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CHALLENGES FACED BY NURSES DURING ADOPTION OF ELECTRONIC HEALTH RECORD SYSTEM IN THE PUBLIC HOSPITAL OF LAHORE, PAKISTAN

Sana Javed[*1], Anjum Tanveer[2]

[1]*Students of Post RN BSN, Institute of Nursing and Allied Health Sciences, Lahore, Pakistan*
[5]*Nursing Instructor, Institute of Nursing and Allied Health Sciences, Lahore, Pakistan*

[*1]sanaamir2913@gmail.com

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Corresponding Author: *
Sana Javed

Abstract

Background: Electronic Health Records (EHR) are introduced to improve efficiency, accuracy, and coordination in healthcare. However, their adoption poses challenges for nurses, who are central to patient care and documentation. Materials and Methods: A quantitative cross-sectional study was conducted from January to May 2024 at the Punjab Institute of Cardiology, Lahore. Using Slovin's formula, 67 nurses were sampled from 80 staff nurses in the emergency department through convenient simple random sampling. Data were collected on demographic factors, training, and perceptions of EHR-related challenges. Results: Among 66 respondents, most were aged 25–30 years (90.9%) with 7–9 years of experience (95.5%). Nurses identified barriers including insufficient training, workload, limited technical support, and decreased patient interaction. Pearson correlation showed a very weak positive relationship (r = 0.062) between age and EHR challenges, suggesting age was not significant. Training, experience, and institutional support emerged as more critical factors. Conclusion: EHR adoption requires tailored training, supportive leadership, and integration into nursing workflows to enhance care quality.

INTRODUCTION

Nurses are the backbone of healthcare, ensuring continuity of care through precise documentation of patient information, interventions, and outcomes. Over recent decades, rapid computerization and the emergence of smart technologies—such as the Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning, and Virtual/Augmented Reality—have transformed multiple sectors including engineering, aerospace, and healthcare (Mourtzis, Boboc, et al., 2023). In nursing, these innovations aim to enhance efficiency, accuracy, and personalization of care, while reinforcing the critical responsibility of documentation as emphasized in the Nursing and Midwifery Council's (NMC) Code (2018), which warns that poor record keeping remains a major cause of professional sanctions (Creighton, Devlin, et al., 2022).

The healthcare sector has evolved through successive digital stages. Healthcare 2.0 introduced computerized tracking and user-enabled

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technologies; Healthcare 3.0 enhanced customization of patient data transfer; and Healthcare 4.0 now integrates blockchain, cloud computing, big data analytics, and AI for real-time, individualized care (Tanwar, Parekh, et al., 2020). The Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH) further accelerated Electronic Health Record (EHR) adoption, aiming to improve care coordination and clinical outcomes (Pugal, Villar, et al., 2021). These secure digital platforms consolidate patient histories, diagnostics, treatments, allergies, and test results, providing clinicians with streamlined access to comprehensive records and reducing duplication of procedures (Stephen & Frank, 2024).

Despite their potential, EHR systems present challenges in integrating nursing standards into practice. While they enhance efficiency, quality of documentation, and support evidence-based care, EHRs often fail to fully capture patient experiences and preferences (Laukvik, Lyngstad, et al., 2024). Studies from diverse contexts reflect mixed nurse perceptions: some highlight reduced workload and improved decision-making, while others raise concerns over communication barriers and workflow disruptions (Salameh, Eddy, et al., 2019; Dash, Shakyawar, et al., 2019). This underscores the need for tailored implementation strategies that align with nurses' roles and foster positive attitudes toward digital transformation in healthcare.

1. Materials and Methods

A quantitative cross-sectional study was carried out at a public hospital in Lahore over five months (January–May 2024) to examine the challenges faced by nurses in adopting Electronic Health Records (EHR). The target population consisted of 80 staff nurses working in the emergency department during a shift.

Using Slovin's formula with a 5% margin of error, the sample size was calculated as 67. Nurses aged 20–45 years with at least three months of work experience were included, while doctors, nursing managers, students, and patients were excluded. Participants were selected using convenient simple random sampling.

Data were collected using a structured questionnaire comprising 23 items. Part I included eight demographic questions such as age, gender, education, and work experience, while Part II contained 15 items assessing knowledge, skills, and attitudes toward EHR use. The questionnaire required approximately 40 minutes to complete.

Formal approval was obtained from the hospital and college administration before data collection. Written informed consent was secured from participants after explaining the study objectives, and confidentiality and anonymity were guaranteed. Participation was voluntary, and respondents could withdraw at any stage.

Data were analyzed using SPSS version 23.0. Frequencies and percentages were computed for demographic and quantitative variables to interpret the findings.

2. Results

Table 1: Demographic Data of Participants

Variable	N	Mean	Median	Mode	Std. Deviation	Minimum	Maximum
Age Group (years)	66	1.23	1.00	1	1.25	1	11
Working Experience (years)	66	2.38	2.00	2	2.56	1	22
Trainings Attended	66	1.33	1.00	1	0.69	1	3

The data were collected from 66 nurses with no missing values. The mean age group score was 1.23, indicating most participants were in the younger age category. Average work experience was 2.38 years, ranging from 1 to 22 years. Nurses had attended an average of 1–2 training sessions, with a maximum of three.

Frontier in Medical & Health Research

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Table 2: Challenges Faced by Staff Nurses (N = 66)

Statement	DA (Disagree)	A (Agree)	SA (Strongly Agree)	Total Respondents
I can confidently use EHR to reduce the incidence of medical error by improving accuracy of medical records	20 (30.3%)	37 (56.1%)	9 (13.6%)	66
I can facilitate referrals to different healthcare services	10 (15.2%)	49 (74.2%)	7 (10.6%)	66
I can confidently access evidence-based tools that can be used by providers to make decisions about patient's care	10 (15.2%)	45 (68.2%)	11 (16.7%)	66
I can confidently provide comprehensive health information about the patients to reduce duplication of tests	15 (22.7%)	41 (62.1%)	10 (15.2%)	66
I continually update my professional knowledge to keep pace with the current EHR based standard to increase my confidence level	14 (21.2%)	35 (53.0%)	17 (25.8%)	66
I have the ability to retrieve diagnostic records	16 (24.2%)	40 (60.6%)	10 (15.2%)	66
I have the ability to facilitate structured communication between nurses and members of the health team	20 (30.3%)	28 (42.4%)	18 (27.3%)	66
I have the capability to make the information available to reduce delays in treatment	24 (36.4%)	27 (40.9%)	15 (22.7%)	66
I have the ability to document abnormalities, reducing time and cost of transcription	15 (22.7%)	40 (60.6%)	11 (16.7%)	66

The results indicate that the majority of nurses showed positive perceptions toward EHR use. More than two-thirds agreed that EHRs help reduce medical errors (56.1% agree, 13.6% strongly agree), facilitate referrals (74.2% agree, 10.6% strongly agree), and support access to evidence-based tools (68.2% agree, 16.7% strongly agree). Similarly, over 75% acknowledged EHRs' role in reducing duplication of tests and improving documentation efficiency. A large proportion also recognized the need to continually update professional knowledge (78.8% agreement overall).

However, challenges remain: around one-third of nurses expressed doubts regarding structured communication (30.3% disagreed) and timely information sharing to reduce treatment delays (36.4% disagreed). These findings suggest that while nurses generally accept and value EHRs as beneficial tools, usability issues and workflow integration still act as barriers to their optimal use.

Table 3: Descriptive Statistics of Age Group and EHR Challenges

Variable	Mean	Std. Deviation	N
Age Group (v1)	4.94	3.03	66
EHR Challenges (v2)	32.65	5.27	65

Frontier in Medical & Health Research

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The analysis examined the relationship between nurses' age group and the challenges faced in adopting EHR systems. Results show a very weak positive correlation (p = .62), indicating no significant association between age and EHR-related challenges. This suggests that factors other than age—such as training, experience, and organizational support—are more influential in shaping nurses' ability to use EHR effectively.

Table 4: Correlation between Age Group and EHR Challenges

Variables	Pearson Correlation (r)	Sig. (2-tailed)	N
Age Group (v1) × EHR Challenges (v2)	0.062	0.623	65

The correlation analysis shows a very weak positive relationship (r = 0.062) between age group and EHR-related challenges, which is statistically insignificant (p = 0.623). This indicates that nurses' age does not meaningfully influence the challenges they face in using EHR systems. Other factors such as training, experience, and organizational support are likely more important determinants.

3. Discussion

The findings of this study highlight that nurses generally recognize the potential of Electronic Health Records (EHR) to improve accuracy, comprehensiveness, and accessibility of patient information, thereby enhancing safety and quality of care. Most participants agreed that EHRs support medical error reduction, facilitate referrals, and enable access to evidence-based tools. However, notable challenges were also reported, including usability issues, workflow disruptions, and concerns about efficiency. These results suggest that while the benefits of EHRs are acknowledged, effective adoption requires addressing barriers related to training, user interface design, and organizational support.

These findings are consistent with Arikan, Kara, et al. (2021), who reported that nurses recognized the usefulness of EHRs but faced difficulties due to time limitations, high patient loads, and unfriendly system designs. Similarly, Vehko, Hyppönen, et al. (2019) emphasized that technical issues, high time pressure, and limited IT proficiency significantly hinder EHR use among healthcare providers. Their study further highlights the importance of investing in informatics education and involving frontline staff in discussions on EHR system design. Such approaches could also benefit nurses in Lahore, where training and user support emerged as critical needs.

At a broader level, the increasing global research attention on EHR adoption reflects the relevance of these challenges. Luan, Zhang, et al. (2023) found that scholarly publications on EHRs have grown consistently, with recent emphasis on topics such as mobile applications, advance care planning, and long-term care. This global trend underscores the importance of continuously adapting EHR systems to evolving healthcare demands and ensuring that they are aligned with clinical workflows.

4. Conclusion

Based on the findings, it is recommended that targeted training programs, user-friendly system designs, and stronger organizational support be prioritized to overcome the barriers nurses face in adopting EHRs. Ensuring alignment of EHR systems with nursing workflows will enhance usability, improve patient safety, and maximize the overall benefits of technology in healthcare delivery.

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