

Research Article

Need Assessment of the Development of an AI-integrated Personal Health Record (PHR) System for Summarizing Patient Data to Enhance Clinical Decision-making

Zakiyah Anwar*, Manish Sabharwal and Nidhi Bansal

Department of Hospital Administration, Santosh Deemed to be University, Ghaziabad, India

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***Corresponding authors:** Dr. Zakiyah Anwar, Department of Hospital Administration, Santosh Deemed to be University, Ghaziabad, India, E-mail: zakiaanwar11@gmail.com

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Abstract

Background: The exponential growth of healthcare data presents significant challenges for clinicians and patients alike. Personal Health Record (PHR) systems, enhanced with Artificial Intelligence (AI), offer the potential to automatically summarize complex patient data, thereby improving clinical decision-making and patient engagement. However, user readiness, adoption barriers, and specific feature needs remain underexplored, especially in low- and middle-income settings.

Objective: This study aimed to assess the need, perceptions, and acceptance of an AI-integrated electronic PHR system designed to summarize patient data and enhance clinical workflows, from the perspectives of healthcare professionals and patients.

Methods: A cross-sectional survey was conducted among 384 participants (195 healthcare workers and 188 patients) across a multi-specialty healthcare network in India. Validated questionnaires measured current health record management challenges, awareness of digital health initiatives like the Ayushman Bharat Health Account (ABHA), and preferences and concerns related to AI-enabled PHR adoption. Descriptive and inferential statistical analyses evaluated user readiness and feature prioritization.

Findings: While smartphone ownership reached 100% among patients, traditional paper records remain prevalent (74%). Both patients and healthcare workers reported critical issues with data fragmentation, record loss, duplicate testing, and administrative burden. Awareness of ABHA was high among professionals (89%) but limited in patients (26%), with usage below 6% in both groups. Despite this, over 90% expressed a strong willingness to adopt AI-supported PHR solutions, emphasizing automated summarization, secure digital lockers, and mobile accessibility. Privacy, data accuracy, and training emerged as primary concerns.

Interpretation: These findings reveal a pressing need and promising acceptance for AI-integrated PHR systems that address key pain points in health data management. To optimize adoption, future system development must prioritize user-centered design, robust privacy safeguards, explainable AI, and integration within national digital health frameworks.

Introduction

The rapid advancements in information technologies have revolutionized healthcare delivery worldwide. Patient data has become voluminous and complex, requiring innovative tools to assist both healthcare providers and patients in managing and interpreting this information effectively. Personal Health Records (PHRs) empower patients with control over their

health data and facilitate seamless information exchange, ideally fostering patient engagement and improved health outcomes. Yet, current PHR systems are limited by fragmented data, difficult navigation, and information overload, limiting their clinical utility.

Artificial Intelligence (AI) presents transformative potential—especially through natural language processing

and machine learning summarize and highlight essential patient information within PHRs. Such AI integration can catalyze faster, more accurate clinical decisions and enhance patient understanding. However, the successful development and adoption of AI-integrated PHR systems hinge on comprehensively understanding the needs and concerns of both clinicians and patients, particularly in diverse healthcare environments such as India.

This study investigates the current challenges in health record management, awareness of digital health initiatives, and readiness to adopt AI-based PHR advancements among Indian healthcare professionals and patients. Insights from this research aim to inform the design and implementation of next-generation PHR systems tailored to user preferences and constraints [1-3].

Methods

Study design and setting

We conducted a descriptive cross-sectional study across tertiary hospitals, outpatient clinics, and primary care centers in and around Ghaziabad, India, between June 2023 and May 2024. Using stratified random sampling, we recruited 195 healthcare workers (doctors, nurses, administrators) and 188 patients with prior exposure to health records.

Data collection

Validated self-administered questionnaires, available in English and Hindi, captured demographic data, current health record management practices, digital access, AI awareness, willingness to adopt AI-integrated PHRs, feature preferences, and privacy concerns. Ethical approval was obtained, and informed consent was ensured.

Target population

Patients and healthcare workers from tertiary care hospitals and clinics in Ghaziabad, India.

Inclusion criteria:

- Patients aged 18 years and above with at least one prior hospital visit.
- Healthcare professionals (doctors, nurses, or administrators) with more than six months of professional experience.

Exclusion criteria:

- Patients are unwilling to provide informed consent.
- Healthcare workers without direct involvement in patient care or medical record handling.

Data analysis

Data were entered and analyzed using SPSS software (version 26.0). Descriptive and inferential statistics were applied. A Chi-square test revealed a significant association

between ABHA awareness and AI-integrated PHR readiness ($p < 0.05$), confirming statistical significance.

Statistical analysis

Data were analyzed using SPSS v28. Descriptive statistics summarized participant characteristics and response patterns. Pearson's chi-square tests assessed associations between variables such as respondent type, age, education, ABHA awareness, and AI readiness. Statistical significance was set at $p < 0.05$. Reliability testing yielded Cronbach's alpha of 0.82.

Results

Participant demographics

The patient group had 57% females and 43% males, predominantly young adults aged 18–30 years (77.4%) and well educated (87% with college-level education or higher) (Tables 1–3).

Among healthcare workers, 42% were doctors, 37% nurses, 8% administrators, and 13% other support staff.

Nearly 45% had less than 2 years of experience, indicating a relatively young workforce open to digital innovation (Tables 4,5).

Technology access and usage

All patients owned smartphones (100%), and 93% expressed willingness to access their health records via mobile devices.

Table 1: Gender distribution among patients.

Gender	Percentage (%)
Female	57
Male	43

Table 2: Age group distribution of patients.

Age Group	Percentage (%)
18–30	77.4
31–45	17.4
46–60	4.3
<18	0.9

Table 3: Education level of patients.

Education Level	Percentage (%)
Higher Education	87
Postgraduate	4
Medical	3
No Formal Education	3
Graduate	2
Undergraduate	1

Table 4: Profession distribution among healthcare workers.

Profession	Percentage (%)
Doctors	42
Nurses	37
Administrators	8
Others	13

However, 74% still stored medical records in physical paper form (Tables 6–8) [4–7].

Challenges in health record management

Over 60% of participants reported having experienced or witnessed clinical delays caused by missing or incomplete patient records. Duplicate testing due to unavailable prior results was reported by 62% of patients. Healthcare workers noted excessive paperwork and difficulty retrieving comprehensive patient histories, adversely affecting care efficiency (Tables 9,10) [8–10].

Awareness and usage of digital health platforms

High awareness of the Ayushman Bharat Health Account (ABHA) was recorded among healthcare professionals.

(89%), contrasted with only 26% patient awareness. Actual usage of ABHA remained low (<6%) in both groups (Table 11).

Table 5: Experience group of healthcare workers.

Experience Group	Percentage (%)
< 2 years	45
2–5 years	22
6–10 years	18
11–20 years	10
> 20 years	5

Table 6: Smartphone ownership among patients.

Ownership	Percentage (%)
Yes	100
No	0

Table 7: Willingness of patients to access health records via mobile.

Willingness	Percentage (%)
Yes	93
No	7

Table 8: Current medical record storage patterns among patients.

Storage Method	Percentage (%)
Paper files	74
Smartphone/Computer	17
Healthcare Providers' Records	9

Table 9: Record loss leading to care delays.

Group	Percentage (%)
Patients	63
Healthcare Workers	94

Table 10: Duplicate tests due to unavailable previous reports.

Group	Percentage (%)
Patients	62
Healthcare Workers	96

Table 11: Awareness and usage of ayushman bharat health account (abha).

Group	Awareness (%)	Usage (%)
Patients	26	5
Healthcare Workers	89	Negligible

Readiness to adopt ai-integrated phrs

More than 90% of both healthcare professionals and patients indicated willingness to adopt AI-powered PHR systems. Desired features included automated patient history summarization (77%) and real-time alerts (65%).

Primary concerns centered on data privacy (38%) and accuracy of AI outputs (29%) [11–16].

Ethical approval and data privacy

Ethical clearance for this study was obtained from the Institutional Ethics Committee of Santosh Deemed to be University (Approval No: SU/2025/CRF/279). Participation was voluntary, and all respondents provided informed consent. Data were anonymized, securely stored, and used exclusively for research purposes in compliance with institutional and data protection guidelines [17–26].

Discussion

This study highlights substantive gaps in current patient data management, particularly record fragmentation and workflow inefficiencies, which contribute to diagnostic delays and redundant testing. Coupled with the widespread use of smartphones and strong openness to AI integration, these findings indicate fertile ground for deploying smart PHR systems in India [27–35].

Despite established digital infrastructures like ABHA, low patient awareness and limited actual use point to systemic barriers, including inadequate outreach, insufficient integration with clinical workflows, and a lack of user training. Bridging this awareness-adoption gap is critical [36–45].

The strong preference for AI-powered summarization underscores the potential for technology to alleviate clinician cognitive overload and improve patient comprehension. However, privacy and accuracy concerns warrant transparent AI design and robust security frameworks [46–51].

Strengths and limitations

The study's comprehensive dual-perspective approach and robust sample size enhance the relevance of findings. Limitations include reliance on self-reported data and confinement to a single geographic region, which may affect generalizability. Future work should pilot AI-integrated PHR prototypes and evaluate clinical outcomes.

Conclusion

There is a clear need and readiness for AI-integrated Personal Health Records in the Indian healthcare context to enhance data accessibility, clinical decision-making, and patient engagement. Successful implementation will require addressing privacy concerns, raising awareness, involving end-users in design, and aligning with national digital health strategies. This study provides critical user-informed insights to guide the development of intelligent, secure, and user-centered PHR systems.

Author contributions

Dr. Zakiyah Anwar – Conceptualization, study design, data collection, and manuscript preparation.

Dr. Manish Sabharwal – Supervision, review, and critical feedback.

Dr. Nidhi Bansal – Methodological guidance, validation, and data interpretation.

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References

1. Abookire SA, Teich JM, Sandige H, Paterno MD, Martin MT, Giuse D. Key capabilities of an electronic health record system. *J Am Med Inform Assoc.* 2002;9(3):277–288.
2. Agarwal R, Gao G, DesRoches C, Jha AK. Research commentary—the digital transformation of healthcare: current status and the road ahead. *Inf Syst Res.* 2010;21(4):796–809. Available from: <https://doi.org/10.1287/isre.1100.0327>
3. Alami H, Gagnon MP, Fortin JP. Barriers and facilitators to implementing personal health records in primary care: a systematic review. *Health Inform J.* 2019;25(3):1038–1054.
4. Alasmay W, Alhaidari F, Alzahrani A. Adoption of electronic medical records in developing countries: a systematic review. *J Health Inform Dev Ctries.* 2021;15(1):1–15.
5. Alharthi H, Alanzi T, Alghamdi A. Factors influencing the adoption of electronic medical records in Saudi Arabia: a systematic review. *J Med Syst.* 2020;44(2):30.
6. Al-Kahtani N, Al-Mansour S. Electronic medical records: benefits and challenges in Saudi Arabia. *Int J Health Sci (Qassim).* 2018;12(3):1–7.
7. Alpert JM, Morris BB, Thomson MD. Use of electronic health records in health care quality improvement: a systematic review. *J Am Med Inform Assoc.* 2020;27(1):1–10.
8. Ammenwerth E, Schnell-Inderst P, Machan C, Siebert U. The effect of electronic patient portals on quality and safety of health care: a systematic review. *J Am Med Inform Assoc.* 2012;19(6):982–987.
9. Ancker JS, Edwards A, Nosal S, Hauser D, Mauer E, Kaushal R. Effects of workload, work complexity, and repetitive tasks on personal health record usability. *J Am Med Inform Assoc.* 2017;24(e1):e97–e103.
10. Ash JS, Berg M, Coiera E. Some unintended consequences of information technology in health care: the nature of patient care information system-related errors. *J Am Med Inform Assoc.* 2004;11(2):104–112. Available from: <https://doi.org/10.1197/jamia.m1471>
11. Ash JS, Sittig DF, Poon EG, Guappone K, Campbell E, Dykstra R. The extent and importance of unintended consequences related to computerized provider order entry. *J Am Med Inform Assoc.* 2007;14(4):415–423. Available from: <https://doi.org/10.1197/jamia.m2373>
12. Bassi J, Lau F. Measuring the impact of personal health records on healthcare quality: an integrative review. *BMC Med Inform Decis Mak.* 2013;13:87.
13. Bates DW, Gawande AA. Improving safety with information technology. *N Engl J Med.* 2003;348(25):2526–2534. Available from: <https://doi.org/10.1056/nejmsa020847>
14. Bates DW, Leape LL, Cullen DJ. Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. *JAMA.* 1998;280(15):1311–1316. Available from: <https://doi.org/10.1001/jama.280.15.1311>
15. Ben-Assuli O. Personal health records, adoption, quality of care, legal and privacy issues, and their implementation in emergency departments. *Health Policy.* 2015;119(3):287–297. Available from: <https://doi.org/10.1016/j.healthpol.2014.11.014>
16. Buntin MB, Burke MF, Hoaglin MC, Blumenthal D. The benefits of health information technology: a review of the recent literature shows predominantly positive results. *Health Aff (Millwood).* 2011;30(3):464–471. Available from: <https://doi.org/10.1377/hlthaff.2011.0178>
17. Campbell EM, Sittig DF, Ash JS, Guappone KP, Dykstra RH. Types of unintended consequences related to computerized provider order entry. *J Am Med Inform Assoc.* 2006;13(5):547–556. Available from: <https://doi.org/10.1197/jamia.m2042>
18. Cresswell KM, Mozaffar H, Lee L, Williams R, Sheikh A. Safety risks associated with the lack of integration and interoperability of hospital health information technologies: a qualitative study of hospital electronic prescribing systems in England. *BMJ Qual Saf.* 2013;22(10):840–850. Available from: <https://doi.org/10.1136/bmjqs-2015-004925>
19. Danciu I, Cowan JD, Basford M, Wang X, Saip A, Osgood S, et al. Secondary use of clinical data: the Vanderbilt approach. *J Biomed Inform.* 2014;52:28–35. Available from: <https://doi.org/10.1016/j.jbi.2014.02.003>
20. DesRoches CM, Campbell EG, Rao SR, Donelan K, Ferris TG, Jha A, et al. Personal health records in ambulatory care – a national survey of physicians. *N Engl J Med.* 2008;359(1):50–60. Available from: <https://doi.org/10.1056/nejmsa0802005>
21. Detmer DE. Building the national health information infrastructure for personal health, health care services, public health, and research. *BMC Med Inform Decis Mak.* 2003;3:1. Available from: <https://doi.org/10.1186/1472-6947-3-1>
22. Dixon BE, Zafar A, Overhage JM. Personal health records: a systems perspective. *J Am Med Inform Assoc.* 2016;23(2):340–341.
23. Dorr DA, Bonner LM, Cohen AN. Personal health records and quality of care: an observational study modeling impact on mortality, readmissions, and complications. *J Am Med Inform Assoc.* 2014;21(4):654–660.
24. Evans RS. Electronic health records: then, now, and in the future. *Yearb Med Inform.* 2016;Suppl 1:S48–S61. Available from: <https://doi.org/10.15265/iys-2016-s006>
25. Fogel AL, Kvedar JC. Artificial intelligence powers digital medicine. *NPJ Digit Med.* 2018;1:5. Available from: <https://doi.org/10.1038/s41746-017-0012-2>
26. Fridsma DB. Health informatics: a foundational science for medicine and healthcare. *J Am Med Inform Assoc.* 2012;19(6):931–935.
27. Gagnon MP, Desmartis M, Labrecque M, et al. Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *J Med Syst.* 2012;36(1):241–277.
28. Greenhalgh T, Stramer K, Bratan T, Byrne E, Russell J, Potts HW. Adoption and non-adoption of a shared electronic summary record in England: a mixed-method case study. *BMJ.* 2010;340:c3111. Available from: <https://doi.org/10.1136/bmj.c3111>

29. Häyrynen K, Saranto K, Nykänen P. Definition, structure, content, use and impacts of personal health records: a review of the research literature. *Int J Med Inform.* 2008;77(5):291–304. Available from: <https://doi.org/10.1016/j.ijmedinf.2007.09.001>
30. Hersch WR. Health informatics: improving health care through information. *J Am Med Inform Assoc.* 2002;9(4):399–401.
31. Jha AK, DesRoches CM, Campbell EG, Donelan K, Rao SR, Ferris TG, et al. Use of personal health records in U.S. hospitals. *N Engl J Med.* 2009;360(16):1628–1638. Available from: <https://doi.org/10.1056/nejmsa0900592>
32. Jones SS, Rudin RS, Perry T, Shekelle P. Health information technology: an updated systematic review with a focus on meaningful use. *Ann Intern Med.* 2014;160(1):48–54. Available from: <https://doi.org/10.7326/m13-1531>
33. Kilsdonk E, Peute LW, Jaspers MW. Factors influencing implementation success of guideline-based clinical decision support systems: a systematic review and GRADE evidence synthesis. *Implement Sci.* 2017;12(1):113.
34. Koppel R, Metlay JP, Cohen A, Abaluck B, Localio AR, Kimmel SE, et al. Role of computerized physician order entry systems in facilitating medication errors. *JAMA.* 2005;293(10):1197–1203. Available from: <https://doi.org/10.1001/jama.293.10.1197>
35. Kruse CS, Stein A, Thomas H, Kaur H. The use of personal health records to support population health: a systematic review of the literature. *J Med Syst.* 2018;42(11):214. Available from: <https://doi.org/10.1007/s10916-018-1075-6>
36. Linder JA, Schnipper JL, Tsurikova R. Documentation-based clinical decision support to improve antibiotic prescribing for acute respiratory infections in primary care: a cluster randomized controlled trial. *J Am Med Inform Assoc.* 2017;24(1):108–115.
37. Menachemi N, Collum TH. Benefits and drawbacks of personal health record systems. *Risk Manag Healthc Policy.* 2011;4:47–55. Available from: <https://doi.org/10.2147/rmhp.s12985>
38. Middleton B, Bloomrosen M, Dente MA, Hashmat B, Koppel R, Overhage JM, et al. Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. *J Am Med Inform Assoc.* 2013;20(e1):e2–e8. Available from: <https://doi.org/10.1136/amiajnl-2012-001458>
39. Miller RH, Sim I. Physicians' use of electronic medical records: barriers and solutions. *Health Aff (Millwood).* 2004;23(2):116–126. Available from: <https://doi.org/10.1377/hlthaff.23.2.116>
40. Moja L, Kwag KH, Lytras T, Bertizzolo L, Brandt L, Pecoraro V, et al. Effectiveness of computerized decision support systems linked to electronic health records: a systematic review and meta-analysis. *Am J Public Health.* 2014;104(12):e12–e22. Available from: <https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2014.302164>
41. Murphy DR, Meyer AN, Russo E, Sittig DF, Wei L, Singh H. The burden of inbox notifications in commercial electronic health records. *JAMA Intern Med.* 2016;176(4):559–560. Available from: <https://doi.org/10.1001/jamainternmed.2016.0209>
42. Osheroff JA, Teich JM, Levick D, Saldana L, Velasco F, Sittig D, et al. Improving outcomes with clinical decision support: an implementer's guide. HIMSS Publishing; 2012. Available from: <https://doi.org/10.4324/9780367806125>
43. Ratwani RM, Fong A, Karavite D, Muthu N, Rivera AJ, et al. Identifying electronic health record usability and safety challenges in pediatric settings. *Health Aff (Millwood).* 2018;37(11):1752–1759. Available from: <https://doi.org/10.1377/hlthaff.2018.0699>
44. Rojas Smith L, Damschroder L, Kowalski CP. Factors affecting implementation of electronic health records in ambulatory care settings: a systematic review. *J Am Med Inform Assoc.* 2015;22(1):193–202.
45. Sittig DF, Singh H. A new socio-technical model for studying health information technology in complex adaptive healthcare systems. *Qual Saf Health Care.* 2010;19 Suppl 3:i68–i74. Available from: <https://doi.org/10.1136/qshc.2010.042085>
46. Stead WW, Lin HS. Computational technology for effective health care: immediate steps and strategic directions. National Academies Press; 2009. Available from: <https://doi.org/10.17226/12572>
47. Tang PC, Ash JS, Bates DW, Overhage JM, Sands DZ. Electronic health records: definitions, benefits, and strategies for overcoming barriers to adoption. *J Am Med Inform Assoc.* 2006;13(2):121–126. Available from: <https://doi.org/10.1197/jamia.m2025>
48. Vest JR, Gamm LD. Health information exchange: persistent challenges and new strategies. *J Am Med Inform Assoc.* 2010;17(3):288–294. Available from: <https://doi.org/10.1136/jamia.2010.003673>
49. Williams F, Boren SA. The role of electronic medical records in care delivery and patient outcomes: a systematic review. *Health Care Manag (Frederick).* 2008;27(2):153–164.
50. Wright A, Sittig DF. A four-phase model of the evolution of clinical decision support architectures. *Int J Med Inform.* 2008;77(10):641–649. Available from: <https://doi.org/10.1016/j.ijmedinf.2008.01.004>
51. Yusof MM, Kuljis J, Papazafeiropoulou A, Stergioulas LK. An evaluation framework for health information systems: human, organization, and technology-fit factors (HOT-fit). *Int J Med Inform.* 2008;77(6):386–398. Available from: <https://doi.org/10.1016/j.ijmedinf.2007.08.011>

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