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Nurses' Informatics Competency Assessment, Perceived Usability, And Implementation Of Electronic Health Records In A Tertiary Hospital In Quezon City, Philippines

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ABSTRACT

Background: Electronic Health Records (EHRs) have been available for the past few decades; however, the geographical disparity in their procurement and utilization varies greatly across countries, based on their healthcare financing schemes, which are significantly influenced by national budget allocations for health and the level of capitalism. The Philippines, a developing country, houses some of the leading healthcare institutions in Southeast Asia. One of which, the research locale of this study, has just recently acquired its EHR and is undergoing a transition towards its full utility. Aligned with this transition is the need to ensure that nurses, as one of the primary end-users of this newly acquired technology, are proficient in its use. It is based on the increasing necessity for digitizing healthcare in the Philippines, particularly with the move towards universal healthcare and the necessity for effective, technology-based patient management. Hence, arriving at the main objective of this study, which is to examine the role of nurses' informatics competence and perceived ease of use of Electronic Health Records (EHRs) in successful implementation in healthcare environments. The selected hospital location is a model of best practices for the utilization of EHRs, providing an appropriate setting for consideration of how technology tools affect the quality of care.

The research highlights three interconnected areas: nurses' informatics competency, the perceived usability of EHR systems, and the effectiveness of EHR implementation on patient care outcomes. Competency in informatics ensures accurate documentation and data use, while usability influences whether nurses can efficiently and confidently navigate EHRs. Successful implementation relies not only on technology itself but also on training, infrastructure, and organizational support. Ultimately, the study highlights the need to enhance nurses' skills, improve system usability, and facilitate implementation for maximizing patient outcomes and maintaining digital healthcare transformation.

Methods: In this study, the researcher used a quantitative approach to understand how nurses' informatics skills and their experience using Electronic Health Records (EHRs) impact patient care. To do this, they used correlation methods (like Pearson's r, Spearman's rho, and Kendall's Tau-B) to explore how strongly these factors are connected. They also applied regression analysis to see if better informatics skills and perceived EHR usability could predict better patient outcomes. Finally, a mediation analysis helped show that when nurses find EHR systems easier to use, their informatics skills have an even stronger effect on the quality of care, making usability an important link between skill and performance.

Result: This study explored how nurses' informatics competency and the perceived usability of Electronic Health Records (EHRs) jointly influence patient healthcare outcomes. Results across correlation, regression, and mediation analyses consistently showed that both factors significantly and positively affect care effectiveness. Informatics competency was strongly correlated with better outcomes ($r = 0.682$), while EHR usability showed an even stronger relationship ($r = 0.787$). Regression analysis revealed that informatics skills explained 46.6% of outcome variance, and usability explained 62%. Mediation analysis confirmed that perceived usability serves as a key bridge between competency and performance, with a stronger indirect effect ($\beta = 0.429$) than the direct one ($\beta = 0.253$). Overall, the study emphasizes that improving both nurses' digital skills and the usability of EHR systems is essential for enhancing patient outcomes.

Conclusion: This study concludes that both nurses' informatics competency and the perceived usability of Electronic Health Records (EHRs) significantly improve patient healthcare outcomes. Informatics skills enhance how nurses perceive EHR systems, which in turn leads to better clinical performance and care quality. The mediation analysis highlights usability as a crucial link between technical skills and patient outcomes. Therefore, improving both informatics training and EHR design is essential for delivering safer, more efficient, and patient-centered care.

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1. INTRODUCTION

Healthcare technology integration, particularly through Electronic Health Records (EHRs), has greatly changed the management of patient data and clinical decision-making. Nurses are crucial to the use of the EHR systems, and their informatics skillset of data analysis, communication, and navigation of the computer-based tools directly contributes to the effectiveness of the patient care (Brennan & Bakken, 2021). Their own views of the EHR usability, such as workflow integration and the system function, further shape adoption and the effectiveness (Kaipio et al., 2016). In spite of the mounting worldwide use of EHRs, there is still limited literature connecting the nurses' informatics competence and perceptions of the usability to real patient outcomes. Evidence indicates that though the high-income nations report nearly universal use of the EHRs, low- and middle-income countries continue to struggle with issues such aslimited infrastructure and training (Sharma et al., 2022). Evidence highlights the importance of user-centered design to optimize system effectiveness and long-term implementation (Lee et al., 2023), and participatory design strategies are most notable in Southeast Asia as optimized system usability by taking into account local requirements (Nguyen et al., 2021). Ongoing training, strict assessment, and ethical deployment are necessary to maximize the EHR implementation and guarantee better healthcare delivery (Johnson et al., 2022; Wang et al., 2023).

2. METHODS

Research Design

Survey-Correlational Design:

This approach employs formal questionnaires to investigate how variables like nurses' informatics competence, usability of EHRs, and perceptions of health outcomes interact. It assists in describing associations and patterns depending on the characteristics of respondents (McCombes, 2023).

Regression Analysis:

This approach examines the predictive association between independent variables (e.g., informatics proficiency) and dependent outcomes (e.g., patient care quality perception). It also estimates and accounts for variable effects to aid data-driven inferences (Ali et al., 2021).

Mediation Analysis:

This approach examines whether perceived ease of use of EHRs functions as a mediator between informatics ability and success in implementing EHRs. It serves to determine indirect paths and mechanisms that affect outcomes (Rijnhart et al., 2021).

Respondents of the Study

245 direct patient care nurses were chosen from the population of 670 from a private health facility in Quezon City. Simple random sampling will be employed using ID numbers or email addresses with the aid of a computer-based tool to provide equal opportunities for selection, minimize bias, and maximize the validity and generalizability of the findings (Rahi, 2017; Stockemer, 2019).

3. RESULT

1. **What is the level of nurses' informatics competency?**

Study participants, who were nurses, expressed the greatest confidence in complying with data protection and security (mean = 4.4), followed by working in a digital healthcare environment and basic IT skills (mean = 4.3). Furthermore, high ratings were posted on the documentation of patient care (nursing process) documentation to an EHR/client system and use of clinical guidelines and evidence-based information (means = 4.1–4.2), reflecting a strong competence in electronic documentation. But mean scores were lower in supporting a client in self-care through e-service (3.6) and supporting a client in choosing appropriate services (3.5), indicating a patient-facing digital skills gap.

These results are consistent with research by Jarva et al. (2024) and Kleib et al. (2024), which find that nurses perform well in documentation but fall short in higher-level digital skills such as patient education and shared decision-making. Kinnunen et al. (2023) called for systematic training to progress from the elementary skills. Overall, the nurses are technically digitally literate but require more development in collaborative and patient-focused digital care (McKenna et al., 2023; WHO, 2020).

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2. What is the assessment of the nurses' usability of the Electronic Health Record system?

Nurses indicated a high usability in such aspects as ease of learning (mean = 6.38), responsiveness (6.3), and assisting in preventing duplicate tests (6.3), which implies that the EHR is intuitive and effective overall. The routine tasks can be performed straightforwardly also scored high (5.96), which suggests that basic functionality is available.

A number of usability problems did crop up, though. Nurses rated low in terms of clarity (2.73), simplicity in correcting the errors (2.58), and the logic of the system (3.12), which indicates the design and interface of the weaknesses. Coordination among the nurses and physicians was also rated low (2.69), demonstrating the poor interdisciplinary support. Surprisingly, the system was also perceived as taking away from the patient care (6.36), a point of concern regarding the cognitive load. The study demonstrates a substantial usability gap across user interface, teamwork, and cognitive ergonomics, which emphasizes the urgent need to redesign EHRs from a nurse's perspective.

These results are consistent with the previous research. Research by Davoody & Font (2025) and Viitanen et al. (2022) describes how a poor interface design and imprecise language augment nurse workload. Abdolkhani et al. (2022) and Palojoki et al. (2024) point out that the absent nursing input in design impedes the workflow and teamwork. Despite the extensive training and initial comfort, as Mwogosi & Simba (2025) reported, usability needs to accommodate the real-time clinical reasoning to be maximally useful.

3. What is the perceived effectiveness on patient outcomes?

Nurses rated the EHRs most favorably for improving team coordination and care efficiency, with high marks for aiding the concurrent clinical decisions (3.94), enhancing documentation (3.88), and minimizing the mental workload and burnout (3.84). These results imply that EHRs are viewed as a valuable mechanism for internal workflow and collaboration. Conversely, the lowest scores were in the patient-centered outcome areas, such as shortening waiting times (2.07), lowering healthcare expenditures (2.39), and assisting patients in comprehending records (2.52), suggesting a low perceived value in participation and availability. Moderate ratings in data privacy and compliance with the regulations (3.66) reinforce the strengths of EHRs in systematic, administrative processes. The net outcome, however, is a paradox: EHRs enhance institutional processes but fail to augment patient experience and empowerment.

This is echoed in current literature, such as Canfell et al. (2024) and Snowdon et al. (2024), which identify that although digital platforms facilitate clinical processes, their face-to-face value is limited. Research by Davoody & Font (2025) and Kleib et al. (2024) emphasizes the importance of systems that integrate technical efficiency with relational and emotional care. Finally, Hussein et al. (2024) underscore that beneficial outcomes are contingent upon empowering nurses with adequate tools and independence, currently deficient in areas such as care planning and centralized access.

4. Is there a significant linear relationship between the nurses' informatics competency and effectiveness in patient health care outcomes using Electronic Health Record?

The Pearson's r, Spearman's rho, and Kendall's Tau-B tests were utilized in this study to explore the correlation between the nurses' informatics and competency and their ability to enhance patient care outcomes using the EHR. All three tests provided a statistically significant and strong positive correlation (p < .001), which ensured that greater informatics competency is associated with improved healthcare provision.

Pearson's r (0.682) reported a linear relationship, whereas Spearman's rho (0.706) and Kendall's Tau-B (0.557) validated the reliability of the trend, even with non-linear data, demonstrating the strength of the findings. The triangulation method in this way also enhances the validity and credibility of the results by providing consistent results through several statistical measures. In conclusion, the evidence supports that informatics competency in nursing is a major driver of effective use of EHRs and good patient outcomes. Healthcare institutions ought to emphasize formal informatics training for maximum EHR value and enabling high-quality, evidence-based care.

The research corroborates earlier studies (Alquraini et al., 2020; Liang et al., 2021; Collins et al., 2022), which demonstrated that the informatics competencies enable accurate documentation, patient-centered care, and enhanced team communication. Scholars such as Wang & Lee (2023) emphasize that expenditures on the informatics training result in enhanced quality of care, adherence to treatment, and efficient workflow.

5. Is there a significant linear relationship between the perceived usability of Electronic Health Records and effectiveness in patient health care outcomes?

The present study explores the relationship between the patient healthcare outcomes and the perceived usability of EHR systems through three statistical approaches: Pearson's r (0.787), Spearman's rho (0.829), and Kendall's Tau-B (0.673). All the tests indicated a robust, statistically significant positive correlation (p < .001), verifying that greater EHR usability is highly related to improved patient outcomes. In summary, the research emphasizes the necessity of investment in user-focused EHR design and supports global guidelines to emphasize usability in system evaluation and implementation

The results highlight that usability is a key determinant of clinical efficiency and safety. When EHRs are simple to use and

intuitive, healthcare providers utilize them more optimally, enhancing documentation, decision-making, and care continuity (Zhao et al., 2021; Ratwani et al., 2022). Triangulation, corroboration, and confirmation through the application of multiple statistical techniques fortify the research with credible results despite challenging clinical data (Manca et al., 2023; Lu & Wu, 2024).

6. **Is there a significant predictive relationship between the nurses' informatics competency and effectiveness in patient health care outcomes using Electronic Health Record?**

This study employed a linear regression analysis to determine if the informatics competency of the nurses predicts the patient healthcare outcomes via EHR application. Findings revealed a moderately high correlation (R = 0.682), and 46.6% of patient outcome variance was explained by informatics competency (R^2 = 0.466). The regression slope (B = 0.777, p < .001) validated a significant positive predictive impact, meaning that more informatics capabilities result in improved patient outcomes. Utilization of triangulated statistical techniques (correlation and regression) enhances the validity of the study through confirmation and corroboration. Finally, the research calls for institutional investment in informatics education, situating digital proficiency as an essential element in the contemporary, EHR-enabled healthcare provision.

Model diagnostics (AIC = 427, BIC = 437, RMSE = 0.571, Durbin–Watson = 2.02) validated the reliability, accuracy, and the independence of the residuals in the model. These results are consistent with the earlier research (Zhang et al., 2023; Mendes et al., 2022), highlighting the effect of the informatics competency on clinical performance, error reduction, and patient safety.

7. **Is there a significant predictive relationship between the perceived usability of Electronic Health Records and effectiveness in patient health care outcomes?**

The perceived usability of Electronic Health Records (EHRs) was found to be a significant and statistically strong predictor of enhanced patient healthcare outcomes. Employing linear regression analysis, it was found that there was a strong correlation (R = 0.787) and that 62% of the variance in patient outcomes (R^2 = 0.620) could be accounted for by how easy nurses perceive the EHR system to use. The coefficient for usability was highly significant (β = 0.751, p < .001).

Model fit was robust, as evidenced by low RMSE (0.481) and positive AIC/BIC statistics, although the Durbin–Watson statistic (2.36, p = 0.008) was suggestive of mild negative autocorrelation, implying that the residuals are not completely independent. A Q–Q plot, however, revealed residuals to be roughly or normally distributed, supporting the assumptions of the model.

These findings emphasize that the intuitive EHR systems have a direct effect on the quality of care, confirming earlier studies (Graves & Gillespie, 2022; Benedict et al., 2023). The research recommends prioritizing the usability of the EHR during design, training, and implementation to increase clinical effectiveness, decision-making, and patient-centered care.

8. **Is there a significant mediating relationship between nurses' informatics competency, perceived usability using Electronic Health Records, and its effectiveness on patient health care outcomes?**

The present research investigated whether perceived usability of Electronic Health Records (EHRs) acts as a mediator between nurses' informatics competency and patient healthcare outcomes. In a mediation analysis, informatics competency emerged to significantly impact perceived usability (path coefficient = 0.84), which is also a strong predictor of patient outcomes (path = 0.58). The direct effect of the informatics competency on the patient outcomes (0.29) was less than the indirect effect (~0.49), which is an indication of the partial mediation.

This indicates that although the informatics education provides nurses with technical capabilities, how they see EHRs being used enhances their potential to make a difference in patient outcomes. This can be supported through theories such as the Technology Acceptance Model (TAM), which focuses on ease of use and perceived usefulness in technology adoption.

The study emphasizes the necessity of a dual strategy and enhancing informatics education and EHR system usability to optimize clinical efficacy. It also showcases the strength of triangulation, corroboration, and confirmation in verifying intricate relationships, supporting the pivotal position of user experience in digital healthcare success.

9. **What mediation analysis can be developed to enhance the effectiveness of patient health care outcomes through nurses' informatics competency and perceived usability of Electronic Health Record?**

In this study, the mediation analysis was used to examine how the nurses' informatics competence impacts the patient healthcare outcomes via the perceived ease of the use of Electronic Health Records (EHRs). The findings showed a significant and strong indirect effect (β = 0.429, effect size = 0.489, p < .001), such that more competent nurses perceive the EHR systems as more usable, which ultimately leads to better patient outcomes. The route from the informatics competency to perceived usability (β = 0.705) and from perceived usability to the patient outcomes (β = 0.609) was both large and extremely significant. Furthermore, the direct impact of the informatics competency on the patient outcomes (β = 0.253, p < .001) was still significant, supporting partial mediation. This indicates that the informatics competency influences patient outcomes directly and indirectly via usability perception. Overall impact of the informatics competency on outcomes was

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significant (β = 0.682), signifying its vital importance in the delivery of healthcare services.

These results support a strong mediation framework under which the perceived usability is an important mechanism that relates to the nurses' technical ability to actual clinical performance. The research stresses that although informatics training is essential, it must be complemented. Healthcare organizations also need to prioritize usability and design of EHR systems to attain the highest benefits from them. This outcome supports current literature that calls for integrated solutions combining digital competence development with user-focused design enhancement. Generally, the study confirms that the enhancement of informatics competency as well as the usability of EHRs is necessary to obtain more efficient, effective, and patient-centered care in the digital health care settings today.

4. CONCLUSION

These findings validate that both nurses' informatics capability and usability of Electronic Health Records (EHRs) are important and related as predictors of enhanced patient health care outcomes. Informatics capability supports and usability perceptions for the EHRs, and improving usability further enhances the clinical performance, documentation quality, and patient safety. These results identify the necessity of healthcare facilities to emphasize informatics education and user-friendly EHR design. The educators, IT professionals, and policymakers have to collaborate in order to make the systems functional as well as easy to use. Finally, the research warrants a dual-task action plan improving the competencies of the nurses and EHR usability as a strategic route to optimal patient outcomes in virtual healthcare environments.

5. CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest related to the conduct of this study. No financial, personal, or professional affiliations influenced the research process, analysis, or interpretation of the findings. All efforts were made to ensure objectivity, transparency, and integrity throughout the course of this study.

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