

## CURRENT STATUS OF INTEGRATION AND EFFECTIVENESS OF ELECTRONIC MEDICAL RECORD USE AMONG CLINICAL NURSES AT MILITARY HOSPITAL 175

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### ABSTRACT

**Background:** *Electronic Medical Records (EMR) are an inevitable trend in digital transformation in healthcare. The implementation of EMR in nursing practice at Military Hospital 175, which began in June 2025, still faces many challenges. Therefore, it is necessary to assess the level of integration and the effectiveness of EMR use to propose solutions to optimize its implementation and utilization.*

**Objective:** *To evaluate the level of integration and the effectiveness of EMR use among clinical nurses at Military Hospital 175.*

**Subjects and Methods:** *A cross-sectional descriptive study was conducted on 328 nurses, midwives, and technicians from clinical departments. Data were collected via a self-administered questionnaire covering 11 factor groups based on the PLS-SEM model. The reliability of the scale was assessed using Cronbach's Alpha coefficient (0.95). Descriptive statistics, Chi-square tests, and logistic regression analyses were used to identify associated factors.*

**Results:** *Among participants, 78% were female, 62.8% had a university degree, 95.4% had basic computer skills, most had 1–5 years of work experience (35.4%), and the majority were clinical care nurses (75.6%). The proportion of participants with a high level of EMR integration was 36.6%, and those with high utilization effectiveness accounted for 41.5%. Logistic regression analysis revealed that two factors were significantly associated with EMR integration levels: technology-induced stress*

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(OR=1.87, 95% CI: 1.001–2.74) and EMR usage habits (OR=2.95, 95% CI: 2.3–3.6). Two factors influenced usage effectiveness: interdependence (OR=2.4, 95% CI: 1.7–3.1) and EMR usage habits (OR=2.8, 95% CI: 2.1–3.4).

**Conclusion:** *The level of integration and effectiveness of EMR use among nurses at Military Hospital 175 was moderately good. Nurses could use EMR for most routine tasks; however, limitations remain in fully exploiting all features, speed of operation, and confidence when using the system. Enhancing training, improving infrastructure, and fostering regular EMR usage habits were necessary to improve application effectiveness.*

**Keywords:** *Electronic Medical Records, nursing, integration level, usage effectiveness, Military Hospital 175*

## 1. INTRODUCTION

Electronic Medical Records (EMRs) are electronic systems for storing health information that enable the systematic collection, management, and presentation of patient data, allowing healthcare professionals to easily access and use clinical information for individual patients [1]. EMRs are regarded as an inevitable trend in the digital transformation of healthcare. The World Health Organization's Global Strategy on Digital Health 2020–2025 emphasizes the application of digital technologies, including electronic medical records, to improve the quality of healthcare, promote effective clinical information management, and support healthcare professionals—particularly nurses—in delivering safe, timely, and comprehensive care [2].

According to the national healthcare roadmap, healthcare facilities in Viet Nam are required to complete the implementation of electronic medical records no later than December 31, 2026 [3]. Nurses, as the primary and most frequent users of EMRs in clinical practice,

play a crucial role in the operation and effectiveness of the system [2]. However, the application of EMRs in nursing practice still faces numerous challenges, including information security requirements, limitations in technological competence, time pressure related to documentation, and technical system issues [4].

At Military Hospital 175, the EMR system has been implemented in clinical departments since June 2025. Therefore, evaluating nurses' level of integration and the effectiveness of EMR use is necessary to provide a basis for proposing solutions to enhance implementation efficiency and improve the quality of patient care. This study was conducted to assess the level of integration and current use of electronic medical records among nurses in the clinical departments of Military Hospital 175. The study further analyzes the effectiveness of EMR application in nursing practice, identifies associated factors, and proposes appropriate solutions to enhance EMR utilization, thereby contributing to improvements in the quality of patient care and patient safety.

## 2. SUBJECTS AND METHODS

### 2.1. Study subjects

**2.1.1. Inclusion criteria:** Nurses, midwives, and technicians directly involved in patient care in the clinical departments of Military Hospital 175, who have accessed and used the EMR system for  $\geq 1$  month and agreed to participate in the survey.

**2.1.2. Exclusion criteria:** Individuals not directly using the EMR system or not completing the survey.

**2.2. Time and location:** The study was conducted from June to September 2025 in the clinical departments of Military Hospital 175.

### 2.3. Research methods

- **Study design:** Cross-sectional descriptive study with convenience sampling.

- **Sample size:** Determined using the sample estimation method for a known population size [5]. The formula used was:

$$n = \frac{N}{1 + N \times e^2}$$

Where:

- $n$ : The required sample size
- $N$ : total population size
- $e$ : The allowable error

According to hospital personnel data (as of May 2025), the total number of nurses directly involved in patient care in clinical departments was 782. With an

allowable error of  $e = 0.05$  and a 10% contingency for non-eligible cases, the required sample size was estimated at 294 participants.

- **Data collection:** Participants completed a self-administered survey via Google Form, including two parts: demographic information and the “EMR Infusion and Individual Performance Questionnaire” by Chen & Hsiao [1], which consists of 11 factor groups. Each factor was measured using a 5-point Likert scale from strongly disagree to strongly agree. For data processing, responses were grouped into two categories for binary logistic regression analysis and to increase estimation stability: the high group (strongly agree and agree), indicating acceptance and active EMR use; the medium/low group (neutral, disagree, strongly disagree), reflecting unclear or limited integration/effectiveness.

The questionnaire was translated into Vietnamese following a standard procedure of forward translation, backward translation, and content adjustment. Forward translation from English to Vietnamese was done independently by a nursing expert and a medical language expert, resulting in a preliminary version. It was then back-translated into English by an independent bilingual person to ensure semantic and conceptual equivalence. The tool was reviewed and validated by an expert panel, pilot-tested, and reliability-checked with a Cronbach’s Alpha of 0.95.

All eligible nurses, midwives, and

technicians were invited to participate in a centralized survey in the auditorium. Participants were informed about the study objectives and voluntarily completed the survey on Google Form.

- **Bias control:** To minimize bias, the questionnaire was anonymous, personal information was not collected, and participants were clearly informed that participation was voluntary and for research purposes only. Responses were collected independently without supervision or influence from managers.

**2.4. Data analysis:** Data were

### 3. RESEARCH RESULTS

#### 3.1. General characteristics of the study subjects

**Table 1. General characteristics of the study subjects (n=328)**

Characteristic	Frequency (n)	Percentage (%)
<i>Gender</i>		
Male	72	22,0
Female	256	78,0
<i>Age group (years)</i>		
≤ 30	119	36,3
31-40	126	38,4
41-50	78	23,8
51-60	3	1,0
>60	2	0,6
<i>Education level</i>		
Intermediate	5	1,5
College	98	29,9
University	206	62,8

entered and processed using Excel and Stata 14.2. Descriptive statistics (frequency, percentage), Chi-square tests, and logistic regression were used to identify factors affecting EMR integration and usage effectiveness.

**2.5. Research ethics:** All participants were informed of the study purpose and content and signed consent forms. The study did not affect participants' rights and obligations, respected their right to refuse, and ensured the confidentiality of personal information.

Postgraduate	19	5,8
<i>Computer literacy</i>		
None	3	0,9
Basic	313	95,4
Advanced	12	3,7
<i>Work experience (years)</i>		
< 1	17	5,2
1-5	116	35,4
>5 -10	60	18,3
> 10	135	41,1
<i>Job position</i>		
Head nurse	26	7,9
Care nurse	248	75,6
Administrative nurse	41	12,5
Other	13	4,0

Table 1 presents some general characteristics of the study subjects according to various factors. The statistical results showed that most survey participants were female (78%), the majority were aged 31–40 (38.4%), most had a university degree (62.8%), basic computer literacy accounted for 95.4%, work experience of 1–5 years was 35.4%, and the majority were care nurses (75.6%).

### **3.2. Level of integration and effectiveness of EMR usage**

**Table 2. Key factor characteristics in EMR application (n=328)**

<b>Characteristic</b>	<b>High n (%)</b>	<b>Average/Low n (%)</b>
<i>Technology factors</i>		
Accessibility	153 (46,7)	175 (53,3)
Portability	127 (38,7)	201 (61,3)
System maturity	111 (33,8)	217 (66,2)
<i>Task performance factors</i>		
Time criticality	143 (43,6)	185 (56,4)
Interdependence	151 (46)	177 (54)

	Mobility	158 (48,2)	170 (51,8)
<i>User factors</i>			
	Personal innovativeness in IT	92 (28,1)	236 (71,9)
	Technostress	209 (63,7)	119 (36,3)
	Habits	132 (40,2)	196 (59,8)

The statistical results in Table 2 indicated:

Technology factors: Accessibility had the highest agreement level at 46.7%, while system maturity was the lowest at 33.8%. Task performance factors: The highest agreement was for mobility at 48.2%, interdependence at 46%, and time criticality at 43.6%, which were almost similar. User factors: The highest agreement was 63.7% for technostress, while the lowest was personal innovativeness in IT at only 28.1%.

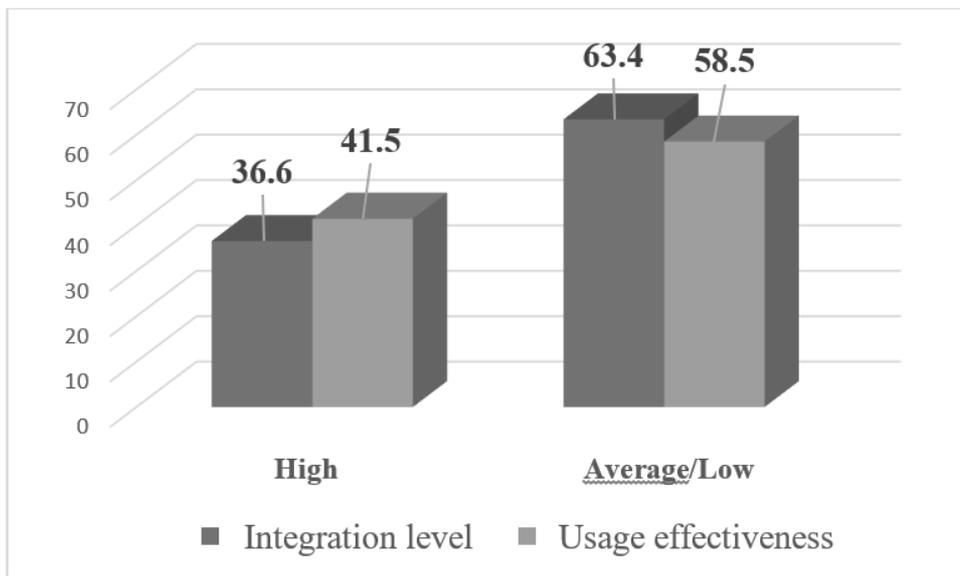


Chart 1. Percentage of EMR integration level and usage effectiveness (n=328)

From the analysis results in Chart 1, the percentage of high-level EMR integration reached 36.6%, and the percentage of high-level EMR usage effectiveness reached 41.5%.

**3.3. Relationship between factors and EMR integration and usage effectiveness**

**3.3.1. Relationship between factors and EMR integration**

**Table 3. Some factors related to EMR integration:**

**Multivariate logistic regression analysis (n=328)**

Characteristic	OR	95% CI	P
Technostress	1,87	1,0-2,7	<0,001
Habit	2,95	2,3-3,6	<0,001

Table 3 presents the results of the multivariate logistic regression analysis, showing that two factors significantly affect EMR integration: technology-induced stress (OR=1.87; p<0.001; 95% CI: 1.001–2.74) and habitual EMR use (OR=2.95; p<0.001; 95% CI: 2.3–3.6). Nurses experiencing high technology stress are 1.87 times more likely to integrate EMR than those with low stress, while those who habitually use EMR are 2.95 times more likely to integrate it. This highlights the importance of individual behavioral and psychological factors in technology adoption.

**3.3.2. Relationship between factors and EMR usage effectiveness**

**Table 4. Some factors related to EMR usage effectiveness:**

**Multivariate logistic regression analysis (n=328)**

Characteristic	OR	95% CI	P
Interdependence	2,4	1,7-3,1	<0,001
Habit	2,8	2,1-3,4	<0,001

Table 4 presents the results of the multivariate logistic regression analysis, showing that the two main factors affecting EMR usage effectiveness are interdependence (OR=2.4; p<0.001; 95% CI: 1.7–3.1) and habitual EMR use (OR=2.8; p<0.001; 95% CI: 2.1–3.4). Nurses with a high level of teamwork were 2.4 times more likely to use EMRs effectively, and the establishment of regular usage habits increased effectiveness by nearly threefold. These findings confirm that teamwork and consistent use behavior are two key factors in enhancing EMR effectiveness.

**4. DISCUSSION**

**4.1. Characteristics of the study participants**

Among the 328 participants, the 31–40 age group accounted for the

highest proportion at 38.4%; 68.6% had a university-level education or higher, and 95.4% had basic computer skills. This indicates a young, skilled workforce, which initially facilitates quick access

and application of EMR. This finding is consistent with Nguyễn Ngọc Bích [6], who reported that younger nurses with higher qualifications adapt better to process changes and new technologies.

## **4.2. EMR integration and usage effectiveness**

### **4.2.1. Characteristics of key factors in EMR application**

Regarding technology factors, although infrastructure has improved and computers are provided in shared work areas of each department, along with in-person and online EMR training, only 46.7% of nurses rated their accessibility as high. This partly reflects limitations in accessing EMR at the bedside. Therefore, it is necessary to continue expanding bedside data-entry devices, improve internal network speed and stability, and enhance hands-on training and on-site technical support to increase EMR access and usage effectiveness.

The “system maturity” factor had the lowest agreement rate (33.8%), indicating that the EMR system at Military Hospital 175 is still in development, with incomplete synchronization of modules and electronic forms, limiting clinical usability. This aligns with domestic studies noting stability and data interoperability as major barriers during early EMR implementation.

For task-related factors, characteristics such as mobility, interdependence, and urgency had similar high-level ratings (43.6–48.2%), reflecting

the high-intensity nature of nursing work, which requires teamwork and rapid decision-making, highlighting the need for EMR optimization for clinical practice.

For user-related factors, 63.7% reported high technology-induced stress, showing psychological challenges as nurses adapt to new systems and increased electronic tasks. Similarly, Chen & Hsiao [1] and La Torre et al. [7] noted that technology-induced stress can reduce system usage effectiveness if not supported by adequate training. Meanwhile, individual IT creativity was low (28.1%), reflecting the early adaptation phase and emphasizing the importance of continuous training and support to enhance EMR competency.

### **4.2.2. Rates of EMR integration and usage effectiveness**

Based on the analyzed key factors, EMR integration reached 36.6% and usage effectiveness 41.5%, indicating that nurses’ EMR application is currently mostly basic and not deeply integrated into patient care processes. During the early implementation phase, limitations in data interoperability, technology infrastructure, software, and unsynchronized medical and care forms forced some processes to run parallel with paper records. Additionally, the requirement for digital signatures while devices are not fully synchronized, and the inability to correct errors post-signature, increased the number of required steps and contributed to caution and hesitation when using the system.

This finding is consistent with Chen and Hsiao [1] in Taiwan, where high EMR integration and usage effectiveness were not predominant in the early phase due to workflows not being redesigned for a digital environment and users maintaining traditional work habits. The authors noted that EMR usage during this stage is often more obligatory than voluntary, leading to limited functional utilization. This indicates that EMR application effectiveness depends not only on users but also on system readiness, process synchronization, and organizational support.

#### **4.2.3. Level of Integration and Effectiveness of EMR Use and Related Factors**

The level of integration and effectiveness of EMR use at Military Hospital 175 is moderately high, similar to studies in other developing countries. Two factors—individual behavior (usage habits) and technology (technostress)—are central in the deep application of EMR, consistent with the model by Chen & Hsiao (2021) in Taiwan [1] and the results in Oman by Abu-Raddaha et al. [8], as well as by Maawati et al. in Indonesia [9]. Additionally, interdependence among nurses contributes to increased usage effectiveness, similar to the findings of Ramoo et al. in Malaysia [10], which affirmed that team coordination reduces errors and improves care quality [11]. These results are consistent with the study objectives and clarify the roles of habits, technostress, and interdependence among

nurses, as noted in Table 4 comments.

In a domestic comparison, studies by Đỗ Danh Thắng [12] and Nguyễn Ngọc Bích [6] also identified key barriers, including limited IT infrastructure, lack of regular training, and the absence of sustainable usage habits. This indicates the need for a strategy of continuous training, encouragement, and supervision to maintain effective and long-term EMR application in the military health system.

#### **4.3. Study Limitations**

This study employed a cross-sectional design, reflecting the level of EMR integration and usage effectiveness at a single point in time, without assessing changes over time. The use of convenience sampling and self-reported data may introduce sampling errors and subjective bias. These limitations were considered during the analysis and interpretation of the results.

### **5. CONCLUSION**

The level of EMR integration and usage effectiveness among nurses at Military Hospital 175 is moderately high. The main influencing factors are usage habits, technostress, and interdependence. It is necessary to strengthen training, improve infrastructure, standardize procedures, and cultivate regular usage habits to enhance EMR application effectiveness. The study results provide a basis for developing training programs and evaluating nurses' competencies in EMR usage throughout the hospital.

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