

Midwives' Electronic Medical Record Use: Perceived Ease, Competence, and the Mediating Role of Usefulness in a Regional Hospital

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Abstract

Background: Electronic Medical Record (EMR) implementation is a key element of hospital digital transformation. In midwifery services, EMR use is particularly important because midwives are responsible for timely, accurate, and continuous maternal and neonatal documentation. **Objective:** This study examined the effects of perceived ease of use and midwife competence on EMR use, with perceived usefulness as a mediating variable. **Method:** A quantitative cross-sectional analytical study was conducted among 103 midwives at Dr. Dradjat Prawiranegara Regional Hospital, Serang, Banten. Total sampling was used. Data were collected using a structured questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). **Result:** Midwife competence showed the strongest direct effect on EMR use (beta = 0.437; $p < 0.001$), followed by perceived ease of use (beta = 0.329; $p < 0.001$) and perceived usefulness (beta = 0.217; $p = 0.002$). Perceived ease of use significantly influenced perceived usefulness (beta = 0.267; $p = 0.001$), and midwife competence also significantly influenced perceived usefulness (beta = 0.615; $p < 0.001$). Perceived usefulness mediated the effects of perceived ease of use (indirect beta = 0.058; $p = 0.019$) and midwife competence (indirect beta = 0.133; $p = 0.005$) on EMR use. The model explained 71.6% of the variance in perceived usefulness and 84.8% of the variance in EMR use. **Conclusion:** EMR use among midwives is shaped not only by system usability but also by professional competence and the degree to which the system is perceived as useful for daily clinical documentation. Hospitals should strengthen workflow-based EMR training, system usability, and clinical data utilization to improve sustainable EMR use.

Keywords: electronic medical record; midwives; perceived ease of use; perceived usefulness; competence; Technology Acceptance Model

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INTRODUCTION

Electronic Medical Records (EMRs) are an essential component of digital health transformation because they support the electronic recording, storage, retrieval, and exchange of patient information. In hospital settings, EMRs can improve documentation accuracy, information accessibility, continuity of care, service efficiency, and patient safety (1,2,9). In Indonesia, EMR implementation has become a regulatory priority through the Minister of Health Regulation Number 24 of 2022 concerning Medical Records, which requires healthcare facilities to implement electronic medical records (2).

Despite these benefits, EMR implementation is not automatically followed by optimal use. Hospitals may have digital systems available, but healthcare workers may still use duplicate documentation, incomplete data entry, or manual records when the system is perceived as difficult, time-consuming, or not directly useful for clinical work (10,13). At Dr. Dradjat Prawiranegara Regional Hospital, Serang, the EMR system has been implemented since 2023 through the Eucalyptus Hospital Management Information System. However, the 2024 internal audit showed that EMR utilization reached 78.30% of the target, and duplicate recording by healthcare workers, including midwives, was still found. These conditions indicate that EMR implementation problems are not only technical but also related to user perception and competence.

Midwives are an important professional group to study separately because midwifery documentation involves maternal assessment, antenatal and intrapartum care, neonatal records, medication documentation, referral notes, and continuity of care information. Documentation errors, delayed input, or incomplete EMR use may affect clinical communication and service continuity. Unlike studies that examine healthcare workers in general, focusing on midwives allows the analysis to capture profession-specific documentation demands and digital competence needs in obstetric services (5,11,12).

The Technology Acceptance Model (TAM) explains that technology use is influenced by perceived ease of use and perceived usefulness (3,4). Perceived ease of use refers to the belief that a system can be operated without excessive effort, whereas perceived usefulness refers to the belief that system use improves job performance. In EMR implementation, perceived usefulness is theoretically important because a system that is easy to use may not be adopted consistently if users do not experience clear benefits for workflow, documentation efficiency, clinical decision-making, or service quality (3,4,12).

In addition to TAM variables, midwife competence is a relevant factor in EMR use. Competence includes knowledge, technical skill, clinical accuracy, digital literacy, and readiness to integrate EMR into midwifery practice. Competency theory and human capital theory suggest that individuals with stronger knowledge and skills are more capable of using organizational resources effectively (6,7,8). In the EMR context, competent midwives are expected to understand the system more easily, use it more consistently, and recognize its usefulness for documentation and service improvement.

Previous EMR studies have examined perceived ease of use, perceived usefulness, or user competence as determinants of technology acceptance (10-13). However, limited evidence explains how perceived usefulness mediates the relationship between perceived ease of use, professional competence, and EMR use among midwives in Indonesian regional hospitals. This study addresses that gap by testing perceived usefulness as a mediating mechanism in TAM-based EMR use among midwives. The study contributes to TAM by positioning midwife competence as an external professional factor that strengthens perceived usefulness and actual EMR use in obstetric service documentation.

OBJECTIVE

This study aimed to examine the effects of perceived ease of use and midwife competence on EMR use, with perceived usefulness as a mediating variable, among

midwives at Dr. Dradjat Prawiranegara Regional Hospital, Serang, Banten.

METHODS

Design and Setting

This study used a quantitative cross-sectional analytical design. The study was conducted at Dr. Dradjat Prawiranegara Regional Hospital, Serang, Banten, Indonesia.

Population, Sample, and Sampling Technique

The study population consisted of all 103 midwives working at Dr. Dradjat Prawiranegara Regional Hospital. Because the population was relatively limited and all members of the population were accessible, this study used total sampling. All eligible midwives were invited to participate, and the final sample consisted of 103 respondents. Total sampling was considered appropriate because the study focused on a defined professional group directly involved in EMR use.

For PLS-SEM analysis, the sample size was considered adequate because it exceeded the minimum requirement based on the complexity of the structural model. The largest number of structural paths directed at

an endogenous construct was three, and the sample of 103 exceeded the minimum requirement suggested for exploratory PLS-SEM with a medium effect size and a 5% significance level (14). However, if the journal requires it.

The inclusion criteria were: (1) registered midwives working at the hospital; (2) midwives who had used the EMR system in clinical or documentation work; (3) midwives with at least six months of work experience; and (4) willingness to participate by providing informed consent. The exclusion criteria were: (1) midwives on leave during the data collection period; (2) midwives who did not use EMR in their work unit; and (3) incomplete questionnaire responses.

Instrument for data collection

Data were collected using a structured self-administered questionnaire developed based on TAM constructs and previous studies on EMR and health information system use (3,4,10-13). The questionnaire was adapted to the midwifery service context and reviewed by experts in hospital administration, health information systems, and midwifery management for content validity. by the authors before resubmission.

Table 1. Questionnaire Constructs and Indicators

Construct	Number of items	Indicator examples	Example item
Perceived ease of use	8 items	ease of access, clarity of display, ease of navigation, ease of data input, system learnability	The EMR system is easy for me to access and operate during midwifery services.
Midwife competence	6 items	technical skill, understanding of EMR procedures, accuracy of data entry, digital readiness, reporting ability	I am able to operate the EMR system correctly according to service procedures.
Perceived usefulness	6 items	work effectiveness, time efficiency, documentation quality, productivity, service quality, decision support	Using EMR helps me complete midwifery documentation more effectively.
EMR use	10 items	frequency of use, routine integration, completeness of documentation, continued use, acceptance	I use EMR consistently in my daily midwifery documentation.

All items were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Higher scores indicated stronger perceived ease of use,

competence, perceived usefulness, and EMR use.

Data Collection Procedure

After obtaining permission from the hospital, eligible midwives were approached and informed about the study objectives, voluntary participation, confidentiality, and the right to withdraw. Written informed consent was obtained before questionnaire completion. Respondents completed the questionnaire independently to minimize response bias. Returned questionnaires were checked for completeness, and incomplete responses were excluded. No personally identifiable information was entered into the dataset.

Ethical Consideration

This study received ethical approval from Universitas Esa Unggul. Data confidentiality was maintained by anonymizing all responses and using the data only for research purposes.

Data Analysis

Data were analyzed using descriptive statistics and PLS-SEM. Descriptive statistics summarized respondent characteristics and construct tendencies. The measurement model was assessed using outer loadings, Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), and discriminant validity. Indicators with loadings below 0.70 but above 0.60 were retained when theoretically relevant and when construct reliability and AVE met the recommended criteria. The structural model was evaluated using R-square, path coefficients, t-statistics, p-values, effect size, predictive relevance, and specific indirect effects. A path was considered significant when $p < 0.05$ (14,15).

RESULTS

Respondent Characteristics

A total of 103 midwives participated in this study. All respondents were female. Most respondents had Diploma III midwifery education, were aged 31-40 years, and had worked for more than 10 years.

Table 2. Respondent Characteristics

Variable	Category	n	%
Gender	Female	103	100.0
Education	Diploma III Midwifery	57	57.0
	Professional midwifery education	43	43.0
Age	31-40 years	45	45.0
	>51 years	11	11.0
Length of service	>10 years	45	45.0

Measurement Model

All constructs met convergent validity and reliability requirements. Composite reliability values ranged from 0.863 to 0.913, and AVE values ranged from 0.547 to 0.681. The outer loading values ranged from 0.617 to 0.902.

Two EMR-use indicators had loadings below 0.70 but were retained because they were theoretically relevant and the EMR-use construct still met composite reliability and AVE criteria.

Table 3. Construct Reliability and Convergent Validity

Construct	Items	Outer loading range	Composite reliability	AVE
Perceived ease of use	8	0.736-0.807	0.904	0.681
Midwife competence	6	0.721-0.785	0.863	0.587
Perceived usefulness	6	0.726-0.902	0.913	0.681
EMR use	10	0.617-0.836	0.909	0.547

Table 4. Outer Loadings of Measurement Indicators

Construct	Indicator	Outer loading
Perceived ease of use	PC1	0.807
Perceived ease of use	PC2	0.798
Perceived ease of use	PC3	0.756
Perceived ease of use	PC4	0.761
Perceived ease of use	PC5	0.757
Perceived ease of use	PC6	0.787
Perceived ease of use	PC7	0.752
Perceived ease of use	PC8	0.736
Midwife competence	KB1	0.730
Midwife competence	KB2	0.783
Midwife competence	KB3	0.785
Midwife competence	KB4	0.775
Midwife competence	KB5	0.739
Midwife competence	KB6	0.721
Perceived usefulness	PM1	0.833
Perceived usefulness	PM2	0.726
Perceived usefulness	PM3	0.886
Perceived usefulness	PM4	0.886
Perceived usefulness	PM5	0.902
Perceived usefulness	PM6	0.820
EMR use	PMRE1	0.722
EMR use	PMRE2	0.697
EMR use	PMRE3	0.748
EMR use	PMRE4	0.750
EMR use	PMRE5	0.772
EMR use	PMRE6	0.748
EMR use	PMRE7	0.617
EMR use	PMRE8	0.667
EMR use	PMRE9	0.836
EMR use	PMRE10	0.794

Structural Model

The structural model showed strong explanatory power. Perceived ease of use and midwife competence explained 71.6% of the

variance in perceived usefulness. Perceived ease of use, midwife competence, and perceived usefulness explained 84.8% of the variance in EMR use.

Table 5. Structural Model Evaluation

Endogenous construct	R-square	Q-square	VIF/effect-size note
Perceived usefulness	0.716	[insert]	[insert]
EMR use	0.848	[insert]	[insert]

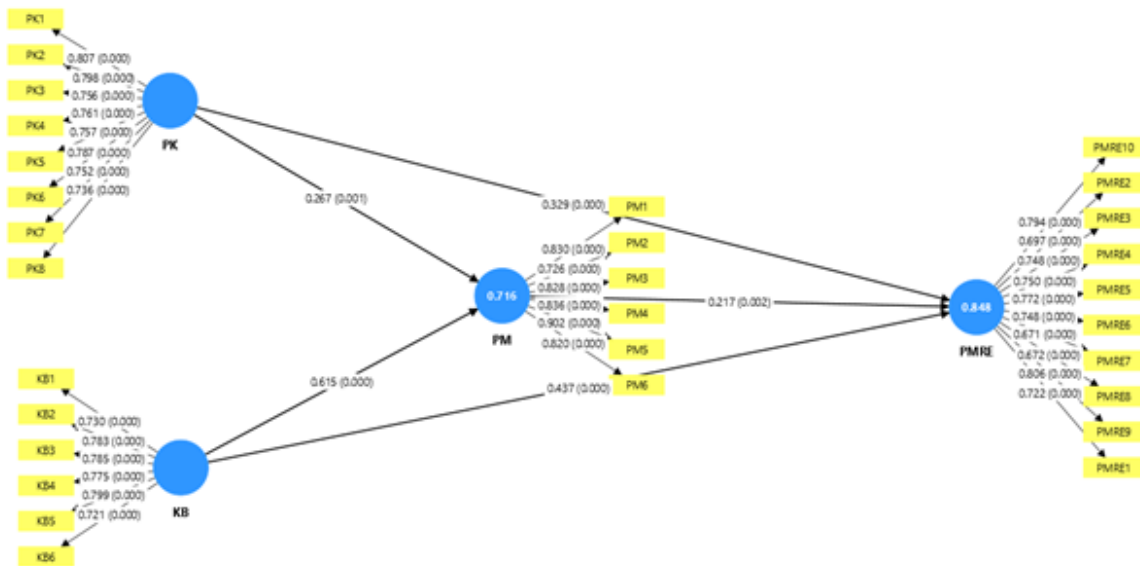


Figure 1. PLS-SEM path model

Direct and Indirect Effects

The path analysis showed that midwife competence had the strongest direct effect on EMR

use, followed by perceived ease of use and perceived usefulness. Perceived usefulness also significantly mediated the effects of perceived ease of use and midwife competence on EMR use.

Table 6. Direct and Indirect Effects

Path	beta	t-statistic	p-value	Interpretation
Perceived ease of use -> EMR use	0.329	[insert]	<0.001	Significant
Midwife competence -> EMR use	0.437	[insert]	<0.001	Significant
Perceived usefulness -> EMR use	0.217	[insert]	0.002	Significant
Perceived ease of use -> Perceived usefulness	0.267	[insert]	0.001	Significant
Midwife competence -> Perceived usefulness	0.615	[insert]	<0.001	Significant
Indirect path	Indirect beta	t-statistic	p-value	Interpretation
Perceived ease of use -> Perceived usefulness -> EMR use	0.058	[insert]	0.019	Significant mediation
Midwife competence -> Perceived usefulness -> EMR use	0.133	[insert]	0.005	Significant mediation

DISCUSSION

This study demonstrates that EMR use among midwives is strongly shaped by professional competence, perceived ease of use, and perceived usefulness. The model explains a large proportion of variance in EMR use, indicating that individual and system-related factors are highly relevant for understanding digital documentation behavior in midwifery services. These findings are consistent with TAM, which

positions perceived ease of use and perceived usefulness as key determinants of technology acceptance (3,4). However, the present study extends TAM by showing that midwife competence acts as a strong professional determinant of EMR use and perceived usefulness.

Midwife competence had the strongest direct influence on EMR use. This may occur because EMR use in midwifery is not merely a technical activity but also a professional

documentation process that requires clinical accuracy, understanding of maternal and neonatal care workflows, and legal accountability. Competent midwives are more likely to understand what information must be recorded, how to navigate the system, and how to integrate EMR into routine care. This supports competency theory and human capital theory, which suggest that knowledge and skills strengthen individual performance and the effective use of organizational resources (6-8).

Perceived ease of use also significantly influenced EMR use and perceived usefulness. This means that when midwives perceive the EMR as easy to access, understand, and operate, they are more likely to use it consistently and to recognize its value for documentation. This finding is consistent with TAM and previous studies showing that ease of use supports health information system acceptance (3,4,11-13). Nevertheless, ease of use alone is not sufficient to ensure optimal perceived usefulness. A system can be technically easy but still not perceived as highly useful if it does not reduce documentation time, support decision-making, or improve service coordination.

An important finding is that perceived usefulness remained only in the moderate category even though perceived ease of use and midwife competence were high. This indicates a practical gap between the ability to use EMR and the perceived value generated from that use. The gap may be related to duplicate recording, limited integration of EMR features into clinical workflow, slow data retrieval, limited use of EMR outputs for clinical decision-making, or the perception that EMR mainly adds documentation tasks rather than improving productivity. Therefore, hospitals should not interpret high EMR use as evidence that the system is already fully beneficial. User experience and workflow outcomes need to be monitored continuously.

Perceived usefulness mediated the relationships between perceived ease of use and EMR use and between midwife competence and EMR use. This finding confirms that perceived usefulness is a psychological and experiential mechanism through which system usability and

professional competence are translated into actual system use. In practical terms, training should not only teach midwives how to operate EMR but also demonstrate how EMR improves documentation accuracy, patient safety, communication, reporting, and continuity of care.

For hospital management, the results imply that EMR improvement should focus on three levels. First, the system level requires interface simplification, faster response time, stable access, integrated forms, and reduced duplication. Second, the user level requires continuous competency-based training, mentoring, and evaluation of midwives' digital documentation skills. Third, the organizational level requires management support, feedback mechanisms, and use of EMR data for clinical audit, service monitoring, and decision-making. These strategies can help convert system use into perceived usefulness and sustainable EMR implementation.

This study has several limitations. The cross-sectional design limits causal inference, and the self-report questionnaire may introduce common method bias. The study was conducted in one regional hospital, so findings may not be generalizable to all hospitals or midwifery settings. Future studies should use longitudinal or mixed-method designs, include multiple hospitals, and explore workflow fit, organizational support, digital literacy, and system interoperability.

CONCLUSION

This study found that midwife competence, perceived ease of use, and perceived usefulness significantly influenced EMR use among midwives in a regional hospital. Midwife competence was the strongest direct predictor, indicating that digital documentation success depends on professional skills as well as system usability. Perceived usefulness significantly mediated the relationships between perceived ease of use, midwife competence, and EMR use, confirming that system ease and user competence lead to stronger EMR use when midwives perceive clear benefits for their work. These findings highlight the need for hospitals to improve EMR usability, provide

workflow-based training, reduce duplicate documentation, and ensure that EMR supports clinical documentation, reporting, and decision-making in midwifery services.

RECOMMENDATION

- Hospitals should improve EMR usability by simplifying forms, reducing duplicate input, improving system speed, and ensuring stable access across midwifery service units.
- EMR training for midwives should be competency-based and workflow-oriented, focusing on antenatal, intrapartum, postpartum, neonatal, referral, and reporting documentation.
- Hospital management should use EMR data for clinical audit, service monitoring, reporting, and decision-making so that midwives can perceive clearer benefits from system use.
- The IT team and hospital leadership should establish routine user feedback mechanisms to identify technical barriers and prioritize system improvements based on midwives' work needs.

ETHICAL DECLARATIONS

This study was approved by IRB Universitas Esa Unggul. Written informed consent was obtained from all respondents before data collection. Data confidentiality: Respondent identities were anonymized, and all data were used only for research purposes. Conflict of interest: The authors declare no conflict of interest.

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