

IMPACT OF EMR IMPLEMENTATION ON HOSPITAL WORKFLOWS, DOCTOR'S ADOPTION, AND TRAINING USEFULNESS

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

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Under the Supervision and Guidance of

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2025

Date:31-May-2025

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Emanpreet Kaur** has worked as a trainee under **Dr. Manikant Jain** in the department of **Medical Administration** from **10-March-2025 to 31-May-2025**.

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For Fortis Escorts Hospital, Jaipur

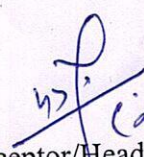

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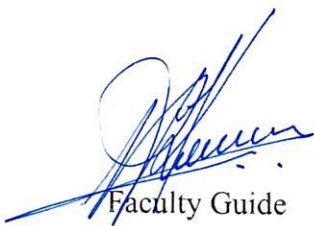
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This is to certify that dissertation titled **Impact of EMR Implementation on Hospital Workflows, Doctor's Adoption, And Training Usefulness** is a record of the research work undertaken by Dr Emanpreet Kaur in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Impact of EMR Implementation on Hospital Workflows, Doctor's Adoption, And Training Usefulness** is the Bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



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Date: 18th June, 2025

Abstract

Title: Impact of EMR Implementation on Hospital Workflows, Staff Adoption, and Training Usefulness

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Background

The adoption of Electronic Medical Records (EMR) represents one of the most significant shifts in modern healthcare delivery, particularly within large, multispecialty institutions in developing countries like India. At Fortis Escorts Hospital, Jaipur, the decision to transition from paper-based to digital record-keeping reflects a broader strategic commitment to improve clinical efficiency, reduce medical errors, and enhance patient care coordination. This study was conceived to closely examine the early outcomes of this digital transformation.

Objectives

- a) To analyze the impact of EMR implementation on hospital workflows.
- b) To identify key challenges faced during and after EMR implementation.
- c) To assess the usefulness of staff training in ensuring successful implementation of EMR
- d) To assess the level of staff adoption and satisfaction with use of EMR.

Methodology

To explore these dimensions comprehensively, a mixed-methods research design was employed. On the quantitative side, the study analyzed 20,015 EMR entries from Fortis

Escorts Hospital's Health Information System (HIS), covering a two-month period from March 20 to May 12, 2025. These records were categorized into three groups—fully completed, in-progress, and check-in only—to assess the level of engagement with the system. Simultaneously, a qualitative approach was implemented by observing and interacting with 50 purposively selected doctors across multiple departments. The researcher assisted these doctors with customized EMR templates, gathered their feedback, and noted real-time behaviors and challenges during usage.

The study setting was a tertiary care, multi-specialty hospital that had just begun implementing EMRs in its OPDs. Ethical protocols were followed strictly—verbal consent was taken from all participants, identities were anonymized, and data was securely handled.

Results

Out of 20,015 OPD records, only 8,406 (42%) were marked as fully completed using the EMR system. Another 2,202 (11%) were in-progress, and 9,407 (47%) were check-in only—indicating no doctor engagement with the record. Departmental performance varied significantly, with Cardiology, Pulmonology, and Pediatric Neurology showing higher adoption levels, especially where template support and real-time training reinforcement were provided. Conversely, departments such as ENT, Neurosurgery, and Gynaecology had negligible EMR usage.

Among the 50 trained doctors, 18% did not use the system at all post-training. The top-performing doctors who received tailored template support achieved over 85% completion rates. The most cited challenges included high patient loads, lack of post-training support, poor system responsiveness, resistance to change, and limited digital familiarity among some staff members.

Conclusion

EMR implementation at Fortis Escorts Hospital reflects both progress and persisting gaps in healthcare digitization. While training and infrastructure were initiated, widespread adoption occurred only in settings where ongoing support, leadership engagement, and customized workflows were available. The study concludes that EMR success depends not merely on training or system availability, but on sustained, user-centric strategies. Targeted

support, department-wise customization, and integration into clinical workflows are essential to transforming EMRs from administrative burdens into valuable clinical tools for modern, efficient, and patient-centered care.

Keywords:

EMR, Electronic Medical Records, Hospital Workflow, Staff Adoption, Training Effectiveness, Healthcare IT, Digital Health, Fortis Escorts Hospital

Acknowledgement

I would like to express my heartfelt gratitude to everyone who has supported and guided me throughout my dissertation journey. This milestone in my academic and professional life would not have been possible without their unwavering trust, valuable insights, and constant encouragement. I am especially thankful to **my academic guide, Dr. Vinod Kumar SV, Professor at IIHMR University, Jaipur**, for his exceptional mentorship. His deep expertise, patient guidance, and constructive feedback played a pivotal role in shaping this dissertation. His continued support has been a source of motivation, inspiring me to strive for excellence.

I extend my sincere thanks to **all the faculty members and academic staff at IIHMR University** for their knowledge, encouragement, and support, which have equipped me with the foundation needed to carry out this research. I am also deeply grateful to **Dr. Manikant Jain, Medical Superintendent at Fortis Escorts Hospital, Jaipur**, for his valuable guidance and constant support during my fieldwork. His insights greatly enriched the practical relevance of my study.

Finally, I would like to express my deepest appreciation to **my family and friends** for their unconditional love, patience, and encouragement throughout my academic journey. Their belief in me and consistent support provided the strength and determination needed to complete this endeavour. I am truly grateful to each and every one who contributed to this accomplishment.

Dr Emanpreet Kaur

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List of Abbreviations

S. No.	Abbreviation	Full Form
1	CTVS	Cardio Thoracic Vascular Surgery
2	EHR	Electronic Health Record
3	EMR	Electronic Medical Record
4	HIS	Hospital Information System
5	IT	Information Technology
6	ICU	Intensive Care Unit
7	NHS	National Health Service
8	OPD	Outpatient Department
9	PHC	Primary Health Center
10	SOP	Standard Operating Procedure

Impact of EMR Implementation on Hospital Workflows, Doctors Adoption, and Training Effectiveness.

Chapter 1 Introduction

1.1 Background

In today's fast-changing world of healthcare, hospitals are under a lot of pressure. They don't just need to provide excellent medical care; they also need to make sure patients have a good experience and that everything runs smoothly. This is especially true for big, private hospitals in developing countries like India. Here, patients often pay directly for their care or rely on insurance, so it's super important for hospitals to connect what doctors advise with what actually happens for the patient.

One very important change happening in modern hospitals is the move to Electronic Medical Records (EMR). Think of an EMR as a digital version of a patient's paper chart. Instead of stacks of paper, all the important health information is stored on computers. This information includes things like patient details, records of visits, medicines they take, allergies, lab results, vital signs (like blood pressure), and notes from doctors. All this information is created, updated, and used by doctors and other hospital staff who are allowed to see it, all within the same hospital.

At Fortis Escorts Hospital in Jaipur, using an EMR system is a big step towards better patient care and making hospital work more efficient. This hospital's decision to go digital shows a larger plan to improve how they work, reduce mistakes, and make sure patient care is well-coordinated. Our study was created to look closely at what happened after this digital change started. We wanted to see the early results of moving from paper records to digital ones.

It's also good to know about another term, Electronic Health Record (EHR). An EHR is a bit broader than an EMR. While an EMR mainly keeps clinical information within one hospital, an EHR gives a more complete picture of a patient's health over time. EHRs are designed to be shared easily between different healthcare providers and places, like different clinics or hospitals. This means a patient's full health story can follow them wherever they go for care, making sure every doctor has the latest information.

One of the biggest benefits of using EMRs at Fortis Escorts Hospital is that doctors and staff can quickly and easily get to a patient's medical history. Imagine a patient seeing different specialists for different problems. With EMR, all these specialists can look at the same patient's file at the same time, even if they are in different parts of the hospital. This makes it much easier for them to work together and make good decisions about the patient's care. For example, a heart doctor can instantly see what medicines a kidney doctor has prescribed, reducing the risk of bad drug interactions.

The EMR system also helps by sending automatic reminders. These reminders can go to both doctors and patients about things like upcoming appointments, lab tests that need to be done, or vaccinations that are due. This makes patient care more proactive, meaning problems can be caught earlier, and care can be given more quickly. It's like having a smart assistant that never forgets important health tasks.

India's healthcare system is quickly moving towards digital tools. A recent study by a healthcare company called Indigene showed that more than 60% of doctors in India are already using digital tools like video calls, apps, emails, and text messages to talk to patients and medical representatives. Fortis Escorts Hospital is a part of this big digital change. They are trying to keep up with how healthcare is evolving globally, where digital records are becoming the standard. This shift is not just about having new technology; it's about fundamentally changing how healthcare is delivered, making it more organized, safer, and more connected.

1.2 Key Functions of EMR Systems at Fortis Escorts Hospital

EMR systems have come a long way. They started simply as ways to record patient information back in the 1960s. But today, the EMR systems at Fortis Escorts Hospital in Jaipur are designed to do many important things. These functions help the hospital run better and provide better patient care. Let's look at six main things these EMR systems do:

1. **Patient Information Recording:** This is the most basic, but also the most important, function. The EMR system collects and shows all the important information about a patient. This includes their personal details (like name, age, address), records of all their hospital visits, a list of all the medicines they are taking (and have taken), any allergies they have, results from lab tests, their vital signs (like temperature, pulse, blood pressure), and all the notes' doctors write about their condition and treatment. This information can be entered in

a structured way (like choosing from a list) or as free text (like writing notes). Having all this in one digital place means no more searching through paper files, and it's always up-to-date. It helps make sure that no important detail about a patient's health is missed.

2. Clinical Decision Support: This is where the EMR system acts like a smart helper for doctors. It uses the patient's data to give doctors useful advice and warnings. For example, if a lab result is very high or very low, the system can highlight it. If a doctor tries to prescribe a medicine that a patient is allergic to, or one that might react badly with another medicine the patient is already taking, the EMR will pop up an alert. It also reminds doctors about important check-ups, screenings (like for cancer), or treatments that are due for a patient. This helps doctors make safer and more informed decisions, reducing human error and improving patient safety.

3. Order Entry and Prescribing: Before EMRs, doctors would write prescriptions and lab requests on paper. This could lead to mistakes because of messy handwriting or lost papers. With EMRs, doctors at Fortis can now send prescriptions for medicines, requests for lab tests, details about immunizations (like vaccines), and referrals to other specialists, all electronically. This means the information goes directly from the doctor's computer to the pharmacy or lab, making the process faster, more accurate, and much more efficient. It reduces errors from misreading prescriptions and speeds up the entire diagnostic and treatment process.

4. Health Information and Reporting: EMR systems are not just for individual patient care; they also help the hospital as a whole. The system can quickly create reports that show how well the hospital is doing in different areas. For example, it can track how many patients received a certain vaccine, or how quickly patients are seen in the emergency room. These reports are important for improving the quality of care. The EMR also helps the hospital meet rules set by government bodies and its own quality teams, by making it easy to gather and share necessary data. This helps the hospital stay accountable and continuously improve its services.

5. Security and Confidentiality: Patient privacy is extremely important in healthcare. EMR systems are designed with strong security features to protect sensitive patient information. This includes strict rules about who can access what information, based on their job role (e.g., a nurse can see different things than a billing clerk). The system also keeps a record of

who accessed which patient file and when (audit trails), has secure ways for staff to log in, makes copies of all data (backups) in case of a system failure, and uses special coding (encryption) to protect data from being seen by unauthorized people. All these measures ensure that patient information remains private and secure.

6. Information Sharing and Interoperability: Modern healthcare often involves many different parts working together. EMRs at Fortis Escorts Hospital are connected with other systems, such as diagnostic labs and pharmacies. This connection, called interoperability, means that lab results can automatically appear in a patient's EMR, and prescriptions can go straight to the pharmacy. This smooth flow of information helps different departments work together seamlessly. It also allows patient data to be shared in standard ways when needed, for example, if a patient is referred to another hospital, ensuring they get continuous and coordinated care without having to repeat their medical history.

1.3 Impact of EMR Systems on Healthcare Delivery at Fortis Escorts Hospital, Jaipur

The introduction of EMR systems at Fortis Escorts Hospital has been a game-changer, helping to tackle some of the biggest challenges in healthcare today. These challenges include reducing medical errors, making communication better between different parts of the hospital, and helping to control the rising costs of healthcare. Let's look at how EMRs have helped in these areas and brought other important benefits:

Reducing Medical Errors: Before EMRs, many errors happened because of handwritten notes that were hard to read, or because important information was missed. For example, a doctor might write a prescription that a pharmacist can't quite make out, leading to the wrong medicine being given. Or, a nurse might not know about a patient's allergy because it was buried in a paper file. EMRs greatly reduce these risks. They ensure that prescriptions are typed clearly, that allergy alerts pop up automatically, and that all care team members have access to the same, up-to-date patient information. This means fewer mistakes with medicines, fewer wrong diagnoses, and overall safer care for patients. It's like having a built-in safety net that catches potential problems before they become serious.

Improving Communication Between Departments and Care Teams: In a big hospital, many different people are involved in a patient's care – doctors, nurses, specialists, lab technicians, pharmacists. If they can't talk to each other easily or share information quickly, things can go wrong. EMRs act as a central hub for all patient information. This means that

if a patient has a blood test, the results are immediately available to their doctor, the nurse, and any other specialist involved in their care. There's no waiting for paper reports to be delivered or phone calls to be made. This real-time sharing of information makes communication much faster and more accurate, leading to better teamwork and more coordinated care. For instance, a surgeon preparing for an operation can quickly check the latest lab results and vital signs, ensuring they have the most current picture of the patient's health.

Controlling Rising Healthcare Costs: While EMR systems themselves are an investment, they help control costs in several ways. By reducing medical errors, they save money that would otherwise be spent on fixing those mistakes or dealing with complications. Improved efficiency means less wasted time for staff, allowing them to see more patients or focus on more complex tasks. Digital records also reduce the need for paper, printing, and physical storage space, leading to savings over time. Furthermore, better coordination and quicker diagnoses can prevent conditions from worsening, which often leads to more expensive treatments down the line. EMRs also help with accurate billing and claims processing, reducing administrative overheads and potential revenue loss from errors.

Beyond these major challenges, Fortis Escorts Hospital has also seen other important benefits:

- i. **Better Patient Outcomes through Timely and Informed Decision-Making:** When doctors have all the patient's information at their fingertips, they can make faster and more informed decisions. This means patients get the right treatment at the right time, leading to better health results. For example, if a patient's condition suddenly changes, the EMR can quickly show their full history, helping the doctor react effectively.
- ii. **Enhanced Coordination Between Doctors, Nurses, and Specialists:** The EMR creates a shared workspace for all healthcare providers. Everyone involved in a patient's care can see the same notes, test results, and treatment plans. This seamless coordination ensures that everyone is on the same page, reducing confusion and making sure care is consistent and continuous. This is especially helpful for patients with complex conditions who need care from many different specialists.

- iii. **Increased Efficiency and Time Savings in Documentation:** Writing notes by hand is slow and can be messy. With EMRs, doctors and nurses can type notes, use pre-made templates, and quickly add information. This saves a lot of time that was previously spent on paperwork, allowing them to spend more time directly with patients. It also makes sure that all the necessary information is captured consistently.
- iv. **More Involvement of Patients in Their Own Care Journey:** Some EMR systems allow patients to access parts of their own medical records through a secure online portal. This can include appointment schedules, test results, and medication lists. When patients can see their own health information, they become more active in managing their health, asking questions, and understanding their treatment plans. This partnership between patients and their care team can lead to better health habits and adherence to treatment.
- v. **Accurate and Quicker Diagnosis and Treatment:** With all patient data centralized and easily searchable, doctors can quickly review a patient's history, compare symptoms, and access relevant medical knowledge. This speeds up the diagnostic process. Once a diagnosis is made, treatment plans can be put into action more rapidly because orders can be placed electronically and results tracked efficiently. This means patients start getting the help they need sooner.

1.4 Why This Study is Being Conducted

Fortis Escorts Hospital in Jaipur has made a big change by bringing in EMRs across all its outpatient departments. While this is a great step forward, it's not enough to just put the new system in place. It's really important to check if it's actually working well and to understand any problems that doctors and staff might be facing when using it every day. This is why our study is being conducted.

This study will look closely at the impact of EMR implementation on healthcare delivery, especially focusing on the challenges faced during and after the EMR system was put into use. We are particularly interested in the outpatient (OPD) setting, as this is often the first point of contact for many patients and where a large volume of daily interactions occur. Understanding the challenges here is crucial because if the system isn't working well in the OPD, it can affect the entire patient journey.

To get a full picture, our research will use a mixed-methods design. This means we will gather insights in two main ways: by looking at numbers (quantitative data) and by talking to healthcare professionals and observing them (qualitative insights). We'll analyze large amounts of data from the hospital's computer system to see patterns in how EMRs are being used. At the same time, we'll talk to doctors and other staff, and watch them use the EMR system in real-time, to understand their experiences, frustrations, and successes. This combination helps us not just see *what* is happening, but *why* it's happening.

The main goal of this study is to see how EMRs are changing patient care and how the hospital's daily work flows. We also want to find any gaps in how doctors are adopting the system, how useful the training they received was, or if there are problems with how easy the EMR is to use. For example, are doctors using the system fully, or just partly? Was the training clear and helpful, or did it leave them confused? Is the system easy to navigate, or does it slow them down? By answering these questions, we can give Fortis Escorts Hospital clear, practical advice on how to make their EMR system work even better. This study is not just about pointing out problems; it's about finding solutions that will lead to better care for patients and a more efficient hospital.

CHAPTER 2: Review of Literature

2.1 Introduction

The move to Electronic Medical Records (EMRs) has really changed how hospitals work all over the world. It has changed how doctors write notes, how easily they can find information, and how smoothly hospital tasks are done. However, putting these systems in place is rarely a simple process. Many studies have pointed out problems like doctors needing more training, people not wanting to change old habits, and not having enough technical support.

This chapter will look at important studies published between 2020 and 2024. We'll include studies from both around the world and specifically from India. The goal is to understand how EMRs affect how hospitals work and how doctors use them. By looking at what others have found, we can get a better idea of the common challenges and successes in EMR implementation. This helps us understand the bigger picture and how our study at Fortis Escorts Hospital fits into it. We'll see that while EMRs offer great benefits, getting everyone to use them effectively is a complex journey.

2.2 International Studies

Many countries have tried to bring in EMRs, and their experiences can teach us a lot.

2.2.1 Study by Rahman et al. (2021) – Malaysia: A study in Selangor, Malaysia, looked at the problems of putting EMRs into public hospitals. The researchers talked to 450 healthcare workers, including doctors, nurses, and administrative staff. They found that a large number of people (67%) felt that not enough training was a big problem. Also, many (59%) said that EMRs changed their usual work routines in a difficult way. This study suggested that hospitals should offer continuous training that is specific to each job role. They also said that hospital leaders need to be very involved in managing this digital change to make it work well. This shows that training isn't a one-time thing; it needs to keep happening and be tailored to what each person does.

2.2.2 Study by Mwangi et al. (2023) – Kenya: Mwangi and colleagues did a study in Nairobi, Kenya, involving 180 healthcare workers from six hospitals. This study focused on how easy EMR systems were to use and how happy users were after the systems were put in place. Even though EMRs were good for storing and finding patient information, only a small number of doctors (42%) found the system easy to

use. They also faced big problems like the system often breaking down or being slow, and not having enough IT support right there in the hospital. The authors concluded that if EMRs aren't designed to fit the specific needs of doctors and if there isn't ongoing technical help, people won't want to use them much. This highlights that technology needs to be reliable and user-friendly, with good support.

2.2.3 Study by Wang et al. (2022) – China: A larger study from China looked at how EMRs affected how efficient and safe clinical work was. This study included over 1,000 doctors. About 78% of them agreed that EMRs made writing patient notes better, and 64% noticed improvements in medicine safety. However, older doctors were much less happy with the system. This showed a "digital gap," meaning that older staff might find it harder to adapt to new technology. The study stressed that EMR systems should be designed with the user in mind, and that training should be specific to different age groups to make sure everyone can use them well. This means understanding that not everyone learns or adapts to new technology at the same pace.

2.2.4 Other International Insights: Beyond these specific studies, many other international experiences reinforce these themes. For example, a report from the Health Foundation (2024) in the UK noted that many NHS (National Health Service) staff struggled to use electronic records effectively. They found that poor design, lack of training, and not enough time to learn the system were major barriers. This suggests that even in developed countries with strong healthcare systems, EMR implementation is a complex human and technical challenge.

2.2.5 Another study by Kavandi et al. (2024), a scoping review of EMR implementation in outpatient settings, identified common benefits like improved data access and reduced errors, but also consistent barriers such as workflow disruption, lack of user training, and resistance to change. This review emphasized that successful implementation requires careful planning, user involvement in design, and ongoing support.

2.2.6 Furthermore, Nuwas et al. (2022) from Tanzania, studying EMR implementation in a referral hospital, found that while EMRs improved data management, challenges included insufficient infrastructure, lack of computer literacy

among staff, and poor change management. This shows that in settings with fewer resources, the basic infrastructure and digital skills are even more critical for success.

These international studies collectively show that EMR implementation is a global challenge. While the specific details might differ between countries, the core problems often remain the same: training, usability, technical support, and managing how people adapt to new ways of working. They all point to the idea that technology alone isn't enough; it needs to be supported by good planning, continuous learning, and a focus on the people who will actually use it.

2.3 Indian Studies

2.3.1 Study by Sharma et al. (2023) – Delhi NCR: Sharma and colleagues looked at how EMRs affected daily work in outpatient departments (OPDs) in three big hospitals in Delhi NCR. They included over 500 participants, like doctors, nurses, and record keepers. The study found that doctors generally liked EMRs because they could more easily access patient histories and test results. This made their work faster and more informed. However, nurses had worries because digital documentation took more time, which sometimes got in the way of their direct patient care duties. This study highlighted that training needs to be specific to each job, and that hospitals should try to automate simple tasks to make things easier for nurses. This is a common issue: what helps one group might create new burdens for another.

2.3.2 Study by Iqbal and Singh (2022) – Bangalore: In Bangalore, Iqbal and Singh looked at why healthcare professionals chose to use EMRs in private hospitals. They used a well-known model called the Technology Acceptance Model (TAM). Their main finding was that how useful people thought the EMR was played a much bigger role in whether they used it than how easy they found it to use. This means that if doctors and staff believed the EMR would truly help them do their clinical work better and make better decisions, they were more likely to use it, even if it seemed a bit complicated at first. This is a crucial insight: showing the practical benefits of EMRs is more important than just making them simple.

2.3.3 Study by Thomas et al. (2021) – Kerala: Thomas and others did a study in a government medical college in Kerala, involving 150 medical officers. They focused on how happy users were after EMRs were put in place. While most participants (80%)

said EMRs helped them get clearer diagnoses, only a small number (30%) found the system fast and responsive, especially in busy areas like emergency departments. The slow speed of the system led to delays in patient care and made many users frustrated. The authors suggested that hospitals need to upgrade their technology and have local IT support to make EMRs work well. This points to the importance of the underlying technology and quick help when problems arise.

2.3.4 Other Indian Insights: The challenges in India are often made more complex by factors like limited digital literacy among some older staff, intermittent internet connectivity in certain regions, and the sheer volume of patients seen daily in public hospitals. For instance, a study on health professionals' readiness in Ethiopia (2014) showed that basic computer skills were a significant barrier to EMR adoption, a finding that resonates with parts of India where digital education is still catching up.

The Financial Times (2024) and The Guardian (2024), while reporting on the NHS in the UK, also touched upon concerns about patient safety risks due to poorly implemented electronic health records. These reports highlight that if EMRs are not properly integrated and used, they can introduce new risks, not just solve old ones. This is a cautionary tale for Indian hospitals, emphasizing that EMR implementation requires careful planning to ensure patient safety is never compromised.

Overall, Indian studies confirm that while EMRs are seen as beneficial for improving patient data access and diagnostic clarity, widespread and consistent adoption faces hurdles related to workflow integration, perceived usefulness, system responsiveness, and the need for tailored training. The unique context of Indian healthcare, with its diverse patient population and varying levels of digital readiness, makes these challenges particularly acute.

2.4 Emerging Themes and Observations

Looking at all these studies, both from around the world and from India, some common ideas and patterns stand out. These themes help us understand the bigger picture of EMR implementation:

- 1. Training and Support are Key:** Almost every study highlights that initial training for EMRs is not enough. There's a strong need for ongoing training that is specific to each

job role (like doctors, nurses, or administrative staff). This training should also include practical, hands-on support. Many studies show that when staff get continuous help, personalized guidance, or even just quick answers to their questions, they use the EMR system much more effectively. This means that training should be seen as a continuous process, not a one-time event.

2. Usability and System Performance Matter: It's not enough for an EMR system to just exist; it needs to be easy to use and work quickly. Studies consistently show that if a system is complicated, slow, or frequently breaks down, users get frustrated and stop using it fully. The speed and responsiveness of the system are especially important in busy hospital environments, like outpatient departments or emergency rooms, where quick decisions are needed. If data entry takes too long, it can disrupt clinical workflow and reduce the time doctors spend with patients.

3. Workflow Integration is Crucial: EMRs don't just replace paper; they change how people work. Many studies point out that if the EMR system doesn't fit smoothly into the existing daily routines of doctors and nurses, it creates more work and frustration. For example, if nurses have to enter the same information in multiple places, or if doctors have to click through too many screens to find what they need, it slows them down. Successful EMR implementation means redesigning workflows to make the digital system a natural and helpful part of daily tasks, not an extra burden.

4. Perceived Usefulness vs. Ease of Use: The study by Iqbal and Singh in Bangalore highlighted a very important point: how useful people *think* the EMR is (how much it helps them do their job better) is often more important than how *easy* it is to use. If doctors see clear benefits in terms of better patient care, reduced errors, or faster access to information, they are more willing to overcome initial difficulties in learning the system. This means that during implementation, hospitals should focus on showing the real, practical advantages of EMRs to their staff.

5. Departmental and Generational Differences: EMR adoption rates often vary significantly across different hospital departments. This is because different specialties have different workflows, patient loads, and digital literacy levels among their staff. For example, a department with very high patient turnover might struggle more with detailed digital documentation than a department with fewer, more complex cases. Also,

there's often a "digital divide" between older and younger healthcare professionals, with younger staff generally being more comfortable and ready to adopt new digital tools. This suggests that a one-size-fits-all approach to EMR implementation and training might not be effective.

6. Leadership and Culture are Important: Beyond technical aspects, the support from hospital leadership and the overall culture of the organization play a huge role. If leaders actively promote EMR use, provide necessary resources, and create an environment where staff feel supported in adapting to new technology, adoption rates tend to be higher. A culture that encourages learning, embraces change, and values digital efficiency can make the transition much smoother.

These emerging themes show that EMR implementation is a complex mix of technology, human behavior, and organizational culture. Success depends on addressing all these aspects in a coordinated way.

2.5 Gaps in the Literature

While there's a growing amount of research on EMRs, there are still some important areas that haven't been fully explored. Recognizing these gaps helps us understand where our study can contribute new knowledge:

- a. Long-Term Outcomes:** Most studies look at the short-term effects of EMR adoption, usually within the first few months or a year after implementation. There's limited research on the long-term impacts of EMRs. For example, how do EMRs affect patient safety over many years? Do they lead to significant cost reductions in the long run? How do they truly optimize workflows and improve the quality of care over extended periods? Understanding these long-term effects is crucial for hospitals to see the full return on their EMR investment.
- b. Focus on Specific Hospital Types:** The majority of studies have focused on large, urban, tertiary care hospitals. This means that smaller hospitals, rural clinics, or primary health centers (PHCs) are often underrepresented in the research. These smaller facilities often have different resources, patient populations, and technical capabilities, so the challenges and successes of EMR implementation might be very

different for them. More research is needed to understand EMR adoption in these diverse settings.

- c. **Perspectives of Non-Clinical Staff:** While many studies focus on doctors and nurses, the experiences of other important user groups are often missed. This includes administrative staff, billing personnel, inventory managers, and IT support staff. These individuals play a crucial role in the overall hospital workflow and EMR usage, but their perspectives on challenges and benefits are not adequately captured in existing literature. Their insights are vital for a complete understanding of EMR integration.
- d. **Real-Time Workflow Observation and Time-Motion Studies:** Few studies use methods like real-time workflow observation or time-motion studies to analyze the actual impact of EMR systems on clinical efficiency. Most research relies on surveys or interviews, which capture perceptions but might not accurately reflect how EMRs change the time it takes to complete tasks or how patient flow is affected. Direct observation can reveal subtle disruptions or efficiencies that surveys might miss, providing a more objective measure of workflow impact.
- e. **Deeper Exploration of Behavioral Resistance:** While many studies mention "resistance to change," they often don't delve deeply into the psychological reasons behind it. Few studies use formal psychological frameworks to understand why some healthcare professionals resist EMRs, even when they understand the benefits. This could involve exploring factors like fear of technology, loss of autonomy, or concerns about data accuracy. A deeper understanding of these behavioral aspects could lead to more effective change management strategies.
- f. **Impact on Patient Experience:** While EMRs aim to improve patient care, there's a gap in research directly linking EMR implementation to patient experience and satisfaction. How do patients perceive the digital shift? Does it make their interactions with healthcare providers better or worse? Understanding the patient's viewpoint is essential for truly patient-centered EMR implementation.

Our current study aims to address some of these gaps, particularly by focusing on real-time observation and detailed analysis of doctor adoption in a specific tertiary care hospital, offering a deeper look into the practical challenges and the usefulness of training in a real-world Indian context.

2.6 Summary

The studies we've reviewed clearly show that while Electronic Medical Records (EMRs) promise to greatly improve healthcare, putting them into practice is complicated and depends a lot on the specific hospital and its environment. For EMRs to be truly successful, several things are essential: doctors and staff need effective training, there must be strong IT infrastructure (like reliable internet and fast computers), the system needs to be designed with the user in mind (easy to use), and everyone involved (doctors, nurses, admin staff) needs to be engaged and supportive.

In India, where hospitals vary greatly in size and resources, a phased approach to EMR implementation, focusing on one department or a few at a time, seems more practical than trying to do everything all at once. This allows hospitals to learn and adapt as they go. This review of existing research provides a solid foundation for our study. It helps us understand the common problems and successes, and it guides us in exploring how EMR systems affect outpatient department workflows, how well doctors use them, and how effective the training programs are within hospitals. Ultimately, the literature confirms that EMR implementation is not just a technology project; it's a complex organizational change that requires careful planning, continuous support, and a focus on the people who will use the system every day.

Chapter 3 Methodology

3.1 Methodology

This chapter outlines the research design, methodology, and ethical considerations adopted to study the implementation and utilization of Electronic Medical Records (EMR) in a hospital setting. The research employs both **quantitative analysis** of EMR data and **qualitative observation** through real-time assistance to clinicians. A dual approach was taken to understand not just how EMRs are used, but why certain usage patterns occur and how they can be improved.

3.2 Research Objectives

1. To analyze the impact of EMR implementation on hospital workflows.
2. To identify key challenges faced during and after EMR implementation.
3. To assess the usefulness of doctors training in ensuring successful implementation of EMR
4. To assess the level of doctors adoption and satisfaction with use of EMR.

3.3 Research Questions

1. How does EMR implementation impact hospital on workflows?
2. How useful was the doctors training in ensuring successful adoption of EMR implementation?
3. What were the key challenges faced during EMR implementation?

3.4 Study Design

This study is a **mixed-methods design**:

- **Quantitative**: Secondary data analysis of EMR usage data from 20,015 patient records.
- **Qualitative**: Live observation of doctors using the EMR system and intervention

3.5 Study Setting

The study was conducted in a multi-specialty tertiary care hospital equipped with an integrated EMR system. The hospital serves a wide range of specialties and maintains all patient records digitally.

3.6 Study Population

- **Quantitative:** 20,015 EMR medical cards created during the study period.
- **Qualitative:** A purposive sample of 50 doctors from different departments who were observed and assisted during EMR use.

3.7 Sampling Technique and Sample Size

- **Quantitative:** Census method; all available records were included (N = 20,015).
- **Qualitative:** Purposive sampling of 50 doctors based on availability and willingness to participate in live observation and template implementation.

3.8 Inclusion Criteria:

- Healthcare professionals directly involved in using the EMR system (e.g., doctors, nurses, and administrative doctors).
- Doctors' members who participated in EMR training sessions.

3.9 Exclusion Criteria:

- Doctors who have minimal or no interaction with the EMR system.
- Temporary doctors or interns with limited exposure to EMR processes.

3.10 Duration of Study: 2 months

3.11 Study Instruments and Variables

Quantitative Data Variables

- Department
- Doctor Name
- Completed Medical Cards

- In Progress (partially completed)
- Check-ins (not opened by doctor)

Qualitative Instruments

- Observation checklists
- Feedback from doctors
- Custom-designed EMR templates created manually by doctors to be put in EMR system.

3.12 Research Procedures

Quantitative Procedure

- EMR usage data was collected from the hospital's central HIS database.
- Data was cleaned, categorized, and analysed using MS Excel

Qualitative Procedure

- The researcher was embedded in clinical settings for real-time observation.
- Participated actively by assisting doctors in navigating EMR workflows.
- Designed and implemented customized templates for 50 doctors to simplify documentation.
- Gathered verbal feedback and noted behavioral shifts post-template introduction.

3.13 Operational Definitions

- **Completed:** Fully documented EMR records finalized by a doctor.
- **In Progress:** Records opened but not finalized.
- **Check-in:** Patient registered, but record never accessed by the doctor.

- **Template:** A structured digital form within the EMR pre-filled with standard fields to reduce typing effort and streamline documentation.

3.14 Data Analysis

Quantitative Analysis

- Descriptive statistics: % completion, department-wise and doctor-wise trends.
- Comparative visualizations (bar charts, pie charts).
- Identification of doctors/departments with the highest and lowest EMR engagement.

Qualitative Analysis

- Narrative summaries of observed behavioural shifts after template introduction.

3.15 Ethical Considerations

- **Consent:** Verbal consent was obtained from all doctors involved in observations and template interventions.
- **Confidentiality:** No personal identifiers were collected; all data anonymized.
- **Data Security:** All data stored in encrypted systems with restricted access.

Chapter 4 Data Analysis

This chapter provides a detailed examination of the quantitative data, specifically focusing on the usage patterns of the Electronic Medical Record (EMR) system at Fortis Escorts Hospital, Jaipur. It analyses a substantial dataset of 20,015 EMR entries collected between March 20 and May 12, 2025. The data is categorized to show the distribution of fully completed, in-progress, and check-in only medical records, offering a clear picture of EMR engagement levels across the hospital's outpatient departments.

Furthermore, this chapter delves into departmental and doctor-specific EMR adoption rates, highlighting variations in usage and identifying top performers as well as those with minimal engagement. The data analysis also includes insights from qualitative observations, such as the impact of customized EMR templates and real-time support on doctor adoption. Visualizations, including bar charts and pie charts, are used to present a clear overview of EMR completion statuses, doctor adoption levels, and feedback from other staff members like nurses and billers regarding their experience with the EMR system. Finally, the chapter identifies and quantifies key barriers to EMR adoption, such as high patient workload and lack of post-training support, providing a data-driven understanding of the challenges faced during implementation.

Fig 4.1 EMR medical record distribution (N=20015)

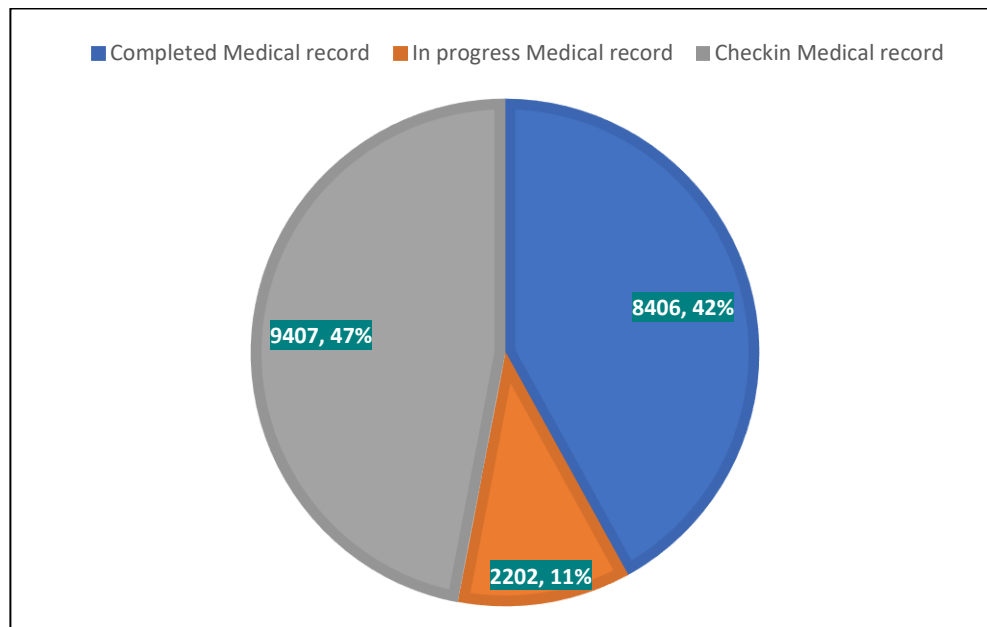


Fig. 4.1 shows **EMR Medical Record Distribution Analysis (N = 20,015)** where **Completed Medical Records**:8,406 records → **42%**. This shows good progress, but there's room for improvement. **Check-in Only**:9,407 records → **47%**. This is the highest portion. These records were only checked in but not opened by doctors at all. **In-Progress Medical Records**: 2,202 records → **11%**. These records are being worked on but are not finalized yet. They may indicate delays or doctors needing more time/training to complete them.

Fig 4.2: Doctors Classification (OPD)-EMR Training and Usage

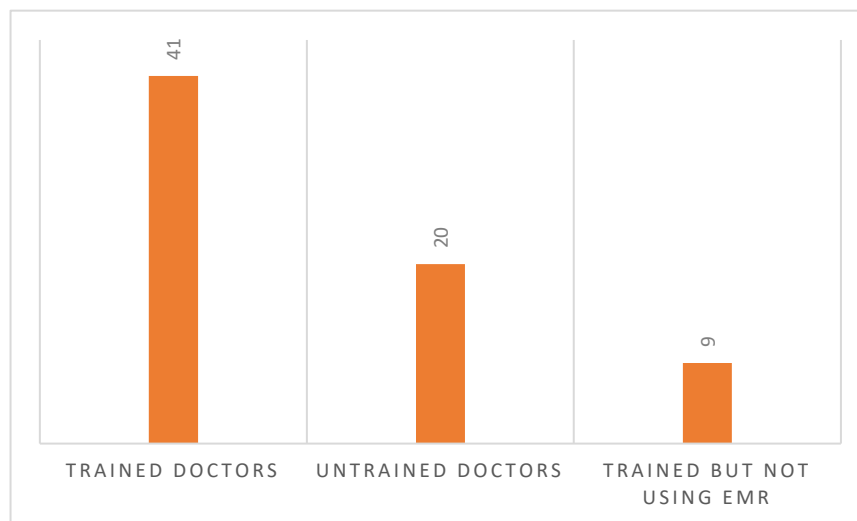


Fig 4.2 shows Doctors Classification (OPD)-EMR Training and Usage in which about **18%** of trained doctors are **not using EMR**, which shows a gap in adoption post-training. Engagement and accountability mechanisms are necessary.

TABLE 1: Doctors trained and assisted

Doctors and Specialization	Sum of Completed	Sum of In_Progress	Sum of Check_In	Total
Consultant	617	104	143	864
CARDIOLOGY	607	12	143	762
HEALTH CHECKUP	10	92	0	102
Consultant	305	29	191	525
RHEUMATOLOGY	305	29	191	525
Consultant	0	0	53	53
ORTHOPAEDICS	0	0	53	53
Consultant	12	14	547	573
ORTHOPAEDICS	12	14	547	573
Consultant	182	0	3	185
HEALTH CHECKUP	1	0	0	1
MEDICAL ONCOLOGY	181	0	3	184
Consultant	132	20	37	189
Minimal Access Surgery	132	20	37	189
Consultant	73	16	97	186
Minimal Access Surgery	73	16	97	186
Consultant	0	4	565	569
DERMATOLOGY	0	2	565	567
HEALTH CHECKUP	0	2	0	2
Consultant	11	10	142	163
GI, MINIMAL ACCESS & BARIATRIC SURGERY	11	10	142	163
Consultant	79	10	163	252
HEALTH CHECKUP	1	1	0	2
UROLOGY	78	9	163	250
Consultant	222	47	3	272
HEALTH CHECKUP	211	47	0	258
INTERNAL MEDICINE	11	0	3	14
Consultant	102	18	669	789
ENDOCRINOLOGY	102	15	669	786
HEALTH CHECKUP	0	3	0	3
Consultant	191	6	82	279
GASTROENTEROLOGY	191	6	82	279
Consultant	237	26	33	296
CARDIO THORACIC VASCULAR SURGERY	202	7	33	242
HEALTH CHECKUP	35	19	0	54
Consultant	100	62	137	299
UROLOGY	100	62	137	299
Consultant	144	14	18	176
HEALTH CHECKUP	1	3	0	4
PAEDIATRICS	143	11	18	172
Consultant	569	2	29	600
HEALTH CHECKUP	1	0	0	1
PAEDIATRIC NEUROLOGY	556	1	20	577
PAEDIATRICS	12	1	9	22
Consultant	331	2	46	379
NEONATOLOGY	331	2	46	379
Consultant	0	0	221	221
GASTROENTEROLOGY	0	0	221	221
Consultant	0	15	295	310
GASTROENTEROLOGY	0	15	295	310
Consultant	335	28	732	1095
NEUROLOGY	335	28	732	1095
Consultant	80	15	150	245
UROLOGY	80	15	150	245
Consultant	121	21	23	165
CARDIO THORACIC VASCULAR SURGERY	117	17	23	157
HEALTH CHECKUP	4	4	0	8
Consultant	27	23	196	246
HEALTH CHECKUP	0	6	0	6
ORTHOPAEDICS	27	17	196	240
Consultant	106	4	240	350
PULMONOLOGY	106	4	240	350

Fig 4.3: Most consistent Department wise EMR -Completed Percentage

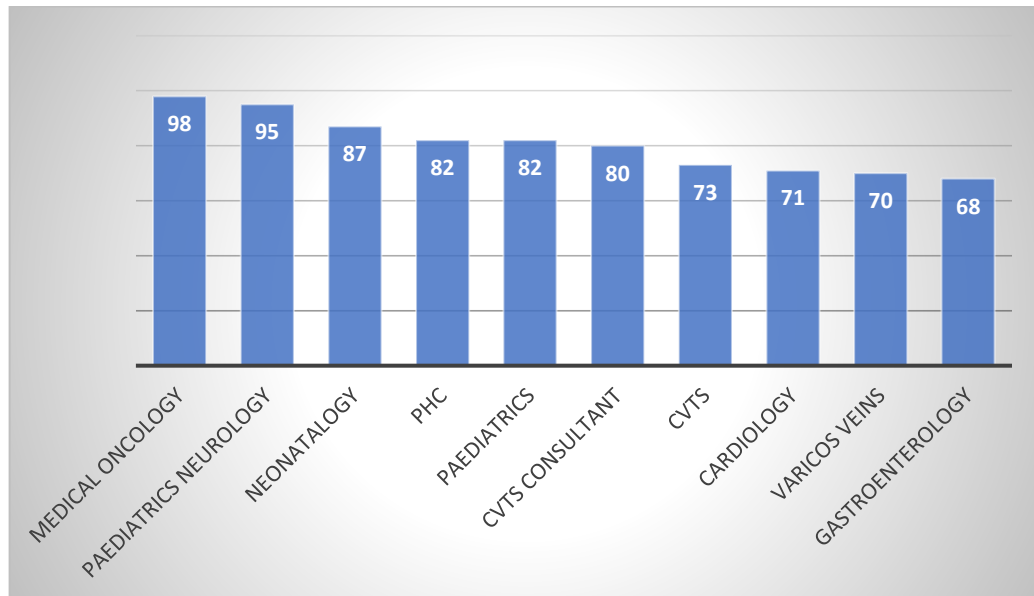


Fig 4.3 shows the most consistent Department wise EMR -Completed Percentage where the percentages for EMR completion vary across departments, ranging from a high of 98% to a low of 68%. This indicates a significant difference in consistency among departments regarding EMR

Fig 4.4: Number of Doctors by EMR Usage Percentage

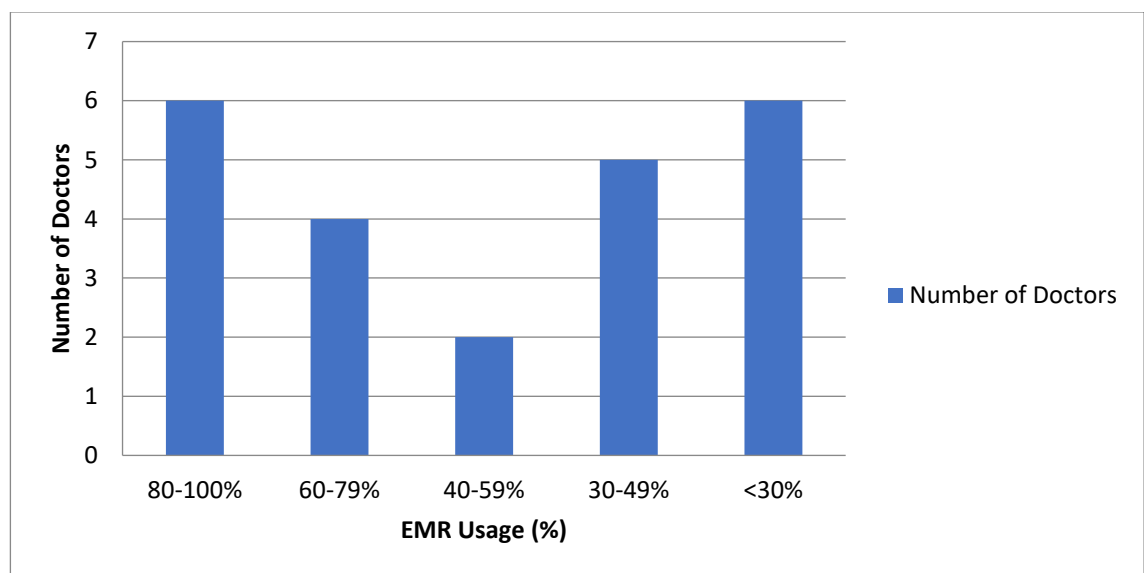


Fig 4.4 shows the number of Doctors by EMR Usage Percentage where the chart shows how many doctors are using the EMR (Electronic Medical Record) system at different levels. Most doctors are either using it very well (80–100%) or very little (less than 30%), with 6 doctors in each of these groups. About 5 doctors are using it at a moderate level (30–49%), and 4 doctors are using it fairly well (60–79%). Only 2 doctors are using it between 40–59%. This means while some doctors have adopted the system well, others are still not using it much and may need more support or training.

Fig 4.5: Perceived Improvements after EMR Training and Assistance: Doctor Feedback%

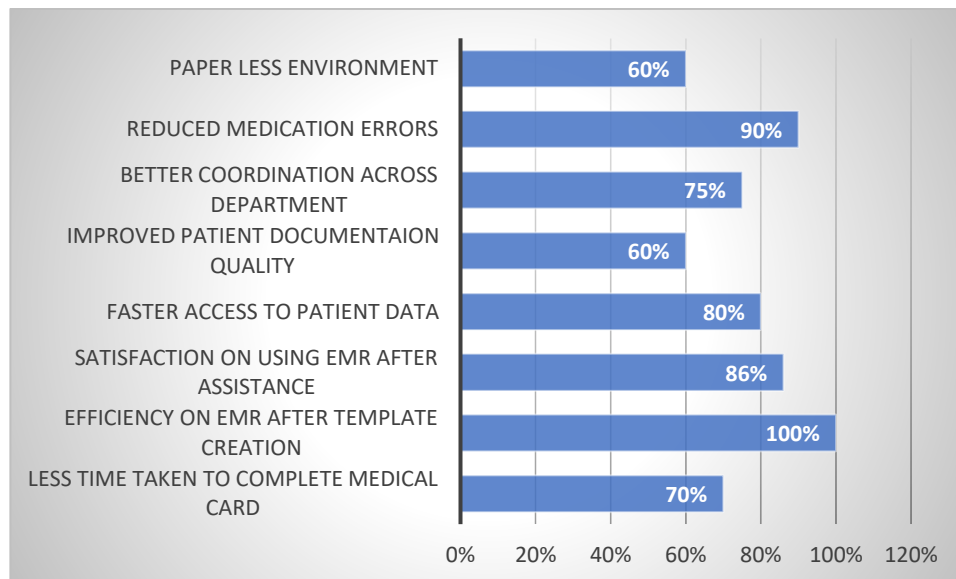
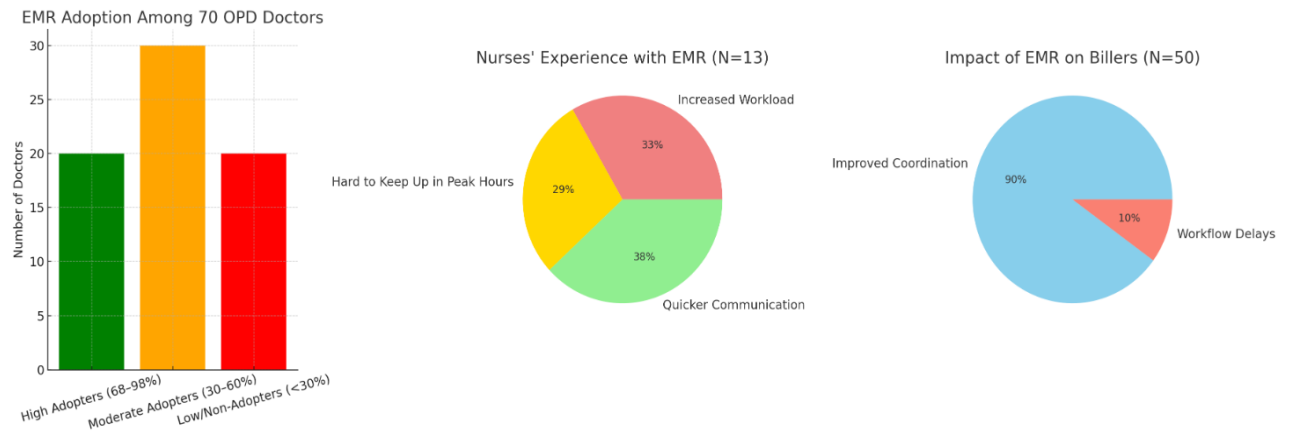


Fig 4.5 shows perceived Improvements after EMR Training and Assistance: Doctor Feedback%. The bar chart highlights the fact that doctors perceived significant improvements after EMR training and assistance, with **100%** reporting increased efficiency due to template support. Other major benefits included a **90%** reduction in medication errors and **86%** satisfaction with EMR usage post-training. Overall, the feedback indicates a strong positive impact on clinical workflows and patient safety from the EMR system.

Fig 4.6: EMR experience among different users



Bar Chart (Doctors): Shows distribution of EMR adoption levels among the 70 OPD doctors—20 are high adopters, 30 are moderate, and 20 are low or non-adopters.

Pie Chart (Nurses): Reflects nurses' experiences with EMR—majority reported quicker communication, but also noted increased workload and difficulty during peak hours.

Pie Chart (Billers): Demonstrates that 90% experienced better coordination due to EMR, while 10% faced workflow delays.

Fig 4.7: Reasons for Doctors Non-Engagement in EMR Usage

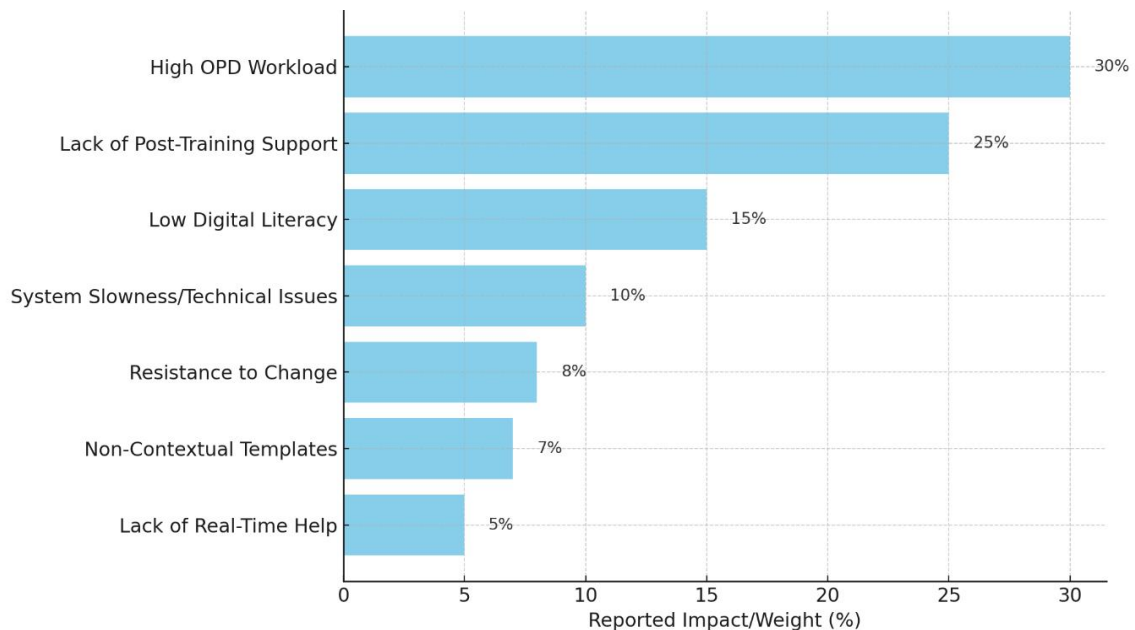


Fig 4.7 shows the reasons for doctors non-engagement in EMR usage. The graph presents a visual summary of the primary **barriers to EMR adoption** among doctors during the initial implementation phase at Fortis Escorts Hospital, Jaipur. It categorizes the main reasons behind the **47% of EMR records being left untouched or incomplete**, despite system rollout and training efforts.

Chapter 5 Discussion

Introduction: EMR as a Digital Transformation Tool

The implementation of Electronic Medical Records (EMR) at Fortis Escorts Hospital, Jaipur, marks a pivotal step in the institution's journey toward digital transformation. The purpose of this study was to evaluate the extent to which EMRs have been adopted, particularly focusing on hospital workflows, staff (primarily doctors) adoption, and the perceived usefulness of the training programs rolled out during the early phase of implementation. As healthcare increasingly transitions to digitized systems globally, this study provides a localized yet significant contribution to understanding the granular challenges and enabling factors that affect EMR rollout in a tertiary care Indian hospital.

Analysis of EMR Record Completion Rates

The quantitative data revealed that of the 20,015 outpatient records generated during the study period, only 8,406 (42%) were fully completed using the EMR system. This level of completion, while reflective of moderate engagement, leaves much room for improvement, especially given the volume of patients handled in a facility of this nature. A more concerning observation, however, is the large proportion of records—9,407 (47%)—that were check-in only, implying that while the patient was registered, the assigned doctor did not access or utilize the EMR for that consultation. Additionally, 2,202 (11%) of the records were initiated but not finalized, suggesting either time constraints or an inability to complete the documentation due to unfamiliarity with the system or workflow interruptions. These figures illustrate that the EMR implementation at Fortis Escorts Hospital is still very much in a transitional phase and that adoption is neither uniform nor deep-rooted across departments or personnel.

Departmental Disparities and Contextual Factors

What becomes evident through the departmental breakdown is that EMR adoption is influenced not merely by the existence of the technology or the provision of training but by a complex interplay of departmental workload, clinician engagement, digital literacy, and the design of EMR templates and workflows. Departments such as Cardiology, Pulmonology, and Paediatric Neurology stood out with higher rates of documentation, while departments like ENT, Neurosurgery, Obstetrics & Gynaecology, and

Physiotherapy exhibited little to no EMR engagement. This disparity suggests that implementation success is highly contextual and cannot rely on a homogenous strategy. Instead, it must account for department-specific operational realities, including patient flow, nature of cases, and clinician comfort with technology.

Impact of Real-Time Support and Customization

The study also included a qualitative component, in which 50 doctors were observed and supported during real-time usage of EMRs. This component was instrumental in uncovering nuanced behavioural and operational factors that quantitative data alone could not reveal. A key observation was that the doctors who received real-time support, including the creation of customized EMR templates, showed significantly higher levels of engagement. For example, clinicians of department oncology, paediatrics, paediatrics-neurology demonstrated exceptional usage rates. Their high performance was not simply a reflection of individual aptitude but was heavily influenced by the presence of enabling structures such as contextual templates, immediate troubleshooting assistance, and an empathetic understanding of their clinical routines. This finding underscores that training, while essential, is insufficient on its own unless supplemented with continuous, context-sensitive support.

Corroboration with Global EMR Implementation Studies

These results echo the findings of global studies. Rahman et al. (2021) in Malaysia identified that a lack of ongoing training and significant workflow disruptions were critical barriers to EMR adoption. Their survey of over 450 healthcare workers emphasized that the initial training must be complemented by continuous learning opportunities and strong leadership engagement to ensure sustained adoption. Similarly, Mwangi et al. (2023) in Kenya found that low user satisfaction stemmed not from the concept of EMRs but from issues such as system slowness, poor usability, and absence of on-ground IT support. These international findings resonate with the Fortis experience, where doctors cited slowness during peak OPD hours and expressed frustration when real-time help was unavailable.

Contrasting Indian Experiences in EMR Rollouts

The Indian context presents a unique blend of challenges and expectations. The study by Sharma et al. (2023) in Delhi NCR, involving over 500 medical professionals, found that while doctors appreciated the easier access to patient histories and diagnostics facilitated by EMRs, nurses were often overwhelmed by the increased documentation workload. A similar duality was noted at Fortis Escorts Hospital. Nurses acknowledged that communication had become faster and more accurate, but many also reported fatigue and delays during peak OPD hours, especially when the EMR system experienced lags or required repetitive data entry. The divergence in experience between doctors and nursing staff highlights the importance of role-specific interventions and workflow integration, especially in high-pressure clinical environments.

Behavioural Resistance and Perceived Usefulness

One of the more critical insights of the present study is the understanding of the behavioural aspects surrounding EMR usage. Among the 50 trained doctors, 18% never used the EMR system post-training, which reveals a significant gap between theoretical knowledge and practical application. This behavioural resistance can stem from multiple sources, including technophobia, perceived time constraints, and a lack of perceived benefit. This finding mirrors the conclusions drawn by Iqbal and Singh (2022), who found that perceived usefulness, rather than ease of use, was the primary determinant of EMR adoption in private hospitals in Bangalore. In other words, when clinicians see direct, tangible benefits in their workflow or patient outcomes, they are more likely to invest time and effort in mastering digital tools—even if the initial learning curve is steep.

Role of Template Design in Facilitating EMR Adoption

Moreover, the importance of tailored template design emerged as a key factor in boosting usage. Doctors who participated in the creation of custom templates found the system more intuitive and efficient. This reflects the argument made by Kavandi et al. (2024) in their scoping review of outpatient EMR implementations, where they emphasized the need for user-centered system design that aligns with specific clinical tasks. At Fortis Escorts Hospital, departments that used customized templates not only had higher completion rates but also reported fewer errors and greater satisfaction with the documentation process. The contrast between departments with template-driven

documentation and those without underscores the potential of co-designed tools in bridging the gap between digital expectations and clinical reality.

Technical Infrastructure and System Responsiveness

Technical infrastructure also plays a pivotal role in shaping user experiences. Several doctors reported system slowness, particularly during peak hours, which led to delayed documentation and, in some cases, abandonment of the EMR mid-way. This feedback aligns with the observations made by Thomas et al. (2021) in Kerala, where only 30% of users found the EMR system responsive in emergency settings. The issue of lag not only hampers workflow efficiency but also undermines user confidence in the system. In high-stakes environments like emergency rooms or high-turnover OPDs, even minor delays can have cascading effects on patient throughput and care quality.

Importance of Organizational Culture and Leadership

In addition to technical and behavioural factors, organizational culture and leadership support emerged as critical enablers—or inhibitors—of EMR success. Departments that showed high adoption often had senior clinicians who championed the EMR system, encouraged their peers, and collaborated with IT teams to refine workflows. Conversely, in departments where no such leadership was visible, adoption was minimal. This observation is consistent with the study by Arabi et al. (2022), which concluded that visible leadership involvement, coupled with resource allocation for ongoing support, was central to successful EMR integration. At Fortis, the presence or absence of such digital champions significantly influenced departmental performance, indicating that EMR success is as much about people and culture as it is about technology.

Strategic Implications for Hospital-Wide Rollout

The implications of these findings are far-reaching. A uniform, hospital-wide strategy for EMR implementation is unlikely to succeed unless it is rooted in the specific operational, technical, and behavioral contexts of each department. The study suggests that phased, department-specific rollouts—where early adopter departments serve as internal case studies—may be more effective. Departments that demonstrate success can become training and mentorship hubs for others, creating an organic, peer-driven diffusion of digital practices. Additionally, the integration of EMR usage into performance

dashboards and review mechanisms can help institutionalize digital accountability, provided these tools are used to support rather than punish clinicians.

Role of Non-Clinical Staff in EMR Success

Furthermore, the feedback gathered from non-doctor staff groups—such as nurses, billers, reinforces the idea that EMR implementation affects the entire hospital ecosystem. Billers, for instance, appreciated the improved coordination enabled by EMRs but cited delays when the system lagged or when documentation was incomplete. These functional inefficiencies point to the need for more robust backend infrastructure and enhanced user support, particularly during peak hours. Including these stakeholders in future training and feedback loops can result in a more cohesive and resilient EMR ecosystem.

Future Directions for Research and Practice

Looking ahead, there are several avenues for future research and implementation strategies. Time-motion studies can provide granular data on how EMR systems impact clinical workflows minute-by-minute. Behavioural studies employing psychological frameworks such as the Theory of Planned Behaviour could offer deeper insights into resistance or acceptance patterns. Multi-site studies comparing Fortis Jaipur with similar institutions across India could help identify regional or institutional best practices. Including patient perspectives would also enrich the discourse, especially in assessing how EMRs influence patient satisfaction, trust, and participation in their own care.

Conclusion: EMRs as Partners in Modern Healthcare

In conclusion, the EMR implementation at Fortis Escorts Hospital, Jaipur, has made commendable progress in laying the digital foundation for improved clinical documentation and interdepartmental coordination. However, the journey toward complete adoption is ongoing and fraught with challenges that span technical, behavioural, organizational, and infrastructural domains. The findings from this study reinforce the understanding that EMR implementation is not merely a technological upgrade but a profound organizational change. Its success depends on more than training sessions and system installations—it hinges on leadership, adaptability, user-centered design, and continuous support.

To navigate these complexities, hospital administrators must adopt a strategy that is iterative, inclusive, and context-sensitive. Departments must be empowered to co-create their digital workflows, training must evolve into mentorship, and system design must reflect the real-world practices of its users. Only through such a comprehensive approach can hospitals like Fortis Escorts Jaipur ensure that their investment in EMRs translates into meaningful improvements in care quality, staff satisfaction, and operational excellence. Ultimately, the promise of EMRs—to enhance patient safety, reduce errors, and create a more efficient healthcare system—can only be realized if the technology is embraced not just as a tool, but as a partner in the delivery of modern healthcare.

Chapter 6: Conclusion

The journey towards fully digital healthcare, marked by the implementation of Electronic Medical Records (EMR) at Fortis Escorts Hospital, Jaipur, is a significant undertaking that promises to reshape patient care and operational efficiency. This study, conducted over a crucial two-month period (March 20 to May 12, 2025) immediately following the EMR rollout, aimed to provide a comprehensive understanding of its initial impact on hospital workflows, staff adoption (particularly doctors), and the effectiveness of the training programs. By employing a mixed-methods approach—combining rigorous quantitative analysis of over 20,000 EMR entries with rich qualitative insights gleaned from observing 50 doctors in real-time—this research offers a nuanced and practical perspective on the complexities of digital transformation within a tertiary care clinical setting in India.

One of the most striking findings of this study was the considerable variation in EMR utilization across different departments within the hospital. While some specialties, such as Cardiology, Pulmonology, Paediatric Neurology, and Mental Health, demonstrated commendable EMR completion rates, indicating a relatively smooth transition and higher user engagement, others, including ENT, Neurosurgery, Obstetrics & Gynaecology, and Physiotherapy, exhibited alarmingly low or virtually negligible digital documentation. This stark disparity underscores that successful EMR implementation is not merely a matter of deploying technology or providing generic training. Instead, it is deeply influenced by a complex interplay of internal departmental factors, including the specific workload characteristics of each specialty, the time constraints faced by clinicians, varying levels of digital literacy among staff, and pre-existing attitudes towards technological change. The implication is clear: a "one-size-fits-all" approach to EMR rollout is unlikely to yield uniform success in a diverse hospital environment where operational realities and user readiness differ significantly across departments.

The study also critically evaluated the role of training in fostering EMR adoption. While 50 doctors received formal training, the quantitative data revealed that a substantial portion did not consistently use the EMR system post-training. This finding is a critical insight, suggesting that initial training, while foundational, is often insufficient on its own to drive sustained behavioural change and widespread engagement. A key differentiator emerged from the qualitative observations: doctors who received not only initial training but also

ongoing, real-time assistance and—crucially—customized documentation templates, demonstrated significantly better outcomes. The top 10 doctors who benefited from such personalized support achieved impressive EMR completion rates, ranging from 68% to 98%. This powerful finding emphasizes the immense value of tailored interventions, immediate troubleshooting support, and continuous handholding during the critical early stages of EMR adoption. These results align perfectly with both national and international literature, which consistently highlights the importance of contextualized training, robust technical support, and peer-led learning systems for successful EMR integration.

Feedback gathered from doctors post-training further illuminated the perceived value of the EMR system. Many reported tangible benefits such as improved efficiency, fewer medication errors, quicker access to comprehensive patient records, and enhanced interdepartmental coordination. These positive perceptions underscore the inherent potential of EMRs to genuinely transform healthcare delivery. However, the study also captured notable reservations and challenges. A significant portion of doctors expressed concerns about the transition to completely paperless workflows and raised issues regarding data entry accuracy. This dual feedback highlights the need for continuous system optimization, highly responsive technical support, and an agile process for integrating user feedback directly into the system's design and ongoing development. Ensuring that EMR systems are not only functionally capable but also inherently user-friendly and reliable is paramount to driving widespread adoption and long-term user satisfaction.

Strengths and Limitations

Despite the significant strengths of this study—including its robust quantitative sample size (N=20,015 EMR entries analysed), the invaluable real-time qualitative observations that provided deep contextual understanding (50 doctors observed and assisted), and its timely relevance within the initial implementation phase—it is important to acknowledge certain limitations. The relatively short two-month study duration primarily captures the immediate post-implementation dynamics, thereby limiting the ability to comprehensively assess long-term adoption trends, the sustained impact on patient outcomes over extended periods, or the enduring improvements in workflow efficiency. Furthermore, while the study provided in-depth insights into doctor adoption, its primary focus on medical practitioners excluded the experiences and perspectives of other crucial EMR users, such as nurses, administrative staff,

and technicians. Their inclusion in future research would undoubtedly provide a more holistic and complete view of EMR system integration and its cascading effects throughout the entire hospital ecosystem. Further, many doctors use certain phrases which can be represented as challenges.

Many doctors' express frustration with Electronic Medical Records (EMRs), often describing the system as ***“not user-friendly”*** and ***“time-consuming”***. A common sentiment is that ***“I spend more time on the screen than with the patient,”*** highlighting how documentation demands interfere with clinical interaction. The workflow is frequently criticized, with remarks like ***“too many clicks – not intuitive”*** and ***“entering vitals and orders takes more time than expected.”*** Some doctors mention that ***“the system crashes frequently”*** or ***“sometimes the system hangs or logs me out,”*** especially when internet speed is an issue. Others admit, ***“I still use both paper and EMR in parallel”*** because the digital interface lacks the flexibility they need in urgent situations. Another recurring complaint is that ***“templates are rigid – can't write freely like on paper,”*** limiting the ability to document nuanced clinical details. Doctors also note that ***“there was no proper training before implementation,”*** which added to their initial resistance. Many believe that ***“tech people don't understand clinical needs,”*** and emphasize that while EMRs might be ***“good for documentation, bad for workflow,”*** they are yet to truly enhance clinical efficiency. Some even go as far as saying, ***“I need a scribe or assistant to handle the EMR while I see patients.”***

Recommendations

Based on the comprehensive findings of this study, several actionable and context-specific recommendations are proposed to significantly enhance the effectiveness of EMR implementation at Fortis Escorts Hospital, Jaipur, and similar healthcare settings embarking on digital transformation journeys.

Short-Term Recommendations (0-3 Months)

Recommendation	Explanation
Conduct monthly EMR orientation refreshers	Helps reinforce training and address specific user concerns post-implementation.
Provide real-time IT support during OPD hours	Ensures immediate troubleshooting during peak usage times.
Use simplified, department-specific Customized templates for OPD documentation	Reduces unnecessary input fields and streamlines note entry for faster documentation.

Mid-Term Recommendations (3-6 Months)

Recommendation	Explanation
Add multiple tab viewing within a single EMR page	Improves navigation and efficiency by allowing users to view lab reports, notes, and prescriptions simultaneously.
Improve EMR font sizes and color contrast across modules	Enhances readability and user comfort, especially for senior clinicians.
Ensure seamless login/logout and auto-save features	Prevents session timeouts and data loss, enhancing user confidence.
Conduct quarterly EMR usage audits by department	Tracks usage, identifies low-adoption areas, and facilitates targeted improvement efforts.
Launch dashboards with doctor-wise EMR usage and completion rates	Encourages accountability and visualizes progress department-wise.
Improve system responsiveness through hardware and internet upgrades	Reduces lag and improves doctor satisfaction during documentation.
Organize peer-led EMR training workshops in each department	Fosters adoption through trusted peer support and department-specific demonstrations.

Recommendation	Explanation
Enable in-EMR user feedback collection pop-up	Gathers real-time insights into usability and system issues for iterative improvements.
Integrate EMR use into performance reviews for consultants	Encourages regular use by making EMR part of formal evaluation.

Long-Term Recommendations (7-12 Months)

Recommendation	Explanation
Introduce EMR stylus pens to OPD consultants	Supports better touchscreen interaction and speeds up handwritten notes capture.
Introduce voice-assisted dictation for EMR documentation	Reduces typing workload and supports faster data entry in OPDs.
Assign EMR champions in every department	Provides ongoing support, drives adoption, and bridges gaps between IT and clinical workflows.
Integrate AI-based clinical decision support in EMRs	Offers alerts, drug interactions, and diagnostic suggestions for safer and faster care.
Redesign EMR interface annually based on usability feedback	Ensures the system remains intuitive, modern, and aligned with clinical needs.
Standardize EMR Customizable templates across hospital branches	Supports data consistency and enhances inter-facility coordination.
Develop mobile/tablet-based EMR documentation interface	Enables bedside documentation, improving real-time data capture and reducing retrospective entries.

Chapter 7 References

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7.2 Annexures

EMR Implementation Feedback Questionnaire – For Doctors

Section A: Background Information

1. Department/Specialty: _____
 2. Years of Clinical Experience:
☐ <1 year ☐ 1–3 years ☐ 4–6 years ☐ >6 years
 3. Have you previously used any EMR system before this implementation?
☐ Yes ☐ No
 4. Did you attend the EMR training sessions organized by the hospital?
☐ Yes ☐ No
-

Section B: EMR Training & Learning Curve

5. Did you receive training for EMR before its implementation?
☐ Yes ☐ No
 6. Rate the quality of EMR training provided:
☐ Excellent ☐ Good ☐ Average ☐ Poor ☐ Not Applicable
 7. Did the training prepare you well for daily clinical documentation using EMR?
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
 8. How confident were you in using the EMR system after the training?
☐ Very Confident ☐ Somewhat Confident ☐ Neutral ☐ Not Confident
 9. Did you face challenges while adapting to EMR in your daily routine?
☐ Yes ☐ No
If Yes, please specify: _____
-

Section C: Workflow & Clinical Impact

10. How has EMR affected the time you spend on clinical documentation?
☐ Reduced ☐ No Change ☐ Increased

11. **Do you feel EMR has improved the accuracy of clinical notes and prescriptions?**
☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
12. **Has EMR made it easier to access patient history, labs, and investigations?**
☐ Yes ☐ No ☐ Partially
13. **Has EMR improved communication with other departments (e.g., radiology, pharmacy)?**
☐ Yes ☐ No ☐ Not Sure
14. **Do you find the EMR interface intuitive for entering clinical information?**
☐ Very Easy ☐ Easy ☐ Neutral ☐ Difficult ☐ Very Difficult
15. **Are there any clinical tasks that have become more time-consuming with EMR?**
☐ Yes ☐ No
If Yes, please specify: _____
-

Section D: Satisfaction, Support & Suggestions

16. **Overall, how satisfied are you with the EMR system?**
☐ Very Satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very Dissatisfied
17. **Do you feel EMR has contributed to better patient care outcomes?**
☐ Yes ☐ No ☐ Not Sure
18. **Do you receive timely IT support when facing technical issues with EMR?**
☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
19. **Would you recommend any improvements in EMR training for doctors?**
-
20. **What features would you like added or improved in the current EMR system?**
-
21. **Additional feedback or observations regarding EMR usage in clinical practice:**

TABLE 1**Total EMR Data (20th march, 2025-12th may, 2025) n=20015**

Specialisation	Sum of Completed	Sum of In_Progress	Sum of Check_In
CARDIO THORACIC VASCULAR SURGERY	319	24	57
Consultant 1	202	7	33
Consultant 2	117	17	23
Consultant 3	0	0	1
CARDIOLOGY	1022	31	1037
Consultant 1	607	12	143
Consultant 2	155	13	146
Consultant 3	0	0	73
Consultant 4	260	6	76
Consultant 5	0	0	599
CRITICAL CARE	17	4	26
Consultant 1	0	0	15
Consultant 2	17	4	11
DERMATOLOGY	0	2	565
Consultant 1	0	2	565
ENDOCRINOLOGY	102	15	669
Consultant 1	102	15	669
ENT	0	0	807
Consultant 1	0	0	1
Consultant 2	0	0	314
Consultant 3	0	0	492
GASTROENTEROLOGY	228	28	1119
Consultant 1	37	7	269
Consultant 2	0	0	252
Consultant 3	191	6	82
Consultant 4	0	0	221
Consultant 5	0	15	295

Specialisation	Sum of Completed	Sum of In_Progress	Sum of Check_In
GI, MINIMAL ACCESS & BARIATRIC SURGERY	11	10	404
Consultant 1	11	10	142
Consultant 2	0	0	262
HEALTH CHECKUP	654	638	0
Consultant 1	10	92	0
Consultant 2	0	1	0
Consultant 3	0	22	0
Consultant 4	0	4	0
Consultant 5	1	0	0
Consultant 6	0	1	0
Consultant 7	0	2	0
Consultant 8	0	2	0
Consultant 9	1	1	0
Consultant 10	211	47	0
Consultant 11	0	3	0
Consultant 12	0	16	0
Consultant 13	378	296	0
Consultant 14	2	38	0
Consultant 15	0	20	0
Consultant 16	10	0	0
Consultant 17	0	44	0
Consultant 18	0	3	0
Consultant 19	35	19	0
Consultant 20	1	3	0
Consultant 21	0	1	0
Consultant 22	1	0	0
Consultant 23	0	11	0
Consultant 24	0	1	0
Consultant 25	4	4	0
Consultant 26	0	6	0

Specialisation	Sum of Completed	Sum of In_Progress	Sum of Check_In
Consultant 27	0	1	0
INTERNAL MEDICINE	201	29	1038
Consultant 1	5	2	208
Consultant 2	1	1	76
Consultant 3	11	0	3
Consultant 4	169	17	25
Consultant 5	15	9	726
INTERVENTIONAL RADIOLOGY	0	0	2
Consultant 1	0	0	2
MEDICAL ONCOLOGY	181	0	3
Consultant 1	181	0	3
MENTAL HEALTH & BEHAVIOURAL SCIENCES	216	4	23
Consultant 1	216	4	23
Minimal Access Surgery	205	36	134
Consultant 1	132	20	37
Consultant 2	73	16	97
NEONATOLOGY	331	2	46
Consultant 1	331	2	46
NEPHROLOGY	15	9	473
Consultant 1	0	0	49
Consultant 2	15	9	424
NEURO SURGERY	0	0	706
Consultant 1	0	0	147
Consultant 2	0	0	3
Consultant 3	0	0	255
Consultant 4	0	0	301
NEUROLOGY	378	46	1563
Consultant 1	43	18	831
Consultant 2	335	28	732
Non-Invasive Cardiology	0	0	1

Specialisation	Sum of Completed	Sum of In_Progress	Sum of Check_In
Consultant 1	0	0	1
Obstetrics	87	12	64
Consultant 1	87	12	64
OBSTETRICS & GYNAECOLOGY	0	1	1410
Consultant 1	0	0	79
Consultant 2	0	0	482
Consultant 3	0	1	830
Consultant 4	0	0	19
OPHTHALMOLOGY	178	15	155
Consultant 1	178	15	155
ORTHOPAEDICS	39	33	1331
Consultant 1	0	0	50
Consultant 2	0	0	352
Consultant 3	12	14	547
Consultant 4	0	2	183
Consultant 5	27	17	196
PAEDIATRIC NEUROLOGY	556	1	20
Consultant 1	556	1	20
PAEDIATRIC SURGERY	0	0	5
Consultant 1	0	0	5
PAEDIATRICS	155	12	27
Consultant 1	143	11	18
Consultant 2	12	1	9
Physical & Rehabilitation medicine	0	0	39
Consultant 1	0	0	39
PHYSIOTHERAPY	0	0	158
Physio Team	0	0	158
PLASTIC SURGERY	1	1	187
Consultant 1	0	0	131
Consultant 2	1	1	56

Specialisation	Sum of Completed	Sum of In_Progress	Sum of Check_In
PULMONOLOGY	393	5	283
Consultant 1	287	1	43
Consultant 2	106	4	240
RHEUMATOLOGY	305	29	191
Consultant 1	305	29	191
SURGICAL ONCOLOGY	0	0	57
Consultant 1	0	0	57
TRANSFUSION MEDICINE	0	1	6
Consultant 1	0	1	6
UROLOGY	258	86	482
Consultant 1	0	0	32
Consultant 2	78	9	163
Consultant 3	100	62	137
Consultant 4	80	15	150

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