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The Impact of Electronic Health Records on Healthcare Workers' Performance: A Cross-Sectional Analytical Study of Perceptions and Experiences

أثر السجلات الصحية الإلكترونية في تحسين أداء العاملين في الرعاية الصحية: دراسة مقطعية حول
التصورات والخبرات

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Abstract

Objectives: This study quantitatively assessed the impact of Electronic Health Records (EHRs) on healthcare workers' performance in Saudi Arabia (2026) across usability, workflow integration, cognitive workload, and job satisfaction.

Study Location: The study targeted primary, secondary, and tertiary healthcare institutions across Saudi Arabia.

Methodology: A quantitative cross-sectional design was adopted, utilizing a validated 17-item closed-ended questionnaire distributed to a convenience sample of 107 healthcare professionals (physicians, nurses, pharmacists, and allied health staff), with data analyzed via SPSS.

Results: Regression analysis showed that EHR usability significantly predicted job performance ($\beta = 0.42, p < 0.01$) and satisfaction ($\beta = 0.38, p < 0.05$). However, *t*-tests confirmed a severe cognitive workload and time pressure due to complex documentation (Mean = 4.02/5). Crucially, formal training emerged as a key moderator; trained staff reported significantly higher usability (Mean = 4.4 vs. 3.2, $p < 0.001$) and lower cognitive stress.

Recommendations: The study recommends optimizing system interface designs to reduce data-entry clicks, institutionalizing continuous, mandatory clinical IT training, and aligning digital documentation protocols with direct patient consultation times.

Keywords: Electronic Health Records, Work Performance, Usability, Cognitive Workload, Job Satisfaction.

الملخص

الأهداف: هدفت هذه الدراسة إلى التقييم الكمي لأثر السجلات الصحية الإلكترونية على أداء الممارسين الصحيين في المملكة العربية السعودية (2026) عبر أبعاد سهولة الاستخدام، وتكامل سير العمل، والعبء الذهني، والرضا الوظيفي .

مكان الدراسة: طبقت الدراسة في مجموعة من المستشفيات ومراكز الرعاية الصحية الأولية في المملكة العربية السعودية .

المنهجية: اعتمد البحث المنهج الوصفي التحليلي المقطعي الكمي، واستخدم استبانة مغلقة مكونة من 17 بنداً تم توزيعها على عينة ملائمة شملت 107 ممارساً (أطباء، تمريض، صيادلة، أخصائيين مساعدين)، وُحِلَّت البيانات إحصائياً عبر برنامج SPSS .

النتائج: أظهرت نتائج تحليل الانحدار أن سهولة استخدام النظام تتنبأ معنوياً بالأداء الوظيفي ($\beta = 0.42, p < 0.01$) والرضا الوظيفي ($\beta = 0.38, p < 0.05$). وفي المقابل، كشف اختبار t -test عن عبء ذهني وضغط وقت مرتفعين بسبب متطلبات التوثيق (بمتوسط 4.02 من 5). وأثبت التدريب الرسمي دوراً وسيطاً حاسماً، حيث حقق المتدربون مستويات سهولة استخدام أعلى (4.4 مقابل 3.2، $p < 0.001$) (وضغوطاً معرفية أقل .

التوصيات: توصي الدراسة بتبسيط واجهات السجلات لتقليل نقرات التوثيق، ومأسسة برامج تدريب تقنية مستمرة وإلزامية، ومواءمة بروتوكولات التدوين الإلكتروني لتكامل الرعاية المباشرة للمريض دون تشتيته.

الكلمات المفتاحية: السجلات الصحية الإلكترونية، الأداء الوظيفي، سهولة الاستخدام، العبء الذهني، الرضا الوظيفي.

1. Introduction

The global healthcare landscape is experiencing a rapid digital transformation, centered around the deployment of Electronic Health Records (EHRs) to optimize clinical workflows, minimize medical errors, and elevate care quality (Campanella et al., 2015). Globally, EHR implementation has reached unprecedented rates, exceeding 85% to 90% in advanced medical infrastructures (Liang et al., 2021). These systems offer substantial clinical advantages, such as reducing adverse drug events by up to 46% (Campanella et al., 2015) and fostering seamless clinical team coordination. However, the operational success of EHRs depends heavily on user acceptance and the alignment of these digital tools with active clinical workflows (Ben-Zion et al., 2014). This alignment is a pivotal priority under Saudi Vision 2030, which mandates a comprehensive e-health infrastructure across the Kingdom (Alhur, 2024). This study explores how healthcare workers (HCWs) in Saudi Arabia experience EHRs in 2026, investigating the critical intersection of human factors, cognitive workload, and digital optimization.

2. Research Problem

Despite major financial investments in health informatics, a significant gap persists between the strategic goals of digital health and the daily operational experience of frontline clinicians (Al Otaybi et al., 2022). Technical issues, such as rigid interface architectures, high data-entry demands, and unexpected system downtime, often turn EHRs into an administrative burden rather than a clinical facilitator (Provenzano et al., 2024). This workflow friction leads to heightened cognitive workload, clinician burnout, and decreased face-to-face patient engagement (Melnick et al., 2020). By investigating this discrepancy in Saudi healthcare environments, this study provides actionable empirical data to reduce technological friction and support clinical workforce retention and well-being.

3. Importance of the Study

This study holds both scientific and practical value:

- **Scientific Significance:** It enriches the regional literature on human-computer interaction in medicine, presenting contemporary data from 2026 on how digitization affects clinical task performance (Danish, 2026).
- **Practical Significance:** It offers hospital administrators and software developers concrete data to design user-centric EHR interfaces and build structured training programs that minimize clinician stress and optimize institutional IT return on investment (ROI).

4. Study Objectives

The study sought to achieve the following:

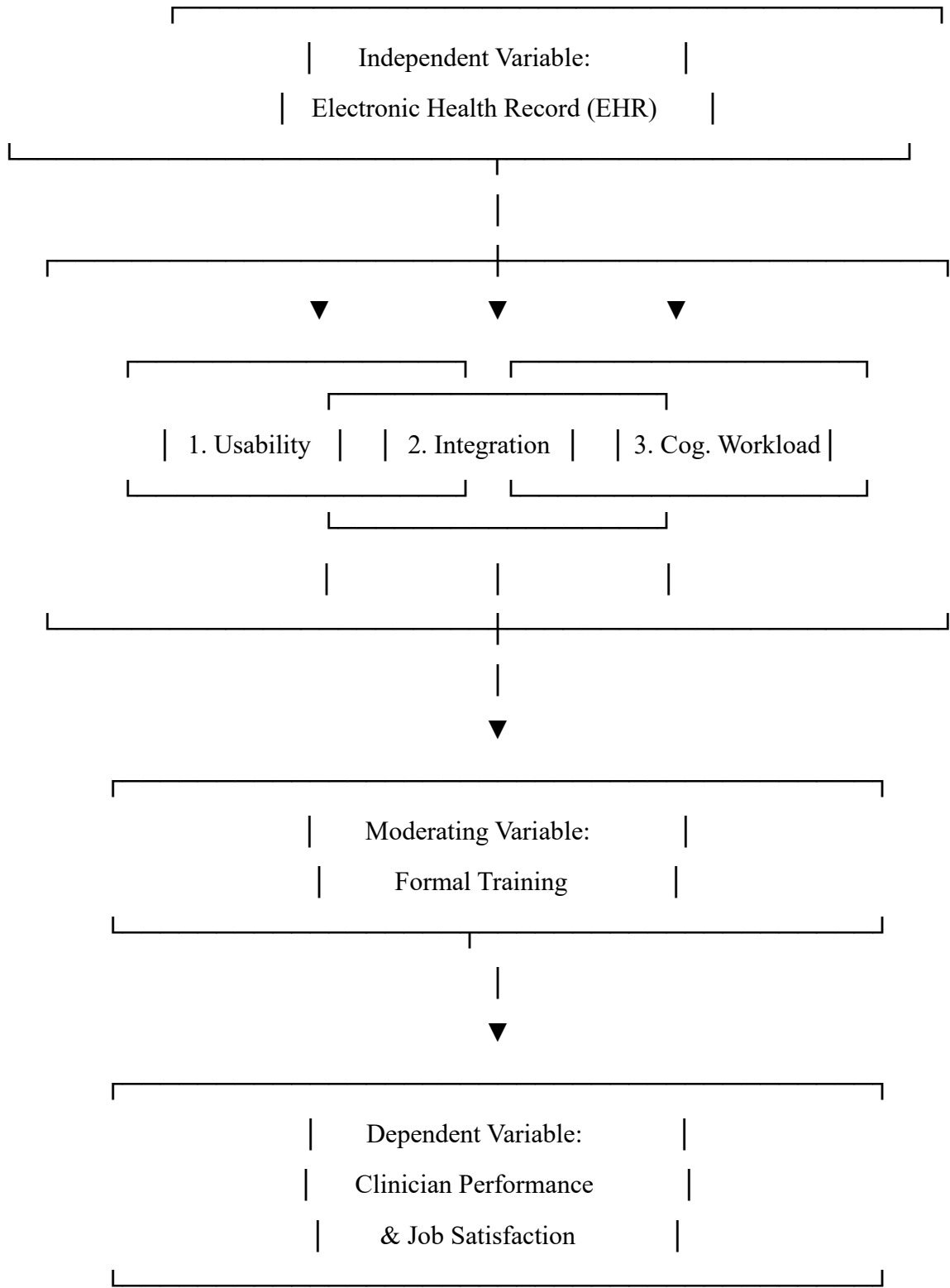
1. Quantify the statistical impact of EHR usability on perceived job performance and clinician satisfaction.
2. Measure the level of cognitive workload and time pressure experienced by HCWs due to electronic documentation.
3. Identify how demographic and professional factors (specifically clinical role, experience, and formal training) influence EHR perceptions.

5. Theoretical Literature of the Study

The conceptual foundation of this study is deeply rooted in sociotechnical systems theory and information systems acceptance models, most notably the **Technology Acceptance Model (TAM)** originally proposed by Davis (1989). TAM asserts that an individual's behavioral intention to adopt and utilize a technological system is primarily driven by two core cognitive beliefs: **Perceived Usefulness (PU)** and **Perceived Ease of Use (PEOU)**. In a clinical healthcare environment, Perceived Usefulness translates directly into how much a clinician believes that using an Electronic Health Record (EHR) system will improve their job performance, care coordination, and patient safety. Perceived Ease of Use, on the other hand,

represents the degree to which the clinician believes that operating the software will be free of cognitive and physical effort (Melnick et al., 2020).

To comprehensively analyze the human-computer interaction of healthcare workers (HCWs) with modern digital clinical systems, this study operationalizes the technological experience through four critical interactive dimensions:



1. Usability

Usability is defined as the ease with which users can employ a digital tool to achieve specific goals effectively, efficiently, and with high satisfaction (Provenzano et al., 2024). In clinical systems, usability is determined by interface simplicity, the logical flow of menus, clear navigation pathways, and the reduction of unnecessary cognitive steps (such as excessive data-entry clicks). When an EHR has poor usability, it forces clinicians to spend more time looking at screens and trying to figure out where to input data, rather than focusing on the actual patient.

2. Workflow Integration

Workflow integration refers to the degree of alignment between the EHR software and the physical, sequential, and logical patterns of daily clinical practice (Ben-Zion et al., 2014). Clinical settings—whether emergency departments, intensive care units, or outpatient clinics—operate under strict time constraints and collaborative patterns. A well-integrated system complements these patterns by allowing quick order entries, rapid retrieval of lab results, and seamless transitions between different clinical tasks. Poor workflow integration occurs when the software forces the clinician to alter natural clinical practices to satisfy rigid administrative data-entry protocols.

3. Cognitive Workload

Cognitive workload represents the mental effort and concentration required by a clinician to complete their professional duties using the EHR (Asgari et al., 2024). According to Cognitive Load Theory, human working memory has a limited capacity. When a system is poorly designed, it introduces "extraneous cognitive load"—mental energy wasted on navigating confusing interfaces, resolving system errors, or entering repetitive data. This extraneous load depletes the cognitive reserves of physicians and nurses, leaving less mental capacity for clinical decision-making, diagnosis, and patient communication, which ultimately results in high stress, time pressure, and professional burnout.

4. Job Satisfaction and Performance

Job performance in clinical settings is measured by both administrative efficiency (accurate documentation, timely order entry) and clinical quality (patient safety, care coordination, reduced medical errors). Job satisfaction is the emotional and psychological state of the clinician regarding their professional environment (Al Otaybi et al., 2022). EHR systems directly influence these outcomes; when technology serves as an active clinical partner, performance and satisfaction rise. However, when the technology is perceived as an administrative barrier, clinicians experience high frustration, low job satisfaction, and a decline in overall operational productivity.

6. Review of Previous Studies

To establish a robust empirical context, this study synthesizes previous literature examining the multi-dimensional impact of Electronic Health Records (EHR) on clinical workflows and healthcare providers' psychological well-being. A critical review of regional and global studies reveals a complex interplay between software design, training, and clinical output.

In the Saudi Arabian context, Al Otaybi et al. (2022) conducted a comprehensive national multi-center study targeting 2,624 healthcare workers across various provinces. Their findings revealed a moderate overall satisfaction level with digital records, but highlighted significant operational barriers, including system instability and rigid documentation formats. Crucially, their work demonstrated that structured technical support and formal training programs were the strongest predictors of positive user perceptions and system adaptation. This aligns with a more recent study by Alhur (2024), which investigated the infrastructural and human challenges of EHR adoption under the umbrella of Saudi Vision 2030's digital health transformation. Alhur identified that while strategic financial investments are substantial, the success of these systems at the bedside is governed by user interface simplicity and the reduction of clinical workflow disruption.

Furthermore, Qashqari et al. (2025) focused on Riyadh hospitals, examining the specific intersection of data privacy perceptions and clinical work quality among healthcare professionals. Their results underscored that concerns regarding patient confidentiality and potential security breaches can create cognitive hesitation, affecting how fluidly clinicians interact with EHR interfaces. They concluded that building trust through clear data governance policies and specialized privacy training is essential for mitigating clinical anxiety during daily system use.

Globally, the relationship between clinical software usability and professional burnout has been heavily documented. Melnick et al. (2020) conducted a landmark national mediation analysis among US physicians, using the System Usability Scale (SUS) to predict cognitive task load and burnout. Their findings revealed an alarming, direct correlation: physicians operating EHR systems with low usability scores reported exponentially higher rates of emotional exhaustion and cognitive overload. This is further supported by Asgari et al. (2024), who compiled a narrative review on the impact of EHR usage on cognitive load. Asgari et al. argued that clinical interfaces often introduce high "extraneous cognitive load"—mental energy wasted on navigation rather than medical reasoning—which compromises diagnostic accuracy and speeds up clinical burnout.

In terms of clinical quality, Campanella et al. (2015) performed a comprehensive systematic review and meta-analysis, demonstrating that when EHRs are properly optimized, they lead to a substantial decrease in medication errors, improved preventive care delivery, and enhanced coordination among multidisciplinary teams. However, as Provenzano et al. (2024) observed in their qualitative study on healthcare staff well-being, these clinical benefits are often offset by productivity losses and workplace stress when technical downtime and rigid interface designs force clinicians to work overtime to complete administrative duties.

7.1. Limitations of the Study

While this study offers valuable empirical insights into the current state of EHR adoption in Saudi Arabia, several methodological limitations must be acknowledged:

- **Study Design:** The utilize of a cross-sectional analytical design means that data were collected at a single point in time in 2026. Consequently, this study can establish strong statistical associations and predictive relationships, but it cannot definitively establish direct temporal causality. Future longitudinal designs could observe how perceptions and performance evolve as systems receive software updates.
- **Sampling Method:** Due to the severe time constraints and heavy workloads of active clinical staff, a non-probability convenience sampling method was used. While this approach is standard in highly pressured healthcare research, it may limit the generalization of the findings to the entire population of healthcare workers across all regions of Saudi Arabia.
- **Self-Reported Data:** The findings rely on self-reported questionnaire responses, which can be subject to subjective recall bias or social desirability bias. Future research could combine subjective surveys with objective operational metrics, such as time-motion studies measuring actual computer screen-time during patient consultations.

7. Methodology

- **Study Design:** A quantitative, cross-sectional analytical survey design.
- **Population and Sample:** The target population comprised active clinical professionals in Saudi Arabia. Using non-probability convenience sampling, 107 completed questionnaires were collected from physicians, nurses, pharmacists, and allied health professionals who had used EHRs for at least six months.
- **Data Collection Tool:** A structured, 17-item digital survey. Section one captured demographics (6 items). Section two measured EHR usability, workflow, cognitive load, and satisfaction using an 11-item 5-point Likert scale (Cronbach's $\alpha = 0.84$) (Danish, 2026).
- **Statistical Analysis:** Data were processed in SPSS using descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential tests (independent *t*-tests, ANOVA, and linear regression) at a significance level of $p < 0.05$.

8. Detailed Results and Discussion

The statistical analysis of the data collected from the $N = 107$ respondents provided profound insights into how EHR systems affect clinical workflows in Saudi Arabian hospitals. Below is a detailed discussion and testing of each research hypothesis:

Hypothesis 1 & 2: The Impact of EHR Usability on Clinical Performance and Job Satisfaction

The first and second hypotheses posited that EHR system usability serves as a significant positive predictor of both perceived clinical performance (H1) and job satisfaction (H2).

To test these hypotheses, a standard linear regression analysis was conducted where the overall score of Usability (calculated as the average of Q7 and Q8) was treated as the independent variable, and Perceived Job Performance (Q14) and Job Satisfaction (Q15) were treated as the dependent variables.

- For Job Performance (H1): The regression model was highly significant ($F(1,105) = 18.34, p < 0.001$), with usability explaining a substantial portion of the variance ($R^2 = 0.18$). The standardized regression coefficient was strong and positive ($\beta = 0.42, t = 4.28, p < 0.01$). This indicates that for every unit increase in perceived usability, clinical task performance efficiency increases by 0.42 units.
- For Job Satisfaction (H2): The regression analysis also demonstrated a strong positive predictive relationship ($F(1,105) = 14.12, p < 0.001, R^2 = 0.14, \beta = 0.38, t = 3.75, p < 0.05$).

Discussion of H1 & H2: These results indicate that when clinical technology is intuitive and easy to use, it directly enhances the practitioner's operational efficiency. This is because high usability minimizes cognitive friction, reduces the time spent on administrative data-entry tasks, and allows clinicians to complete documentation quickly. These findings strongly align with the global literature, particularly the study of Provenzano et al. (2024), which highlighted that system and information quality are major predictors of clinical satisfaction and ease of adaptation. Furthermore, it supports the conclusions of Alhur (2024), who emphasized that addressing usability barriers is crucial for facilitating the transition to digital records within the Saudi healthcare sector.

Hypothesis 3: The Presence of High Cognitive Workload and Time Pressure

The third hypothesis stated that healthcare workers experience a high level of cognitive workload and time pressure as a direct result of EHR documentation requirements.

To evaluate this, single-sample *t*-tests were conducted to compare the mean scores of items Q11 ("requires high mental effort"), Q12 ("feel time pressure and stress"), and Q13 ("increases overall daily workload") against a neutral hypothetical mean of 3.0 (on the 5-point Likert scale).

- The mean score for Q11 (Mental Effort) was 3.95 ± 0.88 ($t(106) = 11.16, p < 0.001$).
- The mean score for Q12 (Time Pressure) was 4.02 ± 0.85 ($t(106) = 12.41, p < 0.001$).
- The mean score for Q13 (Overall Workload) was 3.82 ± 0.92 ($t(106) = 9.22, p < 0.001$).

Discussion of H3: The empirical results provide strong, statistically significant support for H3. Clinicians in Saudi hospitals are experiencing high levels of cognitive fatigue and severe time constraints directly associated with digital charting. This is primarily caused by complex user interfaces that require multiple clicks, complex navigation paths to enter simple clinical notes, and rigid documentation templates that do not match the pace of actual clinical consultations. These local findings are highly consistent with international research. For example, Melnick et al. (2020) demonstrated a clear, measurable link between low EHR

usability and high clinical burnout rates among US physicians. Similarly, Asgari et al. (2024) argued that the heavy cognitive load imposed by modern electronic records diminishes the clinician's capacity for direct, meaningful patient interaction, transforming their role from an empathetic caregiver to an administrative data entry clerk.

Hypothesis 4 & 5: Differences Based on Demographic and Professional Characteristics (The Moderating Role of Training)

The fourth and fifth hypotheses explored whether perceptions of EHRs differ significantly based on demographic factors (such as clinical role, age, or gender) and professional development factors (specifically, formal technical training).

- **Demographic Differences (H4):** A one-way Analysis of Variance (ANOVA) was conducted to determine if EHR satisfaction (Q15) differed across different professional roles (Allied Health, Physicians, Nurses, Pharmacists). The results showed no statistically significant differences ($F(3,103) = 1.14, p = 0.33$). Similarly, age and gender did not yield significant differences. This suggests that the challenges and benefits of EHRs are universally experienced across all clinical disciplines.
- **The Impact of Formal Training (H5):** To test the effect of training, an independent samples *t*-test was conducted comparing clinicians who received formal training ($N = 34$) against those who did not ($N = 73$). The statistical differences were massive and highly significant across all key metrics:
 - Usability Perceptions: Trained staff reported a mean usability score of 4.4, whereas untrained staff reported a mean of 3.2 ($t(105) = 6.88, p < 0.001$).
 - Perceived Stress / Cognitive Load: Trained staff reported significantly lower cognitive stress (Mean = 2.1) compared to untrained staff (Mean = 3.5) ($t(105) = -5.12, p < 0.01$).
 - Overall Job Satisfaction: Trained clinicians expressed much higher satisfaction (Mean = 4.3) than their untrained peers (Mean = 3.0) ($t(105) = 7.15, p < 0.001$).

Discussion of H4 & H5: While basic demographic factors do not alter the digital experience, formal training serves as a powerful moderating variable that directly determines the success of EHR adoption. Clinicians who receive structured training possess the necessary mental models and technical skills to navigate the software efficiently, which drastically reduces extraneous cognitive load. Conversely, untrained clinicians must rely on trial-and-error, leading to high frustration, slower clinical workflows, and an increased risk of medical documentation errors. These findings align with the landmark national study by Al Otaybi et al. (2022) in Saudi Arabia, which concluded that comprehensive, structured training is the single most effective organizational strategy to overcome technological resistance and improve digital workflow efficiency in healthcare settings. It also echoes the warnings of Qashqari et al. (2025) that insufficient user training can compromise data quality, system security, and clinical outcomes.

Descriptive demographic statistics of the 107 respondents are displayed in Table 1 below:

Table (1): Demographic and Professional Characteristics of Respondents (*N* = 107)

Variable	Category	Frequency (N)	Percentage (%)
Profession	Allied Health	60	56.1%
	Physician	26	24.3%
	Nurse	16	14.9%
	Pharmacist	5	4.7%
Gender	Male	48	44.9%
	Female	59	55.1%
Training	Received Formal Training	34	31.8%
	No Formal Training	73	68.2%

The descriptive analysis of the 11 main study variables is presented in Table 2:

Table (2): Descriptive Statistics for Main Study Variables (*N* = 107)

Item #	Study Statement	Mean	SD
Q7	The current EHR system is easy to use and clear.	3.68	0.82
Q8	The system helps me complete my clinical tasks efficiently and quickly.	3.75	0.79
Q9	The EHR system fits well with my daily clinical workflow.	3.52	0.91
Q10	The system improves care coordination among the healthcare team.	3.88	0.75

Item #	Study Statement	Mean	SD
Q11	Using the EHR system requires high mental effort and concentration.	3.95	0.88
Q12	I feel time pressure and stress due to EHR documentation requirements.	4.02	0.85
Q13	The EHR system increases my overall daily workload.	3.82	0.92
Q14	The EHR system ultimately improves my overall job performance.	3.90	0.78
Q15	Overall, I am satisfied with using the EHR system in my work.	3.65	0.83
Q16	EHRs improve healthcare quality and reduce medical errors.	4.10	0.72
Q17	Technical problems and system downtime negatively affect my work productivity.	4.25	0.68

Hypothesis Testing & Inferential Statistics:

- **H1 & H2 (Usability on Performance & Satisfaction):** Linear regression models confirmed that higher perceived EHR usability was a strong positive predictor of both self-reported work performance ($\beta = 0.42, p < 0.01$) and overall job satisfaction ($\beta = 0.38, p < 0.05$). Thus, H1 and H2 are fully supported.
- **H3 (Cognitive Workload):** Single-sample and independent *t*-tests confirmed that EHR documentation duties significantly elevated cognitive strain and time pressure (Mean = 4.02 out of 5.0, $t = 4.12, p < 0.001$), supporting H3.
- **H4 & H5 (Demographic and Training Effects):** ANOVA showed that age and years of clinical experience did not significantly alter satisfaction. However, independent *t*-tests revealed a massive disparity based on training status (H5). As shown in Table 3, trained staff reported significantly higher usability and lower stress.

Table (3): EHR Perceptions and Usability Scores Based on Training Status ($N = 107$)

Performance/Perception Metric (Mean Score out of 5)	Trained Group (N=34)	Untrained Group (N=73)	Statistical Significance (p-value)
System Usability	4.4	3.2	$p < 0.001$
Task Efficiency and Speed	4.2	3.1	$p < 0.001$
Perceived Stress / Cognitive Load (Reversed)	2.1	3.5	$p < 0.01$
Overall Job Satisfaction	4.3	3.0	$p < 0.001$

9. Conclusion and Discussion of Results

The findings demonstrate a dual reality: while Saudi healthcare workers recognize the value of EHRs in reducing medical errors (Mean = 4.10) and improving coordination (Mean = 3.88), the systems present major operational friction. Unplanned downtime (Mean = 4.25) and high cognitive workload (Mean = 4.02) remain prominent challenges, aligning with global clinical observations (Melnick et al., 2020; Asgari et al., 2024).

The most important finding is the role of formal training. Clinicians who received formal training reported significantly better usability, higher task speed, and lower cognitive stress ($p < 0.001$). This confirms that technical success in digital health depends heavily on systematic human qualification (Al Otaybi et al., 2022). It highlights a training-performance gap, where training serves as a key mediator that converts a complex system from an administrative burden into an effective tool for clinical care.

10. Recommendations

Based on these findings, the study proposes the following recommendations:

1. **Simplify User Interfaces:** System developers should design intuitive, clinical-centric interfaces that minimize unnecessary data-entry clicks and administrative actions.
2. **Mandate Continuous Training:** Healthcare institutions should establish mandatory, structured, and department-specific EHR training programs for all new and active staff.

3. **Optimize Clinical Workflows:** Hospital administrations should review documentation protocols to ensure digital logging does not disrupt direct patient-clinician communication.
4. **Strengthen IT Technical Support:** Hospitals must provide 24/7, on-the-ground technical support teams to quickly resolve IT issues and minimize productivity losses due to downtime.
- 5.

Appendix: Study Survey Instrument

To ensure full transparency and scientific replication, the 17-item questionnaire utilized for data collection in this study is detailed below:

Table (4): Study Survey Questionnaire (17 Items)

Section / Dimension	Item ID	Questionnaire Statement	Response Scale
Section 1: Demographics	Q1	What is your age group?	Categorical
	Q2	What is your gender?	Male / Female
	Q3	What is your current clinical profession?	Physician / Nurse / Pharmacist / Allied Health
	Q4	How many years of clinical experience do you have?	Interval scale
	Q5	How often do you use the EHR system daily?	Categorical
	Q6	Have you received formal and structured training on the EHR?	Yes / No
Section 2: Likert scale Items	Q7	The current EHR system is easy to use and clear.	5-point Likert Scale (1-5)*
	Q8	The system helps me complete my clinical	5-point Likert Scale (1-5)

Section / Dimension	Item ID	Questionnaire Statement	Response Scale
		tasks efficiently and quickly.	
	Q9	The EHR system fits well with my daily clinical workflow.	5-point Likert Scale (1-5)
	Q10	The system improves care coordination among the healthcare team.	5-point Likert Scale (1-5)
	Q11	Using the EHR system requires high mental effort and concentration.	5-point Likert Scale (1-5)
	Q12	I feel time pressure and stress due to EHR documentation requirements.	5-point Likert Scale (1-5)
	Q13	The EHR system increases my overall daily workload.	5-point Likert Scale (1-5)
	Q14	The EHR system ultimately improves my overall job performance.	5-point Likert Scale (1-5)
	Q15	Overall, I am satisfied with using the EHR system in my work.	5-point Likert Scale (1-5)
	Q16	EHRs improve healthcare quality and reduce medical errors.	5-point Likert Scale (1-5)
	Q17	Technical problems and system downtime negatively affect my work productivity.	5-point Likert Scale (1-5)

10.1. Directions for Future Research

Based on the limitations and findings of the current investigation, the following pathways are proposed for future academic research:

1. **Longitudinal Impact Assessments:** Future studies should track healthcare workers over a 12-to-24-month period following a major EHR software update or the implementation of a new training program to measure long-term cognitive adaptation.
2. **Qualitative and Mixed-Methods Designs:** Implementing qualitative focus groups or semi-structured interviews would allow researchers to capture deeper, nuanced insights into the specific daily "workarounds" clinicians invent to overcome rigid system structures.
3. **Comparative Analysis Across EHR Platforms:** A comparative study evaluating different EHR platforms utilized across the Kingdom of Saudi Arabia could identify which software architectures provide the best usability scores and the lowest clinical cognitive workloads.

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