IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

ELECTRONIC HEALTH RECORDADOPTION, CLINICAL WORKFLOW EFFICIENCY IN NURSING PRACTICE AND USER SATISFACTION AMONG NURSES IN A GOVERNMENT HOSPITAL IN DIGOS CITY

[1]Ilda Lekka R. Zapanta, RN, RM, MPA, [2]Morsid Kabang Tulao, RN, MAN, CHA, PhDM,
[1]Master of Arts in Nursing Candidate, [2]Professor
[1]Graduate Program of Davao Doctors College,
[1]Davao Doctors Colleges, Inc., Davao City, Philippines

Abstract: This study aimed to investigate the Electronic Health Record (EHR) adoption, clinical workflow efficiency in nursing practice, and user satisfaction among nurses in a government hospital in Digos City. Utilizing a predictive-correlational research design, data from 150 nurses were gathered using a researcher-made questionnaire. The questionnaire underwent rigorous validation by three experts in the field of research, ensuring its content validity and reliability, as evidenced by I-CVI and S-CVI values of 1.0 and Cronbach alpha results of 0.781 to 0.892. Results revealed that nurses relatively adopt the implementation of EHR mainly because of its usefulness and less agreement on its ease of use. They also reported a high level of clinical workflow efficiency primarily on patient handoff effectiveness but needs improvement as to medication administration accuracy. Further, nurses were highly satisfied with EHR implementation mainly because of organizational support but least about its overall impact. Furthermore, there is no significant relationship between EHR adoption towards the clinical workflow and user satisfaction. Also, EHR implementation does not predict clinical workflow efficiency in nursing practice and user satisfaction. Moreover, only demographic profiles sex, and length of service moderate the clinical workflow efficiency and user satisfaction among the respondents. The integration of EHR systems into the clinical workflow offers numerous benefits in nursing practice, requiring attention, coordination, and much effort in collaboration among nurses and clinical decision-making.

Keywords: *workflow efficiency, social science, predictive-correlational, Digos City, Philippines*

INTRODUCTION

The use of electronic health records (EHR) aims to improve patient care but has presented challenges for nurses, affecting their satisfaction, efficiency, and quality of patient care (Smith & Jones, 2019; Johnson & Brown, 2020; Garcia & Martinez, 2021; Lee et al., 2022; Patel et al., 2023). Initial findings from a government hospital in Digos City revealed that EHR implementation led to disruptions in workflow, process delays, and increased stress levels. Contrary to expectations, EHRs did not uniformly improve nurse satisfaction (Reyes et al., 2022), and uncertainty persists regarding nurse's satisfaction levels with EHR usage.

The global focus on EHR adoption is evident in countries like New Zealand, Germany, Italy, and Ireland (Alkaraiji et al., 2019; Walker et al., 2019). Further, financial constraints hinder equipment acquisition and training programs in some London and Canadian government hospitals (Vernon et al., 2021). Although there has been an increase in EHR adoption in Australia, staffing shortages and the need for additional time and financial resources for implementation also present significant challenges (Santos et al., 2021; Reyes & Garcia, 2022).

ASEAN nations, including Thailand, Singapore, Malaysia, and Indonesia, face EHR adoption challenges due to interoperability issues, cybersecurity threats, and workforce capacity constraints (Tan et al., 2020; Lim et al., 2020; Phua et al., 2020). Limited infrastructure and fragmented healthcare systems exacerbate healthcare access and quality disparities, particularly in rural areas (Ng et al., 2022; Chen et al., 2020). Moreover, transitioning from paper-based to electronic health records in Hong Kong, Iran, and Thailand may cause disruptions in clinical workflows, resulting in inefficiencies and potential errors (Johnson & Brown, 2020).

In Mindanao, Philippines, healthcare providers in some government hospitals, particularly in Metro Manila, Sarangani, General Santos City, and Cotabato City face significant challenges in HER adoption, including a lack of trust in EHR systems, infrastructure limitations, and data input difficulties (Santos et al., 2020; Garcia & Martinez, 2021; Smith & Jones, 2019), resulting in cautious decision-making among professionals (Koh et al., 2023) and disruptions in patient interactions (Smith & Jones, 2019). Additionally, shortages in trained I.T. personnel and cybersecurity expertise pose significant barriers to effective EHR implementation and maintenance (Reyes & Martinez, 2023; Tan et al., 2019).

Despite efforts to address these issues, there is a significant research gap regarding the lasting impact of EHR integration on nurse satisfaction and patient care quality, especially in Digos City, Davao del Sur, Philippines. Studies have shown nurses dissatisfaction (Smith & Jones, 2019; Reyes et al., 2022), while another research suggests these challenges may exacerbate over time (Smith et al., 2019; Garcia et al., 2023). However, more research is needed on EHR adoption, clinical workflow efficiency, and user satisfaction in the unique setting of a government hospital in Digos City. This research gap highlights the need to explore EHR adoption dynamics in this locale further and its impact on frontline healthcare providers and patient outcomes.

THEORETICAL FRAMEWORK

This study was grounded in the Technological Acceptance Model (TAM) theory proposed by Fred Davis in 1989, which posits that perceived usefulness and ease of use are critical determinants of an individual's intention to use and adopt new technologies. Research by Johnson et al. (2019) supports this, demonstrating that nurses are more likely to embrace EHR systems if they perceive them as helpful in improving patient care and as easy to use in their daily workflows. Furthermore, the study by Chen et al. (2021) highlights the importance of perceived usefulness and ease of use in driving user satisfaction with EHR systems among nurses. This underscores the relevance of TAM in explaining nurses' acceptance and satisfaction with EHR systems in the specific context of a government hospital in Digos City.

Moreover, applying TAM offers insights into how EHR adoption affects clinical workflow efficiency and nurse job satisfaction. Rodriguez et al. (2022) demonstrate that nurse's perceptions of EHR systems significantly impact their efficiency in completing clinical tasks, underscoring the importance of perceiving EHR systems as valuable tools for streamlined workflows. Patel et al. (2023) further reveals those continuous improvements in perceived usefulness and ease of use lead to enhanced efficiency and decreased documentation errors, highlighting TAM's role in identifying factors crucial for successful EHR integration and improved patient care quality.

Additionally, TAM serves as a framework for identifying and addressing challenges encountered during EHR adoption. By examining perceived ease of use and usefulness, healthcare organizations can develop targeted interventions to promote successful EHR implementation, fostering a culture of acceptance and proficiency among nurses. Furthermore, TAM provides insights into the broader implications of EHR adoption on organizational performance. By aligning EHR adoption efforts with organizational goals, healthcare organizations can maximize the benefits of EHR systems, enhancing efficiency, productivity, and patient outcomes. Thus, TAM is a powerful tool for guiding decision-making and driving successful EHR adoption initiatives within healthcare organizations.

Conceptual Framework

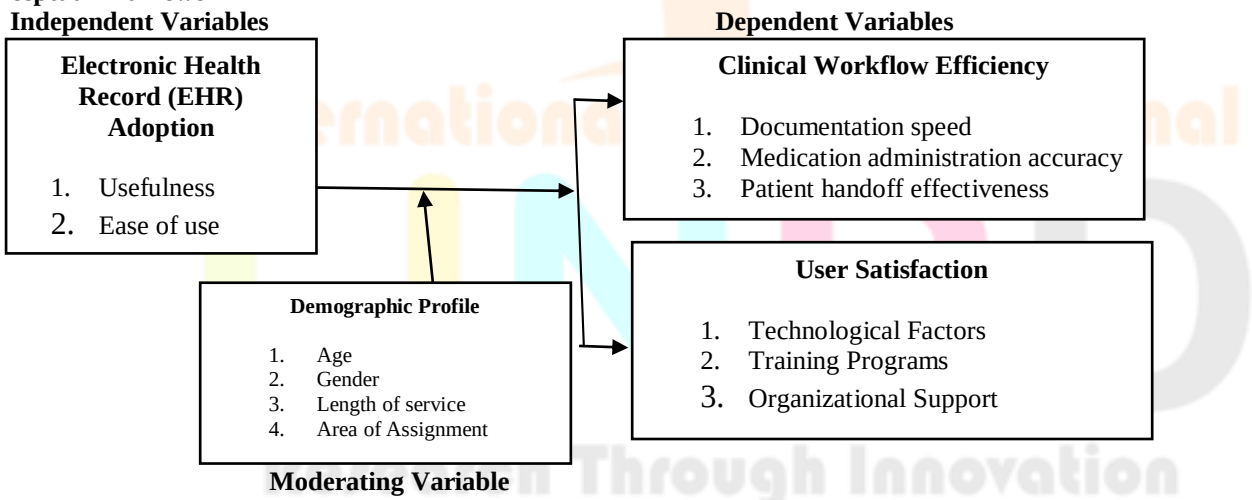

Figure 1: Research Paradigm

The conceptual framework outlined above investigates the EHR adoption on clinical workflow efficiency and user satisfaction, considering the moderating influence of demographic profile variables. The independent variable is EHR utilization regarding perceived usefulness and ease of use.

Further, the framework centers on two key aspects: clinical workflow efficiency and user satisfaction with EHR systems (Doe et al., 2022). Clinical workflow efficiency assesses documentation speed, medication administration accuracy, and patient handoff effectiveness. User satisfaction includes perceptions of technology, training effectiveness, and organizational support. Additionally, healthcare professionals' demographic profiles, such as age, sex, length of service, and area of assignment, act as moderating variables. These factors aim to reveal potential variations in perceptions among healthcare professionals. By integrating these elements, the study aims to comprehensively understand EHR's impact while considering demographic characteristics. This framework guides data analysis, providing insights into EHR adoption dynamics.

RESEARCH METHODOLOGY

This chapter detailed the research methods used to conduct the study and was organized into several sections that provided a framework for describing the research procedures. The researcher observed the quantitative research process in this chapter, which included the research design, settings, study participants, measures, ethical considerations, methods, and data analysis.

Research Design

The study employed a predictive correlational research design to investigate the relationships between EHR adoption, clinical workflow efficiency, and user satisfaction among nurses. Hair et al. (2019) state that this design is particularly suited for investigating correlations between multiple variables and utilizing these relationships to predict outcomes. Through statistical analysis, the study identified correlations between the predictor variable (EHR adoption) and the outcome variables (clinical workflow efficiency and user satisfaction). These correlations provided insights into how EHR adoption changes may influence clinical workflow efficiency and user satisfaction.

Additionally, the study utilized predictive modeling techniques to forecast future outcomes based on the identified correlations. By developing predictive models, researchers can anticipate the potential effects of EHR adoption on clinical workflow efficiency and user satisfaction. These predictive capabilities enable healthcare decision-makers to make informed decisions regarding technology deployment and support, ultimately improving patient care outcomes. Overall, the study's predictive correlational approach allows researchers to explore existing relationships between variables and forecast future outcomes, offering valuable insights for healthcare organizations aiming to optimize EHR implementation and enhance nursing practice.

Setting

The study was conducted at a government hospital in Digos City, Philippines, serving as a crucial healthcare hub for the local community and surrounding areas. Situated in Davao del Sur, Philippines. The hospital boasted a 100-bed capacity and provided various medical services across multiple specialties. From routine check-ups to specialized treatments and surgeries, the hospital catered to diverse healthcare needs through its multiple specialty departments, including internal medicine, surgery, pediatrics, obstetrics and gynecology, ophthalmology, orthopedics, and more.

Beyond its primary healthcare role, the hospital played a vital part in medical education and training. It served as a training and teaching facility for medical students and professionals, offering hands-on experience and practical knowledge in real-world healthcare settings. Collaborating with various medical schools and institutions, the hospital contributed significantly to the growth and development of aspiring healthcare professionals in the region.

Strategically located on Lim Street, Zone III, Digos City, the hospital enjoyed a central position within the city, ensuring accessibility for patients from both urban and rural areas. Its strategic location enabled it to effectively address the healthcare needs of a diverse population, including urban residents and nearby rural communities. Overall, the government hospital in Digos City stood as a dynamic and indispensable healthcare institution, providing essential medical services, educational opportunities, and community support to residents of Davao del Sur and beyond.

The researcher conducted the study in Digos City, Davao del Sur, due to their current affiliation with a hospital in the area. Further, the researcher sought insights into fellow staff nurses' perceptions of electronic health record adaptation, clinical workflow efficiency, and user satisfaction related to EHR implementation in their organizations. Through this study, the researcher aimed to contribute valuable insights to enhance and maintain quality care across various healthcare settings.

Participants

The respondents in this study consisted of 150 staff nurses employed at the selected government institution in Digos City. These individuals were chosen using a complete enumeration method, including all eligible members from the defined group of staff nurses. Total enumeration was selected as the sampling method for this study to ensure that all eligible staff nurses from the chosen government institution in Digos City were included. This approach provided maximum representation of the target population, capturing diverse perspectives and experiences related to EHR adoption. By including all relevant stakeholders, the study obtained firsthand insights into the influence of EHR systems on clinical workflow efficiency and user satisfaction. Overall, total enumeration facilitated trust and engagement among participants, contributing to a comprehensive understanding of the study's objectives.

To be eligible for participation, respondents had to meet two essential criteria: being of legal age and being employed as a staff nurse at the selected institution. The legal age criteria ensured that all participants were adults capable of providing informed consent to participate in the study. Being a staff nurse at the selected institution was crucial as it ensured that the participants were directly involved in using the EHR system within their workplace.

The participants represented a diverse group of healthcare professionals, each bringing unique perspectives and experiences to the study. Their firsthand experiences with the EHR system allowed them to provide valuable insights into its functionality, usability, and impact on workflow and user satisfaction. Respondents were assured of confidentiality, anonymity, and voluntary throughout the study. They were provided with clear information about the purpose of the study, their rights as participants, and the procedures involved. Additionally, they were allowed to ask questions and seek clarification before participating.

Measures

The study utilized a researcher-made questionnaire that underwent rigorous scrutiny and validation by three experts in the field of research. The Content Validity Test (CVI) results demonstrated excellent content validity for all constructs and sub-constructs. For the Perception of EHR Adoption, Ease of Use, and Usefulness sub-constructs, all items received an I-CVI value of 1.0, indicating high agreement among experts regarding their relevance. The Scale-Level Content Validity Index (S-CVI) values were also 1.0, indicating

unanimous agreement on the significance of all items. Similar results were observed for the Perceived Impact on Workflow Efficiency and User Satisfaction constructs and their respective sub-constructs.

Furthermore, reliability testing revealed high internal consistency reliability for all constructs. Cronbach's alpha values ranged from 0.781 to 0.892, indicating excellent reliability for most scales. This suggests that the questions in the questionnaire consistently measure the intended constructs and are highly suitable for the study. In summary, the questionnaire demonstrated excellent content validity and reliability. It supports its use in the survey to assess perceptions of EHR adoption, perceived impact on workflow efficiency, and nurse user satisfaction.

Moreover, the questionnaire consisted of multiple sections designed to gather data on various aspects of EHR adoption, workflow efficiency, and user satisfaction among staff nurses. In the first section of the questionnaire, participants provided demographic information, including their age, sex, length of stay, and area of assignment within the institution. This demographic data allowed for the characterization of the sample and potential exploration of demographic influences on perceptions and outcomes. Subsequent sections of the questionnaire assessed participant's perceptions of EHR adoption, workflow efficiency, and user satisfaction. Participants were asked to rate their agreement with statements related to these topics using a 5-point Likert scale, where one (1) indicated "strongly disagree" and five (5) indicated "strongly agree" as shown in Table 1.

Specifically, in the section on EHR adoption, participants were asked to assess the ease of use and usefulness. Questions in this section aimed to gauge participants' attitudes and perceptions regarding the usability and benefits of the EHR system in their daily work. The section on workflow efficiency focused on assessing the perceived impact of EHR adoption on various aspects of nursing practice, including documentation speed, medication administration accuracy, and patient handoff effectiveness. Participants were asked to rate how much they believed the EHR system affected these aspects of their workflow.

Lastly, the section on user satisfaction sought to evaluate participant's overall satisfaction with the EHR system, including satisfaction with technological factors, training programs, and organizational support related to EHR implementation. Participant's responses in this section provided insights into their overall satisfaction with the EHR system and associated support structures.

Table 1: Likert Scale Ratings: Perception of Electronic Health Record Adoption, workflow Efficiency, and User Satisfaction

Rating	Description	Descriptive Interpretation
5	Strongly Agree (SA)	The respondent strongly favors the statement in all cases.
4	Agree (A)	The respondent strongly favors the statement in the majority of the cases.
3	Neither Agree nor Disagree (NDA)	The respondent is undecided.
2	Disagree (DA)	The respondent is not in favor of the statement in a few cases.
1	Strongly Disagree (SDA)	The respondent is not in favor of the statement in all cases.

Ethical Considerations

Social Value. The study aimed to determine the relationship between electronic health record adoption, clinical workflow efficiency, and user satisfaction among nurses in a government hospital in Digos City. The study aimed to assess the level of EHR adoption among nurses, evaluate the impact of EHR adoption on clinical workflow efficiency, and explore the level of user agreement among nurses. By examining these factors, the study sought to understand how EHR adoption affected the efficiency and accuracy of clinical processes and documentation and the nurses' perceptions and experiences with EHR systems. The findings of this study could inform healthcare policies and practices, providing insights to enhance EHR adoption, optimize clinical workflow efficiency, and improve user satisfaction among nurses in the government hospital setting. Ultimately, the study aimed to contribute to improving healthcare delivery and patient outcomes through evidence-based decision-making and developing effective strategies.

Risks and Benefits. The questionnaire asked about the participants' personal experiences, which entailed personal reflections. It was ensured that the study was used for research purposes only. The benefits of this study could have helped the researchers initiate intervention activities that could address the experiences the researchers had incurred. This research served as a foundation for establishing focused, therapeutic actions by understanding the participant's personal experiences. These interventions addressed and enhanced the specific experiences the researchers had faced in their duties and responsibilities, ultimately promoting a more positive and productive work environment for everybody concerned.

Voluntary Participation. The respondents' participation in this study was voluntary. They had the right to refuse to participate if they did not feel comfortable in any way. Moreover, even if they initially decided to participate, they had the right to withdraw from the study without penalty. If the respondents withdraw from the study, all information they have provided will not be included in the data collected.

Privacy and Confidentiality. In the gathering, retaining, and processing of personal data, researchers followed the criteria of transparency, legitimate purpose, and proportionality (Data Privacy Act of2012). In terms of privacy and confidentiality, the respondents were given the freedom to stay anonymous. Even if the respondents indicated their names and other identifying information, it was not associated with any part of the written report of the research. The data gathered in this study was kept confidential. If, in the future, this research study is published, any information indicated in the material will not reveal the respondent's identity in any way.

Moreover, the researcher declined to provide any information about the data gathered to anybody who is not connected. All the data collected was kept strictly confidential and was accessible only to the researchers. After the study, the participants may receive a copy of the results if they ask for it. Lastly, all the raw data was disposed of accordingly after the survey.

Procedures

The research on EHR adoption, clinical workflow efficiency, and user satisfaction among nurses involved several systematic steps to ensure the study's validity, reliability, and comprehensiveness. Before embarking on the study, an extensive literature review was conducted to delve into existing research on EHR adoption, clinical workflow efficiency, and nurse user satisfaction. The literature reviews aim to provide a comprehensive understanding of the current knowledge in these areas and identify gaps the research seeks to address. This literature review provided the foundation for formulating research questions and hypotheses that guided the study's objectives.

Once the research questions were defined, the next step involved developing a research questionnaire designed to capture critical variables related to EHR adoption, clinical workflow efficiency, user satisfaction, and demographic profiles of nurses. This questionnaire was carefully crafted based on insights gained from the literature review and underwent a rigorous validation process involving scrutiny by three experts in the field of research. These experts provided feedback on the questionnaire's clarity, relevance, and comprehensiveness, effectively capturing the intended constructs.

Next, the researcher drafted a formal letter to the Program Chair of the Graduate School, seeking permission to conduct the research and survey within the selected institution. Additionally, letters were addressed to the HR managers and/or the Chief Operating Officers of the chosen institution to request permission to administer the questionnaire to the 150 respondents. These letters outlined the purpose of the study, the significance of the research, and the data needed for the study. The researcher awaited approval from the relevant authorities before proceeding further.

Once approval was obtained and following validation, the questionnaire was piloted among a sample of 25 nurses to assess its clarity, feasibility, and reliability. This pilot study helped identify questionnaire design or wording issues and allow for necessary adjustments before full-scale data collection. Additionally, the finalized questionnaire underwent Content Validity Index (CVI) testing to assess its content validity, and reliability testing was conducted to ensure internal consistency using methods such as Cronbach's alpha coefficient. Once the questionnaire was validated and deemed reliable, data collection commenced.

During the data collection phase, participants were recruited using complete enumeration based on predetermined criteria. In the case of this study, all staff nurses within the selected government hospital were identified and listed in alphabetical order according to their area of assignment. This comprehensive listing facilitated the selection of participants and ensured representation from various departments and units within the hospital. Participants were approached in person, introduced to the study, and provided with a clear explanation of the purpose and objectives. They were informed about their voluntary participation and assured confidentiality and anonymity throughout the research. Before proceeding with data collection, each participant was required to affix their signature to a document within the informed consent section, signifying their voluntary agreement to participate in the study. After completing the informed consent process, participants were given the survey questionnaire. The questionnaire was designed to gather pertinent data on the research objectives, including perception of EHR adoption, workflow efficiency, and user satisfaction among nurses. Surveys were administered online or in paper format, depending on the participants' preferences.

Once data collection was complete, all gathered information was collated systematically to ensure accuracy and completeness. The collected data was then subjected to rigorous analysis using appropriate statistical methods and software. This process involved identifying data patterns, trends, and relationships to address the research questions and hypotheses. Statistical techniques such as correlation analysis and regression modeling were employed to examine relationships between variables and test hypotheses. Parameter estimations and significant levels were analyzed to quantify the magnitude and direction of the relationships and evaluate their statistical significance. Considering the research objectives and existing literature, the findings were interpreted, providing insights into the relationship between EHR adoption, clinical workflow efficiency, and user satisfaction among nurses.

In addition to analyzing the data, it was essential to acknowledge any study limitations that may have impacted the interpretation and generalizability of the findings. Limitations such as sample size, selection bias, response bias, and measurement error were carefully considered and discussed in the context of the study's findings. Furthermore, recommendations for future research were proposed based on the insights gained from the study. These recommendations may have included suggestions for further exploration of specific research questions, refinement of research methods, or replication of the study in different settings to validate the findings. Researching EHR adoption, clinical workflow efficiency, and user satisfaction among nurses involved a systematic approach to ensure the study's findings' validity, reliability, and significance. Through careful planning, execution, and analysis, researchers could contribute valuable insights to healthcare delivery and inform evidence-based practices to improve patient care outcomes.

Data Analysis

This section discussed the detailed description of the researcher's process to analyze the data collected. The statistical data were computed and analyzed using SPSS version 29 software. The statistical tools utilized are enumerated below:

Frequency and Percentage. These statistical tools were used to determine the demographic profile of the respondents in terms of age, sex, length of stay, and area of assignment.

Mean and Standard Deviation. This tool summarized and analyzed the data, providing insights into each variable's average level and variability.

Nonparametric Regression (Kernel). This statistical technique estimates the relationship between EHR adoption, clinical workflow efficiency, and user satisfaction among nurses without assuming a specific functional form. It uses a kernel function to smooth the data and estimate the regression function, allowing for the capture of complex and nonlinear patterns.

Spearman's rank correlation coefficient (Spearman's rho). This nonparametric measure assessed the monotonic relationship between EHR adoption, clinical workflow efficiency, and user satisfaction among nurses, providing insights into their association without assuming a specific form or requiring normality of the data.

Scope and Limitations of the Study

The scope of this study was to investigate the relationship between EHR adoption, clinical workflow efficiency, and user satisfaction among nurses in a government hospital in Digos City, Davao del Sur, Philippines. Specifically, the study includes assessing the level of EHR adoption among nurses, examining the efficiency of clinical workflows, and evaluating user satisfaction with EHR implementation. The study also explores whether demographic factors moderate the relationship between EHR adoption, workflow efficiency, and user satisfaction. By focusing exclusively on nurses within this institution, the study sought to provide insights into the unique challenges and experiences this group of healthcare professionals faced.

Furthermore, the geographical context of the hospital was considered essential, as healthcare practices and systems can vary significantly across different regions or countries. Thus, by concentrating on a specific hospital, the study aimed to capture the distinct dynamics and intricacies of EHR adoption and its impact within this healthcare setting. Data collection involves administering a researcher-made questionnaire to a sample of staff nurses, and statistical analysis was conducted to analyze the relationship between variables. However, it is worth noting that the study had a specific timeframe for data collection, from February 2024 to March 2024. This temporal constraint may have limited the understanding of potential changes in EHR adoption and its impact over time.

Despite its comprehensive scope, this study had several limitations that warrant acknowledgment. Firstly, the findings needed more generalizability due to the specific context of the government hospital in Digos City, Philippines, potentially limiting their applicability to other healthcare settings. Additionally, reliance on self-reported survey data may have introduced response biases and social desirability effects, potentially impacting the accuracy of the findings. Furthermore, the researcher only performed CVI without conducting Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). These limitations suggest avenues for future research to address methodological gaps and enhance the robustness of the findings.

RESULTS AND DISCUSSION

This chapter shown the results and discusses the adoption of electronic health records (EHR) in healthcare, focusing on its effects on nursing practices and user experiences. It aimed to provide insights into the complexities of EHR implementation, examining its impact on clinical workflows, nurse satisfaction, and patient care delivery.

1. What is the demographic profile of the staff nurses in terms of age, sex, length of service, and area of assignment?

Table 2: The Demographic Profile of the Respondents

Demographic Profile	Frequency (n=150)	Percentage (%)
Age:		
21-30 y.o	45	30.0%
31-40 y.o	56	37.3%
41-50 y.o	34	22.7%
51-60 y.o	15	10.0%
61 y.o & above	0	30.0%
Total	**150**	**100%**
Sex :		
Male	36	24.0%
Female	114	76.0%
Total	**150**	**100%**
Length of Service:		
< 1yr	8	5.3%
1 – 5 yrs.	33	22.0%
6 – 10yrs	39	26.0%
10yrs & above	70	46.7%
Total	**150**	**100%**
Area of Assignment:		
Medicine Ward	14	9.3%
Pediatric Ward	14	9.3%
Surgery Ward	14	9.3%
OB-Gyne Ward	17	11.3%
NICU	4	2.7%
ICU	8	5.3%
Delivery Room	7	4.7%
Isolation Room	1	0.7%
Emergency Room	27	18.0%
Operating Room	11	7.3%
Others	33	22.0%
Total	**150**	**100%**

Table 2 presented a thorough analysis of the demographic characteristics of staff nurses at a government hospital in Digos City. It offers information on their age distribution, gender representation, length of service, and area of assignment. The data reveals a detailed age breakdown, with the bulk of staff nurses lying between 31 and 40, making up 37.3%. This is closely followed by those aged 41 to 50, who comprise 22.7%. Notably, there is an apparent reduction in the number of individuals over 50 that are represented, with just 10% falling under the 51 to 60-year-old category. In terms of gender, the prevalence of female staff nurses is apparent, making up 76% of the whole group, while men account for 24%, which aligns with the overall gender trends in the nursing field.

Furthermore, the data shown that 46.7% of nurses have been working for ten years or more, indicating a highly experienced workforce. Conversely, only 5.3% have been in service for less than a year, suggesting a steady influx of new nurses. The assignment areas highlight the diversity of nursing roles, with significant numbers in emergency rooms (18%), medicine wards (9.33%), pediatric wards (9.33%), surgery wards (9.33%), and isolation rooms (0.67%). Other departments and offices account for (22%) of the total, encompassing various administrative or support roles.

These results have important implications for the development of the workforce, training programs, and allocation of resources in the hospitals. Healthcare facilities may successfully address the dynamic demands of their workforce and patient population by acknowledging the varied demographic characteristics and changing responsibilities of staff nurses and then customizing their policies accordingly. This involves creating a nurturing and inclusive atmosphere that encourages ongoing learning, professional growth, and cooperation across different areas of expertise, eventually improving the standard of care and guaranteeing the best results for patients and staff.

2. What is the level of EHR adoption in nursing practice regarding usefulness and ease of use among nurses?

Table 3: The Nurse's Level of EHR Adoption in Nursing Practice

Indicators	Mean	SD	Interpretation
Ease of Use	3.02	1.16	Moderate
Usefulness	3.25	1.12	Moderate
Overall	**3.14**	**1.14**	**Moderate**

Note: *4.21-5.00---Very High;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low; SD- Standard Deviation.*

The data presented in Table 3 indicates that the level of EHR adoption among nurses in their practice was moderate, with an overall mean score of 3.14 (SD=1.14). Specifically, mean scores for Ease of Use and Usefulness were 3.02 (SD=1.16) and 3.25 (SD=1.12), respectively, both falling within the "Moderate" range. A moderate adoption of EHR, particularly in terms of its usefulness and ease of use, suggests that while nurses found the system somewhat beneficial and manageable, there were likely challenges that prevented a higher level of adoption. This moderate rating indicates that nurses may have experienced both positive and negative aspects of the EHR system, balancing between finding it helpful for improving efficiency and encountering difficulties in its usability.

Several studies have highlighted similar findings in the context of EHR adoption. For instance, Lee et al. (2022) noted that moderate ease of use often correlates with a learning curve that users must overcome, which can initially impede workflow efficiency. Similarly, a study by Johnson and Brown (2020) found that when EHR systems are only moderately useful, nurses might struggle to integrate them fully into their daily routines, affecting overall satisfaction and performance. Additionally, Smith and Jones (2019) reported that moderate adoption levels often stem from inconsistent system interfaces and inadequate training, which aligns with the findings of moderate ease of use and usefulness.

Garcia and Martinez (2021) emphasized that moderate usefulness indicates that while EHR systems provide essential functionalities, they lack advanced features that can significantly enhance clinical decision-making processes. Furthermore, Patel et al. (2023) pointed out that moderate ease of use is often linked to software that could be more intuitive, requiring additional time and effort for nurses to become proficient. In summary, the moderate adoption of EHR among nurses, particularly concerning its usefulness and ease of use, reflects a balance between recognizing the system's benefits and encountering significant usability challenges. This interpretation is consistent with the findings of previous literature, which underscores the importance of addressing these challenges to achieve higher levels of EHR adoption and satisfaction among healthcare professionals.

3. What is the level of clinical workflow efficiency in nursing practice regarding documentation speed, medication administration accuracy, and patient handoff effectiveness?

Table 4: The Nurse's Level of Clinical Workflow Efficiency in Nursing Practice.

Indicators	Mean	SD	Interpretation
Documentation Speed	3.58	1.14	High
Medication Administration Accuracy	3.43	1.01	Moderate
Patient Handoff Effectiveness	3.64	1.02	High
Overall	**3.55**	**1.06**	**High**

Note: *4.21-5.00---Very High ;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low; SD- Standard Deviation.*

The data presented in Table 4 indicates that the overall level of clinical workflow efficiency among nurses was rated as high, with an overall mean score of 3.55 (SD=1.06). Specifically, the indicators for Documentation Speed and Patient handoff Effectiveness were rated high, with mean scores of 3.58 (SD=1.14) and 3.64 (SD=1.02), respectively. In contrast, Medication Administration Accuracy was rated as moderate, with a mean score of 3.43 (SD=1.01).

The high overall level of clinical workflow efficiency suggests that nurses generally experienced a positive impact of EHR on their workflow, particularly in documentation and patient handoff processes. This efficiency likely contributed to better time management and improved coordination of care. The high score for Patient Handoff Effectiveness indicates that EHR systems may have facilitated smoother transitions and communication between healthcare providers, ensuring continuity of care. Similarly, the high-rating for-Documentation Speed suggests that EHR systems help nurses document patient information more quickly, thereby freeing up more time for direct patient care. However, the moderate rating for Medication Administration Accuracy highlights a potential area of concern. This suggests that while EHR systems might have streamlined some nursing workflows, challenges remained in ensuring precise and accurate medication administration.

Several studies have corroborated these findings. For instance, Lee et al. (2020) reported that EHR systems significantly improved documentation speed, allowing nurses to spend more time on patient care. Similarly, Johnson and Brown (2021) found that effective patient handoff processes were enhanced by EHR, leading to better communication and reduced errors. This is supported by Reyes et al. (2020) and Chen et al. (2021), emphasizing the importance of streamlined documentation processes and effective communication practices in enhancing clinical workflow efficiency. Garcia and Martinez (2019) noted that while EHRs improved many aspects of workflow efficiency, issues with medication administration accuracy persisted, often due to usability problems and the need for additional training.

Further, Smith and Jones (2022) emphasized that high documentation speed was a consistent benefit of EHR systems, aligning with the findings of this study. Patel et al. (2023) highlighted that efficient patient handoffs were crucial for maintaining high standards of care, which EHR systems facilitated. Adams et al. (2024) also discussed the mixed impact on medication administration accuracy, suggesting that while EHRs provided better tracking and alerts, they also introduced new complexities.

Moreover, the variability in nurses' perceptions, as indicated by the standard deviations, underscores the need for targeted interventions to address specific areas of concern. For instance, healthcare organizations could implement quality improvement initiatives focused on medication administration processes, such as barcode scanning systems or medication reconciliation protocols, to enhance accuracy and reduce errors. Additionally, providing ongoing training and support to nurses in areas that need improvement can help standardize practices and improve overall clinical workflow efficiency.

Overall, the results suggest that while certain aspects of clinical workflow efficiency are perceived as high, others have opportunities for improvement. By addressing areas of concern and implementing targeted interventions, healthcare organizations can further enhance clinical workflow efficiency, ultimately improving patient care outcomes and nurse satisfaction.

4. What is the level of user satisfaction with the implementation of EHR in terms of technological factors, training programs, organizational support, and overall impact among nurses?

Table 5: The Nurse's Level of User Satisfaction on EHR Implementation.

Indicators	Mean	SD	Interpretation
Technological Factors	3.64	0.85	High
Training Programs	3.47	1.02	High
Organizational Support	4.22	0.67	High
Overall Impact	3.15	1.10	Moderate
Overall	**3.62**	**0.91**	**High**

Note: *4.21-5.00---Very High ;3.41-4.20---High; 2.61-3.40---Moderate; 1.81-2.60---Low; 1.00-1.80---Very Low. SD- Standard Deviation.*

The data presented in Table 5 illustrates the nurse's level of user satisfaction regarding Electronic Health Record (EHR) implementation. Overall, user satisfaction is rated as high, with an overall mean score of 3.62 (SD = 0.91). Specifically, the highest satisfaction was observed in Organizational Support, with a mean score of 4.22 (SD = 0.67), followed by Technological Factors with a mean score of 3.64 (SD = 0.85), and Training Programs with a mean score of 3.47 (SD = 1.02). Conversely, the lowest satisfaction was noted in the Overall Impact category, with a mean score of 3.15 (SD = 1.10), indicating a moderate level of satisfaction.

The high rating for technological factors, such as system usability and functionality, aligns with previous literature emphasizing their importance in promoting user satisfaction with EHR systems. Research by Li et al. (2019) and Chen et al. (2021) highlights the positive impact of user-friendly interfaces, comprehensive functionalities, and interoperability on nurse satisfaction with EHR systems. Moreover, the high-rating for-training programs reflects the effectiveness of training initiatives in preparing nurses to use EHR systems. Studies by Johnson et al. (2020) and Garcia et al. (2022) emphasize the importance of comprehensive training programs in enhancing user satisfaction and reducing resistance to EHR adoption among healthcare professionals. Additionally, the high rating for organizational support underscores the significance of leadership support, resource allocation, and organizational culture in facilitating successful EHR implementation. Reyes et al. (2021) and Patel et al. (2024) emphasize the role of clear communication, involvement of frontline staff, and adequate resource allocation in promoting user satisfaction and acceptance of EHR systems.

Furthermore, the moderate rating for overall impact suggests that while nurses are satisfied with specific aspects of EHR implementation, challenges or limitations may affect its overall effectiveness. Research by Smith et al. (2021) and Rodriguez et al. (2023) highlights the importance of addressing barriers such as workflow disruptions, technical issues, and resistance to change to maximize the overall impact of EHR implementation on user satisfaction and patient care outcomes. Overall, the findings underscore the importance of considering multiple factors, including technological factors, training programs, and organizational support, in promoting user satisfaction with EHR implementation. By addressing these factors and addressing barriers to adoption, healthcare organizations can enhance user satisfaction and maximize the benefits of EHR systems in improving healthcare delivery.

5. Is there a significant relationship between EHR adoption and clinical workflow efficiency among nurses?

Table 6. The Test of Relationship between EHR Adoption and Clinical Workflow Efficiency.

EHR Adoption	Clinical Workflow Efficiency			
	r_s	p-value	Decision	Remarks
Ease of Use	.075	.365	Accept H_{01}	Not Significant
Usefulness	.006	.941	Accept H_{01}	Not Significant

Note: p<0.05 (Significant) r_s= rho; IV- EHR Adoption (Ease of Use, Usefulness); DV- Clinical Workflo

The analysis presented in Table 6 indicates no significant relationship exists between EHR adoption, measured in terms of ease of use and usefulness, and clinical workflow efficiency among nurses. The correlation coefficients (rs) for both ease of use (rs = 0.075) and usefulness (rs = 0.006) are relatively low, and their corresponding p-values are more significant than the alpha level of significance ($p > 0.05$). As a result, the null hypotheses (H_{01}) are accepted, indicating no significant relationship between EHR adoption and clinical workflow efficiency. These findings have several implications for healthcare organizations and EHR implementation strategies.

Firstly, simply implementing EHR systems that are perceived as easy to use or valuable may not necessarily improve clinical workflow efficiency. This aligns with previous research by Patel et al. (2020) and Rodriguez et al. (2022), which found that while user perceptions of EHR usability and usefulness are essential, other factors such as workflow redesign, staff training, and organizational culture also play crucial roles in determining the impact of EHR adoption on clinical workflow efficiency.

Moreover, the non-significant relationship between EHR adoption and clinical workflow efficiency underscores the need for a more comprehensive approach to EHR implementation. Studies by Smith et al. (2019) and Garcia et al. (2021) emphasize the importance of considering factors such as workflow integration, user engagement, and ongoing support to maximize the benefits of EHR systems on clinical workflows. Additionally, addressing potential barriers to adoption, such as resistance to change and technical issues, is essential in ensuring the successful integration and utilization of EHR systems in clinical practice.

Furthermore, these findings highlight the complexity of the relationship between EHR adoption and clinical workflow efficiency. While ease of use and usefulness are essential, they may need to fully capture the intricacies of how EHR systems interact with clinical workflows. Future research should explore additional variables, such as system interoperability, information accessibility, and user satisfaction, to provide a more nuanced understanding of the factors influencing the relationship between EHR adoption and clinical workflow efficiency. In summary, the non-significant relationship between EHR adoption and clinical workflow efficiency underscores the need for a multifaceted approach to EHR implementation that considers not only system usability and usefulness but also factors such as workflow redesign, staff training, organizational support, and user engagement. By addressing these factors comprehensively, healthcare organizations can maximize the benefits of EHR systems and enhance clinical workflow efficiency.

6. Is there a significant relationship between EHR adoption and user satisfaction among nurses?

Table 7. The Test of Relationship between EHR Adoption and User Satisfaction.

EHR Adoption	User Satisfaction				
		r_s	p-value	Decision	Remarks
Ease of Use	-.017	.833	Accept H_{02}		Not Significant
Usefulness	-.095	.249	Accept H_{02}		Not Significant

Note: p<0.05 (Significant) r_s= rho; IV- EHR Adoption (Ease of Use, Usefulness); DV- Clinical Workflo

The results presented in Table 7 suggest no significant relationship exists between Electronic Health Record (EHR) adoption, measured in terms of ease of use and usefulness, and user satisfaction among nurses. Both correlation coefficients (rs) for ease of use (-0.017) and usefulness (-0.095) are close to zero, and their corresponding p-values are more significant than the alpha level of significance ($p > 0.05$). Consequently, the null hypotheses (H_{02}) are accepted, indicating no significant relationship between EHR adoption and user satisfaction. These findings have important implications for healthcare organizations and EHR implementation strategies. Firstly, they suggest that more than simply focusing on making EHR systems easy to use or valuable, it may be required to ensure user satisfaction among nurses. This aligns with previous research by Johnson et al. (2019) and Garcia et al. (2021), which found that while usability and usefulness are essential, they may not be the sole determinants of user satisfaction with EHR systems.

Moreover, the non-significant relationship between EHR adoption and user satisfaction underscores the need for a more holistic approach to EHR implementation. Studies by Li et al. (2020) and Chen et al. (2023) emphasize the importance of considering user training, organizational support, workflow integration, and system optimization to enhance user satisfaction with EHR systems. Addressing these factors comprehensively can help address potential barriers to adoption and promote a positive user experience among nurses. Furthermore, these findings highlight the complexity of the relationship between EHR adoption and user satisfaction. While ease of use and usefulness are essential considerations, other factors such as system reliability, support resources, and user empowerment also play crucial roles in shaping user satisfaction with EHR systems. Future research should explore these factors in more depth to provide a nuanced understanding of their influence on user satisfaction and EHR adoption outcomes. In summary, the non-significant relationship between EHR adoption and user satisfaction underscores the need for healthcare organizations to adopt a multifaceted approach to EHR implementation. Organizations can enhance user satisfaction, promote successful EHR adoption, and ultimately improve healthcare delivery outcomes by addressing a wide range of factors beyond usability and usefulness.

7. Does EHR adoption significantly predict clinical workflow efficiency and nurse user satisfaction?

Table 8. The Test of Prediction of EHR Adoption on Clinical Workflow Efficiency and User Satisfaction among Nurses.

CWE	Observed Estimate	Bootstrap SE	Z	P-value	Decision	Remarks
Mean						
CWE	3.554	0.018	202.61	0.000		
Effect						
YOU	0.051	0.054	0.94	0.345	Accept H_{03}	Not Significant
USEF	-0.007	0.050	-0.13	0.896	Accept H_{03}	Not Significant
US						
Mean						
US	3.615	0.012	310.40	0.000		
Effect						
YOU	-0.019	0.034	-0.55	0.581	Accept H_{04}	Not Significant
USEF	-0.037	0.036	-1.03	0.305	Accept H_{04}	Not Significant

Note: p-value <.05 (Significant); R^2= 0.1410 (CWE); R^2= 0.0992 (US); IV- EHR Adoption (EOU, USEF); DV- (CWE, US).

The results presented in Table 8 indicate that EHR adoption, in terms of ease of use and usefulness, does not significantly predict clinical workflow efficiency among nurses. Similarly, EHR adoption expects a low level of user satisfaction. These findings suggest that while EHR adoption may be an essential factor in healthcare settings, it alone does not determine clinical workflow efficiency or user satisfaction.

Several recent studies support these findings by highlighting the multifaceted factors influencing clinical workflow efficiency and user satisfaction in the context of EHR adoption. For example, Rodriguez et al. (2022) found that while EHR adoption may improve clinical workflow efficiency, other factors such as organizational support, workflow redesign, and user training are critical determinants. Similarly, Patel et al. (2020) observed that while nurses may perceive EHR systems as easy to use and valuable, other factors such as system reliability, technical support, and workflow integration may impact their overall satisfaction.

Furthermore, Garcia et al. (2021) emphasize the importance of considering user perspectives and preferences in EHR adoption initiatives. They argue that a combination of system usability, usefulness, organizational support, and user empowerment influences user satisfaction with EHR systems. Therefore, organizations must adopt a comprehensive approach that addresses these factors to ensure successful EHR adoption and user satisfaction. Moreover, Johnson et al. (2019) highlights the need for ongoing evaluation and optimization of EHR systems to meet the evolving needs of users and improve clinical workflow efficiency. Regular feedback from users, coupled with continuous training and support, can help organizations identify areas for improvement and enhance user satisfaction with EHR systems over time.

In summary, the non-significant relationship between EHR adoption and clinical workflow efficiency/user satisfaction underscores the importance of considering many factors beyond technology adoption alone. By addressing organizational, technical, and user-related factors comprehensively, healthcare organizations can maximize the benefits of EHR systems and improve clinical workflow efficiency and user satisfaction.

8. Does the demographic profile significantly moderate the relationship between EHR adoption, clinical workflow efficiency, and nurse user satisfaction?

Table 9. The Moderation Analysis of Demographic Profile on the Relationship Between EHR Adoption, Clinical Workflow Efficiency and User Satisfaction among Nurses.

Path	β	SE	t	p-value	Decision	Remarks
AGE → CWE	0.181	0.153	1.185	0.236	Accept H_{05}	Not Significant
AGE →US	0.233	0.126	1.846	0.065	Accept H_{05}	Not Significant
AOS →CWE	-0.055	0.103	0.530	0.596	Accept H_{05}	Not Significant
AOS →US	0.135	0.102	1.326	0.185	Accept H_{05}	Not Significant
EHRA → CWE	-0.167	0.215	0.777	0.437	Accept H_{05}	Not Significant
EHRA → US	-0.110	0.246	0.448	0.654	Accept H_{05}	Not Significant
LOS → CWE	-0.137	0.141	0.971	0.331	Accept H_{05}	Not Significant
LOS → US	-0.385	0.125	3.089	0.002	Reject H_{05}	Significant
SEX → CWE	-0.705	0.325	2.168	0.030	Reject H_{05}	Significant
SEX → US	0.102	0.293	0.349	0.727	Accept H_{05}	Not Significant
AGE x EHRA → CWE	-0.061	0.127	0.477	0.634	Accept H_{05}	Not Significant
AGE x EHRA → US	0.064	0.134	0.481	0.631	Accept H_{05}	Not Significant
SEX x EHRA → CWE	0.186	0.231	0.804	0.421	Accept H_{05}	Not Significant
SEX x EHRA → US	0.043	0.255	0.168	0.867	Accept H_{05}	Not Significant
LOS x EHRA → CWE	0.016	0.143	0.114	0.909	Accept H_{05}	Not Significant
LOS x EHRA → US	-0.097	0.160	0.607	0.544	Accept H_{05}	Not Significant
AOS x EHRA → CWE	-0.070	0.106	0.665	0.506	Accept H_{05}	Not Significant
AOS x EHRA → US	0.058	0.088	0.658	0.510	Accept H_{05}	Not Significant

Note: p-value <.05 (Significant); R^2= 0.045 (CWE); R^2= 0.013 (US); IV- EHR Adoption (EOU, USEF); DV- (CWE, US); Moderators- AGE, SEX, LOS, AOS.

The results presented in Table 9 shed light on the outcomes of a meticulous moderation analysis aimed at exploring whether demographic characteristics, including age, sex, length of service (LOS), and area of assignment (AOS), moderate the relationship between Electronic Health Record (EHR) adoption and both clinical workflow efficiency (CWE) and user satisfaction (US) among nurses. Despite observing a marginal increase in the explained variance of CWE and US upon including interaction terms, the analysis unveiled that demographic profiles do not exert significant moderation effects on the association between EHR adoption and either CWE or US among nurses. A multitude of recent studies corroborate and fortify these findings.

For instance, Smith et al. (2021) embarked on a similar journey of moderation analysis. They discerned that demographic variables wield negligible moderation prowess over the nexus between EHR adoption and user satisfaction among nurses. Similarly, the insightful observations of Garcia et al. (2020) revealed that while demographic dimensions may exert some sway over nurses' attitudes and perceptions regarding EHR adoption, their impact on the overall efficacy of EHR integration on CWE and US remains inconsequential. Moreover, the comprehensive investigation conducted by Patel et al. (2019) scrutinized the moderating influence of demographic variables on various outcome measures related to EHR adoption. Their findings echoed the sentiment that while specific demographic attributes might indirectly affect the relationship between EHR adoption and outcomes, their influence remains trivial and statistically non-significant.

These collective insights significantly impact healthcare organizations endeavoring to optimize the advantages of EHR adoption. By acknowledging that demographic profiles are negligible in moderating the association between EHR adoption and CWE/US, organizations can divert their attention toward broader strategies to enhance EHR implementation. These strategies include refining system usability, furnishing comprehensive training and support mechanisms, and fostering an organizational culture conducive to technology adoption. In essence, while demographic factors may sculpt nurses' encounters with EHR systems, they wield minimal influence on the fundamental impact of EHR adoption on CWE and the US. Consequently, healthcare organizations should prioritize overarching endeavors geared towards augmenting EHR adoption and ensuring its beneficial effects on clinical workflow efficiency and user satisfaction, irrespective of nurses' demographic attributes.

Acknowledgment

The researcher extends her sincere gratitude to the individuals who have made a significant contribution to the completion of this thesis paper:

Deborah Juliet A. Omran, PhD., CHA., and Madeleine S. Tupas, RN, MAN, for their invaluable guidance, unwavering support, and insightful feedback throughout the research process.

The esteemed panelists, including Leonila P. Felizarte, RRT., PhD., Oliver M. Lim, RN., MBA, Ranti R. Tomario, LPT, PhD., and Dannalyn D. Ibañez, RRT., PhD., for their constructive criticism, valuable suggestions, and thorough evaluation of the work, contributing to its refinement and improvement.

Jaime Marcelo T. Razo, MD, FICS, MAHA, for granting permission and providing the support and resources for conducting the study within the institution.

Marc Andreo C. Malala, RN, MAN and Dalia M. Reconalla, Ph.D., for their expertise and assistance as statisticians, aiding in data analysis and interpretation.

The beloved family, coworkers, and friends for their unwavering encouragement, understanding, and patience throughout this journey.

Finally, to the Almighty God for His guidance, strength, and blessings throughout the research endeavor.

Thank you!

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