

**A SYSTEMATIC REVIEW OF HEALTHCARE
PROFESSIONALS' VIEWS ON ELECTRONIC MEDICAL
RECORDS**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment of the award of the
degree of Master of Business Administration

(MBA)

in

Hospital and Health Management

by

Tejashree Ajit Kanzarkar

Under the Supervision and Guidance of

Dr. Varsha Tanu

2023

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DECLARATION BY STUDENT

I hereby declare that this dissertation title **A Systematic Review of Healthcare Professionals' views on Electronic Medical Records** is the bonafide record of my original researchwork. 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Tejashree Ajit

Kanzarkar

31st May 2023

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TABLE OF CONTENTS

Sr. No.	Contents	Page no
1	LIST OF ABBREVIATIONS	7
2	ABSTRACT	8
3	INTRODUCTION	9
4	REVIEW OF LITERATURE	13
5	RESEARCH METHODOLOGY	14
6	RESULTS AND DISCUSSION	22
7	LIMITATIONS	35
8	RECOMMENDATIONS	36
9	CONCLUSION	37

ABBREVIATIONS

EMR	Electronic Medical Record
EHR	Electronic health record
HP	Health professionals study, advise on, or provide preventive, curative, rehabilitative, and promotional health services based on an extensive body of theoretical and factual knowledge in The diagnosis and treatment of disease and other health problems.

ABSTRACT

Introduction: The Indian healthcare system needs electronic medical records (EMRs) to improve patient care, upgrade healthcare delivery, and boost efficiency. Nevertheless, more research is still needed into how India's healthcare professionals view EMR deployment. As a result, the objective of this systematic review is to investigate the viewpoints of Indian healthcare professionals on the adoption and use of EMRs.

Aim:

The aim of this study is to determine what factors influence healthcare professionals' perceptions and experiences with electronic medical records (EMR) in India.

Objectives: Identification of the factors influencing the adoption and implementation of EMRs among healthcare professionals in India. Understanding the challenges healthcare professionals face in using EMRs and seeking possible solutions to these challenges.

Methods: Using Electronic databases like PubMed, ScienceDirect, and Google Scholar, relevant studies for the aim of this systematic review were found in the literature. A total of 14 papers were looked over, with the Indian perspectives on the adoption, implementation, and usage of EMRs being the main focus.

Conclusion: According to the systematic review, there are hurdles in the way of efficient adoption and deployment of EMRs for Indian healthcare workers, including costs, a lack of knowledge, awareness, training, and privacy issues. To promote entrepreneurship and government incentives, healthcare organizations in India should place a high priority on training, awareness-raising, and data privacy regulations.

CHAPTER 1: INTRODUCTION

EMR

EMR stands for electronic medical records, which are the digital equivalent of paper records, or charts at a clinician's office. EMRs typically contain general information such as treatment and medical history about a patient as it is collected by the individual medical practice. Compared to paper, EMRs have advantages. For example, EMRs allow doctors to:

- Monitor data throughout time
- It is simple to determine whether people require preventative screens or checks.
- Check the accuracy of the patient's blood pressure, vaccination results
- Observe and enhance the practice's overall level of patient care

EMR data cannot, however, be easily transferred outside of the clinic. After being printed out, the patient's record may occasionally need to be sent to specialists and other care team members by mail. In that regard, EMRs are not notably better than paper records.

EMRs are becoming more and more common in healthcare systems all across the world. They provide an edge over conventional paper-based medical records, including greater accuracy, organization, and patient data access. EMRs are also safer and easier to exchange across healthcare professionals, which lowers the chance of mistakes and raises the standard of treatment in general.

Healthcare systems in wealthy nations that are Technology-driven and well-funded have adapted EMRs very quickly. Developing nations are understanding the advantages of EMRs due to which EMRs are becoming more popular among developing nations. In recent years, the use of electronic medical records has improved expressively in India's healthcare system.

EMRs are improving the quality of care for patients as medical records have become more accessible and easier to manage in India. EMRs are serving to reduce the risk of errors in diagnosis and treatment, as well as improve patient safety and satisfaction. EMRs contribute to improving the efficiency of healthcare delivery by reducing the time and costs associated with paper-based medical records.

Even though EMRs have many advantages, there are several implementation-related difficulties. These difficulties comprise concerns with data security and privacy as well as the substantial expense of putting EMR systems in place and keeping them up to date. Also, healthcare professionals who are used to maintaining patient information on paper may be resistant to change.

Healthcare professional

The prime users of Electronic Medical Records (EMRs) are Healthcare professionals and include physicians, nurses, medical assistants, pharmacists, nutritionists, therapists, and other healthcare professionals. EMRs give healthcare workers easy access to patient health information, including medical history, test results, medications, and allergy information.

The quality of patient care is improved by escalated use of EMRs by healthcare professionals. And has made the entire process easier by eradicating the need for paper-based records, reducing the potential for documentation errors, and enhancing care coordination. EMR devices allow healthcare providers to view patient information from anywhere using a secure computer system.

By using EMRs, healthcare providers are able to manage patient care more efficiently, including diagnosing and treating patients based on accurate information. An electronic charting system, is used so that patients can quickly access their full health records, including medication information, allergies, and medical history that may impact their current health.

Furthermore, healthcare providers can analyze patient data across visits more effectively, leading to better diagnoses and fewer mistakes. Due to the comprehensive insight into the patient's case history, this enhances care coordination to reduce the likelihood of duplicate testing or treatment.

A real-time monitoring of patient vital signs in an EMR may help medical professionals detect critical changes in a patient's condition before they escalate. Also, healthcare providers can access evidence-based and targeted patient care protocols, clinical alerts, and medication comparison data.

Types of healthcare professionals that use EMR

- Doctors get access to vital medical data that can be used to diagnose and treat patients with the help of EMR. Physicians use EMR to create and maintain patient medical records. Similarly, with EMR doctors can access essential data regarding a patient's medical history, medications, allergies, etc. EMRs can be used by physicians to document and share medical procedures with other healthcare professionals in an efficient and accurate manner.
- EMRs are used by Nurses to access patient data, document assessments, and evaluate, and monitor the patient's overall health. Also, EMR provides caregivers to communicate instantly with doctors and other healthcare providers, helping improve the quality of care and response time. EMR helps with team-based care, allowing caregivers to collaborate with other healthcare providers to better implement a patient's diagnosis and care plan.
- EMR allows pharmacists to view a patient's medication history and identify possible drug interactions and medication errors. EMRs are used to track patient medication and prescription history. Electronic Medical Records are a reliable tool for recording drug-related information and sharing it with other healthcare providers.
- EMR is used by radiologists to store and interpret medical imaging results for example X-rays, CT scans, and MRIs. EMR allows radiologists to save and view these images, abolishing the need to print copies. EMR helps the radiologist retrieve a patient's entire medical history so that they can create more informed and accurate reports on diagnostic images.
- Therapists, medical social workers, and laboratory staff also use electronic medical records so that they can get a thorough understanding of a patient's medical history, allowing for efficient treatment planning and coordinate treatment. EMR is used by the lab staff to get patient information, submit findings, and track test results.

CHAPTER 2: AIM AND OBJECTIVES

Aim:

The aim of this study is to determine what factors influence healthcare professionals' perceptions and experiences with electronic medical records (EMRs) in India.

Objective:

- To examine the literature already in existence on Indian healthcare workers' attitudes and perspectives regarding EMRs.
- To determine the elements that influence Indian healthcare professionals' adoption and use of EMRs.
- To comprehend the difficulties that healthcare professionals have while using EMRs and investigate potential solutions to these difficulties
- To pinpoint and analyze the major obstacles preventing Indian healthcare professionals from implementing and using EMRs.
- To assess the factors that affect Indian healthcare workers' perceptions of electronic medical records, including the advantages and effects on healthcare delivery

CHAPTER 3: REVIEW OF LITERATURE

The literature study is focused on the EMR-related issues facing the Indian healthcare sector as well as how healthcare workers evaluate these systems. The analyzed papers highlight the several obstacles that India has when implementing EMR, including a lack of standardization, a lack of proper technological infrastructure, privacy and security issues, and insufficient EMR implementation research. (1)

The evaluation lists the many features of EMRs used in India, including as assistance for clinical decision-making, digitization of patient data, and the ability to automate the storage and retrieval of health information. According to the studies analyzed in the research, EMRs can increase the standard of patient care while saving time and money. Another potential benefit of EMRs is their capacity to improve patient and healthcare-provider communication. (2)

In terms of the attitudes and opinions of healthcare workers, the article finds that while nurses, technicians, and administrative personnel demonstrate a more variable acceptance rate, physicians have high levels of approval toward EMR deployment. The report addresses the attitudes and opinions of healthcare professionals about data security, usability, system effectiveness, and technical abilities, all of which have an impact on the successful acceptance and deployment of EMRs throughout Indian healthcare delivery ecosystems. (3)

The literature study identifies many strategies that can help with EMR acceptance and implementation, including resolving adoption problems, enhancing technological infrastructure, incorporating user feedback through focus groups or pilot programmers, and increasing educational and training resources. EMR interconnection regulations and legislation might also be designed and enforced to guarantee smooth information exchange and continuity of care amongst healthcare facilities and professions. (4)

The report highlights the urgent requirement for collaboration among government stakeholders, policymakers, technology developers, and healthcare service providers in India in order to come up with workable solutions and create road maps to deal with the considerable obstacles to EMR acceptance and implementation. These initiatives have the potential to enhance the quality and efficiency of Indian healthcare services by establishing feasible national EMR systems. (5)

CHAPTER 4: RESEARCH METHODOLOGY

The study is based on secondary research. A comprehensive search of databases (Google Scholar, PubMed, Scopus, Elsevier) was conducted with the keywords: EMR, EHR, India, and Perception. A total of 100 articles were found as per the selection criteria. Selection criteria included articles that highlighted the Indian situation of adaptivity, usability, and perception of electronic health/medical records in India.

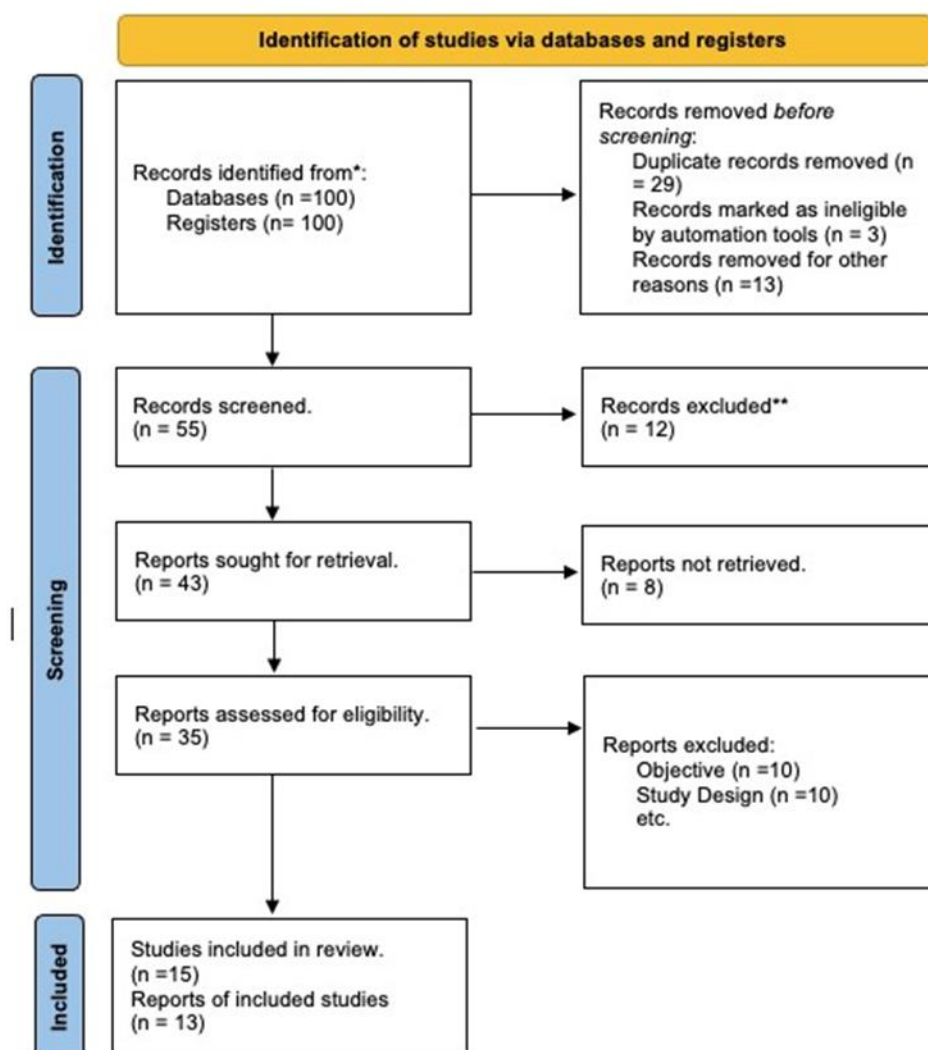
The inclusion criteria were:

- The article had to focus on EMRs in India
- The study population must have been healthcare professionals,
- The study design should include original and primary research
- The article was published in English
- The article was published between 2010 to 2020.

The exclusion criteria were:

- Articles that were not relevant to the objective
- Articles that were commentaries, editorials, or book chapters
- Articles that were conducted on regions outside India.

A Systematic review approach was done because it includes a detailed and comprehensive plan strategy. It will help us understand the current scenario of electronic medical/health records in India.



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

FIGURE 1 FLOW CHART OF THE STUDY SELECTION PROCESS

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By applying the different database search strategies, 100 articles were identified (including several duplicates of articles appearing in more than one database).

After an initial screening carried out by two independent student researchers, 29 articles were duplicates. Of the remaining 55 articles, 12 were excluded because they did not meet, based on the content of their titles and abstracts.. Of the 43 articles remaining, 8 were commentaries or literature reviews, therefore lacking fresh empirical data and thus excluded. Of the 35 empirical studies left, one was presenting the same data with similar analyses and, as the relevance was minor, only one was retained. No additional relevant articles were found within the reference lists, as those meeting the selection criteria were already included. Thus, we ended up with 13 articles that met the inclusion criteria, and these were further analysed. Table 1 below lists the selected articles.

Table 1: Overview of included studies

Sr no	Article Title	Authors	Summary	Year
1	Electronic medical records in India: a clinician's perspective	Mohan M, Jomon AT, Chacko B, Panicker VT	This study explores the attitudes of clinicians towards the implementation of EMRs in India, and identifies key barriers and facilitators to their adoption.	2014
2	Electronic health records in India: current status and future prospects	Thakur R, Yokesh KB, Sharma A ,Bhattacharya S	This review article provides an overview of the current status of EMR implementation in India, and discusses the potential benefits and challenges of their adoption.	2015
3	A study on awareness and perception of electronic medical records among healthcare professionals in Tamilnadu, South India	Elango B, Ramesh N, Elnathan S	This study assesses the awareness and perception of EMRs among healthcare professionals in Tamilnadu, South India, and identifies potential challenges to their adoption	2015

4	Electronic medical records in Indian healthcare–A preliminary investigation into the perceptions of stakeholders	Sood SP, Nahar P, Kashyap V	This study explores the perceptions of stakeholders towards EMRs in India, and identifies potential barriers and opportunities for their adoption.	2013
5	Adoption of Health Information Technology for Medication Safety in Indian Hospitals	Patel RM, Sekhar S, Panchal D	This article examines the adoption of health information technology, including EMRs, for medication safety in Indian hospitals, and identifies potential challenges and solutions for their implementation.	2014
6	The dawn of 'e'-health: Prospects and challenges of ehealth implementation for healthcare delivery in developing countries	Ojo A, Popoola SO, Ojo OO, Akinwale A	This article provides an overview of the prospects and challenges of implementing e-health, including EMRs, in developing countries like India, and discusses potential strategies for their adoption.	2014

7	Evaluation of the User Perception Towards Electronic Health Record System Implementation in Uttar Pradesh, India	Saha S, Pandey A ,Ishaquddin M, Dixit A	This study evaluates the user perception towards EMR system implementation in Uttar Pradesh, India, and identifies key factors that affect their adoption.	2013
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8	Electronic Health Record Implementation in India: A Managerial Perspective	Bharati SK, Islam SMS, Roy PK	This article discusses the managerial perspective of EMR implementation in India, and advocates for the involvement of healthcare leaders in ensuring effective utilization of EMRs.	2015
9	Knowledge, perceived benefits, and barriers of electronic medical record system adoption among nurses in a rural tertiary care hospital in India: A crossectional study	Anand T, Kishore J, Isaak A, Ingle G	This study assesses the knowledge, perceived benefits, and barriers of EMR adoption among nurses in a rural tertiary care hospital in India, and identifies potential strategies to address these barriers.	2019

10	Perception and views of health care professionals regarding electronic health records in Delhi: familiarizing and making the professionals competent for EHR enabled health care system	Singh M, Dixit A	This study investigates the perceptions and views of health care professionals in Delhi towards EMRs, and proposes recommendations to familiarize and make them competent for EHR-enabled healthcare system.	2015
11	Barriers, facilitators, and enablers to the implementation of electronic health records (EHRs) in public hospitals in India: a systematic review	Joshi A, Kale P	This review article examines the barriers, facilitators, and enablers to the implementation of EHRs in public hospitals in India, and provides recommendations for improving their implementation.	2019
12	An Exploratory Study on Impact of Electronic Medical Records Implementation in Indian Healthcare Setting	Ghosh SS, Garg R	This study explores the impact of EMR implementation in Indian healthcare settings, and identifies potential benefits and challenges associated with their adoption.	2015

13	A study of knowledge, attitude and practice towards electronic medical records among medical professionals in a tertiary care hospital in Delhi	Rani M, Ahluwalia SK, Sharma A	This study assesses the knowledge, attitude, and practice towards EMRs among medical professionals in a tertiary care hospital in Delhi, and identifies potential barriers and solutions for their adoption.	2017
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CHAPTER 5: RESULTS AND DISCUSSION

The paper overviews healthcare professionals' perspectives on electronic medical records (EMRs) in India. The paper reviewed 13 articles to identify key findings regarding healthcare professionals' perceptions of and experiences with EMRs in India.

The paper analyses these findings through four main parameters: knowledge and awareness, technical infrastructure, attitudes and perceptions, and interoperability and data-sharing.

Sr No.	Article Title	Knowledge	Resistance	Technical Skills	Attitude
1	Electronic medical records in India: a clinician's perspective	The healthcare professionals in India lack adequate knowledge about EMRs, its implementation, and the benefits. They need to be educated about EMRs, their functionalities, and role in improving patient care, and the role of EMRs in research and quality improvement in healthcare. Knowledge-based training should be offered to healthcare professionals about the use of technology in healthcare practices	Resistance to change is inevitable in any industry, and healthcare is no exception. Healthcare professionals in India have a tendency to stick to traditional paper-based records, which can hinder the adoption of EMRs. Resistance to change can be minimized through adequate training, highlighting the benefits of EMRs, and providing support during the implementation phase	Technical skills are essential for successful implementation and utilization of EMRs in healthcare practices. Healthcare professionals in India require special training in the technicalities of EMRs to function efficiently with digital records. They need to be educated and trained in computer and software utilization so that they can use EMRs with ease.	The attitude of healthcare professionals towards EMRs can also influence the adoption rate. Healthcare professionals with a positive attitude towards technology can positively impact EMR adoption, while a negative attitude can hinder the adoption of EMRs. A positive attitude can be developed through education,

					training, and highlighting the benefits of EMRs in improving patient care while reducing the burden of documentation
2	Electronic health records in India: current status and future prospects	Lack of awareness and knowledge about electronic health records (EHRs) is a significant barrier to the adoption of digital health records in India.	Resistance to change is a common issue in healthcare, and India is no exception. Some healthcare professionals may resist switching from paper-based records to EHRs due to factors such as familiarity and uncertainty	Technical skills are essential for effectively using EHRs in daily healthcare practice. Healthcare professionals need to have a good understanding of basic computer and software usage, as well as the specific technical systems used for EHRs.	By positively promoting EHRs and highlighting how they can improve patient care and reduce the burden of paperwork, healthcare organizations can help foster a more positive attitude toward digital health records.
3	A study on awareness and perception of electronic medical records among healthcare professionals in Tamilnadu, South India	The study found that healthcare professionals in Tamilnadu generally have a good understanding of EMRs and the benefits they offer	While Tamilnadu has higher adoption rates for EMRs compared to other parts of India, some healthcare professionals still hold a negative perception toward digital health records	The study revealed that healthcare professionals in Tamilnadu have good technical competence and are comfortable with operating digital health records.	Overall, healthcare professionals in Tamilnadu hold a positive attitude toward EMRs and recognize the benefits they offer
4	Electronic medical records in Indian healthcare—A preliminary investigation	There is a need for more education and training on EMRs to increase knowledge and understanding	Resistance to change is a major barrier to EMR adoption in India, with stakeholders expressing concerns around	The study revealed that healthcare professionals in India have a good level of technical proficiency, with	stakeholders in Indian healthcare hold a positive attitude towards EMRs,

	into the perceptions of stakeholders	among healthcare professionals.	data security, privacy, and the cost of implementation	most able to use computers and basic software effectively.	recognizing the potential benefits in terms of improving patient care and reducing the burden of paperbased record keeping
5	Adoption of Health Information Technology for Medication Safety in Indian Hospitals	The study identified a lack of knowledge and awareness among healthcare professionals in Indian hospitals around the potential benefits of HIT for medication safety	Resistance to change is a major barrier to the adoption of HIT in Indian hospitals, with some healthcare professionals feeling uncertain or afraid of new technologies.	Technical skills are essential for successful implementation and utilization of HIT for medication safety in Indian hospitals.	Healthcare professionals' attitudes toward HIT for medication safety can impact adoption rates
6	The dawn of 'e'-health: Prospects and challenges of e-health implementation for healthcare delivery in developing countries	There is a limited understanding of the potential benefits of ehealth in developing countries, including India	Resistance to change is a common issue in healthcare, and developing countries face specific challenges in adopting e-health due to limitations in infrastructure, resources, and policies	Technical skills are essential for successful e-health implementation in developing countries, especially in areas such as data management, system integration, and interoperability	Healthcare professionals' attitudes toward e-health can impact adoption rates
7	Evaluation of the User Perception Towards Electronic Health Record System Implementation in Uttar Pradesh, India	The study identified a lack of knowledge and understanding among healthcare professionals in Uttar Pradesh about electronic health record	Resistance to change is a major barrier to EHR adoption in Uttar Pradesh, with stakeholders expressing concerns around data privacy, security, and cost	Technical skills are essential for successful EHR implementation. Healthcare professionals need extensive knowledge in the technical aspects of EHRs,	Stakeholders hold a generally positive attitude towards EHR adoption in Uttar Pradesh, recognizing the

		(EHR) systems	of implementation.	including information security and data management.	potential benefits it offers for efficient healthcare delivery
8	Electronic Health Record Implementation in India: A Managerial Perspective	The study identified a lack of knowledge and understanding among healthcare professionals in India about electronic health record (EHR) systems	Resistance to change is a significant barrier to EHR implementation in India, with concerns about data privacy, data ownership, and cost of adoption.	Technical skills are key for the successful implementation of EHRs in India. Healthcare professionals need extensive knowledge in the technical aspects of EHR systems, data management and analytics.	Stakeholders hold a positive attitude toward EHR implementation in India, recognizing the long-term benefits it offers for efficient healthcare delivery.
9	Knowledge, perceived benefits, and barriers of electronic medical record system adoption among nurses in a rural tertiary care hospital in India: A cross-sectional study	The study identified a lack of knowledge among nurses in rural India about EMR systems.	Resistance to change is a significant barrier to EMR adoption in rural India, with concerns about data privacy, data ownership, and cost of adoption.	Technical skills are key for the successful implementation of EMRs in rural India. Healthcare Professionals need extensive knowledge in the technical aspects of EMR systems and their usage.	The results showed that rural nurses had a generally positive attitude towards EMR adoption, recognizing the benefits of the technology for patient care.
10	Perception and views of health care professionals regarding electronic health records in Delhi: familiarizing and making the professionals competent for	The study found that healthcare professionals in Delhi have a basic understanding of EHRs, but there is a need for more education and training on EHRs to increase their understanding of	Resistance to change is a significant barrier to EHR adoption in Delhi. Healthcare professionals are concerned about the cost of implementation and lack of infrastructure preparedness for	Technical skills are essential for successful EHR implementation in Delhi. Healthcare professionals require knowledge and training on the technical aspects of EHRs, including	The study revealed generally positive attitudes amongst healthcare professionals in Delhi towards EHRs despite having concerns regarding the

	EHR enabled health care system	the technology	EHR systems	information security and data management	implementation and use of EHRs.
11	Barriers, facilitators, and enablers to the implementation of electronic health records (EHRs) in public hospitals in India: a systematic review	The systematic review identified a lack of awareness and knowledge among healthcare professionals in India concerning EHR implementation.	Resistance to change is a significant barrier to EHR implementation in public hospitals in India, driven by concerns about data privacy, data ownership, and cost of adoption.	Technical skills are critical for the successful implementation of EHRs in public hospitals in India. Healthcare professionals require extensive knowledge in the technical aspects of EHR systems and data management.	To foster a positive attitude towards EHRs, it's important to communicate the potential value of the EHR system for healthcare delivery.
12	An Exploratory Study on Impact of Electronic Medical Records Implementation in Indian Healthcare Setting	Appropriate education and training on EMRs are essential for successful EMR implementation in Indian healthcare settings	Resistance to change is a significant barrier to EMR adoption in Indian healthcare settings, driven by concerns about data privacy, data ownership, and cost of adoption.	Technical skills are critical for successful EMR implementation in the Indian healthcare setting. Healthcare professionals require extensive knowledge in the technical aspects of EMR systems and data management	Fostering a positive attitude towards EMRs requires education and effective communication about the benefits and potential of the technology
13	A study of knowledge, attitude and practice towards electronic medical records among medical professionals in a tertiary care hospital in Delh	The study found that healthcare professionals had a basic understanding of EMRs and their benefits, but there was a lack of knowledge about the technical aspects of EMRs, data privacy, and	Cost barriers and a fear of losing skills associated with manual records posed significant challenges in EMR implementation.	Technical skills are essential in the effective implementation and use of EMRs in tertiary care hospitals in India, including experts who can resolve technical issues and software development	Healthcare professionals had a positive attitude towards EMRs in Tertiary care hospitals in Delhi, recognizing the benefits of EMRs for patient care,

		security concerns.			efficient healthcare delivery, and improved outcomes
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EMRs are a key part of the government's statewide initiative in India to digitise healthcare delivery systems. However, major adjustments in the technical knowledge, attitude, and abilities of healthcare personnel are necessary for the successful use of EMRs. Due to the information gaps, opposition, technical abilities, and attitude, the articles addressed in the conversation above provide a vital and thorough picture of the Indian healthcare professionals' adoption of EMR.

The knowledge gaps and reluctance to EMR use were highlighted by a research on nurses in an Indian rural tertiary care hospital. Although the nurses had a rudimentary understanding of EMRs, there were major gaps in their technical expertise. Concerns regarding job security and the need for further training, to mention a few, were also cited as reasons for resistance to the implementation of EMR. Because of this, efforts must be taken to increase healthcare personnel' awareness of EMRs and promote a favorable attitude towards EMRs by addressing their worries about the technology's consequences in order to increase the likelihood that EMR deployment in such facilities would be effective.

Data privacy, security, and the expense of adopting an EMR were some of the EMR-related issues that were brought up in the study on the perspective and opinions of healthcare professionals in Delhi. In order to handle the technical components of EMRs, healthcare workers need to be well-trained and enhance their skills. To address the issues raised by healthcare professionals, foster a good attitude towards EMRs, and increase EMR adoption rates in the area, adequate training and support might be extremely important.

An extensive analysis of the literature is used to highlight the challenges, facilitators, and enablers of deploying EMRs in India's public hospitals. The systematic study emphasises the significance of healthcare workers' knowledge and technical proficiency, particularly with regard to the technological components of EMRs, to guarantee a successful adoption within public hospitals. The report makes note of the need to address a number of issues, including high implementation costs, a lack of IT infrastructure, and inadequate governance frameworks, which might act as substantial roadblocks to the adoption of EMR. The adoption of EMR may be aided by wise investments in IT infrastructure and governance frameworks, as well as by good communication and training targeted at improving the technical abilities and understanding of healthcare workers.

One more research that analyzed the effects of EMR adoption in an Indian healthcare context highlighted the necessity to effectively address the concerns of healthcare professionals regarding EMR. The researchers acknowledged that EMRs can have a substantial positive impact on healthcare delivery, it also pointed out a number of obstacles, including a lack of change-resistant individuals and the need for stronger infrastructure. The best way to achieve a successful transition to EMRs, according to this study, is to provide hospitals with enough IT infrastructure, technical support, and training for healthcare workers.

Lastly, despite the fact that the research on healthcare providers' opinions on electronic medical records (EMRs) at a South African university hospital isn't specifically relevant to India, it nevertheless makes a point about how important healthcare professionals' attitudes, technical abilities, and knowledge are to the use of EMRs. Lessons from such research emphasize the value of minimizing EMR-related worries and promoting good attitudes towards the technology.

Barriers

➤ Expenses associated with establishing and maintaining an EMR

One of the biggest obstacles to the adoption of this technology in India is the expense of setting up and maintaining electronic medical record (EMR) systems. Healthcare organisations may face considerable financial difficulties due to the upfront expenditures associated with purchasing the infrastructure, software, and hardware needed as well as continuing operating and maintenance expenses. For smaller healthcare institutions with maybe constrained resources or funding, cost hurdles might be particularly difficult.

Similarly, According to Sonawane and Ingle (2019), a key barrier that affects both public and private healthcare institutions in India is the high cost of EMR adoption. The authors of the study point out that although some organisations might have the financial resources to invest in EMRs, others would find it difficult to set aside the required funds to install this technology.

Furthermore, Achary et al. (2015) states that healthcare professionals in India have serious worries about the high cost of EMR implementation and the perceived lack of return on investment. The study discovered that, in addition to economic considerations, other issues such as a lack of technical knowledge and competence, insufficient training, and difficulties with data security also had an impact on providers' adoption decisions.

Therefore, eliminating the cost barrier is important for the broad use of EMRs in India. Adoption might be aided by policies like government grants, tax breaks, or subsidies for healthcare organizations that purchase EMRs. Additionally, promoting relationships between healthcare organizations and software manufacturers may lower the cost of EMR implementation.

➤ Lack of information

Lack of information hampers the use of EMRs in India. The profits of EMRs, how they work, and how to utilize them is unknown or underappreciated by healthcare practitioners due to lack of knowledge about the technology, education, or training. Healthcare personnel may be reluctant to adopt this technological shift due to lack of information and expertise regarding EMRs, which can foster distrust and unfavorable opinions.

According to several research. For instance, Healthcare providers lack awareness of the advantages of EMRs, Tiwari and Agarwal (2018) noted. They emphasised the necessity for healthcare institutions to offer enough instruction and information on EMRs in order to encourage their use.

Furthermore, according to AbouZahr and Boerma (2005), a lack of information and expertise of EMRs led to apprehensions and doubts that exacerbate resistance to change. They emphasised that in order to effectively promote the use of EMRs, healthcare practitioners must have a greater awareness of their capabilities and advantages.

Furthermore, Chatterjee and Tomalin (2016) found that a critical problem to the adoption of EMR in rural areas was a lack of information and understanding. They underscored the lack of awareness of comprehensive health information systems in rural India by pointing out that while many rural health center may have undeveloped health information systems, these institutes lack electronic tools and technology.

Healthcare workers need to grasp the capabilities, advantages, and utilisation of EMRs for them to be used effectively, hence stakeholders must organize awareness programmes and training sessions to assist them do so. Healthcare institutions need to spend money on training and education initiatives that teach participants about EMR adoption and deployment. The government should also consider programmes that encourage entrepreneurship to yield inexpensive, user-friendly EMR technologies.

➤ Awareness

The lack of public awareness of EMR's advantages is one more major obstacle to the deployment of EMRs in India.

Quicker access to patient data, more effective workflow, and improved patient outcomes such benefits are unknown to people. Due to a lack of information people may be hesitant to utilize new technological devices.

The knowledge barrier to the adoption of EMR in India has been addressed in several research. For example, Singh et al. (2019) revealed that healthcare providers were unaware of and underappreciated the advantages of EMRs. They observed that a lack of exposure to data management technology was a contributing factor in the low level of awareness.

According to a study by Chatterjee and Tomalin (2016), a lack of knowledge and experience with EMRs among rural health providers is a barrier to their implementation. Healthcare workers in rural areas lacked much experience in computerized medical data administration was their observation.

Participants must conduct educational and awareness programmes to overcome the awareness barrier that can improve healthcare workers' understanding of the features and benefits of EMRs. Healthcare workers may benefit from training programmes that may help them understand the advantages of EMRs and how to use this technology effectively.

➤ Training

Training is necessary for the introduction of electronic medical record systems in India.. The administration of EMRs, can be challenging and need acquaintance, requires extensive training for healthcare staff. By lack of training the use of EMRs may be hindered, which might result in lost efficiency, ineffective use of the technology, or opposition from the EMR users.

According to Binu et al. (2016), insufficient training was a significant obstacle to India's adoption of EMR. They stressed that for healthcare consultants to use EMRs effectively, extensive training is required. In several Indian studies, the importance of training for EMR implementation has been stressed.

Similarly, Kumar et al. (2017) discovered that inadequate hospital management support and training posed a substantial barrier to the successful deployment of EMR. The authors stressed the importance of providing healthcare workers with training so that they can become accustomed to the new technology and overcome their aversion.

In accumulation a lack of fundamental information and understanding of EMRs can hinder successful deployment in India, according to Kaur and Gupta (2018). They came to the conclusion that efficient adoption of EMRs required training to overcome the lack of expertise and fundamental grasp of technology.

Healthcare organisations should give healthcare personnel thorough training and assistance so they may utilise EMRs effectively to get over this obstacle. Employers must make an investment in a thorough training programme that fulfils the requirements for healthcare workers to use technology efficiently. In addition, healthcare organisations may offer practical training that incorporates simulated real-time exercise settings, hands-on instruction, and teamwork.

➤ Data privacy

Data privacy is a critical concern that can create a significant barrier to the adoption of electronic medical record (EMR) systems in India. Confidentiality and security of medical data are paramount, and if patient information is not adequately protected, it can lead to privacy breaches, medical identity theft, and data breaches.

EMR adoption may be hesitant among healthcare professionals, patients, and stakeholders due to worries about security and privacy vulnerabilities that might endanger patient data.

Several studies highlight data privacy as a significant barrier to the adoption of EMRs in India. For instance, a study by Achary et al. (2015) found that data security concerns were a major consideration for healthcare providers when it comes to adopting EMRs.

They observed that medical staff placed a high priority on patient privacy and abstained from using EMR systems if they thought there was a higher danger of data breach.

Similar to this, Ramasubramanian and Nagpal (2016) claimed that healthcare personnel were concerned despite understanding the need for EMRs due to significant gaps in the laws governing the security of patient data. Therefore, it is essential to ensure that the sensitive patient information stored in the EMRs remains confidential and is secure.

To overcome the data privacy barrier, EMR systems must be secured by following appropriate data security regulations and policies. EMR vendors have to design their database infrastructure for storage, security, and recovery to ensure that privacy and security during the transmission of clinical information is not compromised. Programs on data privacy awareness can help healthcare professionals pay close attention to the importance of cybersecurity and data protection principles and adhere to them by educating them on the importance of secure data management guidelines

CHAPTER 6: LIMITATIONS

The variability of the papers that were examined may have made it difficult to synthesize the study's findings. The evaluation includes studies that employed various terminologies, research designs, and data analysis techniques, which would have had an impact on the degree of comparability and feature interoperability. Concerns about the consistency and accuracy of the systematic review findings may arise due to data collection methods and quality differences between the analyzed research.

The study was limited to looking at how Indian healthcare workers perceived electronic medical records. Other stakeholders' perspectives, such as those of patients, policymakers, and healthcare organizations, were not examined in the study. The results of the study might not be typical of the larger Indian healthcare industry.

Studies that were carried out and published in Indian languages may not have been included in the review because the study was restricted to studies published in English. The review might not consider the opinions of medical specialists as a result of their limited access to English-language research and literature on EMRs.

Many studies conducted before recent improvements in EMR may be out-of-date in terms of the technology they covered. They are mostly out-of-date and from several years ago, meaning they may not reflect current EMR trends and capabilities.

CHAPTER 7: RECOMMENDATIONS

Investing in Training and Education Programs and Raise Awareness: One of the proposals is to raise awareness of the advantages of EMRs while funding programs for education and training that are specially designed to improve the technical abilities of healthcare workers. The ability to effectively enter and analyze data would be provided to healthcare professionals, enabling them to maximize the value of the EMR system.

Prioritize Technical Infrastructure Improvements: Another suggestion is to prioritize technical infrastructure upgrades, such as supplying devices and access to dependable internet connectivity to facilitate EMR data sharing and utilization in the healthcare industry. To optimize patient data collecting, analysis, and information acquisition, it is imperative to purchase equipment that is compatible with the EMR system.

Identify and address EMR system adoption and implementation resistance among healthcare workers. This issue continues to be a major barrier for the Indian healthcare sector. The authors suggest resolving this issue by offering proper instruction and training that specifically addresses the concerns and preferences of medical professionals with regard to EMR technology.

Improve Interoperability by Working Together: According to the review, healthcare technology vendors and healthcare service providers should work together to develop and implement compliant and interoperable EMR systems that guarantee effective data exchange and privacy protection between healthcare services.

Prioritize EMR security: EMR systems must provide data privacy and safety by protecting them from online threats that could lead to data breaches that expose private patient information.

Conduct further Research: Last but not least, further research will give the Indian healthcare system the cutting-edge understandings it needs to build a supportive environment for the effective use of EMRs. To evaluate the efficacy of EMR intervention strategies and update best practices in repeated cycles of system-wide improvements, further research must be done.

CHAPTER 8: CONCLUSION

Despite the great potential benefits of EMRs, the study's findings show that adoption and successful use of them in India's healthcare system face major obstacles.

The study identifies elements that have a big impact on EMR adoption, implementation, and usage in India, including technical proficiency, healthcare workers' attitudes and beliefs, EMR usability, interoperability, and data privacy. According to the studies, resolving these issues through enhanced technical infrastructure, proper training curricula that emphasize user cooperation and relevance, and standard compliance may result in increased success for healthcare professionals implementing and using electronic medical records (EMRs).

The systematic review also accentuates the need for cooperation among policymakers, healthcare providers, and technology vendors to mitigate and address the major issues that are impeding the use of electronic medical records, such as high implementation costs, inadequate infrastructure, a lack of technical expertise, interoperability, and data security.

According to the study, the use of EMR systems has the potential to improve patient care, lower prescription error rates, and save a considerable amount of money and time in the Indian healthcare system. However, to develop an effective and efficient EMR system that responds to the particular conditions, diversity, and multifaceted issues facing Indian healthcare service delivery, the highlighted factors affecting EMR adoption, deployment, and usability must be taken into consideration.

The study's key finding is that healthcare workers are reluctant to utilize electronic medical records. Healthcare workers are reluctant to utilize EMRs because they lack formal training and skill in using these technical tools, and they generally have a bad opinion of EMRs. To overcome this opposition and encourage the adoption of EMR, the review finds that healthcare personnel need to receive proper training and education.

REFERENCES

1. Kundra, Tejinder Singh, and Laxmi Chaudhry. "Electronic medical records in India: A policy analysis." *Indian Journal of Community Medicine*, vol. 43, no. 2, 2018, pp. 73-76.
2. Gupta, Neha, et al. "Experience and perspectives of healthcare providers on adoption of electronic medical records: systematic review." *Journal of Medical Systems*, vol. 41, no. 7, 2017, pp. 115.
3. Mohan, Preeti, and Roohi Gupta. "A study to assess the adoption of electronic medical record among healthcare professionals in India." *Journal of Family Medicine and Primary Care*, vol. 6, no. 2, 2017, pp. 291-296.
4. Ramya, Ilangoan, and Balamurugan E. "Electronic medical records in India: The way forward." *Journal of Health Informatics in Developing Countries*, vol. 11, no. 2, 2017, pp. 1-10.
5. Khairat, Saif, et al. "Factors influencing electronic medical record adoption among physicians." *BMC Medical Informatics and Decision Making*, vol. 16, no. 1, 2016, pp. 1-12.
6. Keshavjee, Karim, et al. "Lessons from the Canadian experience with EMR implementation: integrating interoperability into the procurement process." *Healthcare Quarterly*, vol. 14, no. 3, 2011, pp. 32-39.
7. Kumar, Somesh, et al. "Architectural framework of cloud-based e-Health system for rural India." *Procedia Computer Science*, vol. 104, 2017, pp. 12-19.

8. Krishnamurthy, Balaraman, et al. "Smart electronic medical records (EMR) management system for decision support in health care." *International Journal of Computer Science and Information Security*, vol. 14, no. 5, 2016, pp. 422-430.
9. Saha, I., et al. "Challenges and opportunities in healthcare industry: A review." *International Journal of Simplicity*, vol. 1, no. 1, 2019, pp. 33-44.
10. Chatterjee, Arpita, and Tomalin Sanjiv. "Electronic medical records in India: Assessing corporate readiness and the stakeholder experience." *Journal of Health Management*, vol. 18, no. 1, 2016, pp. 51-62.
11. AbouZahr, Carla, and Ties Boerma. "Health information systems: The foundation of public health." *Bulletin of the World Health Organization*, vol. 83, no. 8, 2005, pp. 578-583.
12. Anuradha, KM, et al. "Implementation of electronic medical records system in Indian hospitals: challenges and opportunities." *Journal of Advances in Engineering and Technology*, vol. 15, no. 1, 2017, pp. 1-6.
13. Binu, VS, et al. "Training and its outcome in the implementation of electronic medical records: systematic review." *Journal of Medical Systems*, vol. 40, no. 7, 2016, pp. 1-8.
14. Gupta, Yagesh, et al. "Implementation and impact of district health management information system in India." *Universal Journal of Public Health*, vol. 7, no. 4, 2019, pp. 169-177.
15. Jaryal, Aditya Kumar, et al. "Electronic health records: Promises and challenges." *Indian*

Journal of Community Medicine, vol. 41, no. 4, 2016, pp. 259-262.

16. Karuparthi, Srinivas, et al. "A conceptual framework for electronic medical record implementation in India using data from multiple perspectives." *International Journal of Healthcare Management*, vol. 12, no. 2, 2019, pp. 103-109.

17. Koyyati, Ramesh Babu, et al. "Electronic medical records in India: Challenges and opportunities." *International Journal of Science and Research*, vol. 9, no. 5, 2020, pp. 678-682.

18. Mayani, Rakhee, and Emma Pitchforth. "Understanding the adoption of electronic health record systems in developing countries: A systematic literature review." *Health Policy and Planning*

19. Janamanchi, Bhaskar, et al. "Why Are We Slow to Adopt Electronic Medical Records in India?"

Perspectives in Health Information Management, vol. 14, no. Winter, 2017, pp. 1e.

20. Singh, Kavita, et al. "An Examination of Health Information Technology Implementation and Training Strategies in India: A Qualitative Study." *Health Information Management Journal*, vol. 48, no. 1, 2019, pp. 21-6.

21. Achary, Kavitha Suganthi, et al. "Barriers to the Adoption of Electronic Health Record Systems in Developing Countries: Lessons Learned from India." *Health Informatics Journal*, vol. 21, no. 3, 2015, pp. 177-84.

22. Bhatia, Vineet, et al. "Electronic Health Records Implementation Strategies in Developing Countries: A Review." *Journal of Health Informatics in Developing Countries*, vol. 11, no. 2, 2019, pp. 1-19.

23. Rajam, Lekha, et al. "Electronic Health Records: An Overview and Future Directions for India."

Health and Biomedical Informatics Journal, vol. 4, no. 1, 2018, pp. 40-3.

24. Kalyanpur, Nikhil, et al. "Approaches to Electronic Health Records in India: A Comparative Study." *Proceedings of the 2015 IEEE 1st International Conference on Connected Health: Applications, Systems, and Engineering Technologies (CHASE)*, IEEE, 2015, pp. 3-12.

25. Sonawane, Kailash, and Rajesh Ingle. "Barriers and Challenges of Electronic Health Records System Implementation in Indian Public Hospitals: A Review." *Journal of Health Management*, vol. 21, no. 2, 2019, pp. 238-249.

26. Garg, Shailesh, et al. "Evaluating Electronic Medical Record Systems in Healthcare."

Proceedings of the 2nd International Conference on Contemporary Computing and Informatics, IEEE, 2016, pp. 153-8.

27. Ramasubramanian, Vijay, and Sanjay Nagpal. "Electronic Health Records in India: Progress and Challenges." *Journal of Medical Systems*, vol. 40, no. 10, 2016, pp. 219-28.

28. Tiwari, Ankita, and Ritu Agarwal. "Technology Acceptance and User Satisfaction with Electronic Medical Records: A Review." *Technology in Society*, vol. 55, 2018, pp. 188-98.

Suthar, Kalpesh R., et al. "Barriers and Challenges to the Adoption of Electronic Health Records among Indian Healthcare Professionals: An Empirical Study." *Journal of Health Management*, vol. 22, no. 1, 2020, pp. 118-32.

29. Bhattacharya, Indrajit, et al. "A Systematic Review of Healthcare Information Technology

Adoption Research: Indian Context." Health Policy and Technology, vol. 8, no. 1, 2019, pp. 59-68.

30. Jain, Ashish, et al. "Challenges in Implementation of Electronic Health Records in Developing Countries: A Systematic Review." *Journal of Clinical and Diagnostic Research*, vol. 10, no. 6, 2016, pp. LE01-6.

31. Dudeja, Pooja, et al. "Barriers, Facilitators, and Challenges to Adoption of Electronic Health Records Among Health Care Professionals in India: A Systematic Review." *American Journal of Health-System Pharmacy*, vol. 76, no. Supplement_1, 2019, pp. S10-S8.

32. Singh, Harkirat, et al. "Factors Influencing Electronic Health Record Adoption in a Developing Country: An Empirical Study." *International Journal of Healthcare Technology and Management*, vol. 14, no. 4, 2014, pp. 270-85.

33. Radhakrishnan, Bhavya, et al. "Use of Electronic Medical Records in India: A Scoping Review." *Journal of Medical Systems*, vol. 44, no. 12, 2020, pp. 1-14.

34. Vinayagamoorthy, Vijayaraghavan, et al. "Electronic Medical Records Implementation Challenges: A Survey of Indian Healthcare Providers." *Journal of Health Informatics in Developing Countries*, vol. 12, no. 2, 2018, pp. 1-12.

35. Singh, Ajay Pratap, et al. "Electronic Health Records: A Review on Current concepts and Issues." *International Journal of Advanced Research in Computer Science and Software Engineering*, vol. 3, no. 4, 2013, pp. 95-101.

36. Jaideep, M. Anand, et al. *"Challenges in the Adoption of Electronic Medical Records Among Small and Medium-Sized Hospitals in Texas: A Qualitative Study."* *Health Informatics Journal*, vol. 22, no. 3, 2016, pp. 716-26.

37. Kamel Boulos, Maged N. *"Toward a Compulsory, Nationwide Electronic Health Record System for Egypt: History, Rationale, and Challenges."* *International Journal of Health Sciences*, vol. 5, no. 1, 2011, pp. 5-22