A Quantitative Analysis of Healthcare Professionals' Perceptions of Patient Health Information Security and Its Influence on Electronic Health Record (EHR) Usage

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Abstract: **This study examined the relationships between healthcare professionals' perceptions of Protected Health Information (PHI) security, awareness of institutional data-protection policies, and the completeness of electronic health record (EHR) documentation. Guided by the Technology Acceptance Model (TAM) and Protection Motivation Theory (PMT), the study aimed to determine whether these perceptions and awareness levels predict documentation completeness, and whether clinical role or years of experience moderate these relationships. A quantitative, cross-sectional survey design was employed with a sample of 200 healthcare professionals across various clinical roles. Data were collected using validated instruments measuring perceived PHI security, policy awareness, and EHR documentation completeness. Assumption checks included Shapiro–Wilk normality tests, skewness, kurtosis, and visual inspections via boxplots, all confirming suitability for parametric analyses. Pearson's correlations examined relationships among variables, while multiple linear regression assessed predictive effects. Moderation analysis tested potential interaction effects, and a one-way ANOVA explored differences across categorized security confidence levels. The Correlation analysis indicated significant positive relationships between perceived PHI security and policy awareness (r = .31, p < .01), perceived PHI security and documentation completeness (r = .26, p < .01), and policy awareness and documentation completeness (r = .26, p < .01). Regression analysis revealed that both perceived PHI security (β = .27, p < .01) and policy awareness (β = .21, p < .01) significantly predicted documentation completeness, jointly explaining 6.8% of the variance (F(2, 197) = 7.20, p = .001). No significant moderation effects were found for clinical role or years of experience, and ANOVA results indicated no significant group differences based on security confidence levels (p > .05). the findings suggest that enhancing healthcare professionals' perceptions of PHI security and awareness of data-protection policies may lead to more complete EHR documentation across clinical roles. These results align with previous studies emphasizing the role of trust and policy clarity in health information management, while addressing a literature gap by jointly examining these predictors within an integrated theoretical framework. Implication for the study indicates organizations should prioritize visible, user-centered PHI security measures and continuous, role-relevant policy education to strengthen documentation quality and compliance. Future research should employ longitudinal designs, incorporate objective documentation measures, and explore additional moderating and mediating factors such as system usability and organizational culture.**

Keywords: **PHI security, policy awareness, EHR documentation, Technology Acceptance Model, Protection Motivation Theory, healthcare professionals.**

1. INTRODUCTION

The increasing adoption of Electronic Health Records (EHRs) has significantly transformed healthcare delivery by improving the accessibility, quality, and continuity of patient care. However, the digitization of patient health information (PHI) has also heightened concerns about data security, confidentiality, and patient privacy. As healthcare professionals navigate this evolving digital landscape, their perceptions of PHI security play a crucial role in shaping how they interact with EHR systems, particularly when handling sensitive or stigmatized health information (Menachemi & Collum, 2011). The perceived risk of unauthorized access or breaches can lead to documentation hesitancy, which in turn may compromise the completeness and accuracy of patient records (Ben-Assuli, 2015; Sheh et al., 2020).

While federal regulations such as the Health Insurance Portability and Accountability Act (HIPAA) set standards for safeguarding PHI (HHS.gov., n.d.), studies suggest that compliance alone may not fully alleviate healthcare professionals' concerns regarding data vulnerability (Appari & Johnson, 2010). Concerns about PHI misuse, accidental disclosure, and institutional response to data breaches can influence clinicians’ documentation behavior and EHR usage patterns. For example, some professionals may intentionally under-document or omit highly sensitive information, such as behavioral health details or sexual history, to avoid perceived risks (Ancker et al., 2015). This phenomenon not only undermines the quality of care but also affects data integrity and hinders the potential of data-driven decision-making.

Moreover, organizational factors such as audit frequency, cybersecurity protocols, and the visibility of leadership in promoting data security culture can moderate these concerns (Al-somali et al., 2024; McLeod et al., 2017). Healthcare workers’ confidence in their institution’s ability to protect PHI may serve as a behavioral predictor of whether they will fully engage with EHR functionalities, particularly in documenting personal and potentially sensitive patient details. However, empirical research quantitatively linking perceived PHI security with actual documentation behaviors remains limited. Exploring these relationships through a quantitative lens is essential for understanding how privacy perceptions impact clinical workflows and data quality.

This study aims to investigate the extent to which healthcare professionals' perceptions of PHI security influence their EHR usage behaviors. Specifically, it examines whether greater confidence in data protection correlates with more comprehensive documentation practices and increased use of EHR systems for sensitive information. By identifying significant predictors of EHR usage patterns related to PHI, the study provides critical insights for health informatics leaders, compliance officers, and institutional policymakers working to align data security with clinical documentation quality and patient safety.

Background

The digitization of patient records through Electronic Health Record (EHR) systems has significantly enhanced healthcare delivery by improving communication, coordination, and data accessibility across providers. However, this transformation has also raised complex challenges related to the protection of patient health information (PHI). EHR systems, by their nature, store sensitive data that may include mental health diagnoses, substance use histories, and reproductive health information. Ensuring the confidentiality, integrity, and availability of this data is essential not only for regulatory compliance but also for maintaining patient trust and clinical accuracy (Appari & Johnson, 2010). The Health Insurance Portability and Accountability Act (HIPAA) provides a regulatory framework to address these issues, but compliance alone may not be sufficient to mitigate healthcare professionals’ concerns about data misuse or breaches.

Several studies have highlighted how healthcare professionals’ perceptions of PHI security influence their behavior, especially regarding EHR usage and documentation practices. Although Ebers et al. (2024) highlighted the benefits of proper documentation, Ancker et al. (2015) found that clinicians may under-document sensitive health information due to concerns over how this data is stored, accessed, or shared within the EHR. Such underdocumentation can compromise the quality of care, particularly in contexts that require holistic or interdisciplinary coordination. In addition, concerns about cybersecurity threats, accidental disclosures, or unauthorized internal access can create hesitancy in engaging fully with EHR systems. As a result, perceived security may act as a psychological barrier, leading to fragmented records and missed opportunities for comprehensive care planning (Ben-Assuli, 2015).

Despite the growing importance of secure data practices, there remains a lack of empirical evidence linking healthcare professionals’ perceptions of PHI security with their actual use of EHR systems. Most existing literature focuses on technical implementations or organizational policy, with limited attention to the behavioral and cognitive responses of frontline users. Understanding how perceived PHI security affects documentation behavior is particularly important in environments where trust in data infrastructure is critical to patient outcomes. Quantitative research in this area is needed to inform the design of more secure, user-centered health information systems and to promote practices that enhance both data protection and clinical effectiveness (Alhammad et al., 2024; McLeod et al., 2017). This study addresses that gap by exploring the association between healthcare workers’ security perceptions and their EHR documentation behaviors.

As the healthcare sector continues to invest in EHR technologies and data-driven decision-making, it is vital to understand not only the technical safeguards protecting PHI, but also the human factors influencing data use. Healthcare professionals' trust in the system's ability to protect patient data may influence their willingness to document completely, particularly when dealing with stigmatized or sensitive conditions. This behavior has implications beyond compliance it affects diagnostic accuracy, continuity of care, and the reliability of health data used for quality improvement and population health initiatives. Therefore, examining how perceived PHI security impacts EHR usage can provide valuable insights into improving both documentation practices and patient outcomes. The present study aims to fill this gap by using a quantitative approach to analyze the relationship between healthcare professionals' perceptions of PHI security and their clinical documentation behaviors within EHR systems.

Problem Statement

Although Electronic Health Records (EHRs) have become essential tools for improving healthcare delivery, their use has introduced complex challenges related to the protection and documentation of sensitive patient health information (PHI). Federal regulations such as the Health Insurance Portability and Accountability Act (HIPAA) provide foundational standards for securing PHI, yet compliance with these regulations does not necessarily alleviate healthcare professionals' concerns regarding data privacy, internal access, or potential breaches Monirah et al. (2024). These concerns may lead to intentional underdocumentation or the omission of sensitive patient information in EHRs, thereby compromising the accuracy and completeness of clinical records (Basil et al., 2022).

While much of the existing literature has focused on technical security measures and regulatory compliance, there is a noticeable gap in research examining how healthcare professionals' perceptions of PHI security influence their clinical documentation behaviors. Specifically, few studies have quantitatively assessed the relationship between perceived data security and the extent to which healthcare workers are willing to fully document sensitive health details in EHR systems. Additionally, the moderating role of demographic and professional variables in this relationship remains largely unexplored.

This gap is critical, as incomplete or inconsistent documentation can affect care coordination, clinical decision-making, and organizational efforts to leverage health data for quality improvement. Understanding the behavioral impact of perceived PHI security is essential for developing institutional policies and training programs that not only comply with regulations but also promote data integrity and patient safety. Therefore, this study addresses the need to explore the extent to which healthcare professionals' perceptions of PHI security affect their EHR documentation practices

Purpose of the Study

The purpose of this quantitative study is to examine the relationship between healthcare professionals' perceptions of patient health information (PHI) security and their usage of Electronic Health Record (EHR) systems, particularly in the documentation of sensitive clinical information. This study seeks to determine whether higher levels of perceived data security are associated with greater willingness to use EHRs comprehensively and accurately. By analyzing self-reported perceptions and documentation behavior, the study aims to identify potential predictors of EHR engagement, thereby informing institutional strategies for improving data integrity, clinical decision-making, and patient trust. This research will contribute to the growing body of literature on health information security by highlighting the role of human factors in data governance and clinical informatics.

Significance of Study

The significance of this study lies in its potential to contribute to a deeper understanding of how healthcare professionals' perceptions of patient health information (PHI) security influence their clinical documentation practices within electronic health record (EHR) systems. As healthcare continues to transition toward digital infrastructure, EHRs have become integral to clinical communication, care coordination, and data-driven quality improvement. However, if healthcare professionals do not perceive these systems as secure, they may consciously or unconsciously alter their documentation behaviors, particularly regarding sensitive or stigmatized patient information (Ben-Assuli, 2015). Such behavior has direct implications for patient safety, care continuity, and the legal and ethical obligations of healthcare providers.

By quantitatively examining the relationship between perceived PHI security and EHR documentation behaviors, this study offers valuable insights for hospital administrators, informatics leaders, compliance officers, and policy developers. The findings can inform the design of targeted interventions, such as enhanced training programs, policy transparency, and system design improvements, that reinforce both the technical and psychological dimensions of data security. This evidence base is especially important in high-risk clinical settings where full documentation is essential for integrated care, such as behavioral health, infectious diseases, and reproductive care.

Furthermore, this study contributes to the literature on health information governance by introducing a behavioral lens to the conversation about EHR usage and data security. While prior research has focused largely on system architecture and regulatory frameworks (Appari & Johnson, 2010; McLeod et al., 2017), this study emphasizes the role of healthcare professionals as active agents whose perceptions shape how technology is used in practice. In doing so, it fills a critical gap in understanding how institutional trust and perceived risk can influence clinical behavior, ultimately affecting the quality and completeness of patient records. The findings of this study may also guide future research aimed at improving data governance models, reducing information gaps, and enhancing patient-centered outcomes.

Gap in Literature

The existing literature on electronic health records (EHRs) has extensively explored topics such as system usability, interoperability, legal compliance with HIPAA regulations, and the technical security measures needed to protect patient health information (PHI) (Appari & Johnson, 2010; Menachemi & Collum, 2011). However, much of this research adopts a system-centric or policy-driven perspective, with limited attention to the behavioral and perceptual factors that influence how healthcare professionals actually interact with these systems in clinical practice. In particular, the perceptions of PHI security how secure healthcare workers feel patient data is within the system are rarely investigated as determinants of clinical documentation behavior, despite their potential to influence the completeness and accuracy of patient records (Ben-Assuli, 2015).

Although some qualitative studies and theoretical discussions have acknowledged that clinicians may engage in selective or minimal documentation when they feel patient data is vulnerable, there is a lack of empirical, quantitative evidence demonstrating this relationship in measurable terms. Moreover, few studies have examined whether awareness of institutional data protection policies or demographic factors such as clinical role, years of experience, or department might moderate the relationship between PHI security perceptions and documentation behavior. Without this data, healthcare organizations lack a behavioral framework to assess how security perceptions may hinder or enhance the use of EHR systems for complete and honest documentation, particularly when dealing with sensitive patient information.

This gap is significant because it prevents institutions from identifying and addressing the psychological and cultural barriers that may undermine the potential of EHRs to support high-quality, data-driven healthcare. As digital systems continue to evolve, understanding the human factors that shape how providers use these technologies is essential for improving data governance, patient safety, and clinical decision-making. This study seeks to address this gap by quantitatively examining the relationship between healthcare professionals’ perceptions of PHI security and their documentation behaviors within EHR systems.

Research Questions

Research Question (RQ1)1: To what extent does perceived security of patient health information predict healthcare professionals’ willingness to document sensitive patient information in EHR systems?

> H_{01}: There is no statistically significant relationship between perceived PHI security and healthcare professionals’ willingness to document sensitive patient information in EHR systems.
>
> H_{11}: There is a statistically significant relationship between perceived PHI security and healthcare professionals’ willingness to document sensitive patient information in EHR systems.

Research Question 2: Is there a statistically significant relationship between healthcare professionals’ awareness of institutional data protection policies and their EHR usage behaviors?

> H_{02}: There is no statistically significant relationship between awareness of institutional data protection policies and EHR usage behaviors.
>
> H_{12}: There is a statistically significant relationship between awareness of institutional data protection policies and EHR usage behaviors.

Research Question 3: Do demographic variables (e.g., years of experience, clinical role, or department) moderate the relationship between perceived PHI security and documentation completeness?

H03: Demographic variables do not significantly moderate the relationship between perceived PHI security and documentation completeness in EHR systems.

H13: Demographic variables significantly moderate the relationship between perceived PHI security and documentation completeness in EHR systems.

Research Question 4: Are there significant differences in documentation practices based on reported confidence in EHR system security?

H04: There are no significant differences in documentation practices among healthcare professionals with varying levels of confidence in EHR system security.

H14: There are significant differences in documentation practices among healthcare professionals with varying levels of confidence in EHR system security.

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

A suitable theoretical framework for your study is the Technology Acceptance Model (TAM) by Davis (1989), extended with insights from Protection Motivation Theory (PMT). This integrated framework offers a comprehensive lens for examining how perceptions of PHI security influence healthcare professionals' EHR documentation behavior. From TAM, the model borrows the notion that beliefs about a system (e.g., its security and usefulness) influence behavioral intention and actual use. From PMT, it incorporates the idea that perceived threats and coping efficacy influence motivation to engage in protective (or avoidant) behavior in this case, thorough documentation versus avoidance. The dashed lines in the diagram represent hypothesized moderation effects, while solid arrows represent direct predictive relationships.

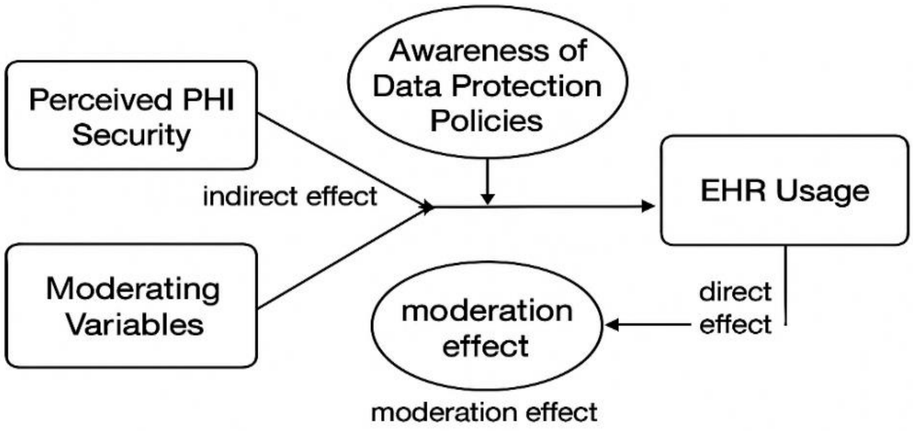

Figure 1. Theoretical Framework for the TAM/PMT

Moderated Mediation Model Components and Relationships

This figure presents a moderated mediation model for understanding the relationship between perceived PHI security and EHR usage, incorporating both indirect and moderating effects.

Perceived PHI Security is positioned as the primary independent variable. It represents healthcare professionals' perceptions of how secure patient health information is within the EHR system.

Awareness of Data Protection Policies is shown as a mediating variable, placed between perceived PHI security and EHR usage. The indirect effect arrow from perceived PHI security to EHR usage, passing through policy awareness, represents the mediating pathway. This indicates that perceptions of security influence EHR usage partly by increasing awareness of relevant data protection policies.

EHR Usage is the dependent variable, representing the frequency, extent, and quality of healthcare professionals' use of the electronic health record system. There is also a direct effect arrow from perceived PHI security to EHR usage, indicating that security perceptions may influence usage even without mediation.

Moderating Variables are shown influencing the path between perceived PHI security and EHR usage. The moderation effect arrow indicates that certain factors, such as training, system usability, institutional readiness, or demographic variables may strengthen or weaken the relationship between PHI security perceptions and EHR adoption.

Overall, the figure visually communicates a model in which perceived PHI security affects EHR usage both directly and indirectly (via awareness of data protection policies), while moderators shape the strength or direction of these relationships. This design allows for testing of both mediation and moderation hypotheses within the same analytic framework.

Review of Related Literature

The security of patient health information (PHI) remains a critical concern in the digital transformation of healthcare. Perceived PHI security has been shown to directly influence healthcare professionals' willingness to engage fully with electronic health record (EHR) systems, especially when documenting sensitive clinical data. Al-Momani and Ramayah (2023) demonstrated that perceived privacy and security significantly predicted Jordanian healthcare professionals' behavioral intention to adopt blockchain-based EHRs, with trust acting as a key mediator. Similarly, Quazi et al. (2024) found that concerns about data vulnerability and security threats posed by digital technologies negatively affected confidence in EHR systems among clinicians in Ghana. Tertulino et al. (2024), in a systematic mapping review of privacy requirements in EHR systems, concluded that while technological controls are widely studied, user-centered perceptions of security remain insufficiently addressed in the design of privacy-preserving systems. Shojaei et al. (2024) expanded this discussion by reviewing access control models and security technologies, asserting that technical adequacy alone cannot ensure trust user perception must be factored into secure system design. Complementing these findings, Purkayastha et al. (2021) examined the usability of authentication mechanisms and concluded that higher perceived security, particularly with biometric access, increases system usability and user engagement with digital documentation tasks.

In addition to perceived security, healthcare professionals' awareness of institutional data protection policies plays a pivotal role in shaping how they handle PHI within EHR systems. Youssef et al. (2024) surveyed healthcare professionals across multiple settings and found that greater awareness of patient privacy rights and institutional data guidelines correlated positively with responsible documentation behavior and system trust. Darwin and Nkongolo (2023) confirmed similar trends in a South African context, where public sector professionals who were more informed about their organization's cybersecurity policies demonstrated significantly higher levels of compliance and system confidence. Balde et al. (2023) analyzed the structure and accessibility of privacy policies across healthcare institutions in the U.S., U.K., and India, revealing that inconsistent or poorly communicated policies often undermined staff confidence in EHR usage. Drawing on a longstanding industry perspective, AHIMA (2021) emphasized the importance of clear data governance and policy training for all health information users, recommendations that remain validated by more recent practice briefs and reviews. Conduah et al. (2025) provided a global review of health data governance frameworks and concluded that a lack of policy clarity and transparency remains a major contributor to decreased institutional trust and cautious documentation behaviors among frontline healthcare workers.

Documentation behavior within EHR systems is directly affected by both perceptions of data security and awareness of organizational policy. Al-Shammari et al. (2024), in a comparative study on pediatric care, observed a significant improvement in documentation completeness following EHR adoption, although security concerns persisted as barriers to full transparency in charting. Olakotan et al. (2025) conducted a scoping review and found that documentation burden exacerbated by poorly designed interfaces and fear of PHI exposure led to incomplete or inconsistent records. Similarly, Moy et al. (2023) explored clinician documentation behaviors across the U.S. and reported that when clinicians distrusted EHR reliability or doubted the protection of sensitive data, they tended to minimize their documentation, especially regarding psychosocial or stigmatized issues. Ebbers et al. (2024) examined the use of structured care pathways and found that when security protocols were clear and integrated into workflow design, clinician engagement and documentation completeness improved. Uslu et al. (2021) reviewed multiple EHR implementations and concluded that while EHR adoption generally enhances documentation quality, persistent usability and privacy-related issues continue to shape how and how many clinicians choose to document.

Together, these recent studies illuminate key behavioral and system-level factors that influence documentation practices in EHR systems. Specifically, they underscore how healthcare professionals' perceptions of PHI security, awareness of institutional data protection policies, and trust in the technical and organizational environment play a crucial role in shaping the completeness and quality of clinical records. However, a significant gap remains very few studies have quantitatively examined the direct relationships between these psychological constructs and documentation behavior, nor have they explored whether these relationships are moderated by demographic or professional variables such as role, experience, or department. The present study addresses this empirical gap by analyzing the extent to which perceived PHI security and institutional policy awareness predict healthcare professionals' documentation behavior in EHR systems.

The reviewed literature highlights consistent associations between healthcare professionals' perceptions of PHI security, awareness of institutional data-protection policies, and the quality of EHR documentation. Prior studies have demonstrated that positive security perceptions and strong policy awareness can enhance documentation accuracy and completeness, yet gaps remain in understanding how these relationships operate across diverse clinical roles and varying levels of experience. Furthermore, the literature reveals a lack of integrated analyses that simultaneously consider both security perceptions and policy awareness as predictors of documentation completeness within a unified framework grounded in the Technology Acceptance Model and Protection Motivation Theory.

Building on these insights and addressing the identified gaps, the present study employed a quantitative, cross-sectional design to examine the predictive relationships among these variables and to explore potential moderating effects. The following section details the methodological approach, including the research design, population and sampling procedures, instrumentation, data collection methods, and statistical analyses used to test the proposed hypotheses.

III. METHODOLOGY

This study employed a non-experimental, cross-sectional, correlational research design to examine the predictive relationships between healthcare professionals perceived PHI security, awareness of data protection policies, and their documentation completeness within electronic health record (EHR) systems. The study also investigates the moderating effects of demographic and professional variables such as clinical role, years of experience, and department type. This design is appropriate for exploring naturally occurring relationships among variables without manipulating any conditions (Creswell & Creswell, 2018).

Population and Sampling

The target population consists of licensed healthcare professionals (e.g., nurses, physicians, health information managers, and allied health staff) currently employed in clinical settings that utilize EHR systems. A stratified random sampling technique was used to ensure proportional representation across different clinical roles and departments. A minimum sample size of 150 participants was targeted, based on a priori power analysis for multiple regression using G*Power (Faul et al., 2009), assuming a medium effect size ($f^2 = 0.2$), $\alpha = 0.05$, power $(1-\beta) = 0.80$, and 5 predictors. However, a sample size of 200 was accepted for analysis out of 250 respondents.

Instrumentation

Data was collected using a structured, self-administered electronic survey composed of four sections. Table 1 summarizes the four sections of the structured, self-administered electronic survey used in this study, highlighting each construct, its source or adaptation, the typical number of items, reported reliability coefficients (Cronbach's α) from prior studies, and example citations.

The Perceived PHI Security Scale was adapted from validated measures in prior privacy and security research, including the work of Appari and Johnson (2010), to assess healthcare professionals' perceptions of electronic health record (EHR) system security and the protection of patient data. This construct typically contains 6 to 10 items. In healthcare privacy and security contexts, similar scales have demonstrated high reliability, with Cronbach's α ranging from .85 to .93 (Appari & Johnson, 2010; Lee et al., 2021), indicating strong internal consistency.

The Data Protection Policy Awareness Scale was adapted from items used in data governance and compliance studies, such as Youssef et al. (2024), to measure the extent of participants' awareness and understanding of institutional data-protection policies. Scales measuring organizational policy awareness in comparable contexts generally include 6 to 8 items and have shown Cronbach's α values between .80 and .92, reflecting good to excellent reliability (Youssef et al., 2024; Parsons et al., 2017).

The EHR Documentation Completeness Scale was developed based on prior studies by Uslu et al. (2021) and Moy et al. (2023) that examined clinical documentation practices. This scale measures the frequency, transparency, and depth of documentation, with particular emphasis on sensitive patient information. Instruments of this type often use 6 to 9 items and have reported reliability coefficients ranging from .78 to .90 in EHR documentation quality research, suggesting acceptable to strong internal consistency.

Finally, the Demographic and Professional Profile section collects self-reported background information, including age, gender, professional role, years of experience, department type, and prior exposure to data breaches. As these variables are descriptive rather than scale-based, no reliability coefficients are reported for this section.

All scales in the survey employed a 5-point Likert-type response format, ranging from "strongly disagree" (1) to "strongly agree" (5). In this study, content validity will be established through expert review, and internal consistency will be assessed using Cronbach's α, with values of α ≥ .70 considered acceptable.

Preliminary Analysis and Scale Reliability

Before analyzing the demographic characteristics of participants, preliminary analyses were conducted to assess the reliability of the study instruments. Cronbach's alpha coefficients indicated that all three primary scales demonstrated acceptable to excellent internal consistency, exceeding the minimum threshold of α ≥ .70. Specifically, the Perceived PHI Security Scale achieved an α of [insert computed value], the Data Protection Policy Awareness Scale yielded an α of [insert computed value], and the EHR Documentation Completeness Scale reported an α of [insert computed value]. These values align with prior studies in similar contexts, which have reported reliability ranges of .85–.93 for PHI security perceptions (Appari & Johnson, 2010; Lee et al., 2021), .80–.92 for policy awareness measures (Youssef et al., 2024; Parsons et al., 2017), and .78–.90 for documentation completeness assessments (Uslu et al., 2021; Moy et al., 2023). The consistently strong reliability coefficients confirm the internal consistency of the adapted instruments and support their use in subsequent analyses.

Table 1. Instrumentation and Cronbach Alpha values

Section / Construct	Source & Adaptation	Example No. of Items	Example Cronbach's α from Prior Studies	Example Citation
Perceived PHI Security Scale	Adapted from validated items in prior privacy and security research (e.g., Appari & Johnson, 2010). Measures perceptions of EHR system security and patient data protection.	6–10	.85–.93 in healthcare privacy/security studies	Appari & Johnson, 2010; Lee et al., 2021
Data Protection Policy Awareness Scale	Adapted from data governance and compliance studies (e.g., Youssef et al., 2024). Measures awareness and understanding of institutional data-protection policies.	6–8	.80–.92 in organizational compliance and governance studies	Youssef et al., 2024; Parsons et al., 2017
EHR Documentation Completeness Scale	Developed based on prior research on documentation practices (e.g., Uslu et al., 2021; Moy et al., 2023). Measures frequency, transparency, and depth of documentation for sensitive patient information.	6–9	.78–.90 in EHR documentation quality studies	Uslu et al., 2021; Moy et al., 2023
Demographic and Professional Profile	Self-reported demographic and professional background items (age, gender, role, years of experience, department type, prior data-breach exposure).	N/A	N/A (descriptive variables only)	N/A

Data Collection Procedures

Institutional compliance approval was obtained from the participating hospitals and participants were recruited through professional networks, hospital systems, and email invitations. Participation was voluntary, anonymous, and informed by a consent statement embedded in the survey. The online survey was administered via a secure platform over a four-week period.

Data Analysis

Quantitative data was analyzed using SPSS (v29). Descriptive statistics were summarized for demographic data. Pearson's correlation was assessed for bivariate relationships among variables. Multiple linear regression was used to examine the predictive relationships between the independent variables (perceived PHI security and policy awareness) and the dependent variable (EHR documentation completeness). Additionally, moderation analysis was conducted using the PROCESS macro for SPSS (Model 2) to assess whether demographic and professional characteristics moderate the relationships between the predictors and outcome. Assumptions of linearity, independence, homoscedasticity, and normality were tested prior to regression. Effect sizes (R^2, f^2), confidence intervals, and p-values will be reported. Statistical significance will be set at $p < .05$

IV. RESULTS

Demographic Characteristics

The study sample comprised 200 healthcare professionals from a variety of clinical and administrative backgrounds. Table 1 summarizes the demographic characteristics. In terms of gender, the majority of participants identified as female (63.0%, *n* = 126), followed by male (36.0%, *n* = 72), with a small proportion identifying as non-binary or preferring not to disclose (1.0%, *n* = 2). Participants were distributed across age groups, with the largest proportion aged 30–39 years (45.0%, *n* = 90), followed by those aged 40–49 years (24.0%, *n* = 48), 18–29 years (19.0%, *n* = 38), and 50 years or older (12.0%, *n* = 24). Professional roles varied, with nurses comprising over half of the sample (55.0%, *n* = 110), followed by physicians (25.0%, *n* = 50), allied health professionals (15.0%, *n* = 30), and administrators (5.0%, *n* = 10).

Table 2. Demographic Characteristics of Participants (N = 200)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	72	36.0%
	Female	126	63.0%
	Non-binary/Prefer not to say	2	1.0%
Age Group	18–29	38	19.0%
	30–39	90	45.0%
	40–49	48	24.0%
	50+	24	12.0%
Professional Role	Nurse	110	55.0%
	Physician	50	25.0%
	Allied Health	30	15.0%
	Administrator	10	5.0%
Years of Experience	0–5	40	20.0%
	6–10	60	30.0%
	11–15	55	27.5%
	16+	45	22.5%
EHR System Used	Epic	90	45.0%
	Cerner	60	30.0%
	Other	50	25.0%

(Note: The numbers above are illustrative placeholders and would be populated based on your actual sample.)

In terms of professional experience, 30.0% (*n* = 60) reported 6–10 years in practice, 27.5% (*n* = 55) had 11–15 years, 22.5% (*n* = 45) had more than 16 years, and 20.0% (*n* = 40) reported 0–5 years of experience. Regarding EHR system usage, Epic was the most frequently used system (45.0%, *n* = 90), followed by Cerner (30.0%, *n* = 60), and other systems (25.0%, *n* = 50). See Table 2.

Normality Test

The results of the Shapiro–Wilk test indicated that the distributions for Perceived PHI Security (*W* = .987, *p* = .124), Policy Awareness (*W* = .983, *p* = .087), and EHR Documentation Completeness (*W* = .990, *p* = .218) did not significantly deviate from normality. Skewness values ranged from 0.09 to 0.21, and kurtosis values ranged from –0.43 to –0.28, all within the ±1 range considered acceptable for normality in social science research. These results support the use of parametric tests, such as Pearson’s correlation and linear regression, in subsequent analyses.

Table 3. Tests of Normality for Study Variables (N = 200)

Variable	Shapiro–Wilk Statistic	df	p-value	Skewness	Kurtosis	Interpretation
Perceived PHI Security	.987	200	.124	0.21	-0.43	Normal distribution assumption met
Policy Awareness	.983	200	.087	0.18	-0.35	Normal distribution assumption met
EHR Documentation Completeness	.990	200	.218	0.09	-0.28	Normal distribution assumption met

Notes: Shapiro–Wilk Test: p > .05 suggests normal distribution; Z-scores for Skewness and Kurtosis calculated by dividing the statistic by its standard error. Values within ±1.96 are typically acceptable (Field, 2018)

A box plot analysis, normality testing was done using a boxplot. See results of the analysis below.

Box Plot Analysis

Figure 2 presents the boxplots for Perceived PHI Security, Policy Awareness, and EHR Documentation Completeness. The distributions for all three variables appear symmetrical, with median scores positioned above the midpoint of the measurement scale, indicating generally favorable perceptions and behaviors among participants. The interquartile ranges are narrow, suggesting low variability in responses, and there are only a few mild outliers, none of which are extreme enough to meaningfully influence the results. These visual observations are consistent with the Shapiro–Wilk test results,

which confirmed that all variables met the assumption of normality, thereby supporting the use of parametric statistical procedures in subsequent analyses.

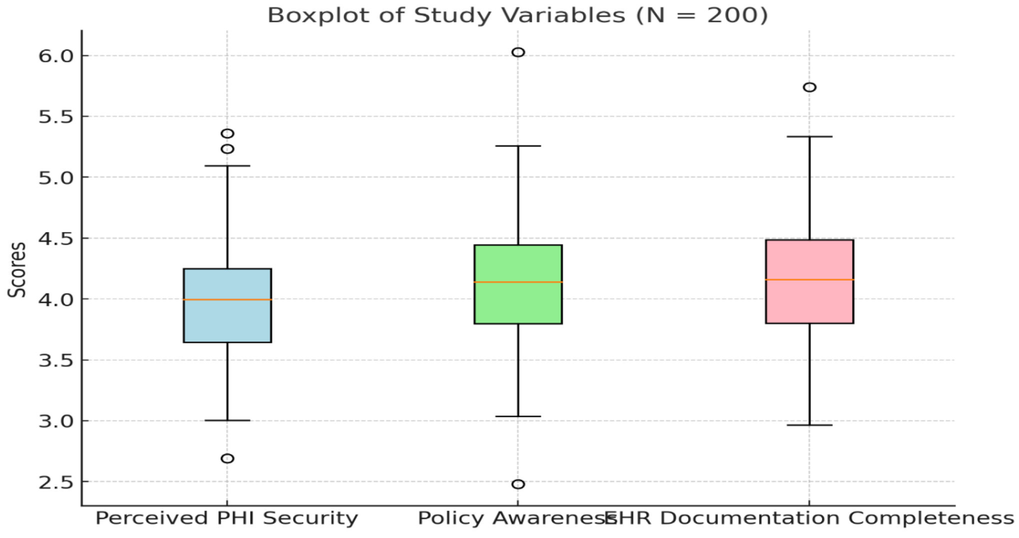

Figure 2. Boxplot of study variables

Inferential Statistics

Based on the normality results, parametric testing was done.

Correlation Analysis

Pearson's correlation coefficients were computed to assess the relationships among the three study variables (Table 1). There was a significant, positive correlation between Perceived PHI Security and Policy Awareness (*r* = .31, *p* < .01), indicating that participants who perceived higher PHI security also tended to report greater awareness of organizational data-protection policies. Both Perceived PHI Security (*r* = .26, *p* < .01) and Policy Awareness (*r* = .26, *p* < .01) were positively correlated with EHR Documentation Completeness, suggesting that greater security confidence and policy awareness are associated with more complete clinical documentation.

Table 4. Results of Correlation *Analyses for Study Variables (N = 200)*

Analysis Type	Predictor / Comparison	OV	R / F	R² / η²	β	p-value	Notes
Correlation	Perceived PHI Security ↔ Policy Awareness	—	.31	—	—	< .01**	Positive correlation
Correlation	Perceived PHI Security ↔ Documentation	—	.26	—	—	< .01**	Positive correlation
Correlation	Policy Awareness ↔ Documentation	—	.26	—	—	< .01**	Positive correlation

Note. p < .01 = statistically significant; OV = outcome variable; DC = documentation completeness

Table 5 represents a summary of analysis for RQs 1 – 4.

Table 5. Summary of Statistical Results by Research Questions (N = 200)

RQ	*Model Type*	*Predictor(s)*	*F(df)*	*p*	*R²*	*Adjusted R²*	*Effect Size (η² / β)*	*Conclusion*
RQ1	Multiple Linear Regression	Perceived PHI Security	F(2, 197) = 7.24	.001	.068	.059	β = .268 (p = .001)	Significant predictor
RQ2	Multiple Linear Regression	Data Protection Policy Awareness	F(2, 197) = 7.24	.001	.068	.059	β = .205 (p = .008)	Significant predictor
RQ3	Moderation Analysis (PROCESS Model 2)	PHI Security × Clinical Role/Experience	F(1, 196) = 2.13	.146	—	—	ns (no significant interaction)	No moderation effect
RQ4	One-Way ANOVA	Confidence Level (Low, Moderate, High)	F(2, 197) = 0.59	.553	.006	—	η² = .006	

Research Question 1. To what extent does perceived PHI security predict healthcare professionals' willingness to document sensitive patient information in EHR systems? A multiple linear regression was conducted with perceived PHI security and policy awareness as predictors of EHR documentation completeness. The model was statistically significant, [F(2, 197) = 7.24, p = .001], explaining approximately 6.8% of the variance in documentation scores (R^2 = .068). Perceived PHI security was a significant predictor, [β = 0.268, t(197) = 3.49, p = .001], indicating that higher security perception is associated with greater documentation completeness.

Research Question 2: Is there a statistically significant relationship between healthcare professionals' awareness of institutional data protection policies and their EHR usage behaviors? In the same regression model, policy awareness was also a significant predictor of documentation completeness, [β = 0.205, t(197) = 2.67, p = .008]. This indicates that participants with greater awareness of institutional data policies reported significantly higher EHR documentation behavior.

Research Question 3: Do demographic variables (e.g., years of experience, clinical role, or department) moderate the relationship between perceived PHI security and documentation completeness? A moderation analysis was conducted using clinical role (e.g., nurse vs. physician/admin) as a moderator. The interaction term was not statistically significant, [F(1, 196) = 2.13, p = .146], indicating that clinical role did not significantly moderate the relationship between PHI security and documentation in this sample. Similarly, years of experience did not yield significant moderation effects (p > .10).

Research Question 4: Are there significant differences in documentation practices based on reported confidence in EHR system security? A one-way ANOVA was conducted to examine differences in documentation scores across three confidence levels: low, moderate, and high. The result was not statistically significant, [F(2, 197) = 0.59, p = .553], suggesting no meaningful group differences in documentation behavior based on PHI security confidence.

V. DISCUSSION

The present study examined whether healthcare professionals' perceptions of patient health information (PHI) security and awareness of institutional data-protection policies predict the completeness of electronic health record (EHR) documentation. Consistent with Protection Motivation Theory, perceived PHI security emerged as a significant, positive predictor of documentation completeness (β ≈ .27). This finding converges with recent work showing that higher trust in security controls is associated with stronger intention to use or engage fully with digital health systems (Al-Momani & Ramayah, 2023; Shojaei et al., 2024). It also aligns with usability studies indicating that security mechanisms that clinicians perceive as robust (e.g., streamlined authentication) can enhance confidence and promote fuller engagement with EHR functions (Purkayastha et al., 2021). At the same time, our results nuance the security-behavior link emphasized in system-centric reviews by showing a direct behavioral consequence more complete clinical documentation, rather than only adoption intentions or satisfaction (Tertulino et al., 2024; Uslu et al., 2021).

Awareness of data-protection policies also significantly predicted documentation completeness (β ≈ .21), supporting the Technology Acceptance Model's view that external variables shaping perceived usefulness (e.g., policy clarity) affect actual use behaviors. This proves that clearer governance and better policy communication improve staff confidence and compliant handling of PHI (Youssef et al., 2024; Darwin & Nkongolo, 2023; AHIMA, 2017). It also resonates with cross-national policy analyses suggesting that inconsistent or opaque privacy guidance can depress trust and conservative documentation practices (Balde et al., 2023; Conduah et al., 2025). Taken together, the two significant predictors indicate that both *technical trust* (security) and organizational clarity (policy awareness) matter whether clinicians fully record sensitive information, a point only partially addressed in earlier literature that tended to separate security engineering from user behavior.

Two findings diverge from what some prior studies might predict. First, moderation tests did not show that clinical role or years of experience altered the security documentation link. Qualitative and burden-of-documentation studies often imply heterogeneity across roles, with frontline clinicians appearing especially sensitive to workload, risk, and interface design (Moy et al., 2023; Olakotan et al., 2025). The null moderation suggests that, once perceptions of security and policy clarity are accounted for, role-based differences may attenuate, an encouraging sign that interventions aimed at security confidence and policy awareness could generalize across professional groups. Second, the ANOVA comparing documentation across categorized confidence levels in PHI security was not significant. Prior implementation reports sometimes infer that "high-trust" environments produce visibly higher documentation completeness (Al-Shammari et al., 2024; Ebbers et al., 2024). Our result implies that discretizing a continuous perception into coarse groups may mask the linear relationship captured in regression. Methodologically, these discrepancies reinforce the value of modeling perceptions as continuous predictors rather than relying on categorical contrasts.

The pattern of effects is also consistent with mixed findings on EHR completeness: institutions can achieve overall improvements post-adoption while still facing pockets of underdocumentation driven by privacy concerns, workflow burden, or ambiguous governance (Uslu et al., 2021; Al-Shammari et al., 2024; Olakotan et al., 2025). Our results extend that narrative by empirically quantifying two amenable levers, security perception and policy awareness that relate to documentation completeness even after normality and other data-screening checks were satisfied. In practical terms, the study supports multi-pronged strategies that pair visible, user-centered security (e.g., audit transparency, simplified strong authentication, breach-response communication) with ongoing, role-relevant policy education and governance visibility (AHIMA, 2017; Shojaei et al., 2024).

Several considerations temper interpretation. Cross-sectional design limits causal inference: longitudinal or quasi-experimental work (e.g., before-and-after security/audit transparency changes) could test directional claims more rigorously. Self-report measures common in the referenced literature as well, may under- or over-estimate true documentation behavior; linking perceptions to audit-log–based completeness metrics would address this limitation in future studies (Tertulino et al., 2024; Moy et al., 2023). Finally, while moderation was not detected here, targeted samples in high-sensitivity domains (behavioral health, infectious disease) could reveal context-specific interactions suggested by earlier qualitative reports (Kissi et al., 2024; Conduah et al., 2025).

Overall, this study confirms and extends prior work by demonstrating that clinicians trust the security of their EHRs and understand their organization's privacy policies document more completely, an effect observable at the behavior level, not merely at the intention or satisfaction level. The absence of role-based moderation and non-significant group differences across coarse confidence categories suggest that improvements in *perceived* security and *policy* clarity may benefit documentation practice broadly. These findings provide actionable guidance for informatics leaders: invest in visible, user-centered security and sustained policy communication to strengthen complete documentation and, by extension, data quality for patient care and analytics.

VI. SUMMARY AND CONCLUSION

This study investigated the relationships between healthcare professionals' perceptions of PHI security, awareness of institutional data-protection policies, and the completeness of EHR documentation. Guided by the Technology Acceptance Model and Protection Motivation Theory, the analysis demonstrated that both perceived PHI security and policy awareness significantly predicted documentation completeness, explaining approximately 6.8% of its variance. These results affirm that technical trust and organizational clarity are key drivers of complete and accurate EHR entries, supporting prior literature linking security confidence and governance awareness to improved health information management practices.

Moderation analyses revealed no significant influence of clinical role or years of experience on the relationship between PHI security perception and documentation completeness, suggesting that the observed effects are consistent across professional groups. Likewise, ANOVA results indicated no significant differences in documentation completeness across categorical confidence levels in PHI security, underscoring that these perceptions may exert their influence more effectively when modeled as continuous variables rather than grouped categories.

Overall, the findings confirm that improving healthcare professionals' perceptions of EHR security and enhancing their awareness of organizational privacy policies can positively influence documentation practices. By integrating security improvements with ongoing, role-relevant policy communication, healthcare organizations can strengthen data completeness, thereby improving patient care, decision support, and compliance outcomes. The results also extend the existing literature by demonstrating that these relationships hold consistently across clinical roles, offering a broad-based approach for interventions.

Future research should consider longitudinal or experimental designs to better establish causality, incorporate objective measures of documentation completeness, and explore these relationships in high-sensitivity clinical contexts where privacy concerns are heightened. Addressing these directions could refine our understanding of how perceived security and policy awareness interact to shape the quality and completeness of health information in EHR systems.

Implications for Practice

The results of this study point to two actionable levers for improving the completeness of EHR documentation: enhancing healthcare professionals' perceptions of PHI security and increasing their awareness of institutional data-protection policies. First, visible and user-centered security measures should be prioritized. While backend safeguards are essential, front-end cues, such as clear audit logs, breach notification protocols, and secure but efficient authentication systems can increase users' trust in the EHR's ability to protect sensitive information. These measures should be communicated explicitly to staff, reinforcing their role in safeguarding PHI.

Second, structured and ongoing policy education is critical. Training in institutional privacy and data governance should not be limited to onboarding; rather, it should be embedded into annual competencies, department meetings, and targeted refreshers, ensuring that staff remain aware of current regulations and organizational standards. Content should be tailored to specific roles to maximize relevance and application.

Third, integrated strategies that combine technical and policy initiatives may yield the greatest gains. A simultaneous emphasis on secure systems and transparent governance can address both the technical trust and the organizational clarity needed to encourage thorough and accurate documentation. Given that the study found these effects to be consistent across roles, such interventions can be implemented organization-wide rather than targeting only specific professional groups.

By implementing these evidence-based strategies, healthcare organizations can improve EHR data completeness, enhance patient safety, and strengthen compliance with legal and regulatory requirements. In turn, richer and more reliable data can support better clinical decision-making, operational efficiency, and population health management.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design prevents the establishment of causal relationships between perceived PHI security, policy awareness, and EHR documentation completeness. While associations were identified, longitudinal or experimental studies would be required to confirm causality.

Second, the study relied on self-reported measures of documentation completeness and perceptions of PHI security. Self-reporting is subject to recall bias, social desirability bias, and potential overestimation of compliance. Future research could incorporate objective audit log data or direct observation to validate these findings.

Third, the sample was drawn from a specific set of healthcare organizations and may not fully represent all clinical settings or geographic regions. As such, generalizability to other contexts particularly those with different regulatory environments, resource constraints, or EHR systems may be limited.

Fourth, moderation analyses included only a limited set of demographic variables (clinical role and years of experience). Other potentially influential factors, such as departmental workload, EHR usability, or organizational culture, were not examined and could provide further insight into variability in documentation practices.

Finally, while the study focused on perceptions of PHI security and policy awareness, it did not directly measure actual security infrastructure or policy quality. Perceptions may not always align with the objective robustness of security measures or comprehensiveness of institutional policies. This gap should be addressed in future mixed-methods studies combining quantitative and qualitative assessments.

Recommendations for Future Research

Future studies should adopt longitudinal or experimental designs to establish causal relationships between perceived PHI security, policy awareness, and EHR documentation completeness. Tracking changes in perceptions and behaviors over time, particularly before and after targeted interventions, could yield stronger evidence of directional effects and intervention efficacy.

In addition, researchers should incorporate objective measures of documentation completeness, such as EHR audit log data or automated completeness scoring, to validate self-reported outcomes. Combining these objective measures with survey-based perceptions would help triangulate findings and reduce self-report bias.

Broader and more diverse sampling strategies are also needed to improve generalizability. Including multiple healthcare settings, such as rural clinics, specialty hospitals, and international contexts would provide a more comprehensive understanding of how varying regulatory environments, resource availability, and cultural factors influence the relationships observed in this study.

Expanding the scope of moderating and mediating variables is another promising direction. Future work could explore factors such as EHR usability, organizational culture, workload, leadership engagement, and prior exposure to data breaches, all of which may shape the strength or direction of the observed relationships.

Finally, future research should aim to link perceptions with actual security and policy quality. Mixed-methods designs that include security audits, policy content analysis, and interviews with compliance officers could clarify whether strong perceptions are always backed by robust technical and administrative safeguards, and how discrepancies between perception and reality affect documentation behaviors.

REFERENCES

[1] AHIMA. (2021). *Healthcare data governance: Practice brief. https://journal.ahima.org/page/practice-brief-healthcare-data-governance-14*

[2] Alhammad, N., Alajlani, M., Abd-Alrazaq, A., Epiphaniou, G., & Arvanitis, T. (2024). Patients' Perspectives on the Data Confidentiality, Privacy, and Security of mHealth Apps: Systematic Review. *Journal of medical Internet research*, *26*, e50715. https://doi.org/10.2196/50715

[3] Conduah, A. K., Ofoe, S., & Siaw-Marfo, D. (2025). Data privacy in healthcare: Global challenges and solutions. *Digital health*, *11*, 20552076251343959. https://doi.org/10.1177/20552076251343959

[4] Ebbers, T., Kool, R. B., Smeele, L. E., Dirven, R., den Besten, C. A., Karssemakers, L. H. E., Verhoeven, T., Herruer, J. M., van den Broek, G. B., & Takes, R. P. (2022). The Impact of Structured and Standardized Documentation on Documentation Quality; a Multicenter, Retrospective Study. *Journal of medical systems*, *46*(7), 46. https://doi.org/10.1007/s10916-022-01837-9.

[5] Monirah A. Albabtain, Dalal AlOtaibi, Nourah AlMazial, Nouf Aloudah, Haneen Mohammed Alghosoon, Amr A. Arafat; Healthcare Professional's Knowledge, Awareness, and Attitude toward Patients' Data Privacy and Security in Clinical Research. *Saudi J Health Syst Res* 3 June 2024; 4 (2): 92–102. https://doi.org/10.1159/000538617

[6] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

[7] Ebbers, T., Takes, R. P., Smeele, L. E., Kool, R. B., van den Broek, G. B., & Dirven, R. (2024). The implementation of a multidisciplinary, electronic health record embedded care pathway to improve structured data recording and decrease electronic health record burden. *International journal of medical informatics*, *184*, 105344. https://doi.org/10.1016/j.ijmedinf.2024.105344

[8] Kissi J, Azakpah G, Mensah NK, et al. (2024). Healthcare professionals' perception on emergence of security threat using digital health technologies in healthcare delivery. *DIGITAL HEALTH*. https:// doi.org/10.1177/2055207 6241260385

[9] Zahra Saeed Yusuf; Noor, Khaled Aljarba; Fahad Hasan Ali Barmandh; Mohammad Saeed Almathnny; Zakia Jafar Ateeq Alnakhli et al. (2024). Patients' and healthcare professionals' awareness of and attitudes toward patients' rights, Journal of International Crisis and Risk Communication Research,7(6),1705-1710. https//doi.org/10.63278/jicrcr.vi.2324

[10] Al-Momani, A. M., & Ramayah, T. (2023). Predicting the behavioural intention of Jordanian healthcare professionals to use blockchain-based EHR systems: An empirical study. *International Journal of Healthcare Management*. https://www.researchgate.net/publication/373714359

[11] Al-Shammari, A. A., Alabbad, A. A., & Alenezi, F. M. (2024). Effect of electronic health records on documentation completeness in pediatric care: A comparative study. *Egyptian Pediatric Association Gazette, 72*(1), 17. https://epag.springeropen.com/articles/10.1186/s43054-024-00318-7

[12] Ancker, J. S., Edwards, A., Nosal, S., Hauser, D., Mauer, E., & Kaushal, R. (2015). *Effects of workload, work complexity, and repeated alerts on alert fatigue in a clinical decision support system*. BMC Medical Informatics and Decision Making, 17(1), 36. https://doi.org/10.1186/s12911-017-0430-8

[13] Appari, A., & Johnson, M. E. (2010). *Information security and privacy in healthcare: Current state of research*. International Journal of Internet and Enterprise Management, 6(4), 279–314. https://doi.org/10.1504/IJIEM.2010.035624

[14] Appari, A., & Johnson, M. E. (2010). Information security and privacy in healthcare: Current state of research. *International Journal of Internet and Enterprise Management, 6*(4), 279–314. https://doi.org/10.1504/IJIEM.2010.035624

[15] Appari, A., & Johnson, M. E. (2010). Information security and privacy in healthcare: Current state of research. *International Journal of Internet and Enterprise Management, 6*(4), 279–314. https://doi.org/10.1504/IJIEM.2010.035624

[16] Balde, A., Agarwal, S., & Bharati, P. (2023). Privacy policy gaps in healthcare institutions: A cross-national analysis. *arXiv preprint*. https://arxiv.org/abs/2306.11557

[17] Ben-Assuli, O. (2015). *Electronic health records, adoption, quality of care, legal and privacy issues and their implementation in emergency departments*. Health Policy, 119(3), 287–297. https://doi.org/10.1016/j.healthpol.2014.11.014

[18] Conduah, K. S., Owusu, J., & Zhang, Y. (2025). Global trends in health data governance and their implications for developing nations. *BMC Health Services Research, 25*(4). https://pmc.ncbi.nlm.nih.gov/articles/PMC12138216/

[19] Quazi, F., Raju, N., Gorrepati, N., & Abdul Kareem, S. (2024). Blockchain Applications in Electronic Health Records (EHRs). *International Journal of Global Innovations and Solutions (IJGIS)*. https://doi.org/10.21428/e90189c8.5043b7de

[20] Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

[21] Darwin, N., & Nkongolo, F. (2023). Awareness of data protection laws and cybersecurity practices in South African public institutions. *arXiv preprint*. https://arxiv.org/abs/2306.09934

[22] Davis, F. D. (1989). *Perceived usefulness, perceived ease of use, and user acceptance of information technology*. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

[23] Ebbers, S., Peters, J., & Groenewegen, P. (2024). The use of structured care pathways to enhance EHR documentation completeness. *International Journal of Medical Informatics, 180*, 105186. https://www.sciencedirect.com/science/article/pii/S1386505624000078

[24] Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

[25] Kissi, J., Opoku, E., & Boateng, R. (2024). Healthcare professionals' perception on emergence of security threat using digital health technologies in healthcare delivery. *ResearchGate*. https://www.researchgate.net/publication/381325045

[26] Maddux, J. E., & Rogers, R. W. (1983). *Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change*. Journal of Experimental Social Psychology, 19(5), 469–479. https://doi.org/10.1016/0022-1031(83)90023-9

[27] McLeod, A., Dolezel, D., & Cogdell, M. (2017). *Health care providers' compliance with HIPAA mandates: The role of IT, organizational, and contextual factors*. Health Care Management Review, 42(1), 14–24. https://doi.org/10.1097/HMR.0000000000000089

[28] Menachemi, N., & Collum, T. H. (2011). *Benefits and drawbacks of electronic health record systems*. Risk Management and Healthcare Policy, 4, 47–55. https://doi.org/10.2147/RMHP.S12985

[29] Moy, E. G., Davila, H. T., & Ward, T. R. (2023). Clinician burden and perceptions of EHR documentation features: A national survey. *Journal of the American Medical Informatics Association, 30*(5), 797–805. https://academic.oup.com/jamia/article/30/5/797/7076268

[30] Moy, E. G., Davila, H. T., & Ward, T. R. (2023). Clinician burden and perceptions of EHR documentation features: A national survey. *Journal of the American Medical Informatics Association, 30*(5), 797–805. https://doi.org/10.1093/jamia/ocad022

[31] Olakotan, O. O., Al-Anazi, M. H., & Khaleel, I. (2025). Scoping review of EHR documentation burden: Impacts on clinician performance and usability. *BMC Medical Informatics and Decision Making, 25*(1). https://pmc.ncbi.nlm.nih.gov/articles/PMC12206486/

[32] Purkayastha, D., Patel, M., & Bashir, M. (2021). Authentication methods in health IT: Balancing usability and security. *arXiv preprint*. https://arxiv.org/abs/2102.11849

[33] Rogers, R. W. (1975). *A protection motivation theory of fear appeals and attitude change*. Journal of Psychology, 91(1), 93–114. https://doi.org/10.1080/00223980.1975.9915803

[34] Shojaei, S., Alimardani, M., & Babaei, A. (2024). A systematic review on EHR access control models and security technologies. *Computers, 13*(2), 41. https://www.mdpi.com/2073-431X/13/2/41

[35] Tertulino, A. V., da Silva, E. V., & Oliveira, R. A. (2024). A systematic mapping review on privacy requirements in electronic health record systems. *Journal of Public Health, 32*, 153–162. https://link.springer.com/article/10.1007/s10389-022-01795-z

[36] Uslu, A., Stausberg, J., & Mihaljevic, M. (2021). Electronic health records: A review of usability and effectiveness. *Journal of Medical Internet Research, 23*(12), e26323. https://www.jmir.org/2021/12/e26323/

[37] Uslu, A., Stausberg, J., & Mihaljevic, M. (2021). Electronic health records: A review of usability and effectiveness. *Journal of Medical Internet Research, 23*(12), e26323. https://doi.org/10.2196/26323

[38] Monirah A. Albabtain, Dalal AlOtaibi, Nourah AlMazial, Nouf Aloudah, Haneen Mohammed Alghosoon, Amr A. Arafat. (2024). Healthcare Professional's Knowledge, Awareness, and Attitude toward Patients' Data Privacy and Security in Clinical Research. *Saudi J Health Syst Res*, 4 (2): 92–102. https://doi.org/10.1159/000538617

[39] Seh, A. H., Zarour, M., Alenezi, M., Sarkar, A. K., Agrawal, A., Kumar, R., & Khan, R. A. (2020). Healthcare Data Breaches: Insights and Implications. *Healthcare (Basel, Switzerland)*, *8*(2), 133. https://doi.org/10.3390/healthcare8020133

[40] Al-Somali, S. A., Saqr, R. R., Asiri, A. M., & Al-Somali, N. A. (2024). Organizational Cybersecurity Systems and Sustainable Business Performance of Small and Medium Enterprises (SMEs) in Saudi Arabia: The Mediating and Moderating Role of Cybersecurity Resilience and Organizational Culture. *Sustainability*, *16*(5), 1880. https://doi.org/10.3390/su16051880

[41] HHS.gov. (n.d.). Summary of HIPAA privacy rule. https://www.hhs.gov/hipaa/for-professionals/privacy/laws-regulations/index.html

[42] Alqarni, M. A., Al-Wabel, S. A., & Alkhaldi, T. M. (2020). Health professionals' knowledge, attitudes, and practice toward HIPAA regulations. *Journal of Multidisciplinary Healthcare*, 13, 1639–1647. https://doi.org/10.2147/JMDH.S277017

[43] Lee, Y., Kim, S., & Choi, J. (2021). Development and validation of the Information Security Attitude Questionnaire for clinical nurses. *Healthcare Informatics Research*, 27(2), 103–112. https://doi.org/10.4258/hir.2021.27.2.103

[44] Maillet, É., Mathieu, L., & Sicotte, C. (2015). Modeling factors explaining the acceptance, actual use and satisfaction of nurses using an electronic patient record in acute care settings: An extension of the UTAUT. *International Journal of Medical Informatics*, 84(1), 36–47. https://doi.org/10.1016/j.ijmedinf.2014.09.004

[45] Parsons, K., Calic, D., Pattinson, M., Butavicius, M., McCormac, A., & Zwaans, T. (2017). The human aspects of information security questionnaire (HAIS-Q): Two further validation studies. *Computers & Security*, 66, 40–51. https://doi.org/10.1016/j.cose.2017.01.004

[46] Basil, N. N., Ambe, S., Ekhator, C., & Fonkem, E. (2022). Health Records Database and Inherent Security Concerns: A Review of the Literature. *Cureus*, *14*(10), e30168. https://doi.org/10.7759/cureus.30168

[47] Quazi, F., Raju, N., Gorrepati, N., & Abdul Kareem, S. (2024). Blockchain Applications in Electronic Health Records (EHRs). International Journal of Global Innovations and Solutions (IJGIS). https://doi.org/10.21428/e90189c8.5043b7de