Evaluating The Impact of Electronic Health Records on Healthcare Delivery System

Mr.Senthil Kumr.M[1]*, Dr.Narayanasamy.K[2], Ms.Charulatha.G[3], Ms.Subasri.T[3]

[1]*Head of the Department, Manager Medical Record Department, Karpagavinayaga Institute of Medical Sciences, Madhuranthagam, Chengalpattu dist, Tamilnadu.*
[2]*The Vice Chancellor of the Tamilnadu Dr.M.G.R Medical University, Chennai, Tamilnadu.*
[3]*Interns, BMRSc, Karpagavinayaga Institute of Medical Sciences, Madhuranthagam, Chengalpattu dist, Tamilnadu.*
Corresponding Author: Mr.Senthil Kumr.M

Abstract
This study examines the impact of electronic health records on healthcare delivery system highlighting the benefits and challenges associated with their use.
Keywords
EHR [Electronic Health Records], ROI [Return On Investment], EMR {Electronic Medical Records]

I. INTRODUCTION

Electronic Health Records (EHRs) play a crucial role in modern healthcare by streamlining the organization, storage, and retrieval of patient data, reducing manual workload, and enhancing the accuracy and accessibility of medical information. They enable quick access to complete patient histories, improve visualization of health trends, and support collaborative, evidence-based care. Unlike traditional paper-based records, which are prone to errors, misplacement, and limited sharing, EHRs offer secure, easily shareable, and integrated digital solutions that connect healthcare providers, administrative staff, patients, researchers, and public health officials. EHRs bring several advantages, including improved data accuracy, reduced duplication of tests, and real-time access to medical information, though challenges such as high implementation costs, training needs, and data security risks remain. Looking ahead, EHRs aim to achieve greater interoperability, integrate AI-driven predictive healthcare, empower patients through secure digital access, and connect with wearable devices and Iot technologies, ultimately fostering a more patient-centered and efficient healthcare ecosystem.

THESIS REVIEWS
1.   Title: A study of evaluating the impact of electronic medical records on healthcare delivery system
a.   This study examines the effect of electronic health record (EHR) digitalization on healthcare facility operational efficiency in india, focusing on the SmartCare system. It reveals that EHRs improve access to patient information, streamline workflows, reduce documentation errors, and enhance communication among healthcare providers. However, challenges such as limited resources, staff resistance, privacy concerns, and integration difficulties hinder full adoption. The research recommends improved funding, staff training, and robust change management to maximize the benefits of EHRs in low-resource settings.

2.   Nurses' perceptions about and confidence in using an electronic medical record system
a.   This thesis focuses on nurses' perceptions and confidence in using Electronic Medical Record (EMR) systems within a hospital setting in Muscat, Oman. It explores how factors such as experience, training, and feedback influence nurses' confidence and usability of EMRs. The study found that while most nurses acknowledged the importance of EMRs in improving patient care and integrating into their daily routines, many lacked prior experience and sufficient training. Confidence was higher among nurses with longer exposure to EMRs, whose suggestions for improvements were considered, and when system data were updated and relevant. The research emphasizes the need for ongoing training, system customization, and active nurse involvement to enhance EMR adoption and improve healthcare delivery.
3.   Assessment of factors influencing nurses acceptance of electronic medical record in a large hospital
a.   This thesis investigates factors influencing nurses' acceptance of Electronic Medical Records (EMRs) in hospital using the Technology Acceptance Model (TAM). It highlights how perceived usefulness, ease of use, system quality, IT support, and management engagement affect nurses' willingness to adopt EMRs. The

study surveyed nursing staff and found a strong positive correlation between system quality, top management support, and nurses' perceptions, leading to better acceptance of EMRs. Demographics such as education level, experience, and computer literacy also influenced acceptance. The findings emphasize the importance of user-friendly systems, adequate training, and supportive organizational culture to enhance EMR adoption, ultimately improving patient care quality.

4.   Examining the implementation challenges and benefits of electronic health records (EHR) systems in large hospital settings

a.   This thesis examines the implementation challenges and benefits of Electronic Health Records (EHR) systems in large Indian hospital settings. It highlights how EHRs improve patient care, clinical decision-making, workflow efficiency, and healthcare coordination while reducing errors and redundant tests through tools like Clinical Decision Support (CDS), Computerized Physician Order Entry (CPOE), and Health Information Exchange (HIE). However, it also identifies major challenges, including high initial costs, technical complexities, staff resistance, inadequate training, and security and privacy concerns. Using quantitative research with structured surveys and structural equation modeling, the study reveals that staff training, organizational support, and robust data protection measures are crucial for maximizing the perceived benefits and minimizing risks. It concludes that while EHR implementation faces cultural, technological, and organizational hurdles, addressing these proactively can lead to sustainable improvements in healthcare delivery and patient outcomes in India.

II.   METHODOLOGY

1.   **AIM:**
   a.   To Present the EHR [Electronic Health Records] In healthcare system. it also depicts the errors and limitations.
2.   **Objectives:**
   a.   Increase efficiency by analyze how EHRs streamline clinical workflows reduce paperwork , and improve productivity
   b.   Improve quality of care that access how EHRs enhance patient outcomes reduce medical errors ,and promote evidence –based medicine.
   c.   Enhance patient safety by evaluate the impact of EMRs on reducing adverse events , medication errors and improving patient safety.
   d.   To evaluate EHR patients,whether EHR reduce time.
   e.   Reduce costs by investigate the financial impact of EHRs on healthcare delivery including reduced administrative costs and improved resource allocation
   f.   Improve accessibility and coordination that examine how EHRs facilitate sharing of patient information among healthcare providers ,improving continuity of care

3.   **Research Method:**
   The study population comprises healthcare professionals, including doctors, nurses, and administrative staff, working in large hospital settings where EHR systems are implemented. Participants with prior knowledge of EHR systems will be recruited using a purposive sampling strategy. The sample size is determined to be 350 participants to ensure adequate representation and statistical power.

4.   **Data collection:**
Data will be collected using a structured questionnaire designed to capture information on both the challenges and benefits associated with EHR system implementation. Demographics, EHR system utilisation, perceived obstacles, and perceived advantages are all included in the questionnaire. Depending on participant choices and accessibility, both online and paper-based questionnaires will be used for data collection. Participants will get guarantees about the privacy and anonymity of their answers Survey overview:

5.   **ETHICAL CONSIDERATION**
   I. Ethical approval from the relevant Ethics Committee, institutional research board (IRB) Will be obtained before data collection begins.
   II. Prior to their Involvement In the research each subject will provide their Informed Permission.
   III. The freedom to withdraw from the study at any time will be communicated to participants.
   IV. Throughout the study procedure, precautions will be taken to guarantee participant data privacy and confidentiality.

III. Result analysis:

1. Analysis- doctors

Fig 1.1 Percentage distribution of outcome among doctors
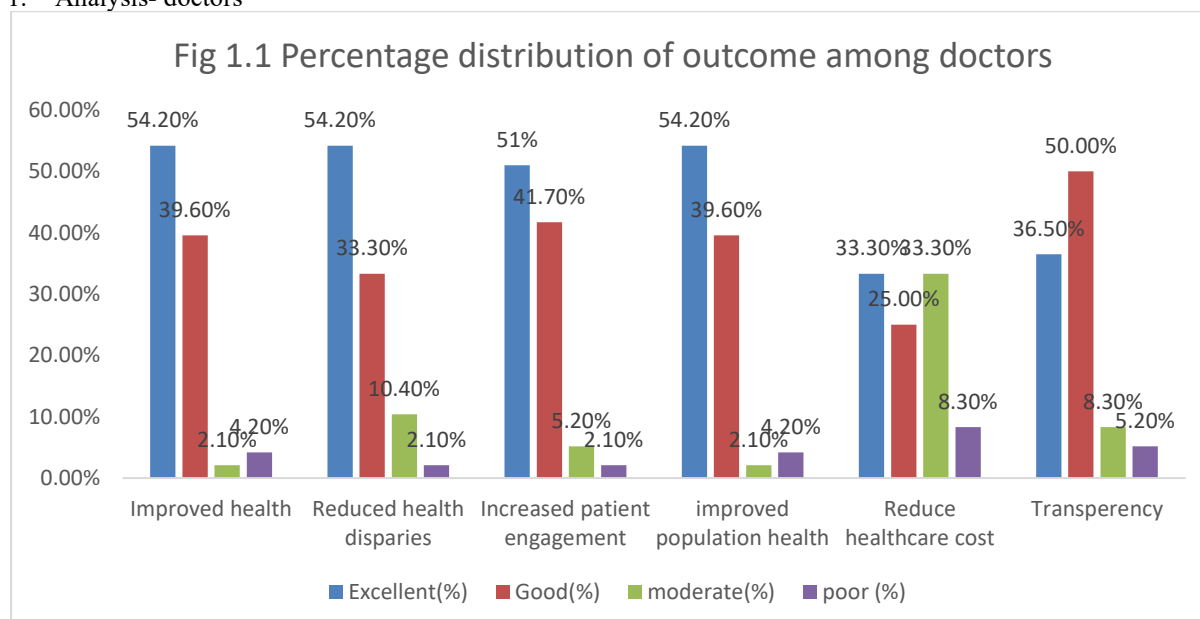
From the bar diagram overall, respondents reported strongly positive perceptions of EMR-related outcomes. More than half rated improved health, reduced health disparities, and improved population health as excellent outcomes of EMR use, with 54.2% consistently marking these as excellent and around 33–40% rating them good, leaving very few moderate or poor responses.

Patient engagement also showed high approval, with 51% rating it excellent and 41.7% good. Transparency and accountability were viewed favorably, with half rating it good and 36.5% excellent, though a small proportion (13.5%) rated it moderate or poor.

The weakest perceived benefit was reduced healthcare cost, where only one-third rated it excellent and another third rated it moderate, indicating uncertainty regarding EMR's cost-saving impact.

Overall, the findings suggest that participants largely believe EMR contributes positively to health outcomes, engagement, and transparency, with some reservations primarily around financial efficiency.

Table1.1 Mean distribution of expected outcome

| Outcome	Mean(SD)	t value	df	Sig	95% Confidence Interval of the Difference	
					Lower	Upper
Improved health	4.42(0.82)	53.000	95	.000	4.2512	4.5821
Reduced health disparies	4.20(0.75)	54.775	95	.000	4.0558	4.3609
Increased patient engagement	4.42(0.69)	62.645	95	.000	4.2767	4.5566
improved population health	4.42(0.82)	53.000	95	.000	4.2512	4.5821
Reduce healthcare cost	3.82(1.01)	36.881	95	.000	3.6171	4.0287
Transperency	4.16(0.82)	49.229	95	.000	3.9986	4.3347

The one-sample t-test results show that participants rated all EMR-related outcomes significantly above the neutral reference value, indicating strong perceived benefits. Improved health, improved population health, and increased patient engagement received the highest mean scores (all M = 4.42), with extremely high t-values (53.0–62.6, p < .001), showing consistent agreement among respondents that EMR enhances key clinical outcomes.

Reduced health disparities (M = 4.20) and transparency (M = 4.16) were also rated significantly high, reflecting positive perceptions of EMR's role in equity and accountability.

Reduced healthcare cost received the lowest mean score (M = 3.82), though still statistically significant (t = 36.88, p < .001), suggesting that while the outcome is viewed positively, there is comparatively more uncertainty or variation regarding EMR's cost-saving impact.

Overall, respondents strongly believe EMR contributes meaningfully to improved healthcare processes and outcomes, with cost reduction perceived as the least certain area.

2.Analysis-Nurses

Fig 2.1 Frequency distribution of outcome - Nurses
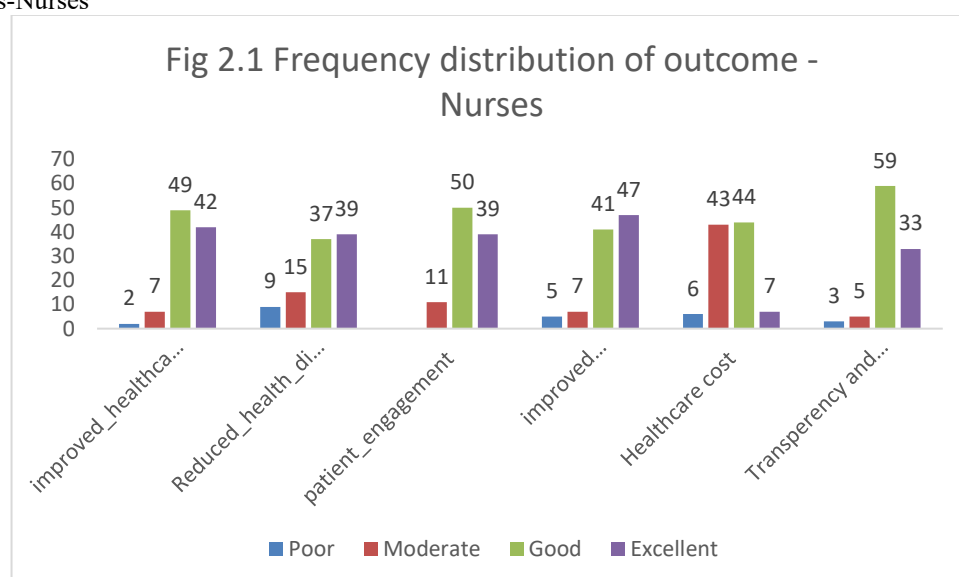
The most respondents rated improved healthcare, reduced disparities, patient engagement, population health, and transparency as Good or Excellent, showing overall positive impact. However, healthcare cost reduction shows weaker performance, with many respondents rating it only Moderate or Good, and fewer rating it Excellent

Table 2.1 Mean distribution of outcome

out come	Mean(SD)	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
improved_healthcare	4.14 (0.63)	64.696	99	.000	4.0130	4.2670
Reduce_healthcare_despiaries	3.88 (0.92)	42.195	99	.000	3.7023	4.0677
increased_patient_engagement	4.02(0.59)	67.648	99	.000	3.9021	4.1379
improved_population_health	4.14(0.80)	51.258	99	.000	3.9749	4.2951
Reduced_healthcare_cost	3.36(0.66)	50.528	99	.000	3.2232	3.4868
transparency	4.04(0.64)	62.901	99	.000	3.9126	4.1674

All the participants reported strongly positive perceptions, with mean scores ranging from 3.36 to 4.14 on a 5-point scale.
All one-sample t-tests were highly significant (p < .001), indicating that each outcome's mean was reliably above the neutral midpoint. The highest perceived benefits were improved healthcare and improved population health (both M = 4.14), followed closely by transparency and increased patient engagement. Even the lowest-rated outcome, reduced healthcare cost (M = 3.36), was still significantly positive.
 Overall, the results demonstrate a consistent belief that the intervention meaningfully enhances multiple dimensions of healthcare quality and system performance.

3.Analysis –Technician

Table 3.1 Mean distribution of outcome

Outcome	Mean (SD)	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
improved_healthcare	4.09(0.78)	32.481	38	.000	3.8389	4.3492
Reduced_health_disparies	4.08(0.85)	29.788	38	.000	3.8118	4.3677

patient_engagement	4.03(0.84)	29.814	38	.000	3.7642	4.3127
improved Population health	4.20(0.93)	28.028	38	.000	3.9014	4.5089
Healthcare cost	3.906(0.79)	30.701	38	.000	3.6484	4.1635
Transperency and accountability	4.12(0.79)	32.498	38	.000	3.8710	4.3854

Above table shows that high mean scores (ranging from 3.91 to 4.20) with statistically significant results (p < 0.001), indicating strong perceived benefits of EMR implementation across domains.
Improved population health had the highest mean (4.20), followed by transparency and accountability (4.12) and improved healthcare (4.09).
Reduced health disparities (4.08) and patient engagement (4.03) were also rated positively, while reduction in healthcare cost, though slightly lower (3.91), still reflected a favourable outcome.

4. Analysis-Management

Fig 4.1-Percentage distribution of outcome-Management
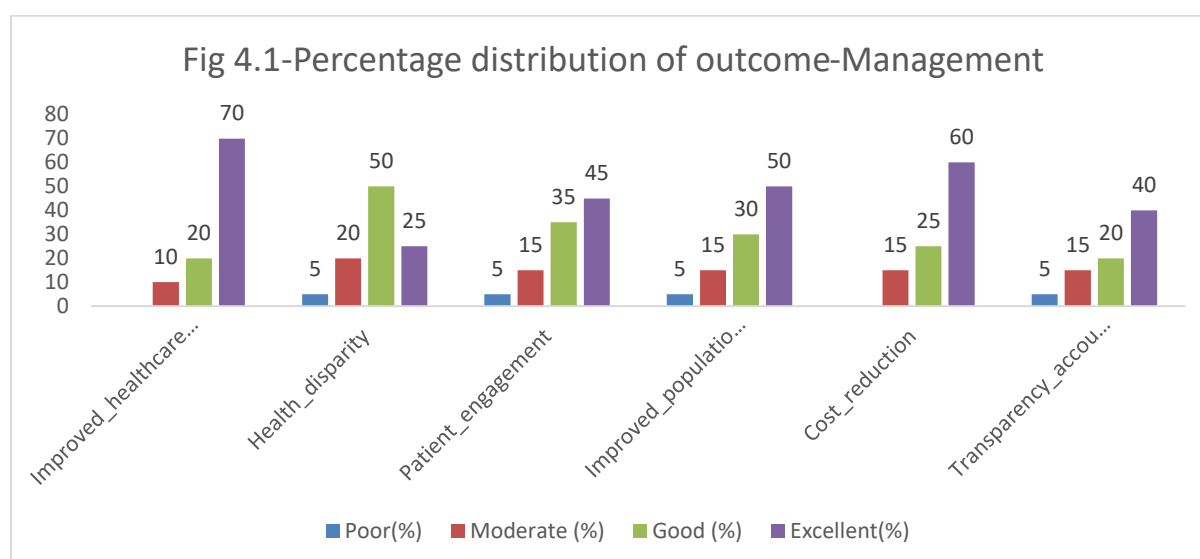
Most respondents reported positive effects of the system across all outcome areas, with the majority rating each domain as either good or excellent. For improved healthcare outcomes, 90% rated the impact as good or excellent. Health disparity reduction showed a slightly more varied pattern, though 75% still rated it positively. Patient engagement and population health improvements were also largely favorable, with 80% and 80% respectively reporting good or excellent outcomes. Cost reduction received strong positive ratings as well, with 85% indicating good or excellent improvement. Transparency and accountability followed a similar trend, with 60% rating it excellent or good, reflecting an overall strong perceived benefit across all measured outcomes

Table 4.1 Mean distribution of outcome

Outcome	Mean(SD)	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
Improved_healthcare	4.325(0.59)	32.725	19	.000	4.0484	4.6016
Disparity	3.95(0.82)	21.397	19	.000	3.5636	4.3364
Patient_engagement	4.025(0.81)	21.984	19	.000	3.6418	4.4082
population_health	3.95(0.72)	24.411	19	.000	3.6113	4.2887
Cost	4.45(0.75)	26.215	19	.000	4.0947	4.8053
Transparency	4.05(0.85)	21.138	19	.000	3.6490	4.4510

The above table shows that the improved healthcare had a high mean s core of 4.33, while disparity reduction and population health improvements both averaged 3.95, demonstrating consistently positive perceptions. Patient engagement also showed a strong mean of 4.03, and cost reduction had the highest mean impact at 4.45. Transparency and accountability were similarly rated positively with a mean of 4.05. All results

were statistically significant (p < .001), with confidence intervals confirming that each outcome's true mean lies well above the neutral midpoint, reflecting overall strong endorsement of system effectiveness.It indicating strong perceived benefits across domains

5.Analysis-Patient

Fig5.1 Percentage Distribution of outcome-Patient
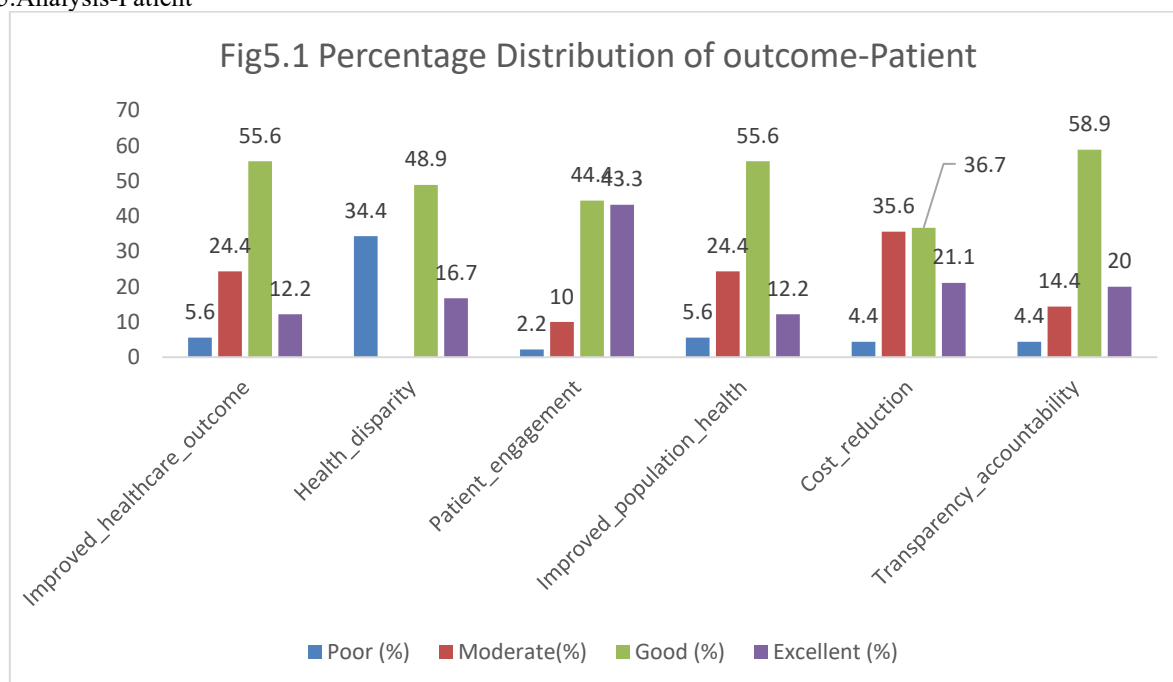
The above table showsthat majority of the participants viewed improved healthcare outcomes, population health, and patient engagement as "good" or "excellent," with more than half rating these areas positively. Transparency and accountability also received strong positive ratings, with nearly 80% marking them as "good" or "excellent." Cost reduction received somewhat mixed responses, though over half still rated it positively. However, perceptions of health disparity were less favorable, with a substantial portion of respondents selecting "poor" or leaving the category unmarked.

Table 5.1 Mean distribution of expected outcome

Outcome	Mean (SD)	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
Improved_healthcare_outcome	3.757(0.65)	53.535	87	.000	3.6181	3.8971
Health_disparity	1.722(0.86)	18.965	89	.000	1.5418	1.9027
Patient_engagement	4.055(0.73)	52.269	89	.000	3.9014	4.2097
Improved_population_health	3.757(0.65)	53.535	87	.000	3.6181	3.8971
Cost_reduction	3.505(0.74)	43.934	87	.000	3.3471	3.6643
Transparency_accountability	3.761(0.66)	53.397	87	.000	3.6214	3.9014

The above table shows that all outcome variables have mean scores significantly different from the test value, with p < .001 across all measures.

Improved healthcare outcomes, improved population health, transparency and accountability, and cost reduction all received relatively high mean ratings (around 3.5–3.8), indicating generally positive perceptions among participants.

Patient engagement received the highest mean score (M = 4.06), suggesting strong agreement that engagement is effectively supported. In contrast, health disparity had a notably low mean (M = 1.72), reflecting participants' perception that disparities in healthcare remain a significant concern.

6.Analysis - Comparison between groups

Table 6.1 Association between the Patient engagement and role

Role	Patient engagement				Value	Df	Asymp. Sig. (2-sided)
	Excellent(%)	Good(%)	Moderate(%)	Poor(%)			
Doctor	49(51.0)	40(41.7)	5(5.2)	2(2.1)			
Nurse	39(39.0)	50(50.0)	11(11.0)	0			
Technician	18(46.2)	16(41.0)	2(5.1)	3(7.7)	14.452	12	.273
Management	9(45.0)	7(35.0)	3(15.0)	1(5.0)			
Patient	39(43.3)	40(44.4)	9(10.0)	2(2.2)			

The chi-square test shows no significant association between role and perceptions of patient engagement (χ^2 = 14.452, df = 12, p = .273). Across all roles—doctors, nurses, technicians, management, and patients—responses were consistently positive, with the large majority rating patient engagement as "excellent" or "good." Only small proportions across groups selected "moderate" or "poor."

Table 6.2 Association between the Improved health population and role

Role	Improved health population				Value	Df	Asymp. Sig. (2-sided)
	Excellent(%)	Good(%)	Moderate(%)	Poor(%)			
Doctor	52(54.2)	38(39.6)	2(2.1)	4(4.2)			
Nurse	47(47.0)	41(41.0)	7(7.0)	5(5.0)			
Technician	25(64.1)	10(25.6)	1(2.6)	3(7.7)	69.359	16	**.000***
Management	10(50.0)	6(30.0)	3(15.0)	1(5.0)			
Patient	11(12.2)	50(55.6)	22(24.4)	5(5.6)			

The chi-square analysis indicates a significant association between role and perceptions of improved population health (χ^2 = 69.359, df = 16, p < .001). Doctors, nurses, technicians, and management staff reported overwhelmingly positive views, with most selecting "excellent" or "good." Technicians in particular had the highest proportion of "excellent" ratings.

Table 6.3 Association between the transparency and accountability and role

Role	Transparency and accountability				Value	Df	Asymp. Sig. (2-sided)
	Excellent(%)	Good(%)	Moderate(%)	Poor(%)			
Doctor	35(36.5)	48(50.0)	8(8.3)	5(5.2)			
Nurse	33(33.0)	59(59.0)	5(5.0)	3(3.0)			
Technician	17(43.6)	17(43.6)	3(7.7)	2(5.1)	28.61	16	**.027***
Management	12(60)	4(20)	3(15)	1(5)			
Patient	18(20.0)	53(58.9)	13(14.4)	4(4.4)			

The chi-square test shows a statistically significant association between stakeholder role and perceptions of transparency and accountability (χ^2 = 28.61, df = 16, p = .027). Overall, all groups rated transparency positively, with most responses falling under "excellent" or "good."

Table 6.4 Mean distribution between job role and health disparity

Health disparity	Mean(SD)	F	df	Sig.	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Doctor	3.395(0.76)				3.242	3.550
Nurse	3.88(0.92)				3.702	4.068
Technician	4.089(0.85)	100.006		.000	3.812	4.368
Management	3.95(0.82)		4		3.564	4.336

Patient	1.722(0.86)				1.542	1.903

The above table indicates a highly significant difference in perceptions of health disparity across various roles (F = 100.006, df = 4, p < .001). Technicians (M = 4.09, SD = 0.85), management (M = 3.95, SD = 0.82), and nurses (M = 3.88, SD = 0.92) reported the highest mean scores, suggesting they perceive health disparities as being addressed effectively. Doctors' ratings were moderately high (M = 3.40, SD = 0.76), whereas patients reported a much lower mean (M = 1.72, SD = 0.86), in

Table 6.5 Mean distribution between job role and patient engagement

Patient engagement					95% Confidence Interval for Mean	
	Mean(SD)	F	df	Sig.	Lower Bound	Upper Bound
Doctor	3.41(0.69)				3.277	3.557
Nurse	4.02(0.59)				3.902	4.138
Technician	4.038(0.84)	13.449		.000	3.764	4.313
Management	4.025(0.81)				3.642	4.408
Patient	4.05(0.73)		4		3.901	4.210

The above table reveal a significant difference in perceptions of patient engagement across participants roles (F = 13.449, df = 4, p < .001). Nurses (M = 4.02, SD = 0.59), technicians (M = 4.04, SD = 0.84), management (M = 4.03, SD = 0.81), and patients themselves (M = 4.05, SD = 0.73) reported similarly high mean scores, indicating strong perceptions of effective patient engagement.

Doctors reported a lower mean score (M = 3.41, SD = 0.69), suggesting they perceive engagement as somewhat less robust than other participants. Overall, this indicates generally positive views of patient engagement across most roles, with doctors perceiving slightly lower levels of engagement.

Table 6.6 Mean distribution between job role and reduced health cost

Reduced health cost					95% Confidence Interval for Mean	
	Mean(SD)	F	df	Sig.	Lower Bound	Upper Bound
Doctor	2.833(0.99)				2.6325	3.0342
Nurse	3.35(0.66)				3.2232	3.4868
Technician	3.907(0.79)	24.454		.000	3.6495	4.1649
Management	4.45(0.75)				4.0947	4.8053
Patient	3.50(0.74)		4		3.3471	3.6643

The above table show a significant difference in perceptions of reduced healthcare costs across stakeholder roles (F = 24.454, df = 4, p < .001). Management reported the highest mean rating (M = 4.45, SD = 0.75), indicating strong perception of cost reduction. Technicians (M = 3.91, SD = 0.79) and patients (M = 3.50, SD = 0.74) also perceived moderate reductions in costs, while nurses (M = 3.35, SD = 0.66) and doctors (M = 2.83, SD = 0.99) reported lower perceptions of cost reduction.

Table 6.7. Mean distribution between job role and Transparency and accountability

Transparency and accountability					95% Confidence Interval for Mean	
	Mean(SD)	F	df	Sig.	Lower Bound	Upper Bound
Doctor	3.177(0.79)				3.0161	3.3381
Nurse	4.04(0.64)				3.9126	4.1674
Technician	4.129(0.79)	22.556		.000	3.8723	4.3866
Management	4.05(0.85)				3.6490	4.4510
Patient	3.758(0.66)		4		3.6171	3.9002

The table results indicate a significant difference in perceptions of transparency and accountability across participants roles (F = 22.556, df = 4, p < .001). Technicians (M = 4.13, SD = 0.79), management (M = 4.05, SD

= 0.85), and nurses (M = 4.04, SD = 0.64) reported the highest mean scores, suggesting strong perceptions of transparency and accountability. Patients reported a moderately high mean (M = 3.76, SD = 0.66), while doctors reported the lowest mean (M = 3.18, SD = 0.79), indicating comparatively weaker perceptions among physicians.

IV.   Conclusion:

Healthcare staffs largely reported "excellent" or "good" improvements in healthcare quality, whereas patients provided more moderate evaluations. This indicates that healthcare providers perceive substantial gains in care effectiveness, aligning with the expected outcome of enhanced healthcare quality.

Significant differences were observed between roles, with healthcare providers perceiving disparities as largely addressed. In contrast, patients reported notable concerns, with a substantial portion rating disparities as "poor," highlighting that while equity remains an objective, patient experiences suggest more work is needed.

All Healthcare staffs and   patients, rated engagement positively, with the majority indicating "good" or "excellent" participation in care. This reflects successful achievement of the expected outcome of enhanced patient involvement.

Technicians and nurses reported the highest perceptions of population health improvements, followed by management and patients. Doctors rated this slightly lower, suggesting overall positive perceptions of population-level benefits of digital healthcare.

Management and technicians perceived strong reductions in healthcare costs, while doctors, nurses, and patients showed mixed responses. This indicates partial achievement of the expected outcome, with potential for further optimization in cost efficiency.

Technicians, management, and nurses rated transparency and accountability highly, whereas patients and doctors reported moderately lower perceptions. Overall, digital systems are contributing to greater transparency, meeting this expected outcome, though patient experience could be strengthened.

Digital healthcare systems are perceived to improve care quality, engagement, population health, transparency, and cost efficiency, while challenges remain in addressing patient-perceived health disparities.

Over all the study demonstrates that EMR implementation substantially enhances healthcare performance, aligning with the aim of evaluating its effectiveness. Across all the participants EMRs were associated with improved healthcare outcomes, greater patient engagement, enhanced population health, and stronger transparency and accountability. Providers, particularly nurses, technicians, and management, reported the most positive perceptions, while patients noted meaningful improvements in care quality and engagement. Cost reduction and health equity were recognized but rated moderately, indicating room for further optimization. Overall, EMRs effectively streamline workflows, reduce errors, support evidence-based practice, and improve patient participation, confirming their pivotal role in advancing quality, efficiency, and accountability in healthcare delivery.

REFERENCE

[1].   Ng'andu, D., & Haabazoka, L. (Year). A study of the effect of health records digitalization on healthcare facility operational efficiency. University of Zambia.
[2].   Nurses' perceptions and confidence in using electronic medical record (EMR) systems in a hospital setting in Muscat, Oman.
[3].   Aldosari, B., Al-Mansour, S., Aldosari, H., & Alanazi, A. (2018). Assessment of factors influencing nurses' acceptance of electronic medical record in a Saudi Arabia hospital. Informatics in Medicine Unlocked, 10, 82–88. https://doi.org/10.1016/j.imu.2017.12.007
[4].   Ahammed, N., Pareek, N., & Tanwar, V. (2024). Examining the implementation challenges and benefits of electronic health records (EHR) systems in large hospital settings. International Journal of Advanced Academic Studies, 6(2), 59–66. https://doi.org/10.33545/27068919.2024.v6.i1a.1153
[5].   Ramesh, S., & Subramanian, P. (2025). Doctors' perceptions of electronic medical record adoption in a private hospital in India: A mixed-methods study. BMC Health Services Research, 25(4), Article 12877. https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-025-12877-5
[6].   Rajan, S., & Prakash, A. (2020). Developing a standard EHR framework for India: Challenges and opportunities. Health Services & Outcomes Research, 16(2), 45–56. https://doi.org/10.1007/s10742-020-00238-0
[7].   Muyepa, A., & Stringer, J. (2014). ZEPRS: Zambia Electronic Perinatal Record System—Lessons from a national-level EMR. Journal of Medical Informatics in Developing Countries, 8(1), 22–29.
[8].   McKinney, M., & Basnet, R. (2018). Implementing Bahmni EMR in a rural Nepalese hospital: Lessons learned. BMJ Global Health, 3(Suppl 2), e000587. https://pmc.ncbi.nlm.nih.gov/articles/PMC5874496/
[9].   Al-Kahtani, A., & Almutairi, H. (2021). Electronic health record adoption in GCC countries: A systematic review. Middle East Journal of Health Informatics, 9(3), 112–125.
[10].   Liu, C., et al. (2017).** *The role of EHR in operational efficiency in healthcare organizations*. Journal of Healthcare Management. This paper discusses the role of EHRs in enhancing the speed and accuracy of decision-making by providing quicker access to patient data
[11].   Hersh, W. R., et al. (2015).** *Health Information Technology and Quality of Care: A Systematic Review of the Literature*. Journal of the American Medical Informatics Association. This study finds that while EHRs can improve the quality of care, they may sometimes interrupt the direct doctor-patient interaction

[12]. Kellermann, A. L., & Jones, S. S. (2013).** *The Role of Health Information Technology in Addressing the Quality and Efficiency Challenges of U.S. Health Care*. JAMA. This study discusses how frequently doctors and healthcare staff use EMRs to streamline communication and decision-making in healthcare

[13]. Blumenthal, D., et al. (2014).** *The Impact of Electronic Health Records on Healthcare Quality and Efficiency: A Systematic Review*. Journal of the American Medical Association. This article discusses how new patients and long-time visitors alike may experience differences in the use of EHRs, depending on how integrated the system is into the healthcare facility's workflow

[14]. Gandhi, T. K., et al. (2011).** *The Impact of Health Information Technology on Patient Satisfaction*. Journal of Patient Safety. The research in this paper links the implementation of EHR systems to higher levels of patient satisfaction by reducing errors and improving healthcare quality

[15]. Pablos, M., et al. (2016).** *Enhancing Collaboration and Communication in Healthcare with Electronic Health Records: A Systematic Review*. Journal of Medical Systems. This paper highlights the role of EHR in improving communication between healthcare professionals and patients, particularly regarding complications or adverse events during treatment

[16]. Hersh, W. R., et al. (2015).** *Health Information Technology and Quality of Care: A Systematic Review of the Literature*. Journal of the American Medical Informatics Association. This study suggests that the accessibility of digital records has the potential to enhance patient engagement and participation in their own care

[17]. Hsieh, J. L., et al. (2014).** *The Effect of Electronic Health Record Systems on Patient Satisfaction: A Cross-Sectional Study of the US Health System*. Journal of Health Communication. The study discusses how education level can impact how patients interact with and perceive EHR systems

[18]. Liu, C., et al. (2017). *The role of EHR in operational efficiency in healthcare organizations*. Journal of Healthcare Management. This study finds that EHRs can improve operational efficiency, although challenges remain in full system utilization

[19]. Pablos, M., et al. (2016). *Enhancing Collaboration and Communication in Healthcare with Electronic Health Records: A Systematic Review*. Journal of Medical Systems. This study highlights the positive impacts of EHR systems on communication and collaboration within healthcare teams

[20]. Goldstein, M. M., et al. (2011). *Impact of Electronic Health Record Use on Quality of Care in U.S. Healthcare Settings*. Journal of Health Informatics. This study emphasizes that digitized EHRs significantly enhance access to patient information, improving the overall quality of care.