hospital Jaipur, Manipal Hospitals Jaipur, and Narayana Multi Speciality Hospital. Each hospital appears to have an equal frequency of 50 occurrences, suggesting that they are possibly being compared or analysed based on some common criteria.

TABLE 2: Positions of the Participants

Position	Frequency
Administrators	81
Doctors	22
Healthcare Workers	47

Interpretation: The table provides a breakdown of positions and their respective frequencies within a healthcare context. Administrators have the highest frequency with 81 occurrences, followed by healthcare workers with 47 occurrences, and doctors with the lowest frequency of 22 occurrences.

TABLE 3: Which of the following do you consider as the main advantage(s) of using the EHR system?

Advantages	Frequency
Improved accessibility of patient records	37
Better coordination among healthcare providers	24
Reduction in paperwork	66
Enhanced patient safety	23

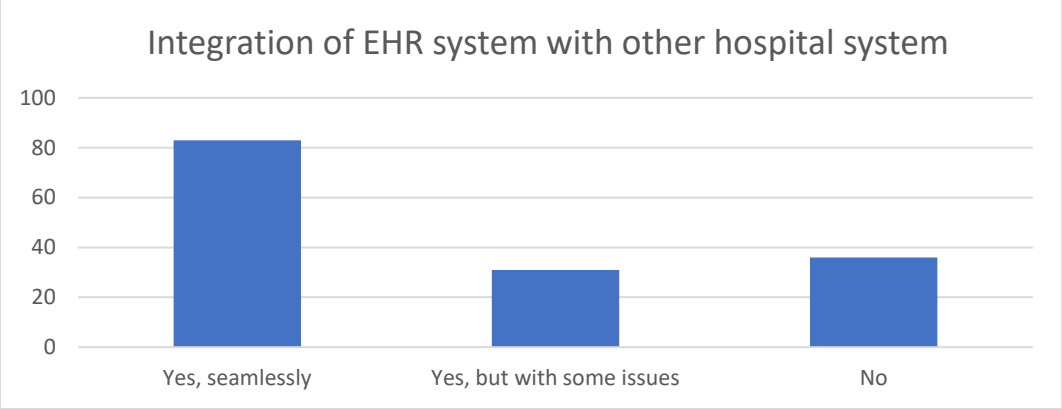
Interpretation: The table shows that the most frequently mentioned benefit is the reduction in paperwork (66 mentions), followed by improved accessibility of patient records (37 mentions), better coordination among healthcare providers (24 mentions), and enhanced patient safety (23 mentions).

TABLE 4: How has the EHR system impacted the efficiency of healthcare delivery in your hospital?

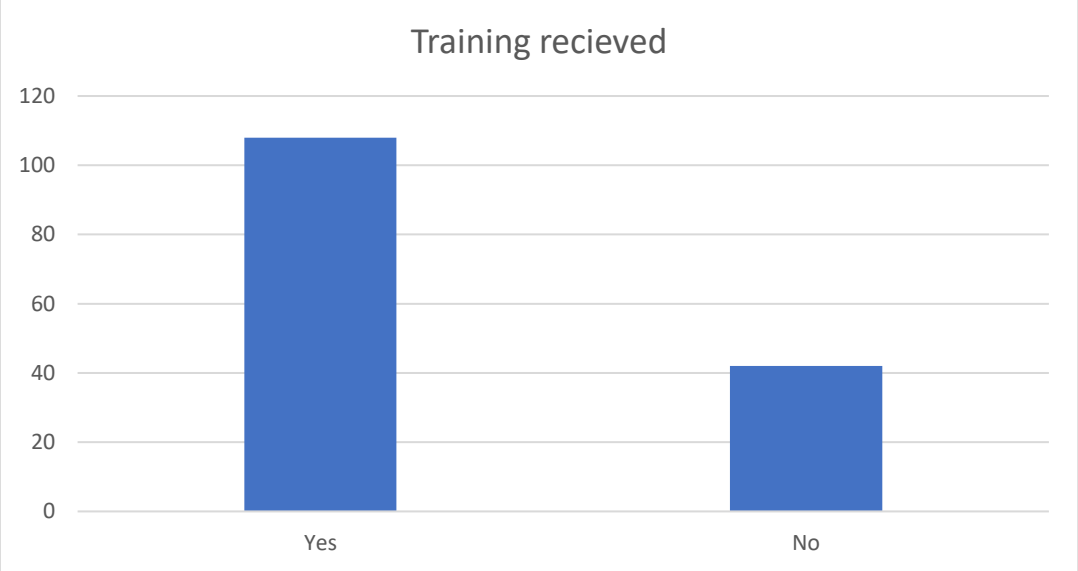
Impact	Frequency
Improved efficiency	99
No significant change	42
Decreased efficiency	9

Interpretation: The data shows that improved efficiency was the most frequently reported impact, occurring 99 times, while no significant change was noted 42 times, and decreased efficiency was the least reported impact, occurring only 9 times.

GRAPH 1: Does the EHR system integrate with other hospital systems?



GRAPH 2: Have you received adequate training to use the EHR system effectively?



KEY FINDINGS OF STUDY:

1. The study accesses the impact of EHR system on efficacy and accuracy in view with Indian hospitals. This may also include the criteria such as patient safety, quality of care, and advantages of EHR over conventional.
2. The findings indicate that the efficacy and accuracy has significantly increased and this also shows that the EHR system is beneficial than the conventional systems of record maintenance.
3. The research also identifies the challenges or complications that is faced by healthcare providers in hospitals. This may include usability issues, data security concern, and difficulties in adoption.

CONCLUSION:

The study on the impact of Electronic Health Record (EHR) implementation on efficiency and accuracy in select hospitals reveals significant findings that underscore the transformative potential of EHR systems in modern healthcare. The results demonstrate that EHRs contribute to improved efficiency in hospital operations and enhance the accuracy of medical records and patient care. In conclusion, the implementation of EHR systems in select hospitals has shown to significantly improve efficiency and accuracy in healthcare delivery. By addressing the associated challenges and continuously optimizing these systems, hospitals can further enhance their operational efficiency and the quality of patient care. The positive outcomes from this study support the broader adoption of EHR systems as a vital component of modern healthcare infrastructure.

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TEXTBOOKS:

i. "Health Informatics: An Interprofessional Approach" by Ramona Nelsion and Nancy Staggers.
ii. "Introduction to Health Informatics" by Nadinia A. Davis and Melissa LaCour.

WEBSOURCES:

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ii. https://niper.gov.in
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