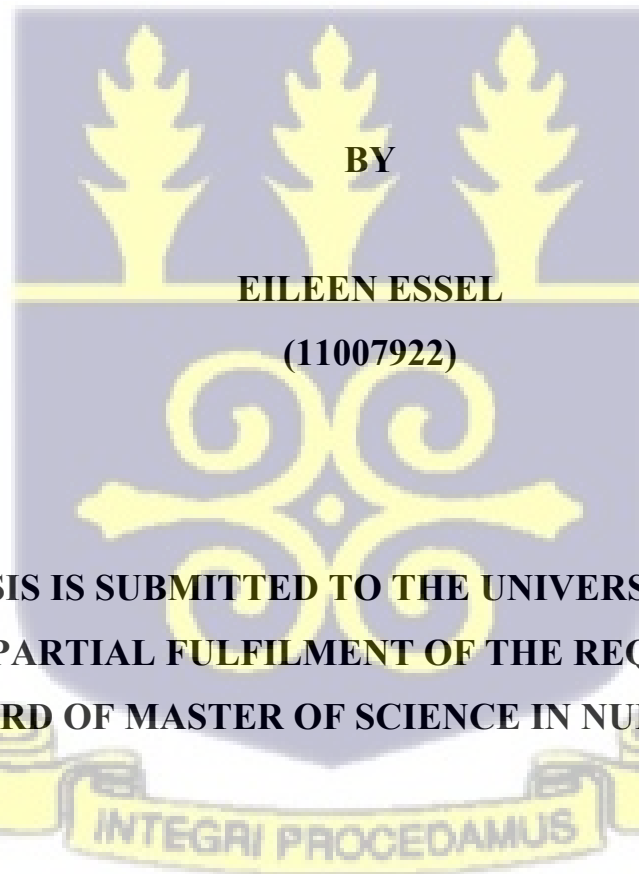


**UNIVERSITY OF GHANA, LEGON
SCHOOL OF NURSING AND MIDWIFERY**



**INFLUENCE OF NURSING INFORMATICS ON DECISION-
MAKING AND DOCUMENTATION OF NURSING PRACTICE IN 37
MILITARY HOSPITAL**



BY

EILEEN ESSEL

(11007922)

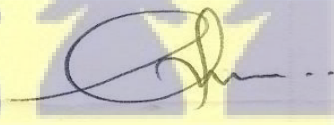
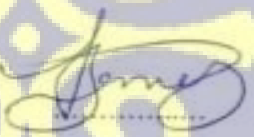
**THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA,
LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR
THE AWARD OF MASTER OF SCIENCE IN NURSING DEGREE**

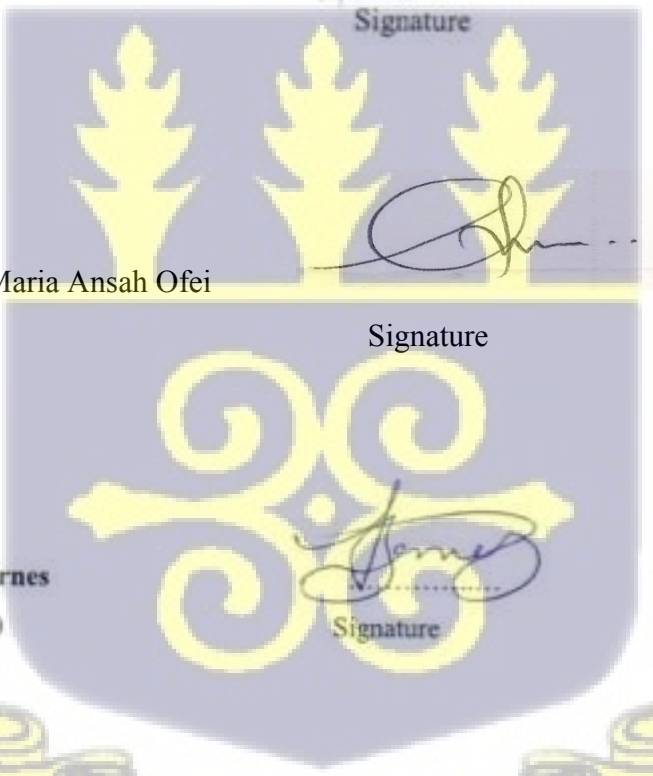
FEBRUARY, 2025

DECLARATION

I, EILEEN ESSEL, hereby certify that the research described in this statement was carried out by me under the guidance of Professor Adelaide Ansah Ofei and Dr Theresa Barnes of the University of Ghana, School of Nursing and Midwifery. All writers of articles, theses, and books cited in this study have been given proper credit for their work. This dissertation has not already been approved partially for another degree, and it is not presently being submitted for another degree, I attest.

In light of this, I accept full responsibility for any study shortcomings.

Eileen Essel (11007922)	 Signature	<u>30/06/2025</u> Date
Prof Adelaide Maria Ansah Ofei	 Signature	<u>2/7/2025</u> Date
Dr Theresa Barnes (Co-Supervisor)	 Signature	<u>30/06/25</u> Date



INTEGRI PROCEDAMUS

DEDICATION

I dedicate this thesis to my family for their love, encouragement and unwavering support.



ACKNOWLEDGMENT

Firstly, I give thanks and glory to Almighty God for His Mercies throughout the course of this research work. I would like to express my deepest sense of Gratitude to my supervisor, Professor Adelaide Ansah Ofei and Dr Theresa Barnes who offered their guidance and made sure that the right things were done as far as this work was concerned. I also wish to express my appreciation to all staff of School of Nursing and Midwifery, University of Ghana, Legon for their immerse contribution to knowledge. Lastly, my profound gratitude goes to authors of the various books used as reference and persons, especially respondents who contributed in making this project work a successful one.



ABSTRACT

Nursing informatics has shown significant potential in improving healthcare delivery by reducing human errors, enhancing patient outcomes, and streamlining care coordination. The Institute of Medicine (IOM) report has led to increased adoption of health information technology, which positively impacts patient safety. Therefore, this study assessed the influence of nursing informatics on nursing practice (decision-making and documentation) in 37 Military Hospital. The study utilized a descriptive cross-sectional design. A total sample of 217 nurses were selected for the study using a simple random sampling technique. Data collection was done using a structured questionnaire, and analyzed using SPSS version 27. The study results show that 49.8% of nurses rated the healthcare facility's IT infrastructure average, with 55.3% of nursing staff having access to computers for documentation and 90.8% receiving training. 57.1% of nurses demonstrated high nursing informatics competency, while 42.9% had low competency. The study also revealed a strong correlation between nursing informatics and nursing decision making ($r = 0.754$, $p < 0.001$) and nursing documentation ($r = 0.751$, $p < 0.001$). Challenges faced in the use of nursing informatics tools include limited access to up-to-date technology (65.9%), time constraints (65.4%), inadequate resources for continuous professional development in informatics (77.9%), resistance from colleagues (68.7%), absence of standardized protocols for data documentation (74.7%), inadequate technical support and troubleshooting resources (68.2%), the need for constant software updates and system (77.9%), and inconsistencies in data input and retrieval processes (68.7%). Addressing challenges such as limited resources, time constraints, and resistance to informatics adoption can foster a more supportive environment for nurses to integrate informatics into their daily practices. Strengthening data security and confidentiality protocols, along with offering adequate technical support, can further optimize the integration of nursing informatics into clinical decision-making and documentation.

TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION.....	ii
ACKNOWLEDGMENT	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF TABLES.....	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS.....	x
 CHAPTER ONE.....	 1
1.0 INTRODUCTION	1
1.1 Background of the Study.....	1
1.2 Problem Statement	5
1.3 Purpose of the Study	7
1.4 Specific Objectives	7
1.5 Research Questions	7
1.6 Research Hypotheses	8
1.7 Significance of the Study	8
1.8 Summary	8
1.9 Operational definition of terms	9
 CHAPTER TWO	 10
LITERATURE REVIEW	10
2.0 Introduction.....	10
2.1 Concept of Nursing Informatics.....	10
2.2 Resources available for the implementation of nursing informatics.....	12
2.3 Nursing informatics competencies among nurses.....	15
2.4 Challenges with the use of nursing informatics tools for decision making and documentation.....	17
2.5 Level of decision making and documentation among nurses	20
2.6 Impact of nursing informatics on nursing decision-making and documentation among nurses.....	24
2.7 Summary of the chapter	26
 CHAPTER THREE	 27
RESEARCH METHODOLOGY	27
3.0 Introduction.....	27
3.1 Research Design.....	27

3.2 Research Setting.....	27
3.3 Target population	28
“3.3.1 Inclusion criteria”	28
3.3.2 Exclusion criteria.....	28
3.4 Sample Size Determination.....	28
3.5 Sampling Technique”.....	29
3.6 Data Collection Instrument	30
3.7 Data Collection Procedure	30
3.8 Validity and Reliability of Instrument	31
3.9 Data Management	31
3.10 Data Analysis	31
3.11 Ethical consideration.....	32
3.12 Summary	32
CHAPTER FOUR	34
RESULTS.....	34
4.0 Introduction.....	34
“4.1 Socio-demographic Information”	34
4.2 Resources available for the implementation of nursing informatics.....	36
4.3 Nursing Informatics Competencies among Nurses.....	40
4.3.1 Level of Nursing Informatics Competencies.....	43
4.3.2 Perceived Areas of Nursing Informatics Competencies.....	44
4.4 Challenges with the use of nursing informatics tools for decision making and documentation.....	45
4.5 Impact of Nursing Informatics on Nursing Decision Making and Documentation.....	47
4.5.1 Impact of Nursing Informatics on Nursing Decision Making.....	47
4.5.2 Impact of Nursing Informatics on Nursing Documentation.....	50
4.5.3 Impact of Nursing informatics on Nursing Decision-Making.....	54
4.5.4 Impact of Nursing informatics on Nursing Documentation.....	54
4.6 Predictors of Nursing Decision-making among Nurses.....	55
4.7 Predictors of the Level of Nursing Documentation among Nurses	56
4.8 Summary	57
CHAPTER FIVE	59
DISCUSSION.....	59
5.0 Introduction.....	59
5.1 Sociodemographic Characteristics.....	59
5.2 Resources Available for the Implementation of Nursing Informatics	60
5.3 Nursing Informatics Competencies among Nurses.....	63

5.4 Challenges with the Use of Available Nursing Informatics Tools for Decision Making and Documentation.....	66
5.5 Level of Decision-Making and Documentation among Nurses.....	68
5.6 Impact of Nursing Informatics on Nursing Decision-Making and Documentation.	72
5.6.1 Predictors of the Level of Nursing Decision-making among Nurses.....	73
5.6.2 Predictors of the Level of Nursing Documentation among Nurses.....	75
5.7 Summary and Conclusion	76
CHAPTER SIX.....	78
SUMMARY, CONCLUSION, AND RECOMMENDATION.....	78
6.0 Introduction.....	78
6.1 Summary of the study	78
6.2 Implications.....	79
6.2.1 Nursing Practice or Administration.....	79
6.2.2 Nursing Education.....	80
6.2.3 Nursing Research	80
6.3 Conclusion	80
6.4 Recommendations.....	81
6.4.1 Nursing Administration.....	81
6.4.2 Nurse Managers.....	82
6.4.3 Hospital Management.....	83
6.4.4 Nursing Education and Research	83
REFERENCES	85
APPENDIX: NURSING INFORMATICS QUESTIONNAIRE	101



LIST OF TABLES

Table 4.1: Socio-demographic Information of the respondents (N=217).....	35
Table 4.2a: Current IT infrastructure in the healthcare facility (N=217)	36
Table 4.2b: Access to computers or devices for documentation (N=217)	37
Table 4.2c: Nursing staff training on informatics tools (N=217)	37
Table 4.2d: Integration of nursing informatics with existing healthcare systems (N=217)	38
Table 4.2e: Established Protocols for security and confidentiality (N=217).....	38
Table 4.2f: User-friendliness of nursing informatics tools (N=217)	39
Table 4.2g: Alignment of nursing informatics tools to existing nursing workflows (N=217)	39
Table 4.2h: Satisfaction with provision of technical support (N=217)	40
Table 4.3: Nursing informatics competencies among the respondents (N=217).....	42
Table 4.4: Challenges with the use of available nursing informatics tools for decision making and documentation (N=217).....	46
Table 4.5a: Influence of nursing informatics on nursing decision making (N=217).....	48
Table 4.5b: Influence of nursing informatics on nursing documentation (N=217).....	50
Table 4.5c: Correlation analysis of the influence of nursing informatics on nursing decision-making (N=217).....	54
Table 4.5d: Influence of nursing informatics on nursing documentation (N=217).....	54
Table 4.6: Predictors of the level of nursing decision-making among nurses.....	55
Table 4.7: Predictors of the level of nursing documentation among nurses.....	57



LIST OF FIGURES

Figure 4.1: Level of Nursing informatics competencies among nurses (N=217).....	43
Figure 4.2: Perceived areas of nursing informatics competencies among nurses (N=217)	44
Figure 4.3: Self-reported level of nursing decision-making among respondents (N=217)	49
Figure 4.4: Self-Reported level of nursing documentation among respondents (N=217).	53



LIST OF ABBREVIATIONS

ANA	–	American Nurses Association
EHR	–	Electronic Health Record
EMR	–	Electronic Medical Record
HIMSS	–	Healthcare Information and Management Systems Society
HIT	–	Health Information Technology
IOM	–	Institute of Medicine
IT	–	Information Technology
MEDINFO	–	MEDical INFOrmation
NI	–	Nursing Informatics
PPM	–	Professional Practice Model



CHAPTER ONE

1.0 INTRODUCTION

This chapter includes the background of the study, problem statement, purpose and objectives of the study, significance of the study, and operational definition of key terms.

1.1 Background of the Study

In the 21st century, there has been resistance to the adoption of health information technology (HIT) among some healthcare professionals. Nevertheless, it is fundamentally altering the skills and behaviours required in the workplace (Rosy, 2018). This century is marked by the significance of digitalization across various life domains, particularly in healthcare. Emerging digital health technologies utilize computing platforms, connectivity, software, and sensors. The World Health Organization's "Global Strategy on Digital Health 2020-2025" aims to fortify the healthcare system through the implementation of digital health technologies such as mobile health, health information technology, wearable devices, telehealth, and personalized medicine (Park & Park, 2023).

Technology in healthcare is increasingly integral to the healthcare delivery system, identified by strategists as a means to achieve sustained improvement in healthcare outcomes. Nursing informatics, is a field that merges nursing, computer, and information sciences, which is crucial in maintaining and developing medical data and systems to support nursing practice and enhance patient care outcomes (Ademuyiwa, Faleke, & Otetubi, 2020). The term "nursing informatics" first appeared in literature in the 1980s, defined as the combination of nursing, information, and computer science for managing and processing data into knowledge for use in nursing practice (Hannah, Ball, & Edwards, 2017). Nursing informatics, formerly known as medical informatics, was initially introduced by Scholes and Barber in 1980 during the MEDINFO conference in Tokyo (Robinson-Bassey & Edet, 2015).

Hana (1985) defined nursing informatics as the application of information technology (IT) in nursing duties, including education, management, and practice. Later, Graves and Corcoran (1989) expanded the definition, describing nursing informatics as the integration of information science, computer science, and nursing science to support nursing practice and knowledge management (Darvish, Bahramnezhad, Keyhanian, & Navidhamidi, 2014). These definitions highlight the evolving understanding of nursing informatics, from its focus on technology application in nursing to a broader integration of interdisciplinary sciences aimed at enhancing nursing practice and knowledge.

The American Nurses Association (ANA) first defined nursing informatics in 1994 as a specialty that integrates nursing science, computer science, and information science to effectively manage and communicate data, information, knowledge, and wisdom in nursing practice. This field leverages computer technology across various domains of nursing, including clinical services, education, and research (Samuel, Yahaya, Muhammed, Ademola, & Oladoyinbo, 2023). This enhances patient care outcomes, streamline clinical workflows, and improve the overall efficiency of healthcare delivery (Sari, Prihatiningsih, & Lusmilasari, 2021).

Nursing informatics has demonstrated significant potential for improving healthcare delivery by reducing human errors, enhancing patient outcomes, improving care coordination, streamlining practice efficiencies, and tracking data over time. Following the Institute of Medicine (IOM) report, there has been increased development and adoption of health information technology with a positive impact on patient safety (Asonye, Idowu, Sodimu, Leslie, Akinlawon, & Fadipe, 2021).

Nursing, as both an art and a science, involves using both the heart and the mind. Nurses, playing a vital role in healthcare, use logical principles in the nursing process to assess patients comprehensively. Thus, nursing informatics competencies are critical for meeting the

expectations of providing safe and effective patient care, as they enable the integration of technology into nursing practice (Olajubu, Irinoye, & Olowokere, 2014; Sinha & Joy, 2022).

There are many advantages of nursing informatics which includes computerized record-keeping, computer-assisted instruction, interactive video technology, distance learning-web-based courses, internet resources, and standardized language related to nursing terms. The ability to identify trends in aggregate data is also a notable benefit (Kumbhakar, 2019). Overall, nursing informatics empowers healthcare professionals to deliver more efficient, accurate, and evidence-based care, enhancing clinical decision-making, improving patient outcomes, and advancing the overall quality of healthcare delivery.

Knowledge and skills in nursing informatics influence the optimal use of technology, and nursing leaders advocate for all nurses to participate in nursing informatics. Therefore, nurses should be familiar with health information technology and information management, receiving adequate training in informatics to provide high-quality and safe healthcare services (Zareshahi, Mirzaei, & Nasiriani, 2022).

The informatics competencies crucial for nurses, initially outlined 15 years ago, remain relevant. These encompass computer proficiency, informatics knowledge, and informatics skills. Nurses, depending on their career stage and expertise, exhibit varying levels of informatics skills, ranging from entry-level (Level 1) to advanced innovator (Level 4). The integration of new eHealth technology in healthcare processes opens up enhanced opportunities for shaping improved healthcare outcomes (Kinnunen, Heponiemi, Rajalahti, Ahonen, Korhonen, & Hyppönen, 2019; Farzandipour, Mohamadian, Akbari, Safari, & Sharif, 2021).

Studies assessing nursing informatics competency have shown varying results, with a cross-sectional study in Iran indicating a competency level of 59.9%, while in Finland, overall informatics competencies among nurses were considered good (Khezri & Abdekhoda, 2019; Kinnunen et al., 2023). However, in Egypt, only 28% of nurses were considered experts in

nursing informatics, whereas in Nigeria, a majority of nurses perceived themselves as not competent across different healthcare facilities (Hassona & Ali, 2019; Olajubu et al., 2014). In Ghana, a cross sectional study in Sunyani municipality revealed that majority of nurses possessed fair skills in nursing informatics (Owusu, Audu, & Mensah, 2022). Achieving effective and safe care, while improving the quality of patient outcomes, requires nurses to possess specific competencies. These include proficiency in computer skills, the ability to manage existing software, familiarity with nursing information systems, knowledge of nursing-related databases, and expertise in web search methods (Zareshahi et al., 2022).

Electronic Health Records (EHR) are a critical component of nursing informatics, fundamentally transforming healthcare delivery and clinical practice. EHR systems store patients' medical histories, treatment plans, laboratory results, and other essential data, allowing for seamless access and sharing of patient information among healthcare providers (Vos, Boonstra, Kooistra, Seelen, & van Offenbeek, 2020). As part of nursing informatics, EHRs improve the accuracy and completeness of documentation, reduce medication errors, enhance care coordination, and support evidence-based practice (Forde-Johnston, Butcher, & Aveyard, 2022). By maintaining standardized records, EHRs facilitate better decision-making, streamline workflows, and enable data tracking over time, providing a comprehensive view of a patient's medical history (Ratwani, 2017; Kumari & Chander, 2024).

The influence of nursing informatics, including EHR systems, on nursing practice is substantial. Through nursing informatics, nurses can leverage data to make timely and accurate clinical decisions, enhancing patient safety and outcomes (Nibbelink, Young, Carrington, & Brewer, 2018). Informatics competencies empower nurses to collect, analyze, and apply data in real-time, thus improving care coordination and reducing redundant tests or procedures. Studies have shown that nursing informatics promotes efficiency by enabling quick access to patient data, which is crucial for handling emergency situations or complex cases (Kinnunen

et al., 2023). Additionally, informatics tools such as EHRs support continuous quality improvement efforts by allowing nurses to track patient outcomes, identify patterns, and adjust care plans as needed (Javaid, Haleem, & Singh, 2024).

At the 37 Military Hospital in Ghana, there has been a growing emphasis on integrating nursing informatics into daily practice, yet there remain challenges that impact its effective utilization. While EHRs have been introduced as part of efforts to improve healthcare quality, barriers such as limited training, inadequate infrastructure, and varying levels of informatics competencies among nurses hinder their full adoption and impact on patient care. This gap is particularly concerning as the hospital strives to modernize its healthcare services to meet global standards. Despite these efforts, it remains unclear to what extent nurses are equipped to fully utilize informatics tools for clinical decision-making and documentation. Therefore, the present study aimed to assess the influence of nursing informatics on nursing decision-making and documentation among nurses in the 37 Military Hospital.

1.2 Problem Statement

In the contemporary healthcare setting, nurses encounter various sophisticated clinical technologies, requiring them to possess advanced skills and knowledge in informatics. Given that informatics is increasingly recognized as a cornerstone for improving patient safety and care quality, competency in informatics has become indispensable for nurses in fulfilling their professional roles (Khezri & Abdekhoda, 2019). The effective utilization of nursing informatics not only benefits nurses but also organizations and patients alike. Electronic Health Records (EHRs) stand out as one of the most promising tools in nursing informatics.

Positive patient outcomes encompass a reduced incidence of medication errors, streamlined wound management through electronic documentation, and shorter patient stays due to enhanced communication, decision-making processes, and workflows (Shin et al., 2018). Efficient use of nursing informatics not only improves nursing workflow but also

empowers organizations to acquire valuable information for decision-making, cost analysis, and workflow enhancements. Notably, two Australian studies revealed that inadequate documentation, leading to under-coding of diseases, resulted in funding penalties and adversely impacted the quality of patient care (Tubaishat, 2018).

In Ghana, a low-middle-income country, substantial progress has been made in promoting the use of nursing informatics, particularly Electronic Health Records (EHRs), in health institutions since the initiation of its national electronic health policy in 2010. The 37 Military Hospital has been recognized as a leading quasi-government hospital in implementing EHRs in Ghana with the aim of providing quality healthcare services since 2018 (Adomah-Afari et al., 2023). This has improved the management and processing of nursing data, information, and knowledge. Despite the potential benefits, it has come to my attention that nurses at the 37 Military Hospital face obstacles in fully harnessing the power of nursing informatics. These challenges range from inadequate training and resources to cumbersome technological interfaces.

As a result of these barriers, many nurses are unable to effectively use nursing informatics in their day-to-day activities. This lack of informatics integration impairs timely and accurate clinical decision-making, weakens the continuity of care, and contributes to poor-quality documentation. Consequently, patient care suffers due to increased risk of medication errors, delayed interventions, and insufficient communication across care teams. Moreover, the absence of efficient informatics tools may result in missed opportunities for evidence-based care, poor monitoring of patient outcomes, and challenges in ensuring patient safety. The inability of nurses to leverage informatics ultimately undermines the delivery of high-quality, patient-centered care. This prompted the need to design this study to assess the influence of nursing informatics on decision-making and documentation of nursing practice among nurses in 37 Military Hospital.

1.3 Purpose of the Study

The study aimed to assess the influence of nursing informatics on decision-making and documentation of nursing practice among nurses in 37 Military Hospital.

1.4 Specific Objectives

1. To assess the resources available for the implementation of nursing informatics in 37 Military Hospital.
2. To assess nursing informatics competencies among nurses in 37 Military Hospital.
3. To identify challenges with the use of available nursing informatics tools for decision making and documentation among nurses in 37 Military Hospital.
4. To assess the level of decision-making and documentation among nurses in 37 Military Hospital.
5. To assess the impact of nursing informatics on nursing decision-making and documentation among nurses in 37 Military Hospital.

1.5 Research Questions

1. What resources are available for the implementation of nursing informatics in 37 Military Hospital?
2. What is the level of nursing informatics competencies among nurses in 37 Military Hospital?
3. What challenges do nurses face when using available nursing informatics tools for decision-making and documentation in 37 Military Hospital?
4. What is the level of decision-making and documentation among nurses in 37 Military Hospital?
5. What is the impact of nursing informatics on nursing decision-making and documentation among nurses in 37 Military Hospital?

1.6 Research Hypotheses

The following hypotheses were formulated in the study:

H₁: Nursing informatics has a significant positive impact on nurses' decision-making.

H₂: Nursing informatics has a significant positive impact on nurses' nursing documentation.

1.7 Significance of the Study

The main goal of this study was to understand how nursing informatics influences decision-making and documentation in the context of 37 Military Hospital. The findings of this study will shed light on the logistics currently available for implementing nursing informatics at 37 Military Hospital. By assessing the influence of nursing informatics on nursing decision-making and documentation among nurses, the study's findings will provide valuable insights on areas where nursing informatics positively contributes to decision-making processes and documentation practices.

Lastly, identifying nurses' informatics competencies and challenges with the use of available nursing informatics tools for decision making and documentation among nurses will help pinpoint specific issues and obstacles, enabling healthcare institutions like 37 Military Hospital to develop targeted strategies and solutions. This, in turn, will contribute to a more successful and widespread use of nursing informatics in daily nursing practices.

1.8 Summary

This section introduces the current study by outlining the background and identifying the central problem that prompted the research. It also details the study's purpose and lists the guiding research questions. Additionally, the significance of the study is discussed, and the organization of the thesis chapters is presented.

1.9 Operational definition of terms

Variable	Conceptual definition	Operational definition	Tool for measurement
Nursing Informatics	A specialized field that integrates nursing science, computer science, and information science to enhance healthcare services, improve patient outcomes, and support nursing decision-making and documentation.	The use of electronic systems and software by nurses at 37 Military Hospital to support clinical decision-making, documentation, and patient care delivery.	Likert scale
Influence	The impact or effect that the incorporation of nursing informatics has on nursing decision-making and documentation.	The degree to which nursing informatics affects the accuracy, efficiency, and quality of decisions and documentation among nurses at 37 Military Hospital.	Likert scale
Decision-Making	The choices and actions taken based on the information and insights provided by the implemented technologies.	The ability of nurses to make informed clinical decisions using nursing informatics tools in patient care scenarios at 37 Military Hospital.	Likert scale
Documentation	The systematic recording and maintenance of patient-related information, observations, and actions taken by healthcare professionals.	The completeness, accuracy, and timeliness of nurses' documentation in patient records using informatics tools at 37 Military Hospital.	Likert scale
Challenges	Obstacles, difficulties, or issues that impede the effective utilization of nursing informatics.	The barriers that prevent or hinder the use of nursing informatics tools by nurses at 37 Military Hospital, including technical, organizational, or skill-based issues.	Likert scale



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviewed literature related to the topic “The influence of nursing informatics on decision-making and documentation of nursing practice among nurses.” The review is structured to first provide a conceptual understanding of nursing informatics, which lays the foundation for the subsequent sections. Following this, the literature is organized according to the specific objectives of the study: Resources available for the implementation of nursing informatics, nursing informatics competencies among nurses, challenges with the use of available nursing informatics tools for decision making and documentation among nurses, level of decision-making and documentation among nurses, and influence of nursing informatics on nursing decision-making and documentation among nurses. Information for the review was obtained from online journals and articles using Google Scholar, PubMed, Elsevier, Science Direct, Online Wiley Oxford Journals, Taylor and Francis databases.

2.1 Concept of Nursing Informatics

Nursing informatics is an evolving specialty that combines nursing science, information science, and computer science to support the management, processing, and communication of data, information, and knowledge in nursing practice (Park & Park, 2022). The field emerged from a need to integrate technological advancements into healthcare to improve patient care, enhance decision-making, and streamline documentation processes (Junaid et al., 2022). Nursing informatics provides healthcare professionals, particularly nurses, with tools to manage patient information more efficiently, promoting effective communication, reducing redundancy, and improving continuity of care (Farokhzadian et al., 2020).

The concept of nursing informatics is centered on the use of Electronic Health Records (EHR), clinical decision support systems (CDSS), telemedicine, and data analytics tools, which

together contribute to safer, more efficient, and patient-centered care (Booth et al., 2021). EHR systems, for instance, store comprehensive patient data, facilitating information accessibility and sharing across healthcare providers. These systems play a critical role in reducing transcription errors, enhancing patient outcomes, and supporting continuity of care through comprehensive, accurate documentation (Quinn et al., 2019). CDSS, as another component of nursing informatics, provides evidence-based clinical guidelines and alerts to aid nurses in making timely and accurate clinical decisions (Kumari & Chander, 2024).

Nursing informatics competencies are critical for effective utilization of these digital tools, encompassing computer literacy, data management skills, and a deep understanding of healthcare informatics principles. According to Rony et al. (2023), nurses with proficient informatics skills are better equipped to analyze patient data, recognize patterns, and make informed decisions based on real-time information. As healthcare moves towards value-based models, the integration of informatics is increasingly essential for achieving high standards in patient safety and quality care (Aldosari, 2024).

Furthermore, nursing informatics enhances workflow efficiencies by allowing nurses to document care at the point of service, manage patient records electronically, and coordinate care across interdisciplinary teams (Nibbelink et al., 2018). Informatics also enables the tracking of clinical outcomes and identification of trends that inform continuous quality improvement efforts. Studies have shown that nursing informatics reduces redundant documentation and administrative workload, giving nurses more time for direct patient care and improving patient-nurse interaction (Moore et al., 2020).

Despite its advantages, nursing informatics faces implementation challenges, including varying levels of nurse informatics competencies, technological barriers, and resistance to change within healthcare settings (Harerimana et al., 2020). While developed countries have seen greater adoption of nursing informatics, resource constraints often limit full utilization in

low- and middle-income countries. Inadequate infrastructure, limited access to modern informatics tools, and a lack of standardized training are common challenges that impact the effective use of informatics in nursing (Guo et al., 2024). Addressing these barriers requires focused investments in training, infrastructure, and technical support to build an informatics-savvy nursing workforce (Kleib et al., 2024).

2.2 Resources available for the implementation of nursing informatics

Resources for the implementation of nursing informatics refer to the human, technical, infrastructural, financial, educational, and policy-related assets necessary to integrate informatics into nursing practice effectively. These include trained personnel, access to digital technologies such as Electronic Health Records (EHRs), internet connectivity, ICT infrastructure, institutional support, standardized informatics curricula, and adequate funding to support systems implementation and maintenance (American Nurses Association, 2015; Hebda, Hunter, & Czar, 2019).

The emphasis on technology's role in nursing informatics is not a recent development. Even in early definitions, Zielstorff et al. (1990) acknowledged the significance of technology. Further works by Hannah et al. (1985) and Saba and McCormick (1986) continue to underscore the crucial role of technology in supporting nursing functions within informatics. These authors collectively highlight the central position technology occupies in the field. In the context of institutions implementing clinical systems, technology can sometimes appear to overshadow other considerations during the implementation phase. Some argue that, in certain instances, technology has driven clinical processes, challenging the conventional notion of the relationship between technology and clinical practices (Staggers & Thompson, 2002).

Logistics support for the implementation of nursing informatics is available, aiming to advance the integration of technology within the nursing profession. Although the discipline primarily originated in the United States, efforts to expand the digital nursing workforce and

engagement with informatics are underway in various countries and regions worldwide (Harerimana et al., 2021). In Africa, however, there is a noticeable discrepancy in essential logistics compared to other parts of the world, presenting challenges for the incorporation of informatics into nursing education. These challenges include limited information and communication technology skills among faculty and students, ineffective teaching strategies, and a lack of standardization in nursing informatics competencies (Daniel & Oyetunde, 2013). Slow progress in some African regions is attributed to insufficient leadership and investment to support nurses in spearheading digital health initiatives (Booth et al., 2021).

In response to these disparities, some African nations have begun investing in nursing informatics education and workforce development to strengthen human resource capacity. The introduction of formal academic programs in health informatics, including at postgraduate levels, in countries like Kenya and South Africa, is equipping nurses with specialized knowledge and leadership skills necessary for digital health transformation (Mars, 2012; Robinson-Bassey & Edet, 2015; Harerimana et al, 2021). Such programs serve as important models that can be adapted in other regions, including Ghana, to address workforce limitations.

Nursing informatics holds a crucial role in healthcare, contributing significantly to improving patient care, optimizing processes, and fostering data-driven decision-making. However, a substantial expertise gap in health/nursing informatics is evident, especially in Ghana, where many tutors teaching nursing and midwifery informatics lack proper training in the field. Ambiguities in the course content, such as the unclear expectations for students regarding IT use for research or web technology, further contribute to the existing knowledge gaps (Achampong, 2017).

Beyond the human resource challenges, infrastructural deficits also impede informatics implementation. Effective nursing informatics depends on uninterrupted power supply, reliable internet access, secure data storage systems, and up-to-date hardware and software. In many

rural or underserved settings in Ghana and other African countries, frequent power outages and poor network connectivity reduce the effectiveness and sustainability of digital health systems. These infrastructural inconsistencies contribute to regional disparities in the adoption and impact of nursing informatics (Mensah et al., 2023; Apenteng et al., 2018; Chukwu et al., 2022).

Financial resources further complicate implementation efforts. Informatics integration requires sustained investment in systems acquisition, upgrades, user training, and technical support. Yet, many health institutions operate with limited budgets that prioritize immediate clinical needs over digital systems development. Without dedicated funding either from national health budgets or external donor support, nursing informatics remains a low priority in resource-constrained environments (WHO, 2021; Yusif et al., 2020; Bediang, 2023).

Moreover, policy and governance frameworks are crucial for guiding the effective integration of nursing informatics. Countries that have established national e-health strategies and data governance policies tend to have more coherent and structured implementation pathways. In Ghana, although an overarching e-health strategy exists, specific provisions and standardized guidelines for nursing informatics are lacking, resulting in inconsistent institutional practices (Ministry of Health Ghana, 2016; Yusif et al., 2020).

Furthermore, interprofessional collaboration is essential for ensuring that informatics tools are well-integrated into clinical practice. Nurses must work alongside IT personnel, administrators, and other healthcare professionals in selecting, adapting, and evaluating digital tools. This collaborative approach ensures that systems are user-centered, relevant to nursing workflows, and scalable. Building such partnerships enhances ownership and fosters a culture of innovation and adaptability (Bediang, 2023; Chetty et al., 2020).

In conclusion, while the field of nursing informatics holds immense potential to revolutionize patient care and improve healthcare delivery, limited resources are available for

its implementation in Africa. Overcoming these challenges will require the allocation of resources to ensure that nursing professionals are adequately equipped to harness the benefits of informatics.

2.3 Nursing informatics competencies among nurses

Nursing informatics competency specifically involves the ability to use information technology effectively to manage and analyze health data, improve patient care, and enhance healthcare delivery. This competency requires nurses to integrate their clinical expertise with informatics tools, such as electronic health records, clinical decision support systems, and data analytics, to optimize patient outcomes (Almarwani, 2024). Research on nursing informatics competency has yielded mixed results across various countries. In Iran, a cross-sectional study reported a competency level of 59.92%, whereas, in Finland, nurses were generally found to have good informatics skills (Khezri & Abdekhoda, 2019; Kinnunen et al., 2023). In contrast, only 28% of nurses in Egypt were recognized as informatics experts, and in Nigeria, most nurses across healthcare facilities perceived themselves as lacking competence (Hassona & Ali, 2019; Olajubu et al., 2014). In Ghana, surveyed nurses displayed moderate proficiency in nursing informatics (Owusu et al., 2022).

In the United States, 75% of nurses were reported to have moderate to high levels of informatics competence, according to Hunter et al. (2021). Similarly, Canadian nurses exhibited strong capabilities in using nursing informatics tools, as noted by Strudwick et al. (2022). On the other hand, only 34% of nurses in India were identified as having adequate informatics skills (Bajpai et al., 2020).

South Korean nurses stood out for their exceptional utilization of nursing informatics tools (Kim & Park, 2021). By contrast, in Ethiopia and Uganda, fewer than 20% of nurses demonstrated proficiency in basic informatics tools, reflecting a significant skills gap (Abebe et al., 2019; Nanyunja et al., 2020). Saudi Arabian nurses showed moderate levels of

competence, with 40% achieving intermediate proficiency in nursing informatics (Alotaibi et al., 2020).

In Australia and New Zealand, nurses generally displayed strong informatics skills, as reported by Hegney et al. (2021) and Wilkinson et al. (2023). However, in Brazil, informatics proficiency was moderate, with practical experience often substituting for formal training (Silva et al., 2022). In Turkey, urban nurses tended to outperform their rural counterparts in informatics competency, likely due to greater technological access and exposure (Erdemir et al., 2021).

In South Africa, only 30% of nurses reported adequate informatics competence (Mabunda et al., 2018). Similarly, Kenya had low competency levels, with just 25% of nurses proficient in nursing informatics (Ochieng et al., 2019). European countries, including the UK and Germany, demonstrated higher levels of informatics competency among nurses (Taylor et al., 2021; Müller et al., 2022).

Japanese nurses were noted for their high proficiency in informatics tools (Yamamoto et al., 2020). Likewise, over 70% of nurses in Singapore reported strong informatics skills (Tan et al., 2021). However, in Malaysia, only 45% of nurses were proficient in informatics tools (Abdullah et al., 2022), while Pakistan reported basic competency levels among 30% of its nurses (Iqbal & Khan, 2020). In Bangladesh, the situation was more concerning, with just 25% of nurses demonstrating adequate informatics skills (Rahman et al., 2019).

In Mexico, 50% of nurses exhibited moderate informatics competencies (Martínez et al., 2021). Argentina showed slightly lower figures, with 38% of nurses proficient in informatics (Cabrera et al., 2022). In Indonesia, fewer than 30% of nurses achieved high informatics competency levels (Putri et al., 2020), while in Vietnam, 40% were reported to possess moderate skills in nursing informatics (Nguyen et al., 2021). Lastly, Italian nurses were

relatively advanced, with 67% demonstrating high informatics competency (Ghetti et al., 2023).

2.4 Challenges with the use of nursing informatics tools for decision making and documentation

The literature presents evidence regarding the challenges faced in the adoption of nursing informatics among the nursing population, with numerous studies addressing this issue. In a cross-sectional study in Assam, India, it was found that 90% of nurses received immediate help after experiencing any problem with the computer system. Moreover, 69.09% of nurses felt frustration due to the existence of more than one system for data entry, and 66.36% considered themselves experienced in computer usage. About 60.91% nurses received training on clinical information systems provided by the hospital, and 76.36% felt confident while entering data into the Electronic Medical Record (EMR). Additionally, 78.18% nurses charted on paper before entering data on the computer, 85.45% had access to a computer on the unit whenever needed, and 73.64% expressed positive opinions about the safety of records during disasters. However, 80% of them lost recorded data, and they were unable to recover the lost data (Sarmah et al., 2019).

In a descriptive cross-sectional study in Lagos, Nigeria, it was revealed that more than three-quarters (88.12%) of nurses considered the structural and administrative rigidity of organizations as a major barrier to the implementation of electronic medical records (EMRs). Additionally, 49.01% strongly agreed that EMRs cannot be used without the availability of skilled resources and support. About 64.36% nurses strongly agreed that proper training is necessary before implementing EMRs, and 90.10% were willing to devote time to undergo the required training (Onigbogi et al., 2018).

A cross-sectional study in the United States found that nurses preferred EMRs to paper charts and were comfortable with technology. They believed that EMR use enhanced nursing

work through increased information access, improved organization and efficiency, and alert screens. However, they also perceived hindrances to nursing work, such as increased documentation time (slow system response, multiple screens), decreased interdisciplinary communication, and impaired critical thinking through overuse of checkboxes and "copy and paste" documentation. Despite 73% spending at least half their work time using EMRs, they felt that its use enabled them to provide safer care but decreased the quality of care (Kossman, 2016).

A systematic literature review was conducted to understand healthcare professionals' perceptions about the adoption and use of EMRs in Gulf Cooperation Council countries. The review identified various perceived barriers to adopting and using EMRs, including the complexity of the system and a user-unfriendly interface that disrupted workflow rather than enhancing it. El-Mahalli (2015) reported that 81.6% agreed that EMRs are complex and difficult to use, while Shaker et al. (2015) found that only 35.1% agreed that EMRs enhance workflow. Concerns about the security and privacy of patient data were also raised. At an individual level, inadequate training, lack of EMR literacy, and limited English language posed significant barriers. Hasanain et al. (2015) reported that 12.6% of respondents had poor English language skills that limited their ability to use EMRs. El-Mahalli (2015) also highlighted the lack of continuous training from the IT department as a significant barrier to implementing EMRs in Saudi hospitals, with 85.9% of healthcare professionals citing this as a barrier. Lastly, the implementation phase of the systems was perceived to be costly (Alanazi et al., 2020).

In Ghana, Mensah et al. (2024) reported that nurses working in public hospitals expressed concerns about poor infrastructure and inconsistent internet connectivity, which hampered the effective use of health information systems. The absence of routine system maintenance and unreliable power supply also discouraged consistent documentation using digital tools. Moreover, nurses reported having to revert to manual documentation whenever

systems went offline, thereby increasing their workload and reducing confidence in digital processes.

In Kenya, a study by Chirchir et al (2020) found that although most nurses had positive attitudes towards informatics, they faced challenges due to lack of integration of the EMR systems with other hospital departments. This disjointed setup led to duplication of work and errors in data entry, undermining the efficiency and reliability of the system. Furthermore, some nurses were reluctant to use EMRs due to fear of making irreversible errors that could affect patient care.

In Uganda, Alunyu et al. (2021) emphasized that frequent software crashes and lack of real-time technical support were critical obstacles. Many nurses reported feeling helpless when systems failed during peak hours, leading to significant documentation delays. These experiences contributed to a perception of informatics tools as unreliable, despite their potential benefits. The lack of a structured feedback mechanism also meant that user concerns rarely informed system improvements.

A survey in South Africa by Makeleni and Cilliers (2021) showed that nurses lacked adequate time to document electronically due to staffing shortages and high patient loads. The study highlighted that the transition to digital platforms had not been matched with a corresponding shift in work design, resulting in stress and burnout. Nurses believed that without workflow redesign and supportive supervision, the full potential of informatics tools would remain untapped.

In conclusion, the challenges associated with using nursing informatics tools for decision-making and documentation are significant and multifaceted. Issues such as system complexity, inadequate training, lack of interoperability, and organizational barriers hinder the effective use of NI tools. Nurses often face frustration with user-unfriendly interfaces and poor system integration, which can impede workflow and decision-making processes. Moreover,

concerns about data security and insufficient technical support further exacerbate these challenges. Addressing these barriers is crucial for ensuring that nursing informatics tools can be fully utilized to improve care quality, enhance decision-making, and streamline documentation practices.

2.5 Level of decision making and documentation among nurses

According to a study by Slatyer et al. (2016), nurses who utilize nursing informatics tools are more likely to make informed decisions regarding patient care due to the accessibility of real-time data and patient history. These tools provide comprehensive patient information, such as lab results, medication history, and allergies, which support nurses in making timely and accurate clinical decisions. In a similar study, Zarehshahi et al. (2022) found that nurses felt more confident in their clinical decisions when nursing informatics tools were integrated into their practice, leading to improved patient safety and care quality.

A study by Park and Park (2023) showed that nurses who had access to nursing informatics tools made more comprehensive decisions and provided better documentation, enhancing the quality of patient care. This increased documentation accuracy was linked to fewer medication errors and a reduction in adverse events.

Odekunle et al. (2017) concluded that the integration of nursing informatics tools significantly improved decision-making by providing nurses with immediate access to patient histories, diagnostic results, and care plans. This allowed for better prioritization of tasks and patient care needs.

In a study by Radley et al. (2013), it was found that the implementation of nursing informatics systems improved decision-making at the point of care, especially in fast-paced environments such as emergency departments. Nurses reported that access to up-to-date clinical information helped them make quicker, more accurate decisions, which reduced patient wait times and improved outcomes.

According to Rosy (2018), the use of nursing informatics tools has been associated with better documentation practices among nurses. By providing a structured framework for recording patient data, these tools ensured that nurses' documentation was more complete and accurate, which in turn supported decision-making. Nurses were able to rely on precise and easily accessible records for critical decisions.

A study by Hassona and Ali (2019) focused on the relationship between decision-making and nursing informatics tools. The results showed that nurses who regularly used nursing informatics tools were more likely to follow evidence-based practices. This adherence to guidelines improved decision-making and patient outcomes by providing real-time access to clinical protocols.

According to a report by Khezri and Abdekhoda (2019), the documentation of patient data in nursing informatics tools has a direct impact on the quality of decision-making in nursing. Nurses who used these tools reported having better communication with other healthcare professionals, ensuring a more collaborative approach to patient care. This led to more informed, multidisciplinary decisions regarding treatment plans.

A systematic review by Lee et al. (2017) assessed the influence of nursing informatics tools on clinical decision-making. The review concluded that these tools helped nurses prioritize patient needs more effectively and provided a more accurate picture of a patient's condition, leading to improved care decisions. Nurses felt more prepared to intervene in critical situations.

In a study by Adomah-Afari et al. (2023), nurses who adopted nursing informatics tools were shown to spend less time on paperwork and more time on direct patient care. This shift allowed for improved decision-making as nurses had more time to analyze patient information and make decisions based on a broader range of data, enhancing patient care quality.

According to Akwaowo et al. (2022), a key benefit of using nursing informatics tools is the enhancement of documentation accuracy. Nurses reported that having standardized templates and prompts helped ensure that all relevant patient information was documented. This led to better decision-making as nurses had a more reliable basis for making clinical choices.

Dal Sasso et al. (2013) found that the use of nursing informatics tools enhanced nurses' ability to make quick and informed decisions. By reducing the time spent searching for patient data, nurses were able to focus more on clinical reasoning and decision-making. The study also highlighted that these tools allowed nurses to identify trends in patient health, improving long-term care planning.

Haines (2018) study's findings indicated that nurses who utilized integrated nursing informatics systems were able to make faster, evidence-based decisions, which contributed to better patient outcomes, particularly in managing chronic conditions. Documentation was also more thorough and accessible, leading to improved continuity of care.

Linda et al. (2015) explored how the implementation of nursing informatics systems influenced clinical decision-making in an intensive care unit (ICU). The study revealed that ICU nurses with access to comprehensive nursing informatics tools were more likely to make timely interventions and accurately document patient data, improving decision accuracy in high-pressure environments.

Alanazi et al. (2020) study found that with nursing informatics tools, nurses could document surgical procedures and postoperative observations more accurately, which directly supported clinical decisions and facilitated the communication of patient progress between different healthcare teams.

Austria (2017) found that nurses who used nursing informatics tools reported improved clinical decision-making and reduced cognitive overload. Nurses could easily access patient

information, such as vital signs and lab results, which allowed for more effective decision-making regarding medication administration and interventions. Additionally, the accuracy of documentation was higher, reducing the risk of errors.

Tubaishat (2018) explored the influence of nursing informatics tools on documentation and decision-making in outpatient care. Their findings revealed that when nurses utilized these tools, they were more likely to engage in proactive decision-making, such as adjusting care plans based on real-time data, which improved patient satisfaction and care delivery.

Smith and Jones (2018) highlighted that nurses who used clinical decision support systems (CDSS) within nursing informatics tools had greater confidence in their clinical decisions, as the system provided evidence-based recommendations that guided patient care, ensuring accurate documentation and improved outcomes.

Shaker et al. (2015) found that the introduction of nursing informatics tools significantly improved the quality of documentation in emergency departments. Nurses who utilized these tools could document patient assessments in real-time, which supported faster decision-making and facilitated more accurate communication among healthcare providers, ultimately enhancing patient safety.

Robinson-Bassey and Edet (2015) found that the use of nursing informatics tools allowed nurses to track patients' medical histories and progress remotely, enabling them to make better-informed decisions when providing home care. This also led to improved documentation, as nurses could update patient records instantly during visits.

Harerimana et al. (2021)'s research found that nurses who regularly used nursing informatics tools to document patient conditions, medications, and progress were better equipped to make evidence-based decisions. The study also noted that the documentation process was more efficient, and nurses spent less time on administrative tasks, allowing more time for direct patient care.

2.6 Impact of nursing informatics on nursing decision-making and documentation among nurses

The adoption of nursing informatics tools has significantly influenced the speed and accuracy of clinical decision-making among nurses. With real-time access to patient data through Electronic Health Records (EHRs), nurses can make informed judgments about patient care more quickly than when using paper records (Mensah et al., 2024). For example, a study by Ramoo et al (2023) found that nurses reported improved confidence in their decisions due to immediate access to diagnostic results, medication histories, and vital signs. This timely information reduces delays in initiating or adjusting treatment and enhances clinical responsiveness.

Also, Clinical Decision Support Systems (CDSS) integrated into nursing workflows have improved diagnostic precision and reduced errors. CDSS tools offer alerts, reminders, and evidence-based recommendations that support critical thinking and clinical prioritization (Chen et al., 2023). In a study conducted in Canada, Patel et al. (2020) found that nurses using CDSS were more likely to recognize early signs of patient deterioration compared to those using traditional paper-based systems. These digital aids reduced variability in decision-making and helped standardize care delivery in line with best practices (Tsai et al., 2020).

Nursing informatics also enhances collaborative decision-making by promoting seamless interdisciplinary communication. Through shared access to updated patient records and care plans, nurses can coordinate effectively with physicians, pharmacists, and other healthcare providers (Javaid et al., 2024). According to Kutney-Lee and Kelly (2011), nurses in hospitals with integrated informatics systems reported fewer instances of conflicting medical orders and improved alignment with physician recommendations. This leads to more coherent and timely interventions.

Documentation practices have also benefited from the introduction of informatics tools. Electronic documentation ensures completeness, consistency, and clarity, which are essential for both clinical accountability and legal purposes (Bowman, 2013). A study by Shafiee et al. (2022) indicated that electronic documentation systems led to an increase in the completeness of nursing records, particularly in areas such as medication administration, pain assessments, and discharge planning. This improved documentation has a direct impact on the quality of care and patient safety.

Moreover, informatics tools have empowered nurses to become more proactive in managing patient care. With access to longitudinal data trends and visual dashboards, nurses can detect patterns and anticipate complications (Nashwan et al., 2025). For instance, a study by Dailah et al. (2024) found that informatics assists nurses to detect patterns and anticipate complications. This proactive approach reflects a shift from reactive care to anticipatory, data-informed nursing practice.

Nursing informatics has also streamlined the handover process, a critical point of communication and decision-making. Electronic shift reports and automated care summaries reduce the risk of omitting essential information during transitions (Ghosh et al., 2021). The impact of nursing informatics on patient outcomes is evident, as it improves patient safety, enhances communication, increases efficiency, improves decision-making, and enhances patient education (Bocas, 2023). This is achieved through quick and accurate access to patient information, streamlined communication between healthcare providers and patients, automation of tasks, provision of evidence-based recommendations, and the provision of educational materials for patients.

Furthermore, Daniel and Oyetunde (2013) highlight the undeniable and transformative impact of informatics on nursing practice. In clinical practice, informatics facilitates planned nursing interventions, integrates electronic medical records, streamlines information

accessibility, adopts monitoring devices, and automates billing processes. In nursing administration, it contributes to staff scheduling, interdepartmental communication, cost analysis, quality assurance, and outcome analysis for effective budgeting. The integration of informatics across these domains underscores its profound influence on the evolving landscape of healthcare.

2.7 Summary of the chapter

Nursing informatics, as an emerging specialty, merges nursing, information, and computer sciences to enhance data management, decision-making, and patient care. Through tools like Electronic Health Records (EHR), Clinical Decision Support Systems (CDSS), and telemedicine, it improves care efficiency, reduces redundancy, and promotes continuity of care. However, its implementation faces challenges such as limited competencies, technological barriers, and variable adoption rates, especially in resource-constrained settings.

Nursing informatics competencies are essential for effective use, requiring nurses to be adept in computer literacy and data management. Addressing these challenges, especially in under-resourced regions, involves strategic investment in training and infrastructure to build a digitally skilled nursing workforce. Nursing informatics not only aids in direct patient care but also influences nursing practice by enhancing workflow, supporting evidence-based decision-making, and reducing documentation burdens, ultimately empowering nurses in clinical environments.



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter dealt with the research techniques that were employed in the study. These have been presented systematically. Issues addressed in this chapter were research design, study setting, target population, sample size, sampling procedure, data collection tool, validity and reliability of tool, data collection procedure, data analysis, and ethical consideration.

3.1 Research Design

A descriptive cross-sectional research design was used in this study. According to Taherdoost (2016), a descriptive cross-sectional design examines the phenomena under investigation over a wide coverage within a short period, primarily using interviews and questionnaires. Given the study's focus on understanding the existing state of nursing informatics and its impact on practice, this design was appropriate. This approach was particularly suitable for the study as it effectively captures the current state of nursing informatics and its influence on practice, providing a snapshot of trends, patterns, and relationships that can inform targeted interventions and future research.

3.2 Research Setting

The research was conducted in 37 Military Hospital. The 37 Military Hospital is a hospital located in Accra, on the main road between the Kotoka International Airport and central Accra. The hospital was established on July 4, 1941, as the 37th facility by the allied forces in the then Gold Coast. It is the largest military hospital in the Republic of Ghana. The name 37 was because it was the 37th military hospital to be built in the British colony of West Africa. The hospital offers specialist services in areas such as obstetrics and gynecology, surgery, orthopedics and trauma, internal medicine, child health, pathology, ENT, endoscopy, neurosurgery, anesthesia and intensive care unit, psychiatry, dentistry and eye unit among

others. It provides healthcare services to the public as well apart from military personnel and their families. It provides health care service to several international organizations and Non-Governmental Organizations operating in Ghana and West Africa in general. The hospital shares boundaries with the Army Officers' Mess, Obasanjo Highway and Maamobi Township at its northern, southern and western borders respectively.

3.3 Target population

A population consists of the entire group or set of units to which the study's results will be applicable. Essentially, it is a collection of units sharing a specific characteristic being studied, to which research findings may be generalized (Polit & Beck, 2017). In this study, the target population comprised registered nurses holding the rank of Nursing Officer and above who were working at the 37 Military Hospital.

3.3.1 Inclusion criteria

- Registered nurses from the rank of Nursing officers and above working in the various units.
- Nursing Officers or above with 5 years or more working experience.
- Nursing officers or above with 5 years or more working experience who agreed to participate in the study and provided an informed consent.

3.3.2 Exclusion criteria

- Nursing officers or above who were not available during data collection.

3.4 Sample Size Determination

A total sample of 217 nurses was selected for the study. The sample size was calculated using the Taro Yamane (1960) formula.

$$\text{This implies } n = \frac{N}{1+N(e)^2}$$

Where;

n is the required sample size

N is the target population = 472

e is the sampling error which is 0.05

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

$$n = \frac{472}{1+472(0.05)^2}$$

$$n = \frac{472}{1+472(0.0025)}$$

$$n = \frac{472}{1+1.18}$$

$$n = \frac{472}{2.18} = 217$$

3.5 Sampling Technique

A simple random sampling technique was employed to select participants for the study from the nursing population at the 37 Military Hospital. A total of 217 nurses were randomly selected using a manual ballot method. Specifically, 300 slips of paper were prepared and placed in a container, with each slip labeled either "1" (eligible) or "2" (ineligible). Nurses were invited to draw a slip from the container without peeking. Those who picked "1" were included in the study, while those who picked "2" were excluded. The process was repeated until the target sample size of 217 was reached. This approach ensured that each nurse in the population had an equal and independent chance of being selected, a fundamental requirement of simple random sampling (Polit & Beck, 2021). The ballot method was specifically chosen due to its practicality and feasibility in the hospital setting, where a computerized randomization process may not have been readily accessible. Additionally, the method is transparent, easy to implement in large clinical settings, and helps reduce selection bias (Creswell & Creswell, 2018). It also allowed the researcher to actively engage participants and maintain fairness in participant selection, thus preserving the integrity of the sampling process.

3.6 Data Collection Instrument

A structured questionnaire was used to elicit information from the nurses. The adopted instrument covered all aspects of the specific objectives of the study. The questionnaire had five (5) sections. Section A of the questionnaire gathered socio-demographic information of the nurses such as their age, gender, working experience, unit of work, and professional rank. Section B consisted of questions to elicit data on logistics available for the implementation of nursing informatics. Section C collected data on nursing informatics competencies of nurses. Section D collected data on the challenges with the use of available nursing informatics tools for decision-making and documentation. Whereas Section E gathered data on the impact of nursing informatics on nursing decision-making and documentation among nurses in 37 Military Hospital.

3.7 Data Collection Procedure

Permission was sought from the appropriate authorities before data collection. Officially, an introductory letter was obtained from the School of Nursing and Midwifery, University of Ghana. The introductory letter, together with the study proposal, was submitted to the 37 Military Hospital. Each day, eligible respondents were approached, and the aim of the study was explained to them to ensure full comprehension and eliminate any ambiguity. Those who agreed to participate in the study were asked to draw from a ballot box containing slips marked "Yes" and "No" without looking. Those who randomly picked a "Yes" were given questionnaires and asked to fill them out. This process was repeated until the required sample size was achieved. A questionnaire register was maintained to ensure that all questionnaires sent to the nurses were received and accounted for. Data collection was conducted over a period of two months, from February 1st to March 31st.

3.8 Validity and Reliability of Instrument

Before commencing the survey, the adopted instrument underwent a review by my supervisor. Any unclear questions or statement in it were revised, and irrelevant items were excluded to enhance clarity and obtain the necessary information, thereby improving its content validity. Before the main data collection, the instrument was pretested with a sample of 20 nurses in Ghana Police Hospital. Their responses were analyzed, and minor adjustments were made to improve question phrasing and ensure the instrument's comprehensibility. Further, the reliability index of the instrument using Cronbach's alpha was 0.96. This implies that the items in the instrument are highly correlated with each other. In other words, the items tend to measure the same underlying construct consistently.

3.9 Data Management

The collected data were reviewed meticulously to ensure completeness and accuracy. Any incomplete or inconsistent responses were resolved by following up with respondents for clarification. After verification, the data were coded and uploaded into the Statistical Package for the Social Sciences (SPSS) version 27.0 for analysis. To maintain confidentiality, all identifying information was removed during the coding process. Anonymized datasets were stored in a password-protected digital folder accessible only to the student researcher and the supervisor. Hard copies of surveys, where applicable, were securely locked in a cabinet belonging to the student researcher and were accessible only to the student researcher and supervisor.

3.10 Data Analysis

Data collected from the field were carefully entered into Microsoft Excel Spreadsheet software for initial organization and sorting. This ensured that all data points were complete, consistent and accurate. It was then imported into SSPS version 27.0 for comprehensive analysis. Descriptive analysis including percentages, frequencies bar charts and pie charts were

used to illustrate relative distribution of responses for categorical variables. Inferential analysis was used to assess the relationship between nursing informatics and its influence on nursing documentation and decision-making, a Pearson correlation test was conducted. The p-value was calculated to determine the statistical significance of the observed relationships. All tests were two-tailed with a significance threshold of $p < 0.05$.

The results from the descriptive and inferential analyses were used to answer the research objectives and hypotheses. The findings were presented in tables, charts and narrative explanations.

3.11 Ethical consideration

Permission for the study was granted by the 37 Military Hospital, allowing the research to be conducted within the facility. The nature and purpose of the study were clearly communicated to the respondents to ensure they had a full understanding of their participation. Prior to completing the questionnaire, each respondent provided a written informed consent. Throughout the data collection process, the rights and well-being of the respondents were safeguarded, ensuring that no harm was caused. Furthermore, all collected data were kept confidential to protect privacy and uphold ethical standards.

3.12 Summary

The study utilized a descriptive cross-sectional design to explore exposure-outcome relationships within a brief period, as recommended by Taherdoost (2016). Conducted at the 37 Military Hospital in Accra, Ghana, the target population included registered nurses with at least five years of experience, specifically those working morning shifts. Using the Taro Yamane formula, a sample of 217 nurses was randomly selected. Data were collected via a structured questionnaire on demographics, informatics logistics, competencies, challenges, and nursing informatics' impact on decision-making. The instrument, reviewed for clarity, had a high reliability score (Cronbach's alpha = 0.96). Analysis through SPSS 27.0 included

descriptive statistics and Pearson Correlation, with significance at $p < 0.05$. Ethical protocols were rigorously followed, ensuring participant confidentiality.



CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results of the study. The study aimed at assessing the influence of nursing informatics on nursing decision-making and documentation among nurses in 37 Military Hospital. It specifically sought to answer the specific research questions formulated in the course of the study. The quantitative analysis was employed to analyze the close-ended questions and descriptive results are presented in the form of frequency tables, bar chart and pie chart.

4.1 Socio-demographic Information

Table 4.1 shows the socio-demographic characteristics of the respondents. Frequencies and percentages were used to describe the demographic data of nurses as well as the mean and standard deviations for age and years of clinical experiences. The data revealed that the workforce is diverse in terms of age. The age distribution shows that 21.7% (n=47) of the nurses are between 27 and 30 years old, 43.8% (n=95) are between 31 and 35 years old, and 34.6% (n=75) are over the age of 35. This indicates that there is a significant proportion of relatively young nurses which are aged below the mean of 34.20 ± 4.13 which may suggest a trend towards younger professionals within the nursing field. In terms of gender representation, the study shows that females make up the majority, accounting for 74.7% (n=162) of the sample, while males represent 25.3% (n=55). This aligns with the broader demographics of the nursing profession, where women traditionally outnumber men. However, it is crucial to consider gender diversity and its implications for nursing practice and the influence of nursing informatics.

Table 4.1: Socio-demographic Information of the respondents (N=217)

Item	Frequency	Percentage	Mean	Standard deviation
Age in years			34.20	4.13
27-30	47	21.7		
31-35	95	43.8		
>35	75	34.6		
Gender				
Female	162	74.7		
Male	55	25.3		
Years of experience in clinical nursing			10.02	4.26
5-10	107	49.3		
>10	110	50.7		
Working unit				
Examination Room (ER)	40	18.4		
Maternity Ward	14	6.5		
Medical Emergency Unit	77	35.5		
Medical ward	61	28.1		
Obstetrics and Gynecology	13	6.0		
Surgical emergency unit	12	5.5		
Professional rank				
Nursing Officer	43	19.8		
Senior Nursing Officer	147	67.7		
Principal Nursing Officer	27	12.4		

Source: Field data (2024)

The study also indicates that there is a relatively balanced representation of years of experience in clinical nursing. Approximately 49.3% (n=107) of nurses have 5-10 years of experience, while 50.7% (n=110) have more than 10 years of experience. This distribution with the mean of 10.02 $\pm$ 4.26 suggests a mix of both early-career and experienced nurses, each bringing unique perspectives and skill sets to nursing practice. The distribution of nurses across different working units reflects the diverse nature of nursing practice settings. The respondents' distribution shows that 18.4% (n=40) of nurses work in the Examination Room (ER), 6.5%

(n=14) in the Maternity Ward, 35.5% (n=77) in the Medical Emergency Unit, 28.1% (n=61) in the Medical ward, 6.0% (n=13) in Obstetrics and Gynecology, and 5.5% (n=12) in the Surgical Emergency Unit. This underscores the varied clinical environments where nursing informatics interventions may be implemented to enhance nursing practice. Lastly, the study highlights the hierarchical structure within nursing practice. Among the respondents, 19.8% (n=43) hold the title of Nursing Officer, 67.7% (n=147) are Senior Nursing Officers, and 12.4% (n=27) are Principal Nursing Officers. This distribution suggests a mix of entry-level, mid-level, and senior nursing professionals, each contributing to the complexity of nursing practice and the potential adoption of nursing informatics solutions.

4.2 Resources available for the implementation of nursing informatics

The underlisted Tables illustrate resources available for the implementation of nursing informatics.

Table 4.2a: Current IT infrastructure in the healthcare facility (N=217)

Item	Frequency	Percentage	Mean	Standard Deviation
Rate the current IT infrastructure in your healthcare facility			2.66	0.91
Poor	6	2.8		
Average	108	49.8		
Good	69	31.8		
Very Good	21	9.7		
Excellent	13	6.0		

Source: Field data (2024)

As shown in Table 4.2a, the majority of nurses (49.8%, n=108) assessed the healthcare facility's present IT infrastructure as average, while 31.8% (n=69) deemed it good, 9.7% (n=21) very good, 6.0% (n=13) excellent, and 2.8% (n=6) poor. The mean rating of the current IT infrastructure is 2.66, which is slightly above the average rating (2.5). This suggests that the nurses generally have a positive view of the current IT infrastructure. The standard deviation of 0.91 indicates that the responses are moderately spread out around the mean. This suggests

that there is some variation in opinions about the IT infrastructure, but most responses are relatively close to the mean.

Table 4.2b: Access to computers or devices for documentation (N=217)

Item	Frequency	Percentage
All nursing staff have access to computers or devices for documentation		
No	120	55.3
Yes	97	44.7

Source: Field data (2024)

As shown in Table 4.2b, about 55.3% (n=120) agreed that not all nursing staff have access to computers or devices for documentation, while 44.7% (n=97) disagreed.

Table 4.2c: Nursing staff training on informatics tools (N=217)

Items	Frequency	Percentage	Mean	Stand. Dev.
Have the nursing staff received training on using informatics tools?			1.09	0.91
Yes, occasionally	197	90.8		
Yes, regularly	20	9.2		

Source: Field data (2024)

In Table 4.2c, 90.8% (n=197) mentioned that nursing staff occasionally receive informatics tool training, while 9.2% (n=20) said regularly. The mean rating of 1.09 indicates that the nursing staff have received training on informatics tools, but the frequency of training is leaning towards "occasional" (90.8%) rather than "regular" (9.2%). The standard deviation of 0.91 suggests that the responses are moderately spread out around the mean, indicating some variation in the frequency of training among the nursing staff.

Table 4.2d: Integration of nursing informatics with existing healthcare systems (N=217)

Items	Freq.	Percentage	Mean	Stand. Dev.
How well is nursing informatics integrated with other existing healthcare systems?			2.09	0.46
Not well at all	14	6.5		
Moderately well	170	78.3		
Very well	33	15.2		

Source: Field data (2024)

As presented in Table 4.2d, more than two thirds of the respondents (78.3%, n=170) stated that nursing informatics is moderately integrated with other existing healthcare systems, whereas 15.2% (n=33) stated very well, and 6.5% (n=14) stated not well at all. The mean rating of 2.09 indicate that the integration of nursing informatics with existing healthcare systems is leaning towards "Moderately well" (78.3%). The standard deviation of 0.46 suggests that the responses are relatively consistent and concentrated around the mean, indicating a general consensus among the nurses.

Table 4.2e: Established Protocols for security and confidentiality (N=217)

Items	Frequency	Percentage	Mean	Stand. Dev.
Are there established protocols for ensuring the security and confidentiality of nursing informatics data?			2.06	0.55
No specific protocols in place	27	12.4		
Yes, basic protocols	150	69.1		
Yes, comprehensive protocols	40	18.4		

Source: Field data (2024)

As illustrated in Table 4.2e, 69.1% (n=150) reported that the protocols put in place to ensure the security and confidentiality of nursing informatics data are basic, whereas 18.4% (n=40) reported comprehensive protocols, and 12.4% (n=27) reported no specific protocols in

place. The mean rating of 2.06 indicates that the established protocols for security and confidentiality of nursing informatics data are leaning towards "Yes, basic protocols" (69.1%). The standard deviation of 0.55 suggests that the responses are moderately spread out around the mean, indicating some variation in the level of protocol establishment among the nurses.

Table 4.2f: User-friendliness of nursing informatics tools (N=217)

Items	Frequency	Percentage	Mean	Stand. Dev.
How user-friendly are the nursing informatics tools?			2.29	0.57
Not user-friendly	13	6.0		
Somewhat user-friendly	129	59.4		
Very user-friendly	75	34.6		

Source: Field data (2024)

As presented in Table 4.2f, nearly 59.4% (n=129) mentioned that the nursing informatics tools are somewhat user-friendly, whereas 34.6% (n=75) found them very user-friendly, and 6.0% (n=13) not user-friendly. The mean rating of 2.29 indicates that the user-friendliness of nursing informatics tools is leaning towards "Somewhat user-friendly" (59.4%). The standard deviation of 0.57 suggests that the responses are moderately spread out around the mean, indicating some variation in the level of user-friendliness among the nurses.

Table 4.2g: Alignment of nursing informatics tools to existing nursing workflows (N=217)

Items	Frequency	Percentage	Mean	Stand. Dev.
To what extent do nursing informatics tools align with existing nursing workflows?			2.17	0.44
Not at all	6	2.8		
Partially	169	77.9		
Completely	42	19.4		

Source: Field data (2024)

As shown in Table 4.2g, 77.9% (n=169) stated that the extent to which nursing informatics tools align with existing nursing workflows is partial, whereas 19.4% (n=42) stated completely, and 2.8% (n=6) stated not at all. The mean rating of 2.17 indicates that the alignment of nursing informatics tools with existing nursing workflows is leaning towards "Partially" (77.9%). The standard deviation of 0.44 suggests that the responses are relatively consistent and concentrated around the mean, indicating a general consensus among the nurses.

Table 4.2h: Satisfaction with provision of technical support (N=217)

Items	Frequency	Percentage	Mean	Stand. Dev.
How satisfied are you with the technical support provided for nursing informatics tools?			1.79	0.55
Unsatisfied	60	27.6		
Satisfied	143	65.9		
Very satisfied	14	6.5		
Total				

Source: Field data (2024)

As illustrated in Table 4.2h, 65.9% (n=143) were satisfied with the technical assistance offered for nursing informatics tools in the healthcare facility, whereas 27.6% (n=60) were unsatisfied and only 6.5% (n=14) were very satisfied. The mean rating of 1.79 indicates that the staff satisfaction with technical support provided for nursing informatics tools is leaning towards "Satisfied" (65.9%). The standard deviation of 0.55 suggests that the responses are moderately spread out around the mean, indicating some variation in the level of satisfaction among the nurses.

4.3 Nursing Informatics Competencies among Nurses

Table 4.3 shows nursing informatics competencies among the respondents. In this study, the nurses gave the highest mean score (4.35 ± 0.69) to the statement "I understand the importance of data security and confidentiality in nursing informatics." The statement "I am

proficient in using electronic health record (EHR) systems." received the second highest mean score (4.20 ± 0.72), while "I am confident in my ability to educate other healthcare professionals on nursing informatics." ranked third (4.04 ± 0.80). The statement "I can integrate information technology into my nursing practice seamlessly." (3.91 ± 0.84) ranked fourth, "I can analyze and interpret data to improve patient outcomes" (3.88 ± 0.81) ranked fifth. The statement with the sixth highest mean score was "I actively participate in training programs to enhance my informatics skills." (3.84 ± 0.80). The seventh item was "I effectively communicate patient data to other healthcare professionals using technology." (3.76 ± 0.91). The item that ranked eighth is the statement "I am confident in my ability to educate other healthcare professionals on nursing informatics." (3.73 ± 1.04). The ninth ranked statement is "I feel confident in troubleshooting common issues with nursing informatics tools" (3.60 ± 1.00), and the tenth ranked item was "I regularly update my knowledge on emerging trends in nursing informatics." (3.48 ± 1.03).

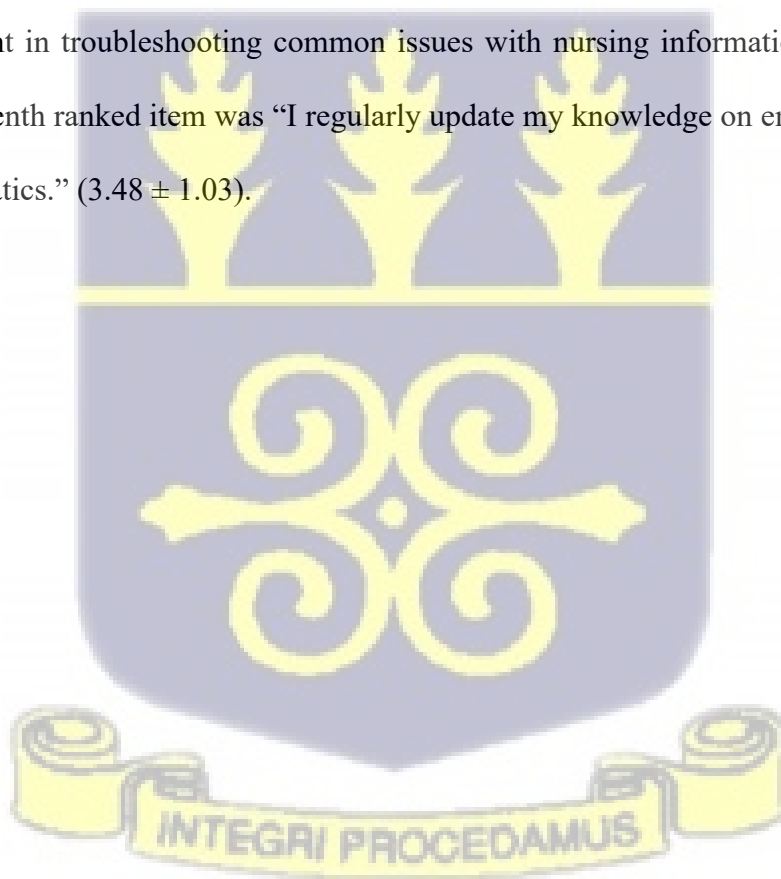


Table 4.3: Nursing informatics competencies among the respondents (N=217)

Variable	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	F	%	F	%	F	%	F	%	F	%		
I am proficient in using electronic health record (EHR) systems.	0	0.0	6	2.8	21	9.7	114	52.5	76	35.0	4.35	0.69
I understand the importance of data security and confidentiality in nursing informatics.	0	0.0	6	2.8	8	3.7	107	49.3	96	44.2	4.20	0.72
I can generate accurate and meaningful reports from health informatics systems.	7	3.2	27	12.4	32	14.7	103	47.5	48	22.1	4.04	0.80
I can integrate information technology into my nursing practice seamlessly.	0	0.0	27	12.4	41	18.9	107	49.3	42	19.4	3.91	0.84
I can analyze and interpret data to improve patient outcomes	0	0.0	19	8.8	29	13.4	128	59.0	41	18.9	3.88	0.81
I actively participate in training programs to enhance my informatics skills.	7	3.2	20	9.2	66	30.4	84	38.7	40	18.4	3.84	0.80
I effectively communicate patient data to other healthcare professionals using technology.	0	0.0	13	6.0	48	22.1	102	47.0	54	24.9	3.76	0.91
I am confident in my ability to educate other healthcare professionals on nursing informatics.		0.0	13	6.0	27	12.4	116	53.5	61	28.1	3.73	1.04
I feel confident in troubleshooting common issues with nursing informatics tools.	0	0.0	39	18.0	62	28.6	103	47.5	13	6.0	3.60	1.00
I regularly update my knowledge on emerging trends in nursing informatics.	0	0.0	46	21.2	61	28.1	69	31.8	41	18.9	3.48	1.03
I can collaborate with interdisciplinary teams using digital communication tools.	0	0.0	7	3.2	68	31.3	94	43.3	48	22.1	3.41	0.85
Total Mean:											3.74	

Source: Field data (2024)



The statement "I feel confident in troubleshooting common issues with nursing informatics tools." earned the lowest mean score (3.41 ± 0.85). The least mean of 3.41 collaborates with interdisciplinary teams using digital communication tool while the highest mean of 4.35 collaborates with proficient in using electronic health record (EHR) systems. Being below the total mean of 3.74 indicates a lower level of agreement or proficiency in the specific nursing informatics competency. For example, a mean of 3.41 indicates that nurses are somewhat neutral or disagree about their ability to collaborate effectively. The standard deviation ranges from 0.69 to 1.04, indicating moderate to high variation in responses.

4.3.1 Level of Nursing Informatics Competencies

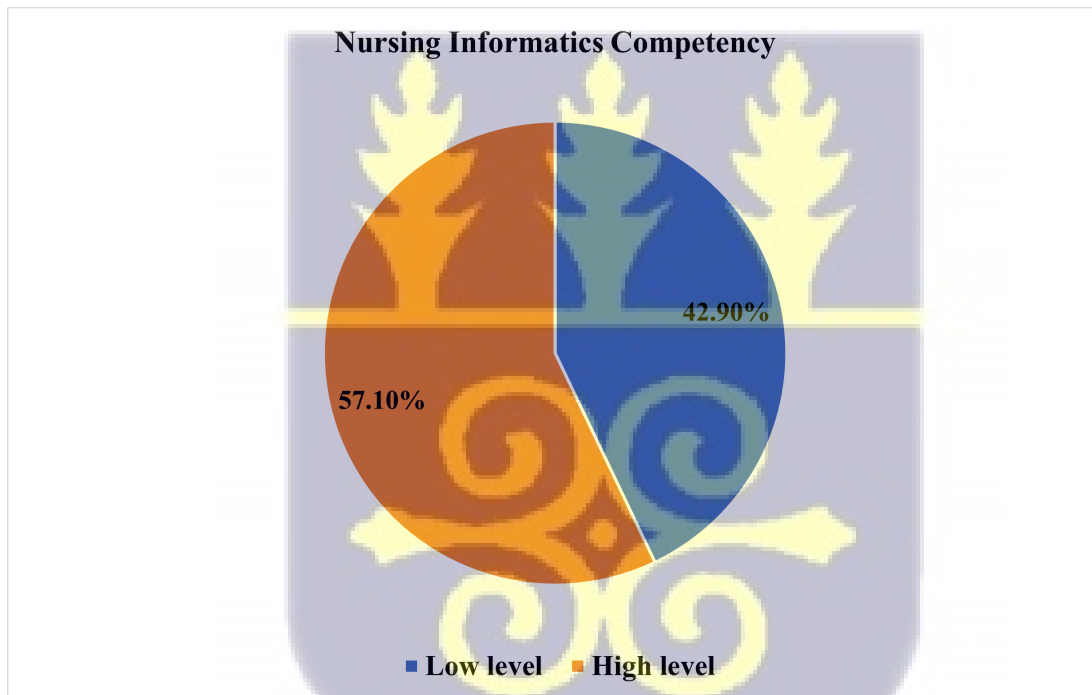


Figure 4.1: Level of Nursing informatics competencies among nurses (N=217)
Source: Field data (2024)

As illustrated in Figure 4.1, the mean of the respondents' responses to all nursing informatics competency items was calculated to determine their degree of competence. The total mean of the nursing informatics competences scale was determined and used as a cutoff criterion. Those who scored at or above the mean were regarded to have a "high level of nursing

informatics competency," whereas those who scored below the mean were considered to have a "low level of nursing informatics competency". Accordingly, 57.1% (n=124) of nurses demonstrated a high level of nursing informatics competency, compared to 42.9% (n=93) who demonstrated a low level of competency.

4.3.2 Perceived Areas of Nursing Informatics Competencies

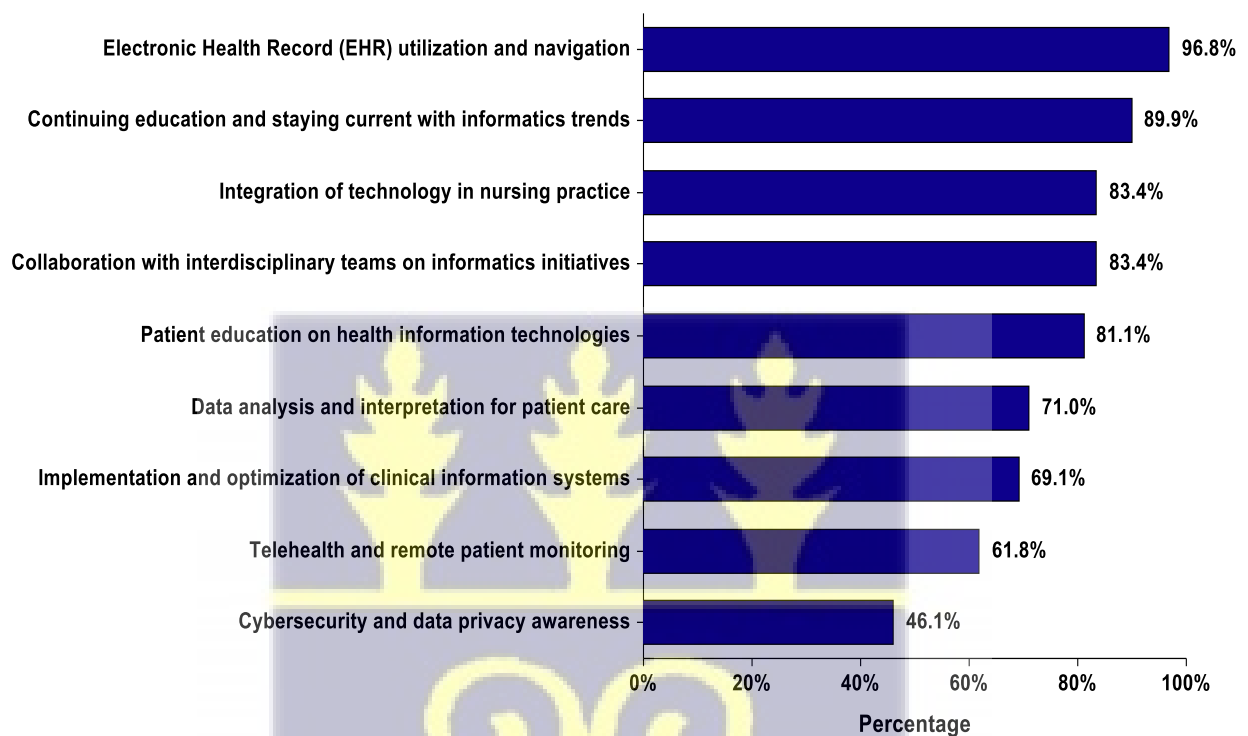


Figure 4.2: Perceived areas of nursing informatics competencies among nurses (N=217)
 Source: Field data (2024)

As displayed in Figure 4.2, nurses evaluated Electronic Health Record (EHR) utilization and navigation as the most proficient area of nursing informatics, with a high proportion of 96.8% (n=210). In contrast, cyber-security and data privacy awareness were viewed as the least proficient area, with only 46.1% (n=117) of respondents expressing confidence in this aspect. A bar chart was used for the data interpretation because it gave a better representation than other charts.

4.4 Challenges with the use of nursing informatics tools for decision making and documentation

As presented in Table 4.4, in relation to the challenges associated with nursing informatics tools for decision making and documentation, 65.9% (n=143) of nurses agreed that limited access to up-to-date technology poses challenges in utilizing nursing informatics, 65.4% (n=142) agreed that time constraints impede the effective incorporation of nursing informatics in patient care, 77.9% (n=169) agreed that inadequate resources for continuous professional development in informatics, 68.7% (n=149) agreed that resistance from colleagues to adopt nursing informatics practices affects collaboration, 74.7% (n=162) agreed that the absence of standardized protocols for data documentation creates challenges, 68.2% (n=148) agreed that inadequate technical support and troubleshooting resources hinder utilization, 77.9% (n=169) agreed that the need for constant software updates and system maintenance disrupts workflow, and 68.7% (n=149) agreed that inconsistencies in data input and retrieval processes hinder smooth workflow. The mean scores range from 3.18 to 3.88, indicating a generally moderate to high level of agreement with the challenges faced in using nursing informatics tools. The total mean of 3.79 indicates that the respondents generally agree that these challenges hinder the effective use of nursing informatics tools. The mean scores suggest that the challenges are moderately to highly significant, with the highest mean scores indicating the most significant challenges. The standard deviations range from 0.99 to 1.29, indicating moderate to high variation in responses.

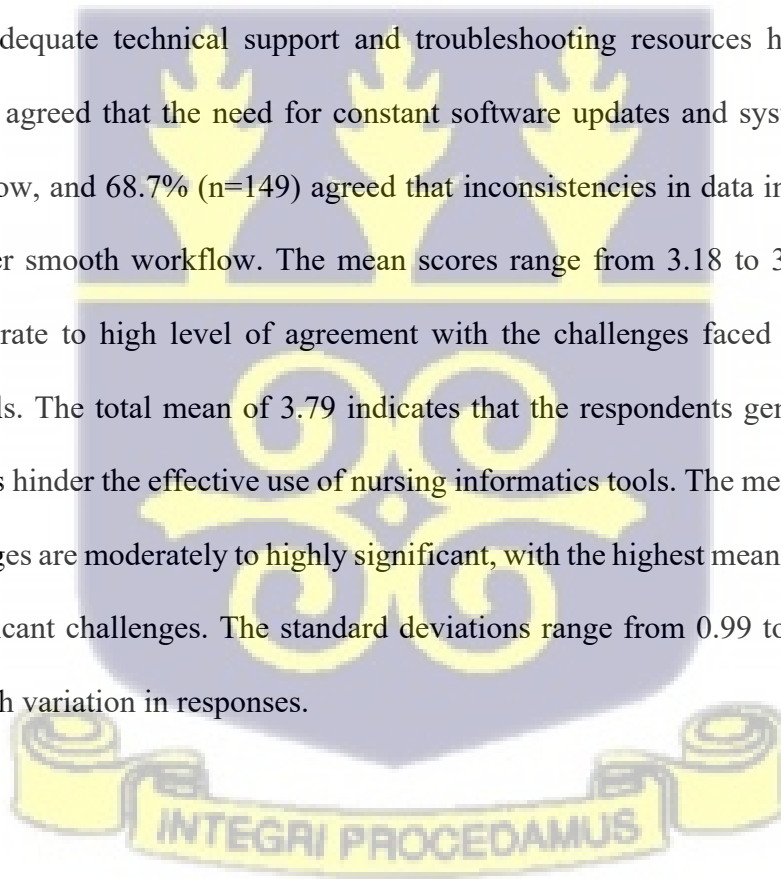


Table 4.4: Challenges with the use of available nursing informatics tools for decision making and documentation (N=217)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	F	%	F	%	F	%	F	%	F	%		
The complexity of nursing informatics tools hinders efficient use in daily tasks.	7	3.2	47	21.7	69	31.8	87	40.1	7	3.2	31.8	3.18
Insufficient training and education on nursing informatics affect my proficiency.	13	6.0	67	30.9	34	15.7	49	22.6	54	24.9	15.7	3.29
Limited access to up-to-date technology poses challenges in utilizing nursing informatics.	0	0.0	26	12.0	48	22.1	101	46.5	42	19.4	22.1	3.73
Time constraints impede the effective incorporation of nursing informatics in patient care.	6	2.8	20	9.2	49	22.6	121	55.8	21	9.7	22.6	3.60
Inadequate resources for continuous professional development in informatics.	6	2.8	14	6.5	28	12.9	127	58.5	42	19.4	12.9	3.85
Resistance from colleagues to adopt nursing informatics practices affects collaboration.	6	2.8	28	12.9	34	15.7	102	47.0	47	21.7	15.7	3.72
The absence of standardized protocols for data documentation creates challenges.	6	2.8	7	3.2	42	19.4	116	53.5	46	21.2	19.4	3.87
Inadequate technical support and troubleshooting resources hinder utilization.	0	0.0	19	8.8	50	23.0	107	49.3	41	18.9	23.0	3.78
The need for constant software updates and system maintenance disrupts workflow.	6	2.8	20	9.2	22	10.1	115	53.0	54	24.9	10.1	3.88
Inconsistencies in data input and retrieval processes hinder smooth workflow.	6	2.8	35	16.1	27	12.4	95	43.8	54	24.9	12.4	3.72
Total Mean											3.79	

Source: Field data (2024)



4.5 Impact of Nursing Informatics on Nursing Decision Making and Documentation

4.5.1 Impact of Nursing Informatics on Nursing Decision Making

As shown in Table 4.5a above, a significant majority (63.1%, n=137) of respondents agreed that nursing informatics enhances their ability to make informed decisions in patient care. Similarly, a majority (53.5%, n=116) of respondents agreed that they feel more confident in their decision-making when utilizing nursing informatics tools. The majority (84.3%, n=183) of respondents either agreed or strongly agreed that informatics in nursing has improved the accessibility and retrieval of patient records, aiding in faster decision making. A substantial majority (78.4%, n=170) of respondents agreed or strongly agreed that the implementation of informatics systems contributes to better communication among healthcare professionals. A majority (69.6%, n=151) of respondents agreed or strongly agreed that they find nursing informatics valuable in reducing errors during the decision-making process. Moreover, a majority (73.5%, n= 158) of respondents agreed or strongly agreed that the implementation of informatics has improved the overall workflow in nursing decision-making. Lastly, about (69.6%, n=151) of respondents agreed or strongly agreed that they perceive nursing informatics as a time-saving resource in their daily nursing tasks.

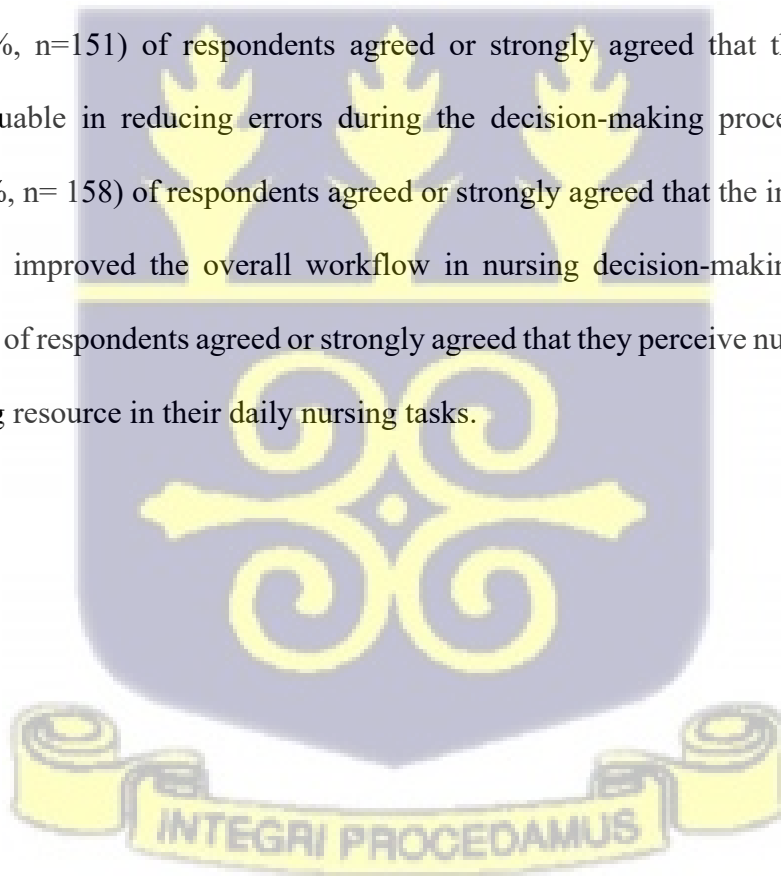


Table 4.5a: Influence of nursing informatics on nursing decision making (N=217)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	Disagree								Agree			
	F	%	F	%	F	%	F	%	F	%		
The use of nursing informatics enhances my ability to make informed decisions in patient care.	0	0.0	6	2.8	40	18.4	137	63.1	34	15.7	3.91	0.66
I feel more confident in my decision-making when utilizing nursing informatics tools.	0	0.0	7	3.2	53	24.4	116	53.5	41	18.9	3.88	0.74
The use of informatics in nursing has improved the accessibility and retrieval of patient records, aiding in faster decision making.	6	2.8	0	0.0	28	12.9	107	49.3	76	35.0	4.13	0.84
The implementation of informatics systems contributes to better communication among healthcare professionals.	0	0.0	6	2.8	41	18.9	108	49.8	62	28.6	4.04	0.76
I find nursing informatics valuable in reducing errors during the decision-making process.	1	0.5	6	2.8	59	27.2	103	47.5	48	22.1	3.88	0.79
The implementation of informatics has improved the overall workflow in nursing decision-making.	8	3.7	6	2.8	45	20.7	110	50.7	48	22.1	3.84	0.92
I perceive nursing informatics as a time-saving resource in my daily nursing tasks.	7	3.2	13	6.0	46	21.2	117	53.9	34	15.7	3.72	0.91

Source: Field data (2024)



4.5.1.1 Self-Reported Level of Nursing Decision-Making among Nurses

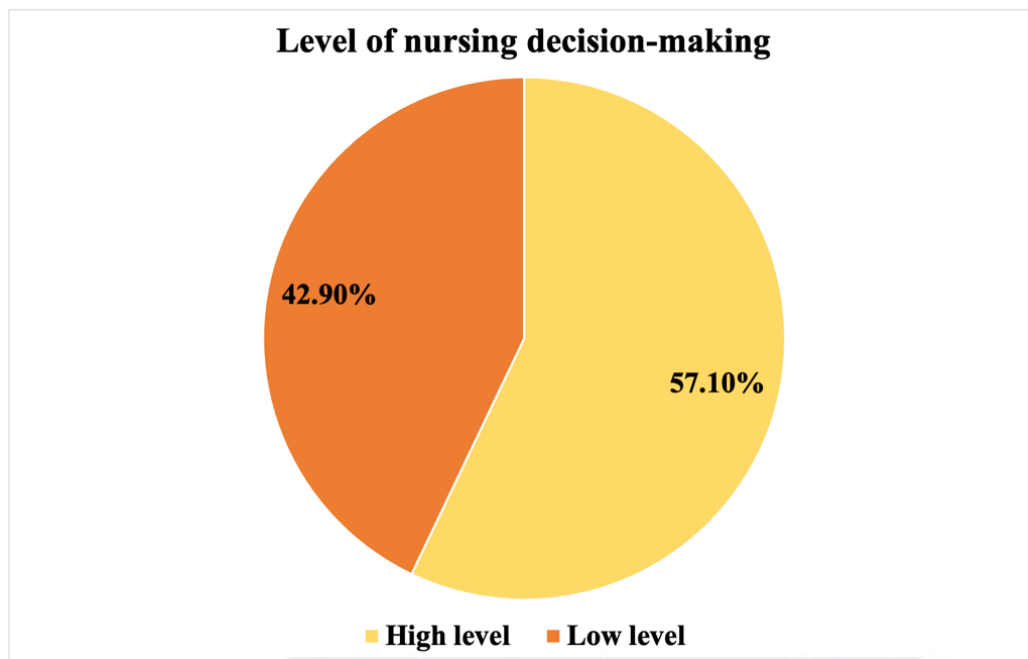


Figure 4.3: Self-reported level of nursing decision-making among respondents (N=217)
Source: Field data (2024)

As illustrated in Figure 4.3, the mean of the respondents' responses to all nursing decision-making items were calculated to determine their level of decision-making ability with the use nursing informatics tools. The total mean of the nursing decision-making scale was determined and used as a cutoff criterion. Those who scored at or above the mean (that is, 3.9) were considered to have a "high level of nursing decision-making," while those who scored below the mean were classified as having a "low level of decision-making." Accordingly, 57.1% (n=124) of nurses demonstrated a high level of nursing decision-making, in contrast to 42.9% (n=93) who exhibited a low level of decision-making.

4.5.2 Impact of Nursing Informatics on Nursing Documentation

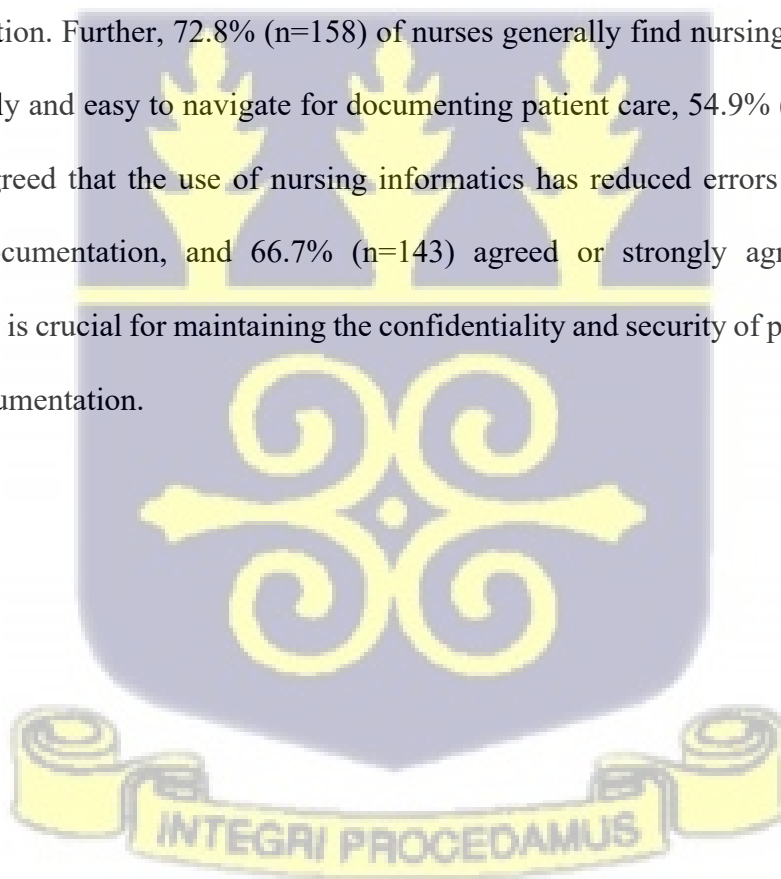
Table 4.5b: Influence of nursing informatics on nursing documentation (N=217)

Items	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean	Standard deviation
	F	%	F	%	F	%	F	%	F	%		
The use of nursing informatics has improved the accuracy of nursing documentation.	0	0.0	32	14.7	42	19.4	102	47.0	41	18.9	3.70	0.94
Nursing informatics has enhanced the efficiency of nurses in documenting patient care activities.	0	0.0	32	14.7	40	18.4	90	41.5	55	25.3	3.77	0.99
Nursing informatics contributes to a more comprehensive and holistic approach in nursing documentation.	0	0.0	20	9.2	53	24.4	104	47.9	40	18.4	3.75	0.86
Nursing informatics has positively influenced my perception of the importance of thorough documentation in patient care.	0	0.0	6	2.8	48	22.1	108	49.8	55	25.3	3.97	0.76
The training provided for nursing informatics tools has adequately prepared me for effective nursing documentation.	0	0.0	34	15.7	52	24.0	90	41.5	41	18.9	3.63	0.96
I find nursing informatics tools user-friendly and easy to navigate for documenting patient care.	0	0.0	20	9.2	39	18.0	83	38.2	75	34.6	3.98	0.94
The use of nursing informatics has reduced errors and omissions in nursing documentation.	1	0.5	39	18.0	60	27.6	104	47.9	13	6.0	3.41	0.86
I perceive nursing informatics as crucial for maintaining the confidentiality and security of patient information during documentation.	0	0.0	20	9.2	54	24.9	88	40.6	55	25.3	3.82	0.91

Source: Field data (2024)



Based on the findings shown in Table 4.5b, respondents (65.9%, n=143) generally agreed or strongly agreed that the use of nursing informatics has improved the accuracy of nursing documentation. A majority of respondents (66.8%, n=145) also agreed or strongly agreed that nursing informatics has enhanced the efficiency of nurses in documenting patient care activities. Also, respondents (66.3%, n=144) agreed or strongly agreed that nursing informatics contributes to a more comprehensive and holistic approach in nursing documentation. Most respondents (75.1%, n=163) agreed or strongly agreed that nursing informatics has positively influenced their perception of the importance of thorough documentation in patient care, and 60.4% (n=131) agreed or strongly agreed that training provided for nursing informatics tools adequately prepared them for effective nursing documentation. Further, 72.8% (n=158) of nurses generally find nursing informatics tools user-friendly and easy to navigate for documenting patient care, 54.9% (n=140) agreed or strongly agreed that the use of nursing informatics has reduced errors and omissions in nursing documentation, and 66.7% (n=143) agreed or strongly agreed that nursing informatics is crucial for maintaining the confidentiality and security of patient information during documentation.



4.5.2.1 Self-Reported Level of Nursing Documentation among Nurses

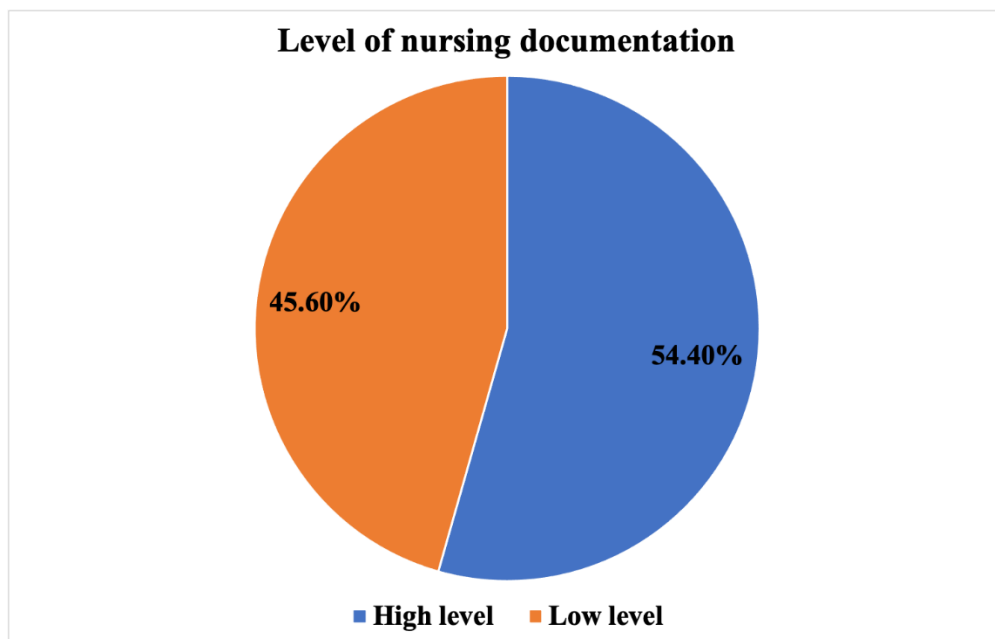


Figure 4.4: Self-Reported level of nursing documentation among respondents (N=217)

Source: Field data (2024)

As illustrated in Figure 4.4, the mean of the respondents' responses to all nursing documentation items was calculated to determine their level of documentation competency. The total mean of the nursing documentation scale was determined and used as a cutoff criterion. Those who scored at or above the mean (that is, 3.7) were considered to have a "high level of nursing documentation," while those who scored below the mean were classified as having a "low level of documentation." Accordingly, 54.4% (n=118) of nurses demonstrated a high level of nursing documentation, in contrast to 45.6% (n=99) who exhibited a low level of documentation.

4.5.3 Impact of Nursing informatics on Nursing Decision-Making

Table 4.5c: Correlation analysis of the influence of nursing informatics on nursing decision-making (N=217)

Variable	Nursing Decision-making
Pearson Correlation	0.754**
Sig. (2-tailed)	0.000
N	217
**. Correlation is significant at the 0.01 level (2-tailed).	

As presented in Table 4.5c, a Pearson correlation analysis was conducted to examine the relationship between nursing informatics and nursing decision making. The results revealed a strong and positive correlation between nursing informatics and nursing decision making ($r = 0.754$, $p < 0.001$). This finding suggests that as nursing informatics increases, so does the likelihood of enhanced nursing decision-making.

4.5.4 Impact of Nursing informatics on Nursing Documentation

Table 4.5d: Influence of nursing informatics on nursing documentation (N=217)

Variable	Nursing Documentation
Nursing Informatics	
Pearson Correlation	0.751**
Sig. (2-tailed)	0.000
N	217
** Correlation is significant at the 0.01 level (2-tailed).	

As demonstrated in Table 4.5d, a Pearson correlation examination was performed to explore the association between nursing informatics and nursing documentation. The findings indicated a positive correlation between nursing informatics and nursing documentation ($r = 0.751$, $p < 0.001$). This suggests that nursing informatics substantially contributes to the enhancement of nursing documentation.

4.6 Predictors of Nursing Decision-making among Nurses

Table 4.6: Predictors of the level of nursing decision-making among nurses

Variable/Characteristics	Estimate	S.E	t Ratio	P value	95% CI	
					Lower	Upper
Age in years						
27-30	Reference					
31-35	0.23	0.09	2.55	0.0116*	0.05	0.40
>35	-0.45	0.08	-5.77	<0.0001*	-0.61	-0.30
Gender						
Male	Reference					
Female	-0.11	0.05	-2.21	0.0281*	-0.22	-0.0
Years of experience in clinical nursing						
5-10	Reference					
>10	0.09	0.05	1.70	0.0912	-0.01	0.20
Working unit						
Surgical emergency unit	Reference					
Examination Room (ER)	-0.47	0.09	-5.20	<.0001*	-0.65	-0.3
Maternity Ward	0.12	0.14	0.88	0.3816	-0.15	0.39
Medical Emergency Unit	0.26	0.08	3.14	0.0019*	0.10	0.42
Medical ward	0.38	0.09	4.19	<.0001*	0.20	0.57
Obstetrics and Gynecology	0.08	0.14	0.55	0.5849	-0.20	0.36
Professional rank						
Nursing Officer	Reference					
Senior Nursing Officer	0.07	0.09	0.70	0.4821	-0.12	0.25
Principal Nursing Officer	0.02	0.10	0.16	0.8717	-0.18	0.21
*Statistically significant at P<0.05 (2-tailed); S.E = Standard Error						

*Statistically significant at $P < 0.05$ (2-tailed); S.E = Standard Error

Table 4.5 highlights the multiple linear regression analysis of predictors of the level of nursing decision-making among respondents. It was found that significant predictors were age, gender, and work unit. Being 31 to 35 years was associated with high levels of nursing decision-making ($B = 0.23$, $p = 0.0116$). Working in the Medical Emergency Unit

($B = 0.26$, $p = 0.0019$) and the Medical Ward ($B = 0.38$, $p < 0.0001$) was also positively associated with high decision-making levels. In contrast, being over 35 years was associated with lower levels of nursing decision-making ($B = -0.45$, $p < 0.0001$), as was being female ($B = -0.11$, $p = 0.0281$). Additionally, working in the Examination Room (ER) was associated with lower decision-making levels ($B = -0.47$, $p < 0.0001$).

4.7 Predictors of the Level of Nursing Documentation among Nurses

Table 6 presents the multiple linear regression analysis of predictors of the level of nursing documentation among respondents. Being aged 31 to 35 years was associated with high levels of nursing documentation ($B = 0.28$, $p = 0.0146$). Working in the Maternity Ward ($B = 0.64$, $p = 0.0014$) and the Medical Ward ($B = 0.68$, $p = 0.0001$) also showed positive associations with high documentation levels. Additionally, being a Senior Nursing Officer ($B = 0.33$, $p = 0.0036$) or Principal Nursing Officer ($B = 0.30$, $p = 0.0184$) was associated with higher documentation levels. Conversely, being over 35 years was associated with lower levels of nursing documentation ($B = -0.60$, $p < 0.0001$), as was being female ($B = -0.19$, $p = 0.0351$). Nurses working in the Examination Room (ER) ($B = -0.46$, $p = 0.0074$) and the Obstetrics and Gynecology Unit ($B = -0.73$, $p = 0.0003$) were also associated with lower documentation levels. These findings indicate that age, gender, working unit, and professional rank significantly influence documentation levels among nurses.



Table 4.7: Predictors of the level of nursing documentation among nurses

Variable/Characteristics	Estimate	S.E.	t Ratio	P value	95% CI	
					Lower	Upper
Age in years						
27-30	Reference					
31-35	0.28	0.12	2.46	0.0146*	0.06	0.51
>35	-0.60	0.10	-6.09	<.0001*	-0.79	-0.40
Gender						
Male	Reference					
Female	-0.19	0.09	-2.12	0.0351*	-0.37	-0.01
Years of experience in clinical nursing						
5-10	Reference					
>10	-0.10	0.10	-1.05	0.2933	-0.29	0.09
Working unit						
Surgical emergency unit	Reference					
Examination Room (ER)	-0.46	0.17	-2.70	0.0074*	-0.80	-0.13
Maternity Ward	0.64	0.20	3.24	0.0014*	0.25	1.03
Medical Emergency Unit	0.28	0.16	1.73	0.0859	-0.04	0.61
Medical ward	0.68	0.17	3.94	0.0001*	0.34	1.03
Obstetrics and Gynecology	-0.73	0.20	-3.65	0.0003*	-1.12	-0.33
Professional rank						
Nursing Officer	Reference					
Senior Nursing Officer	0.33	0.11	2.95	0.0036*	0.11	0.55
Principal Nursing Officer	0.30	0.13	2.38	0.0184*	0.05	0.55
*Statistically significant at P<0.05 (2-tailed); S.E = Standard Error						

*Statistically significant at $P < 0.05$ (2-tailed); S.E = Standard Error

4.8 Summary

The quantitative analysis was employed to analyze the close-ended questions and descriptive results are presented in the form of frequency tables, bar chart and pie chart.

The study aimed to provide a snapshot of the current competencies and challenges related to informatics among experienced nurses. The structured questionnaire allowed the

researcher to measure various aspects of nursing informatics, from logistical support to its practical effects on nursing outcomes. This analysis reveals not only the level of integration of nursing informatics but also its potential influence on clinical decisions and patient care documentation. The study contributes valuable data to inform further development of nursing informatics competencies, ultimately aiming to improve healthcare delivery within similar institutions.



CHAPTER FIVE

DISCUSSION

5.0 Introduction

This chapter presents the discussions of key findings in the study. The study aimed at assessing resources available for the implementation of nursing informatics, nursing informatics competencies among nurses, challenges with the use of available nursing informatics tools for decision making and documentation among nurses, level of decision-making and documentation among nurses, and the influence of nursing informatics on nursing decision-making and documentation among nurses in 37 Military Hospital.

5.1 Sociodemographic Characteristics

The study reveals that most of the nursing workforce falls within the 31–35 age range (43.8%, n=95), a pattern consistent with findings from the United States by O'Hara and Reid (2024) who observed that mid-career professionals often form the core of healthcare staff. This finding aligns with Abugri and Jarvis (2018) analysis in South Africa, where they suggest that early-career nurses frequently transition to specialized or managerial roles by their 30s. However, a study conducted in Thailand by Szabo et al. (2020) highlight slight differences, showing a higher presence of younger nurses (26–30 years) in high-stress units. This discrepancy may be attributed to varying recruitment policies or shifts in career preferences across healthcare settings.

In terms of gender distribution, with females representing 74.7% (n=162) of the sample. A study conducted in Europe by Prosen (2022) attributes this to historical perceptions of nursing as a female profession. When considering years of experience, this study's finding that over half (50.7%, n=110) of nurses have more than ten years of experience aligns with the report by the National Academies of Sciences (2021) in the United States. However, this contrasts with the findings of Smiley et al. (2023) in the United

States who reported a younger nursing workforce with less experience in urban hospitals. The inconsistency could reflect different work environments, with rural or suburban hospitals retaining staff longer due to fewer alternative employment options.

In conclusion, the study highlights key sociodemographic characteristics of the nursing workforce, revealing that a significant portion of nurses falls within the 31–35 age range, which is consistent with existing literature on mid-career professionals in healthcare. This finding aligns with prior studies that suggest nurses in their 30s are likely to transition into specialized or managerial roles. Gender distribution in the sample shows a predominance of females, reflecting long-standing perceptions of nursing as a predominantly female profession. Additionally, the majority of nurses in this study have more than ten years of experience, a finding consistent with broader trends in rural or suburban healthcare settings, though differing from urban hospital data. These variations suggest that work environments and recruitment policies may influence the demographic makeup of nursing staff, warranting further investigation into the factors shaping career trajectories in different healthcare contexts.

5.2 Resources Available for the Implementation of Nursing Informatics

The first objective of this study was to assess the resources available for the implementation of nursing informatics in 37 Military Hospital. Nearly half of the respondents (49.8%, n=108) rated IT infrastructure in their facility as "average," a finding that aligns with findings from Bimerew and Chipps (2022) in Western Cape, who reported mid-level IT resources as common in healthcare facilities due to budget constraints. However, Oluwale et al. (2018) in Nigeria found greater dissatisfaction among healthcare staff, who rated their facility's IT infrastructure as inadequate. The difference in findings may be attributed to regional disparities in funding.

More than half of the respondents (55.3%, n=120) reported that not all nursing staff have access to computers or devices for documentation. This finding is consistent with

Salameh et al. (2019), who noted similar challenges in rural healthcare facilities. By comparison, Bøgeskov and Grimshaw-Aagaard (2018) in Denmark found higher device availability in metropolitan hospitals, where more resources are dedicated to informatics. The contrasting findings suggest that access to documentation tools may vary significantly by country, with developed countries often better equipped than developing countries due to higher funding allocations.

A large majority of respondents (90.8%, n=197) indicated that informatics training is only occasionally provided, echoing Booth et al. (2021) assertion in a study in Canada, who reported that sporadic training sessions limit nursing informatics competencies. Conversely, a study done in South Africa by le Roux et al. (2024) found regular training in institutions with well-established informatics departments, resulting in higher competency levels among staff. This difference may point to the impact of institutional prioritization on training frequency, with larger or well-funded institutions possibly able to invest more consistently in ongoing education.

In this study, more than three-quarters of the nurses (78.3%, n=170) noted that nursing informatics is moderately integrated with other healthcare systems. This aligns with the findings of a study in Finland by Kaihlanen et al. (2021), who reported that moderate integration is typical during phased informatics adoption. However, a study in Australia by Jedwab et al. (2022) observed lower integration in facilities lacking centralized IT coordination, where integration issues often lead to inefficiencies. This inconsistency may stem from differences in implementation strategies, as facilities with phased approaches may experience smoother transitions than those without centralized support.

When asked about data security protocols, 69.1% (n=150) of respondents rated them as "basic," similar to findings of a study in Turkey by Arikan et al. (2022), who found that limited resources often lead to minimal security measures in smaller hospitals. By contrast, a study in Ghana by Amoah et al. (2019) reported that larger facilities with more extensive

budgets generally implement advanced security protocols, resulting in higher data protection standards. This variation suggests that resource availability may play a critical role in determining the level of security infrastructure implemented within healthcare settings.

In terms of workflow compatibility, 77.9% (n=169) of respondents noted only partial alignment between nursing informatics tools and existing nursing workflows. This finding aligns with a study in China by Or et al. (2014), who reported similar issues with off-the-shelf informatics systems that lack customization. In contrast, a study in United Kingdom by Hamed and Konstantinidis (2022) found better workflow integration in hospitals that implemented tailored informatics systems, suggesting that custom solutions may enhance compatibility and reduce workflow disruptions.

Lastly, 65.9% (n=143) of respondents expressed satisfaction with the technical support provided for nursing informatics tools, consistent with observations by Moulaei et al. (2023) that steady support improves user satisfaction. However, a study in Pakistan by Khan et al. (2022) reported lower satisfaction in facilities without dedicated IT staff, where delayed troubleshooting led to frequent disruptions. The difference in satisfaction may reflect the influence of having specialized technical support personnel, which can reduce system downtime and support user confidence in the technology.

In conclusion, the study highlights several key challenges and opportunities regarding the implementation of nursing informatics at the study setting. While nearly half of the respondents rated the IT infrastructure as "average," similar to findings in other healthcare facilities with limited resources, there was a notable disparity in device access for documentation. The study also found that informatics training was provided sporadically, limiting staff competencies, in line with previous research showing that consistent training is more common in larger, well-funded institutions. Moreover, the study revealed moderate integration of nursing informatics with other healthcare systems, typical

during phased adoption, and pointed out that data security protocols were generally basic, a reflection of resource constraints. Workflow compatibility issues were noted, with informatics tools only partially aligning with nursing workflows, a problem common in off-the-shelf systems. Finally, while technical support was generally satisfactory, lower satisfaction was observed in facilities lacking dedicated IT staff, suggesting the importance of specialized support in enhancing user experience and system reliability.

5.3 Nursing Informatics Competencies among Nurses

Research on nursing informatics competency has produced varied results across different countries. Thus, the second objective of this study was to assess the nursing informatics competencies among nurses. In this study, nurses gave the highest mean score (4.35 ± 0.69) to the statement "I understand the importance of data security and confidentiality in nursing informatics." This finding aligns with the work of Everson and Richwine (2024) in United States, who similarly found that nurses in their study had a high level of understanding regarding data security, as it is often emphasized in nursing informatics training. The higher ratings in this study could reflect better access to resources or more comprehensive training programs on data security.

The second highest mean score (4.20 ± 0.72) in this study was for the statement, "I am proficient in using electronic health record (EHR) systems." This finding mirrors the results of Jouparinejad et al. (2020), who reported strong EHR proficiency among nurses. On the other hand, Habibi-Koolae et al. (2015)'s study in Iran found that EHR proficiency was lower among nurses in rural settings, where technology access and training opportunities are often limited. The variation between these studies may be attributed to differences in institutional support, with larger or better-funded facilities offering more robust training and support for EHR systems.

The statement "I am confident in my ability to educate other healthcare professionals on nursing informatics" received the third-highest mean score (4.04 ± 0.80)

in this study, indicating a moderate level of confidence in the ability to teach informatics. This is consistent with findings in Ghana by Essuman et al. (2020), who found that while many nurses were confident in their individual informatics skills, fewer were confident in their ability to teach others. This discrepancy could reflect a gap in leadership training or mentorship opportunities, which are essential for developing the skills needed to educate peers.

The statement “I can integrate information technology into my nursing practice seamlessly” (3.91 ± 0.84) ranked fourth in this study, similar to the findings of Farokhzadian et al. (2020), who found that nurses in their study struggled with seamless integration of technology into practice, especially in environments where IT infrastructure was not fully developed. By contrast, a study in Italy by Barchielli et al. (2021) found that nurses in technologically advanced hospitals reported higher ease of integration, suggesting that integration challenges may be linked to the readiness and compatibility of the IT systems used in healthcare facilities.

The statement “I can analyze and interpret data to improve patient outcomes” (3.88 ± 0.81) ranked fifth, consistent with findings of Bimerew and Chipps (2022) in the Western Cape, who noted that nurses in their study had a moderate ability to analyze and interpret healthcare data but were often constrained by time, training, and available tools. This finding suggests that while nurses understand the importance of data analysis, there may still be barriers to fully utilizing data to improve patient outcomes, such as insufficient training in data analytics or lack of time to engage in detailed analysis.

The statement “I actively participate in training programs to enhance my informatics skills” (3.84 ± 0.80) ranked sixth, which indicates a moderate level of participation in professional development. This finding is consistent with findings of Bimerew and Chipps (2022) in the Western Cape, who reported that while many nurses participate in training, the frequency and depth of the training programs often vary. Nurses in facilities with

dedicated informatics departments were more likely to receive continuous, structured training, while those in less resourced settings had fewer opportunities for ongoing professional development. This discrepancy may explain the moderate participation rates observed in this study.

Moreover, overall, most of the nurses (57.1%, n=124) had a high level of nursing informatics competency. A high level of competency in nursing informatics implies that the nurses exhibited proficiency in utilizing information technology, data management systems, and electronic health records to support nursing practice, education, research, and administration effectively. This corroborates with the study in Iran by Khezri and Abdekhoda (2019), which revealed that nurses' informatics competency level was high. Another study in Finland by Kinnunen et al. (2023) also found that informatics competencies among nurses were considered good. However, the study result is not in agreement with past research in Egypt by Hassona and Ali (2019) and in Nigeria by Olajubu et al. (2015), where most of the nurses had a low level of nursing informatics competency. Variations in healthcare systems, resources, and technology infrastructure in the countries where the studies were conducted may influence the nurses' competency levels. Therefore, advocating for improved resource allocation in healthcare systems can help provide nurses with the tools and equipment they need to perform their jobs effectively and improve their nursing informatics competencies.

In conclusion, in this study, nurses have high proficiency in key areas such as data security and confidentiality, as well as electronic health record (EHR) systems. The findings align with previous studies showing strong competencies in these areas, likely due to better access to resources and training. However, challenges in seamless integration of information technology into practice and a moderate level of confidence in teaching informatics suggest gaps in leadership training and IT infrastructure. Overall, 57.1% of nurses demonstrated high levels of informatics competency, consistent with studies from

other countries like Iran and Finland. However, disparities were noted when compared to research in Egypt and Nigeria, highlighting the influence of varying healthcare systems and resources on competency levels. These findings emphasize the need for improved resource allocation and continuous training to enhance nursing informatics competencies globally.

5.4 Challenges with the Use of Available Nursing Informatics Tools for Decision Making and Documentation

The third objective sought to identify challenges with the use of available nursing informatics tools for decision-making and documentation among nurses. The current study revealed that limited access to up-to-date technology (65.9%, n=143) is a challenge in the use of available nursing informatics tools for both decision making and documentation and showed agreement with the study in China by Guo et al. (2024). Slow progress in some areas has been due to a lack of leadership and investment that supports nurses to champion and lead digital health initiatives. Globally, uncertainty remains regarding the next steps the nursing profession should take to increase and optimize its use of digital technology. This challenge is exacerbated by the global diversity of the profession, including unequal access to resources such as technological infrastructure maturity and expertise. Huge differences exist among countries and regions of the world in terms of the digitalization of healthcare processes, access to internet connectivity, and transparency of health information processes.

Another challenge recognized by the nurses was time constraints which impede the effective incorporation of nursing informatics in patient care and is congruent with the study of Gyamfi et al. (2017) in Ghana. One main reason is that, informatics tools often require extensive data entry and documentation, which can be time-consuming for healthcare professionals. Healthcare professionals may also find it challenging to seamlessly integrate these tools into their daily routines, leading to resistance or incomplete utilization. To address the time constraints faced by nurses in incorporating nursing

informatics into patient care, healthcare organizations should invest in streamlining data entry processes by adopting more intuitive and user-friendly informatics tools. This could involve implementing automated data capture technologies, reducing redundant documentation, and providing comprehensive training to ensure smooth integration of informatics systems into daily workflows.

Furthermore, 77.9% of the nurses agreed that inadequate resources for continuous professional development is a challenge in the use of available nursing informatics tools for both decision making and documentation. This is in line with the studies in India by Singh et al. (2020) and Yehualashet et al. (2021) which revealed that one of the challenges to nursing informatics tools utilization is inadequate resources for continuous professional development. From a pragmatic standpoint, healthcare institutions can leverage the findings of this study to strategize and allocate resources towards ongoing professional development. Additionally, governmental and global partnership assistance can bolster healthcare facilities by providing necessary resources to enhance the utilization of nursing informatics tools.

Majority of nurses (68.7%) agreed that resistance from colleagues to adopt nursing informatics practices affects collaboration. Several studies in the literature have reported that many barriers prevent nurses from implementing the EHR system. Essentially, such barriers are caused by three reasons, which include EHR system usability (ease of use, functionality, impact on workload), physical environment, and individual characteristics of nurses (Arikan et al., 2022). For example, electronic health record (EHR) systems often face user resistance in hospitals, which results in a failure to acquire their full benefits. To implement the nursing informatics tools successfully, it is crucial to reduce nurses' resistance to use the system (Cho et al., 2021). To reduce resistance to the adoption of nursing informatics and enhance collaboration among nurses, healthcare institutions should prioritize addressing the usability of EHR systems by ensuring they are intuitive, functional,

and integrate well into existing workflows. This could involve providing personalized training to nurses, involving them in the selection and customization of the systems, and creating a supportive environment that fosters open communication.

A significant number of nurses (77.9%) agreed that the need for constant software updates and system maintenance disrupts workflow and they see it as a challenge in the use of available nursing informatics tools for both decision making and documentation. Frequent updates often require system downtime, disrupting nurses' workflow and potentially affecting patient care. Each software update may introduce new features or changes in functionality, necessitating additional training for nurses. Nurses may need to adapt to new interfaces or features, leading to temporary decreases in efficiency until they become familiar with the changes. Furthermore, downtime events, particularly unplanned ones, have the potential to result in serious patient safety risks, as these disruptions may hinder nurses' ability to effectively use informatics tools for critical decision-making and documentation (Larsen et al., 2018; Larsen et al., 2019). The study suggests that healthcare institutions should establish a structured schedule for updates, ideally during off-peak hours, to minimize the impact on nurses' workflows and patient care. Also, implementing a clear communication plan that notifies nurses in advance about upcoming updates and provides detailed training on new features can help reduce resistance and enhance their ability to adapt quickly.

5.5 Level of Decision-Making and Documentation among Nurses

The study evaluated the level of nursing decision-making among nurses. A significant 63.1% (n=137) of respondents in this study agreed that nursing informatics enhances their ability to make informed decisions in patient care. This aligns with the findings of Nibbelink et al. (2018) in United States, who concluded that nursing informatics significantly improves decision-making by providing timely and accurate patient information. However, a study in Romania by Tsarfati and Cojocar (2022) found that

despite the availability of informatics tools, many nurses still struggled to make informed decisions due to a lack of proper integration into clinical workflows. This discrepancy highlights that while informatics tools are beneficial, their true potential is realized only when fully integrated into day-to-day clinical practice.

Again, 53.5% of nurses agreed that they feel more confident in their decision-making when utilizing nursing informatics tools. This result supports the findings of a study in Finland by Kinnunen et al. (2023), who reported that the use of informatics tools increased nurses' confidence in making clinical decisions by providing quick access to patient data and clinical guidelines. However, another study in China by Guo et al. (2024) found that confidence levels were lower in hospitals with outdated or poorly maintained informatics systems, suggesting that the quality and functionality of the tools may play a crucial role in shaping nurses' confidence.

The majority of respondents in this study (84.3%) agreed that informatics in nursing has improved the accessibility and retrieval of patient records, aiding in faster decision making. This result is in line with the findings of a study in South Africa by le Roux et al. (2024), who observed that the use of informatics tools in healthcare settings facilitated faster decision-making by improving access to patient records. However, in contrast, a study in the United States by Forman et al. (2020) reported that some nurses experienced delays due to technical issues such as slow system performance or incompatible software. These inconsistencies suggest that while informatics tools have the potential to enhance decision-making speed, technical issues can hinder their effectiveness.

In general, 57.1% of nurses demonstrated a high level of nursing decision-making. This finding is consistent with the research in Iran by Zareshahi et al. (2022), who found that nurses with higher levels of informatics competency demonstrated better decision-making skills, as they could access real-time data to inform their clinical choices. However, a study in India by Shringi (2024) found that some nurses, despite having access to

informatics tools, were still unable to make high-level decisions due to a lack of experience or adequate training in using the tools for decision support. This discrepancy may reflect the need for both experience and training in conjunction with the tools themselves to enhance decision-making capabilities effectively.

Secondly, the level of nursing documentation among nurses was evaluated. According to the findings of the study, 65.9% of nurses agreed that the use of nursing informatics has improved the accuracy of nursing documentation. This finding aligns with the research in India by Shringi (2024), who found that informatics tools enhanced documentation accuracy by reducing the risk of human error through standardized formats and automated checks. In contrast, a study in Saudi Arabia by Almarwani (2024) found that while informatics tools contributed to more accurate documentation, challenges such as incomplete data entry due to system glitches were still common. This difference may arise from variations in the functionality and maintenance of the informatics tools across different healthcare settings.

In addition, 66.8% of respondents in this study agreed that nursing informatics has enhanced the efficiency of nurses in documenting patient care activities. This is consistent with the findings of Afra et al. (2024) in Iran, who reported that informatics tools, such as electronic health records (EHRs), significantly improved documentation speed by enabling quick input and retrieval of patient information. However, a study in Iran by Khezri and Abdekhoda (2019) noted that while informatics tools were designed to save time, some nurses found the initial learning curve and the time needed for system updates to offset the efficiency gains. The difference in findings may reflect variability in user experience or the quality of technical support available in different settings.

A significant 66.3% of nurses in this study agreed that nursing informatics contributes to a more comprehensive and holistic approach to nursing documentation. This finding is supported by research in India by Kumbhakar (2019), who highlighted that

nursing informatics encourages a more detailed and integrated approach to patient care documentation by allowing nurses to document a wide range of clinical data in one platform. Conversely, a study in Iran by Khezri and Abdekhoda (2019) reported that in some healthcare facilities, informatics tools led to oversimplification of documentation, with important details being omitted due to time constraints or poorly designed templates. The discrepancy could be attributed to the design and customization of informatics tools to suit the needs of different clinical environments.

Moreover, 54.9% of respondents in this study agreed that the use of nursing informatics has reduced errors and omissions in nursing documentation. This aligns with the findings of Kumbhakar (2019) in India, who reported a reduction in documentation errors following the adoption of EHR systems. However, a study in Canada by Kleib et al. (2024) found that while informatics tools reduced some types of errors, they also introduced new challenges, such as data entry errors due to system malfunctions or user mistakes. This difference could reflect the reliability of the systems in use or differences in the training provided to staff.

Approximately 66.7% of the nurses agreed that nursing informatics is crucial for maintaining the confidentiality and security of patient information during documentation. This result aligns with the findings of a study in Nigeria by Oluwale et al. (2018), who emphasized that informatics tools enhance patient confidentiality by providing secure, digital methods for storing and accessing patient records. However, a study in Finland by Kinnunen et al. (2023) found that despite the use of secure systems, concerns about data breaches and unauthorized access persisted among healthcare workers, indicating that while informatics tools can improve security, their implementation must be coupled with robust privacy policies and monitoring systems.

Overall, 54.4% of nurses demonstrated a high level of nursing documentation. This result is consistent with the findings of Almarwani (2024) in Saudi Arabia, who found that

nurses who demonstrated higher levels of informatics competency were more likely to produce accurate and comprehensive documentation. However, le Roux et al. (2024) in South Africa found that a significant proportion of nurses, despite having access to informatics tools, struggled with documentation due to time constraints and heavy workloads. This difference may reflect variations in the work environment, where nurses with higher workloads may find it more difficult to focus on documentation despite having access to informatics tools. However, to optimize the integration of nursing informatics tools for decision-making and documentation, healthcare institutions should focus on enhancing the seamless incorporation of these tools into daily clinical workflows. This can be achieved by improving the user-friendliness and functionality of informatics systems, ensuring they are regularly updated and well-maintained.

5.6 Impact of Nursing Informatics on Nursing Decision-Making and Documentation

The study aimed to assess the impact of nursing informatics on nursing decision-making and documentation. Hence, a Pearson correlational analyses were performed.

The study showed a strong and positive correlation between nursing informatics and nursing decision making ($r = 0.754$, $p < 0.001$). This implies that nursing informatics significantly contributes to improving nursing decision making. This finding aligns with research in the United States by Nibbelink et al. (2018), which revealed that nursing informatics tools provide crucial support for nurse decision-making by integrating patient information with evidence. One component of informatics is the study and use of clinical decision support systems. Therefore, implementing nursing informatics can enhance access to evidence, potentially impacting the quality of patient care and supporting evidence-based nursing (Darvish et al., 2014).

Additionally, the study found that there is a strong and positive correlation between nursing informatics and nursing documentation ($r = 0.751$, $p < 0.001$). In other words, as nursing informatics increases, there is a corresponding increase in the quality or extent of

nursing documentation. A study in Australia by Slatyer et al. (2016) reported that the use of informatics eliminates cumbersome data entry. Nursing informatics can help nurses in a variety of ways, including: Efficiently managing patient records. Improving communication between healthcare providers and patients. Documenting and communicating patient care plans (Bocas, 2023).

5.6.1 Predictors of the Level of Nursing Decision-making among Nurses

The multiple linear regression analysis in this study identified several significant predictors of the level of nursing decision-making. One key finding was that being aged 31 to 35 years was positively associated with higher levels of nursing decision-making ($B = 0.23$, $p = 0.0116$). This result is consistent with a study carried out in Iran by Zare Shahi et al. (2022), who found that nurses in this age range tend to possess a combination of clinical experience and confidence that enhances their decision-making abilities. However, a contrasting study in Netherlands by Vos et al. (2020) found that older nurses, particularly those over 40, exhibited more confidence and competence in decision-making, suggesting that experience rather than age might be the determining factor in decision-making abilities.

Additionally, working in specific units was associated with higher decision-making levels. Nurses working in the Medical Emergency Unit ($B = 0.26$, $p = 0.0019$) and the Medical Ward ($B = 0.38$, $p < 0.0001$) demonstrated higher decision-making levels. This supports findings of the study in India by Shringi (2024), who noted that nurses in high-pressure environments like emergency units develop strong decision-making skills due to the need for rapid judgment. However, a study in Palestine by Salameh et al. (2019) reported that while high-pressure environments often foster quicker decision-making, they sometimes compromise the depth of clinical reasoning, as nurses prioritize speed over thoroughness. The difference could be attributed to variations in unit protocols or support systems available in different healthcare settings.

Being over 35 years was associated with lower levels of nursing decision-making ($B = -0.45, p < 0.0001$). This finding contradicts research in South Africa by le Roux et al. (2024), which showed that older nurses tend to have higher levels of decision-making competence due to years of experience. The difference might reflect generational differences in adapting to newer technologies or changes in clinical practices, with younger nurses potentially more adaptable to current evidence-based practices and digital tools.

Additionally, being female ($B = -0.11, p = 0.0281$) was negatively associated with decision-making levels. This finding resonates with a study in India by Kumbhakar (2019), which found that gender disparities in decision-making could stem from societal and organizational biases that affect women's confidence and authority in clinical settings. However, a study in Canada by Kleib et al. (2024) found no significant gender differences in decision-making levels, suggesting that other factors such as unit culture and organizational support might influence these outcomes more than gender alone.

Lastly, working in the Examination Room (ER) was associated with lower decision-making levels ($B = -0.47, p < 0.0001$). This aligns with findings of a study in Finland by Kinnunen et al. (2023), who noted that nurses working in more controlled, routine environments like the ER often face fewer complex decision-making scenarios compared to those in more dynamic units such as intensive care or emergency settings.

In conclusion, several factors influenced nursing decision-making among the nurses. Nurses aged 31 to 35 years demonstrated higher decision-making levels, likely due to a combination of experience and confidence. Nurses in high-pressure units, such as the Medical Emergency Unit and Medical Ward, also exhibited higher decision-making abilities. In contrast, nurses over 35 years had lower decision-making levels, which may reflect challenges in adapting to newer practices. Additionally, nurses in the Examination Room showed lower decision-making levels, likely due to less complex scenarios. These

findings highlight the influence of age, gender, environment, and experience on decision-making abilities.

5.6.2 Predictors of the Level of Nursing Documentation among Nurses

Similar to the predictors of decision-making, the level of nursing documentation was also influenced by several key factors. Being aged 31 to 35 years was positively associated with higher levels of nursing documentation ($B = 0.28$, $p = 0.0146$), reflecting the finding that nurses in this age group often have sufficient experience and familiarity with documentation systems to maintain high documentation standards. This result is consistent with a previous study in China by Guo et al. (2024) who found that mid-career nurses are more likely to integrate documentation seamlessly into their workflows. Conversely, a study in United States by Forman et al. (2020) suggested that younger nurses, due to their comfort with technology, may be better equipped to handle digital documentation systems, which could explain some of the variability in findings.

Additionally, nurses working in specific wards showed higher levels of documentation. Those in the Maternity Ward ($B = 0.64$, $p = 0.0014$) and the Medical Ward ($B = 0.68$, $p = 0.0001$) were associated with better documentation levels, a trend also reported from Iran by Farokhzadian et al. (2020), who found that nurses in these wards typically deal with more detailed and complex patient care, thus necessitating more comprehensive documentation.

On the other hand, being over 35 years was negatively associated with nursing documentation levels ($B = -0.60$, $p < 0.0001$). This finding aligns with the work in United States by Everson and Richwine (2024), which suggested that older nurses may face challenges with digital documentation systems, affecting their efficiency and accuracy. However, other studies like Essuman et al. (2020) in Ghana, have shown that experience often leads to more thorough and organized documentation practices, indicating that the

difference in findings may stem from varying technological proficiency or attitudes towards digital tools.

The role of seniority was also highlighted in this study, with Senior Nursing Officers ($B = 0.33, p = 0.0036$) and Principal Nursing Officers ($B = 0.30, p = 0.0184$) demonstrating higher levels of documentation. This finding is consistent with the study in Canada by Booth et al. (2021), who found that senior nurses, due to their leadership roles, are often more diligent in ensuring thorough documentation, both for regulatory compliance and quality assurance. However, a study in Denmark by Bøgeskov and Grimshaw-Aagaard (2018) found no significant difference in documentation quality based on seniority, suggesting that factors such as workload and the complexity of patient care may outweigh seniority in influencing documentation practices.

Last but not least, nurses working in the Examination Room ($B = -0.46, p = 0.0074$) and the Obstetrics and Gynecology Unit ($B = -0.73, p = 0.0003$) were associated with lower documentation levels. This is consistent with the findings of a study in Saudi Arabia by Almarwani (2024), who found that nurses in these settings, due to the nature of their work, often prioritize patient care over documentation, leading to incomplete or delayed documentation. However, a study in Iran by Afra et al. (2024) found that despite the fast-paced nature of these units, well-implemented informatics systems can ensure that documentation remains accurate and timely, suggesting that differences in outcomes could be attributed to the quality of the systems in place.

5.7 Summary and Conclusion

The study provides an in-depth exploration of the nursing workforce, focusing on sociodemographic characteristics, resources for nursing informatics, competencies, and challenges in utilizing informatics tools. It reveals that a significant number of nurses are mid-career professionals, predominantly female, with many possessing over ten years of experience, reflecting broader trends in healthcare settings. The assessment of resources for

nursing informatics at the 37 Military Hospital indicates that IT infrastructure is generally average, with notable gaps in access to documentation tools and sporadic training opportunities that hinder competency development. While nurses demonstrate strong proficiency in data security and electronic health record systems, challenges remain in integrating technology seamlessly into practice and in confidence levels regarding teaching informatics to peers. Moreover, the study identifies obstacles such as limited access to up-to-date technology and insufficient leadership support for digital initiatives, which impede the effective use of nursing informatics tools for decision-making and documentation. Overall, the findings underscore the need for enhanced resource allocation, consistent training programs, and improved leadership support to optimize nursing informatics competencies and address existing challenges in healthcare settings.



CHAPTER SIX

SUMMARY, CONCLUSION, AND RECOMMENDATION

6.0 Introduction

This chapter presents the summary, conclusions and recommendations from the study findings. The conclusions of this study are based on the major findings of the study which sought to assess influence of nursing informatics on decision-making and documentation of nursing practice among nurses in 37 Military Hospital. The recommendations were drawn from the study findings and targeted to help them make evidence-based decisions and develop appropriate interventions.

6.1 Summary of the study

Nursing informatics plays a crucial role in enhancing healthcare by reducing errors, improving outcomes, and streamlining care coordination. The Institute of Medicine (IOM) report has accelerated the adoption of health information technology, improving patient safety (Asonye et al., 2021). eHealth technology integration offers potential for better healthcare outcomes (Kinnunen et al., 2019; Farzandipour et al., 2021). Electronic Health Records (EHRs) are key in reducing medication errors, improving wound management, and shortening hospital stays (Shin et al., 2018). Since 2010, Ghana has made progress in implementing nursing informatics, particularly EHRs, with the 37 Military Hospital leading in this effort since 2018 (Adomah-Afari et al., 2023). However, challenges such as insufficient training and resources hinder full utilization. The study was therefore conducted to assess the influence of nursing informatics on decision-making and documentation of nursing practice among nurses in 37 Military Hospital. The study utilized a descriptive cross-sectional design. A total sample of 217 nurses were selected for the study using a simple random sampling technique. Data collection was done using a structured questionnaire, and analyzed using SPSS version 27.

Findings revealed that 49.8% of respondents rated the IT infrastructure as average, with 55.3% having computer access for documentation and 90.8% receiving training. Over half reported moderate integration of nursing informatics with other systems, with basic data security protocols in place. Competency levels were split, with 57.1% showing high competency. The study found a strong correlation between nursing informatics and decision-making ($r = 0.754$, $p < 0.001$) and documentation ($r = 0.751$, $p < 0.001$). Challenges included limited access to technology (65.9%), time constraints (65.4%), lack of continuous professional development (77.9%), colleague resistance (68.7%), absence of standardized protocols (74.7%), inadequate technical support (68.2%), and inconsistent data processes (68.7%).

6.2 Implications

6.2.1 Nursing Practice or Administration

The findings highlight that current gaps in access to technology and limited informatics competencies among nurses have direct implications for the quality and efficiency of patient care. These gaps suggest that nursing practice remains constrained by infrastructural and skill-related barriers, which can hinder optimal use of available digital tools. The persistence of time constraints and resistance to the adoption of informatics tools reflects broader organizational and cultural issues within clinical settings that must be understood and addressed to support effective practice change. Moreover, the findings imply that without adequate safeguards for data security and confidentiality, nurses may be hesitant to fully engage with digital documentation systems, potentially compromising the reliability of health records. Overall, these insights emphasize that for nursing informatics to positively influence clinical decision-making and documentation, systemic improvements must be aligned with the real-world experiences and challenges identified by frontline nurses.

6.2.2 Nursing Education

The findings imply that existing nursing education programs may not sufficiently prepare nurses for the increasing integration of technology in healthcare. The limited proficiency in informatics observed among participants suggests a gap between formal training and the practical demands of modern clinical environments. Additionally, the presence of resistance from colleagues and the lack of standardized informatics protocols indicate that educational efforts have not fully addressed the cultural and operational challenges associated with technology adoption. These findings suggest that nursing education must evolve to bridge the disconnect between theoretical instruction and practical informatics competence, thereby enabling nurses to confidently and effectively engage with digital tools in clinical practice.

6.2.3 Nursing Research

The study's findings also underscore the importance of further research in the area of nursing informatics. Future studies could focus on exploring the impact of advanced informatics systems on clinical decision-making, patient care outcomes, and the overall efficiency of healthcare systems. Additionally, research could investigate strategies to overcome the challenges faced by nurses in adopting informatics, such as providing better technical support and standardizing protocols across healthcare settings. These efforts would contribute to the body of knowledge on nursing informatics and inform policy and practice improvements.

6.3 Conclusion

In conclusion, the findings of this study conducted at 37 Military Hospital underscore both the strengths and challenges of implementing nursing informatics in this healthcare setting. Regarding available resources, nurses reported that the hospital's IT infrastructure is of average quality, with some challenges in access to technology and ongoing training. Despite these challenges, nursing informatics competencies were

relatively high, with a majority of nurses demonstrating a strong understanding of key concepts such as data security and the use of electronic health records (EHRs). In addition, nurses identified several barriers, including limited access to up-to-date technology, time constraints, and inadequate resources for continuous professional development, which impede the effective use of informatics tools in decision-making and documentation. The study also revealed that nursing informatics has a positive influence on both nursing decision-making and documentation. A majority of nurses felt that informatics tools enhanced their decision-making abilities, improved documentation accuracy, and facilitated better communication and collaboration among healthcare professionals. Furthermore, a strong positive correlation between nursing informatics usage and nursing decision-making and documentation was observed. Furthermore, the analysis of predictors of decision-making and documentation levels highlighted that factors such as age, professional role, and the unit of work within the hospital significantly influence the levels of decision-making and documentation with the use of informatic tools among nurses.

6.4 Recommendations

Based on the findings of the study, the following recommendations were appropriately made:

6.4.1 Nursing Administration

1. Given the average rating of the current IT infrastructure, nursing administration should advocate for investments to upgrade and modernize the hospital's infrastructure. This will enhance the efficiency and effectiveness of nursing informatics tools, supporting better documentation and data management. Upgrading both hardware and software will improve the overall workflow, making it easier for nurses to integrate informatics into their practice.

2. Although nursing staff receive occasional training on informatics tools, nursing administration should prioritize the establishment of regular and comprehensive training

sessions. Continuous education and professional development opportunities will help nurses build confidence in using these tools and overcome challenges, ultimately maximizing the benefits of nursing informatics in daily practice.

3. To further support nursing staff in using informatics tools, nursing administration should focus on enhancing technical support services. Improved support can address technical challenges more effectively, ensuring that nursing staff can rely on these tools with minimal disruptions.

4. Nursing administration should work towards developing and enforcing standardized protocols for data documentation and input processes. These protocols will address inconsistencies in data management and retrieval, improving the accuracy and reliability of documentation. Regular audits and feedback mechanisms can help ensure adherence to these standards, fostering a culture of continuous improvement.

6.4.2 Nurse Managers

1. Nurse managers should conduct thorough assessments of existing nursing processes and workflows to identify areas where nursing informatics tools are not fully aligned. Customizing and optimizing these tools to seamlessly integrate with nursing practices will reduce disruptions and improve adoption rates among nursing staff, enhancing workflow efficiency.

2. Nurse managers can play a pivotal role in facilitating government support for nursing informatics by advocating for grants or funding programs aimed at enhancing technology infrastructure and implementing informatics initiatives. By securing financial resources, nurse managers can help secure the necessary upgrades to hardware and software, acquire advanced informatics tools, and provide necessary training programs for nursing staff to improve overall practice.

6.4.3 Hospital Management

1. Hospital management should prioritize significant investments to upgrade the hospital's IT infrastructure, ensuring it aligns with current technological standards. This includes the acquisition of updated hardware, software, and networking systems to support the seamless integration of nursing informatics into clinical workflows. Modernized infrastructure will enhance data management, improve documentation processes, and support clinical decision-making.

2. Hospital Management should allocate sufficient resources to establish ongoing training and professional development programs in nursing informatics. This should include workshops, hands-on training sessions, and access to online learning platforms. Ensuring nurses are proficient in using informatics tools will enhance their ability to utilize these systems effectively, leading to improved patient care outcomes.

3. Hospital management should actively seek funding from government bodies, private organizations, and international donors to support informatics-related initiatives. This includes financial support for infrastructure upgrades, training programs, and the acquisition of advanced informatics tools. A robust funding strategy will ensure the sustainability of nursing informatics within the hospital.

6.4.4 Nursing Education and Research

1. Nursing education institutions should integrate nursing informatics comprehensively into their curricula to prepare future nurses for the evolving digital healthcare environment. This integration should go beyond theoretical knowledge and include practical, hands-on training with real informatics tools and systems to build competency and confidence among nursing students.

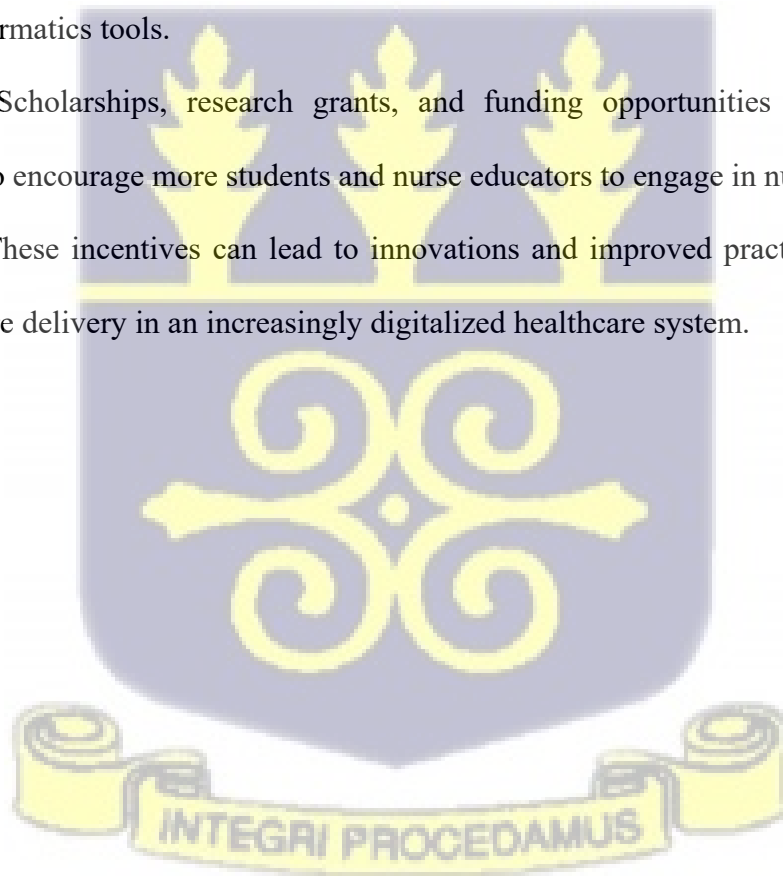
2. Faculties should be equipped with up-to-date informatics resources and trained educators who are proficient in both the theoretical and practical aspects of nursing

informatics. This will ensure that students receive high-quality instruction aligned with current industry standards and healthcare technology trends.

3. Research in nursing informatics should be promoted and supported to generate evidence on best practices, effectiveness, and impact on nursing care and patient outcomes. Academic institutions and healthcare facilities should collaborate on research initiatives that explore areas such as informatics competencies, system usability, and patient data security.

4. Nursing researchers should also investigate the barriers and facilitators of informatics adoption among practicing nurses. Such studies can inform policy development, training programs, and system design to ensure user-friendly, efficient, and secure informatics tools.

5. Scholarships, research grants, and funding opportunities should be made available to encourage more students and nurse educators to engage in nursing informatics research. These incentives can lead to innovations and improved practices that advance nursing care delivery in an increasingly digitalized healthcare system.



REFERENCES

- Abugri, A., & Jarvis, M. A. (2018). Northern Ghana final-year nurses' attitudes towards nursing and remaining post qualification. *Curationis*, 41(1), Article 1. <https://doi.org/10.4102/curationis.v41i1.1832>
- Achampong, E. K. (2017). Assessing the Current Curriculum of the Nursing and Midwifery Informatics Course at All Nursing and Midwifery Institutions in Ghana. *Journal of Medical Education and Curricular Development*, 4(3), 238212051770689. <https://doi.org/10.1177/2382120517706890>
- Ademuyiwa, I. Y., Faleke, S. O., & Otetubi, E. E. (2020). Knowledge and Use of Nursing Informatics among Nurses in a University Teaching Hospital in Lagos, Nigeria. *International Journal of Health Sciences and Research (Www.Ijhsr.Org)*, 10(December), 12.
- Adomah-Afari, A., Anakwa-Awuku, A., & Gadeka, D. D. (2023). Patients' satisfaction with the quality of care upon implementation of electronic health records system at the 37 Military Hospital, Ghana. *Health Sciences Investigations Journal*, 4(2), 494–501. <https://doi.org/10.46829/hsijournal.2023.12.4.2.494-501>
- Afra, A., Ban, M., & Bachari, S. S. (2024). Comparative Study of Nursing Informatics Competencies in Educators, Students, and Clinical Nurses. *Journal of Nursing and Midwifery Sciences*, 11(4), Article 4. <https://doi.org/10.5812/jnms-151692>
- Akwaowo, C. D., Sabi, H. M., Ekpenyong, N., Isiguzo, C. M., Andem, N. F., Maduka, O., Dan, E., Umoh, E., Ekpın, V., & Uzoka, F. M. (2022). Adoption of electronic medical records in developing countries—A multi-state study of the Nigerian healthcare system. *Frontiers in Digital Health*, 4(November), 1–18. <https://doi.org/10.3389/fdgth.2022.1017231>

- Aldosari, B. (2024). Information Technology and Value-Based Healthcare Systems: A Strategy and Framework. *Cureus*, 16(2), e53760. <https://doi.org/10.7759/cureus.53760>
- Almarwani, A. M. (2024). Evaluation of the nursing informatics competency among nursing students: A systematic review. *Nurse Education in Practice*, 78, 104007. <https://doi.org/10.1016/j.nepr.2024.104007>
- Alunyu, A. E., Wamema, J., Kiwanuka, A., Moses, B., Amiyo, M., Kambugu, A. E. and Nabukenya, J. (2021). Investigating the Impediments to Accessing Reliable, Timely and Integrated Electronic Patient Data in Healthcare Sites in Uganda. In *Proceedings of the 14th International Joint Conference on Biomedical Engineering Systems and Technologies (BIOSTEC 2021) - HEALTHINF*; ISBN 978-989-758-490-9; ISSN 2184-4305, SciTePress, pages 522-532. DOI: 10.5220/0010266705220532
- American Nurses Association. (2015). *Nursing informatics: Scope and standards of practice* (2nd ed.). ANA.
- Amoah, V. M. K., Anokye, R., Boakye, D. S., Acheampong, E., Budu-Ainooson, A., Okyere, E., Kumi-Boateng, G., Yeboah, C., & Afriyie, J. O. (2019). A qualitative assessment of perceived barriers to effective therapeutic communication among nurses and patients. *BMC Nursing*, 18(1), 4. <https://doi.org/10.1186/s12912-019-0328-0>
- Apenteng, B. A., Opoku, S. T., Ansong, D., Akowuah, E. A., & Afriyie-Gyawu, E. (2018). The effect of power outages on in-facility mortality in healthcare facilities: Evidence from Ghana. *Global public health*, 13(5), 545–555. <https://doi.org/10.1080/17441692.2016.1217031>
- Arikan, F., Kara, H., Erdogan, E., & Ulker, F. (2022). Barriers to Adoption of Electronic Health Record Systems from the Perspective of Nurses A Cross-sectional Study.

CIN - Computers Informatics Nursing, 40(4), 236–243. <https://doi.org/10.1097/CIN.0000000000000848>

Asonye, C. C., Idowu, O. P., Sodimu, J., Leslie, T. A., Akinlawon, A. Q., & Fadipe, O. O. (2021). Knowledge and Utilization of Nursing Informatics Among Nurses Knowledge and Utilization of Nursing Informatics Among Nurses in Babcock University Teaching Hospital Ilishan Remo Ogun State. *Global Scientific Journals*, 9(7), 3522–3528. <https://doi.org/10.11216/gsj.2021.07.52841>

Barchielli, C., Marullo, C., Bonciani, M., & Vainieri, M. (2021). Nurses and the acceptance of innovations in technology-intensive contexts: The need for tailored management strategies. *BMC Health Services Research*, 21(1), 639. <https://doi.org/10.1186/s12913-021-06628-5>

Bediang, G. (2023). Implementing clinical information systems in sub-saharan Africa: report and lessons learned from the matLook project in Cameroon. *JMIR Medical Informatics*, 11, e48256.

Bimerew, M., & Chipps, J. (2022). Perceived technology use, attitudes, and barriers among primary care nurses. *Health SA Gesondheid*, 27, 2056. <https://doi.org/10.4102/hsag.v27i0.2056>

Bøgeskov, B. O., & Grimshaw-Aagaard, S. L. S. (2018). Essential task or meaningless burden? Nurses' perceptions of the value of documentation. *Nordic Journal of Nursing Research*. <https://doi.org/10.1177/2057158518773906>

Booth, R. G., Strudwick, G., McBride, S., O'Connor, S., & Solano López, A. L. (2021). How the nursing profession should adapt for a digital future. *The BMJ*, 373, 1–11. <https://doi.org/10.1136/bmj.n1190>

Bowman S. (2013). Impact of electronic health record systems on information integrity: quality and safety implications. *Perspectives in health information management*, 10(Fall), 1c.

- Chen, Z., Liang, N., Zhang, H., Li, H., Yang, Y., Zong, X., Chen, Y., Wang, Y., & Shi, N. (2023). Harnessing the power of clinical decision support systems: challenges and opportunities. *Open heart*, 10(2), e002432. <https://doi.org/10.1136/openhrt-2023-002432>
- Chetty, S., Bangalee, V., & Brysiewicz, P. (2020). Interprofessional collaborative learning in the workplace: a qualitative study at a non-governmental organisation in Durban, South Africa. *BMC medical education*, 20(1), 346. <https://doi.org/10.1186/s12909-020-02264-5>
- Chirchir, L. K., Aruasa, W. K., & Chebon, S. K. (2020). Technical factors influencing electronic health records adoption by nurses at Moi Teaching and Referral Hospital, Kenya. *African Journal of Science, Technology, Innovation and Development*, 13(5), 551–558. <https://doi.org/10.1080/20421338.2020.1777676>
- Cho, Y., Kim, M., & Choi, M. (2021). Factors associated with nurses' user resistance to change of electronic health record systems. *BMC Medical Informatics and Decision Making*, 21(1), 1–12. <https://doi.org/10.1186/s12911-021-01581-z>
- Chukwu, E., Garg, L., Foday, E., Konomanyi, A., Wright, R., & Smart, F. (2022). Electricity, Computing Hardware, and Internet Infrastructures in Health Facilities in Sierra Leone: Field Mapping Study. *JMIR medical informatics*, 10(2), e30040. <https://doi.org/10.2196/30040>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Dailah, H. G., Koriri, M., Sabei, A., Kriry, T., & Zakri, M. (2024). Artificial Intelligence in Nursing: Technological Benefits to Nurse's Mental Health and Patient Care Quality. *Healthcare (Basel, Switzerland)*, 12(24), 2555. <https://doi.org/10.3390/healthcare12242555>

- Daniel, O., & Oyetunde, M. O. (2013). Nursing informatics: A key to improving nursing practice in Nigeria. *International Journal of Nursing and Midwifery*, 5(5), 90–98. <https://doi.org/10.5897/ijnm2013.0101>
- Darvish, A., Bahramnezhad, F., Keyhanian, S., & Navidhamidi, M. (2014). The role of nursing informatics on promoting quality of health care and the need for appropriate education. *Global Journal of Health Science*, 6(6), 11–18. <https://doi.org/10.5539/gjhs.v6n6p11>
- Essuman, L. R., Apaak, D., Ansah, E. W., Sambah, F., Ansah, J. E., Opare, M., & Ahinkorah, B. O. (2020). Factors associated with the utilization of electronic medical records in the Eastern Region of Ghana. *Health Policy and Technology*, 9(3), 362–367. <https://doi.org/10.1016/j.hlpt.2020.08.002>
- Everson, J., & Richwine, C. (2024). Barriers to obtaining and using interoperable information among non-federal acute care hospitals. *Journal of the American Medical Informatics Association*, ocae263. <https://doi.org/10.1093/jamia/ocae263>
- Farokhzadian, J., Khajouei, R., Hasman, A., & Ahmadian, L. (2020). Nurses' experiences and viewpoints about the benefits of adopting information technology in health care: a qualitative study in Iran. *BMC medical informatics and decision making*, 20(1), 240. <https://doi.org/10.1186/s12911-020-01260-5>
- Farzandipour, M., Mohamadian, H., Akbari, H., Safari, S., & Sharif, R. (2021). Designing a national model for assessment of nursing informatics competency. *BMC Medical Informatics and Decision Making*, 21(1), 1–12. <https://doi.org/10.1186/s12911-021-01405-0>
- Forde-Johnston, C., Butcher, D., & Aveyard, H. (2022). An integrative review exploring the impact of Electronic Health Records (EHR) on the quality of nurse–patient interactions and communication. *Journal of Advanced Nursing*, 79(1), 48. <https://doi.org/10.1111/jan.15484>

- Forman, T. M., Armor, D. A., & Miller, A. S. (2020). A Review of Clinical Informatics Competencies in Nursing to Inform Best Practices in Education and Nurse Faculty Development. *Nursing Education Perspectives*, 41(1), E3. <https://doi.org/10.1097/01.NEP.0000000000000588>
- Ghosh, S., Ramamoorthy, L., & Pottakat, B. (2021). Impact of Structured Clinical Handover Protocol on Communication and Patient Satisfaction. *Journal of patient experience*, 8, 2374373521997733. <https://doi.org/10.1177/2374373521997733>
- Graves, J. R., & Corcoran, S. (1989). The study of nursing informatics. *Image--the journal of nursing scholarship*, 21(4), 227–231. <https://doi.org/10.1111/j.1547-5069.1989.tb00148.x>
- Guo, J., Liu, J., Liu, C., Wang, Y., Xu, X., & Chen, Y. (2024). Nursing informatics competency and its associated factors among palliative care nurses: An online survey in mainland China. *BMC Nursing*, 23(1), 157. <https://doi.org/10.1186/s12912-024-01803-5>
- Gyamfi, A., Mensah, K. A., Oduro, G., Donkor, P., & Mock, C. N. (2017). Barriers and facilitators to Electronic Medical Records usage in the Emergency Centre at Komfo Anokye Teaching Hospital, Kumasi-Ghana. *African Journal of Emergency Medicine*, 7(4), 177–182. <https://doi.org/10.1016/j.afjem.2017.05.002>
- Habibi-Koolae, M., Safdari, R., & Bouraghi, H. (2015). Nurses Readiness and Electronic Health Records. *Acta Informatica Medica*, 23(2), 105. <https://doi.org/10.5455/aim.2015.23.105-107>
- Hamed, M. M. M., & Konstantinidis, S. (2022). Barriers to Incident Reporting among Nurses: A Qualitative Systematic Review. *Western Journal of Nursing Research*, 44(5), 506–523. <https://doi.org/10.1177/0193945921999449>

- Hannah, K. (1985). Current Trends in nursing informatics: Implications for curriculum planning. In Hannah, K. L., Guillemin, E. J., & Conklin, D. N. (Eds.), *Nursing uses of computers and information science*. Amsterdam, Netherlands: Elsevier.
- Hannah, K. J., Ball, M. J., & Edwards, M. J. A. (2017). *Introduction to nursing informatics* (4th edition). Springer.
- Harerimana, A., Wicking, K., Biedermann, N., & Yates, K. (2020). Integrating nursing informatics into undergraduate nursing education in Africa: A scoping review. *International Nursing Review*, 68(3), 420. <https://doi.org/10.1111/inr.12618>
- Harerimana, A., Wicking, K., Biedermann, N., & Yates, K. (2021). Integrating nursing informatics into undergraduate nursing education in Africa: A scoping review. *International nursing review*, 68(3), 420–433. <https://doi.org/10.1111/inr.12618>
- Hassona, F. M., & Ali, A. Z. F. (2019). Relationship between Nursing Informatics Competency and Innovativeness among Qualified Nurses. *Evidence-Based Nursing Research*, 1(3), 9. <https://doi.org/10.47104/ebnrojs3.v1i3.87>
- Hebda, T., Hunter, K. M., & Czar, P. (2019). *Handbook of informatics for nurses and healthcare professionals* (6th ed.). Pearson.
- Javaid, M., Haleem, A., & Singh, R. P. (2024). Health informatics to enhance the healthcare industry's culture: An extensive analysis of its features, contributions, applications and limitations. *Informatics and Health*, 1(2), 123–148. <https://doi.org/10.1016/j.infoh.2024.05.001>
- Javaid, M., Haleem, A., & Singh, R. P. (2024). Health informatics to enhance the healthcare industry's culture: An extensive analysis of its features, contributions, applications and limitations. *Informatics and Health*, 1(2), 123-148.
- Jedwab, R. M., Manias, E., Hutchinson, A. M., Dobroff, N., & Redley, B. (2022). Understanding nurses' perceptions of barriers and enablers to use of a new electronic medical record system in Australia: A qualitative study. *International*

Journal of Medical Informatics, 158, 104654. <https://doi.org/10.1016/j.ijmedinf.2021.104654>

Jouparinejad, S., Foroughameri, G., Khajouei, R., & Farokhzadian, J. (2020). Improving the informatics competency of critical care nurses: Results of an interventional study in the southeast of Iran. *BMC Medical Informatics and Decision Making*, 20, 220. <https://doi.org/10.1186/s12911-020-01244-5>

Junaid, S. B., Imam, A. A., Balogun, A. O., Silva, L. C. D., Surakat, Y. A., Kumar, G., Abdulkarim, M., Shuaibu, A. N., Garba, A., Sahalu, Y., Mohammed, A., Mohammed, T. Y., Abdulkadir, B. A., Abba, A. A., Kakumi, N. A. I., & Mahamad, S. (2022). Recent Advancements in Emerging Technologies for Healthcare Management Systems: A Survey. *Healthcare*, 10(10), 1940. <https://doi.org/10.3390/healthcare10101940>

Kaihlanen, A.-M., Gluschkoff, K., Laukka, E., & Heponiemi, T. (2021). The information system stress, informatics competence and well-being of newly graduated and experienced nurses: A cross-sectional study. *BMC Health Services Research*, 21(1), 1096. <https://doi.org/10.1186/s12913-021-07132-6>

Khan, S., Sultan, A., Hanif, J., Jamil, K., & Batool, Z. (2022). Nurses' perception regarding barriers to use of health information system in the teaching hospital of Abbottabad: Nurses' perception regarding barriers to use of health information system. *Pakistan Journal of Health Sciences*, 183–187. <https://doi.org/10.54393/pjhs.v3i04.87>

Khezri, H., & Abdekhoda, M. (2019). Assessing nurses' informatics competency and identifying its related factors. *Journal of Research in Nursing*, 24(7), 529–538. <https://doi.org/10.1177/1744987119839453>

Kinnunen, U. M., Heponiemi, T., Rajalahti, E., Ahonen, O., Korhonen, T., & Hyppönen, H. (2019). Factors Related to Health Informatics Competencies for Nurses—Results of a National Electronic Health Record Survey. *CIN - Computers*

Informatics Nursing, 37(8), 420–429. <https://doi.org/10.1097/CIN.0000000000000511>

- Kinnunen, U.-M., Kuusisto, A., Koponen, S., Ahonen, O., Kaihlanen, A.-M., Hassinen, T., & Vehko, T. (2023). Nurses' Informatics Competency Assessment of Health Information System Usage: A Cross-sectional Survey. *Computers, Informatics, Nursing*, 41(11), 869. <https://doi.org/10.1097/CIN.0000000000001026>
- Kirchner, R. B. (2016). An introduction to nursing informatics. *Nursing Critical Care*, 11(3), 9–10. <https://doi.org/10.1097/01.CCN.0000482517.43282.fe>
- Kleib, M., Arnaert, A., Nagle, L. M., Sugars, R., & Da Costa, D. (2024). Newly Qualified Canadian Nurses' Experiences With Digital Health in the Workplace: Comparative Qualitative Analysis. *JMIR Medical Education*, 10, e53258. <https://doi.org/10.2196/53258>
- Kritchanchai, D., Engelseh, P., & Srisakunwan, S. (2018). Implementing and Using New Information Technology in Hospital Logistics. *IEEE International Conference on Industrial Engineering and Engineering Management*, 2019-December (December), 1186–1190. <https://doi.org/10.1109/IEEM.2018.8607418>
- Kumari, R., & Chander, S. (2024). Improving healthcare quality by unifying the American electronic medical report system: Time for change. *The Egyptian Heart Journal*, 76, 32. <https://doi.org/10.1186/s43044-024-00463-9>
- Kumbhakar, S. (2019). Assessment of Knowledge Regarding Nursing Informatics Among Nursing Faculties in Selected Nursing College of Northwest India: Cross-Sectional Study. *International Journal of Community Health Nursing*, 1(1), 1–9. <https://doi.org/10.37628/ijchn.v1i1.563>
- Kutney-Lee, A., & Kelly, D. (2011). The effect of hospital electronic health record adoption on nurse-assessed quality of care and patient safety. *The Journal of nursing administration*, 41(11), 466–472. <https://doi.org/10.1097/NNA.0b013e3182346e4b>

- Larsen, E., Fong, A., Wernz, C., & Ratwani, R. M. (2018). Implications of electronic health record downtime: An analysis of patient safety event reports. *Journal of the American Medical Informatics Association*, 25(2), 187–191. <https://doi.org/10.1093/jamia/ocx057>
- Larsen, E., Hoffman, D., Rivera, C., Kleiner, B. M., Wernz, C., & Ratwani, R. M. (2019). Continuing Patient Care during Electronic Health Record Downtime. *Applied Clinical Informatics*, 10(3), 495–504. <https://doi.org/10.1055/s-0039-1692678>
- le Roux, L., Bimerew, M., & Chipps, J.-A. (2024). A survey of nurse informatics competencies of professional nurses in clinical practice public hospitals in South Africa. *International Journal of Africa Nursing Sciences*, 21, 100783. <https://doi.org/10.1016/j.ijans.2024.100783>
- Lee, A. (2014). The role of informatics in nursing. *Nursing Made Incredibly Easy*, 12(4), 55. <https://doi.org/10.1097/01.NME.0000450294.60987.00>
- Lee, T. Y., Sun, G. T., Kou, L. T., & Yeh, M. L. (2017). The use of information technology to enhance patient safety and nursing efficiency. *Technology and Health Care*, 25(5), 917–928. <https://doi.org/10.3233/THC-170848>
- Makeleni, N. & Cilliers, L. (2021). Critical success factors to improve data quality of electronic medical records in public healthcare institutions. *South African Journal of Information Management* 23(1), a1230. <https://doi.org/10.4102/sajim.v23i1.1230>
- Mars M. (2012). Building the capacity to build capacity in e-health in sub-Saharan Africa: the KwaZulu-Natal experience. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*, 18(1), 32–37. <https://doi.org/10.1089/tmj.2011.0146>
- Mensah, N. K., Adzakupah, G., Kissi, J., Abdulai, K., Taylor-Abdulai, H., Johnson, S. B., Opoku, C., Hallo, C., & Boadu, R. O. (2024). Health professionals' perceptions of

electronic health records system: a mixed method study in Ghana. *BMC medical informatics and decision making*, 24(1), 254. <https://doi.org/10.1186/s12911-024-02672-3>

Mensah, N. K., Adzakpah, G., Kissi, J., Boadu, R. O., Acheampongmaa, Q. K., Taylor-Abdulai, H., & Chatio, S. T. (2023). Perceived impact of digital health technology on health professionals and their work: a qualitative study in Southern Ghana. *Digital Health*, 9, 20552076231218838.

Mensah, N.K., Adzakpah, G., Kissi, J. *et al.* Health professionals' perceptions of electronic health records system: a mixed method study in Ghana. *BMC Med Inform Decis Mak* **24**, 254 (2024). <https://doi.org/10.1186/s12911-024-02672-3>

Ministry of Health Ghana (2016). National E-Health Strategy. Available at <https://www.moh.gov.gh/wp-content/uploads/2016/02/Ghana-E-Health-120504121543.pdf>

Moore, E. C., Tolley, C. L., Bates, D. W., & Slight, S. P. (2020). A systematic review of the impact of health information technology on nurses' time. *Journal of the American Medical Informatics Association : JAMIA*, 27(5), 798. <https://doi.org/10.1093/jamia/ocz231>

Moulaei, K., Moulaei, R., & Bahaadinbeigy, K. (2023). Barriers and facilitators of using health information technologies by women: A scoping review. *BMC Medical Informatics and Decision Making*, 23(1), 176. <https://doi.org/10.1186/s12911-023-02280-7>

Nashwan, A. J., Cabrega, J. A., Othman, M. I., Khedr, M. A., Osman, Y. M., El-Ashry, A. M., Naif, R., & Mousa, A. A. (2025). The evolving role of nursing informatics in the era of artificial intelligence. *International nursing review*, 72(1), e13084. <https://doi.org/10.1111/inr.13084>

- National Academies of Sciences, E., Medicine, N. A. of, Nursing 2020–2030, C. on the F. of, Flaubert, J. L., Menestrel, S. L., Williams, D. R., & Wakefield, M. K. (2021). The Nursing Workforce. In *The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity*. National Academies Press (US). <https://www.ncbi.nlm.nih.gov/books/NBK573922/>
- Nibbelink, C. W., Young, J. R., Carrington, J. M., & Brewer, B. B. (2018). Informatics Solutions for Application of Decision-Making Skills. *Critical Care Nursing Clinics of North America*, 30(2), 237. <https://doi.org/10.1016/j.cnc.2018.02.006>
- O'Hara, C., & Reid, M. (2024). The Under 35 Nursing Workforce in 2022: Overworked, Under Supported, and Burned Out. *Journal of Nursing Regulation*, 15(1), 45–55. [https://doi.org/10.1016/S2155-8256\(24\)00028-0](https://doi.org/10.1016/S2155-8256(24)00028-0)
- Olajubu, A. O., Irinoye, O. O., & Olowokere, A. E. (2014). Competencies and Barriers to the Use of Nursing Informatics among Nurses in Primary, Secondary and Tertiary Healthcare Facilities in Nigeria. *Journal of Health Informatics in Africa*, 2(1), Olajubu. <https://doi.org/10.12856/JHIA-2014-v2-i1-85>
- Oluwale, B. A., Olaposi, T. O., Adedeji, T. O., & Ayanlade, O. S. (2018). Impact of Technological Infrastructure on Quality of Service in the Nigerian Health Sector. *Advances in Research*, 1–8. <https://doi.org/10.9734/AIR/2018/40368>
- Or, C., Dohan, M., & Tan, J. (2014). Understanding Critical Barriers to Implementing a Clinical Information System in a Nursing Home Through the Lens of a Socio-Technical Perspective. *Journal of Medical Systems*, 38(9), 99. <https://doi.org/10.1007/s10916-014-0099-9>
- Owusu, D. K., Audu, D. E., & Mensah, R. S. (2022). Perceived Informatics Competencies among Midwives: A Cross-Sectional Study in the Sunyani Municipality of Ghana. *Student's Journal of Health Research Africa*, 3(3), 16.

- Park, J., & Park, J. (2022). Identifying the Knowledge Structure and Trends of Nursing Informatics: A Text Network Analysis. *Computers, Informatics, Nursing*, 41(1), 8. <https://doi.org/10.1097/CIN.0000000000000919>
- Polit, D. F., & Beck, C. T. (2021). *Nursing research: Generating and assessing evidence for nursing practice* (11th ed.). Wolters Kluwer.
- Prosen, M. (2022). Nursing students' perception of gender-defined roles in nursing: A qualitative descriptive study. *BMC Nursing*, 21(1), 104. <https://doi.org/10.1186/s12912-022-00876-4>
- Quinn, M., Forman, J., Harrod, M., Winter, S., Fowler, K. E., Krein, S. L., Gupta, A., Saint, S., Singh, H., & Chopra, V. (2019). Electronic Health Records, Communication, and Data Sharing: Challenges and Opportunities for improving the diagnostic process. *Diagnosis (Berlin, Germany)*, 6(3), 241. <https://doi.org/10.1515/dx-2018-0036>
- Ratwani, R. (2017). Electronic Health Records and Improved Patient Care: Opportunities for Applied Psychology. *Current Directions in Psychological Science*, 26(4), 359. <https://doi.org/10.1177/0963721417700691>
- Robinson-Bassey, G. C., & Edet, O. B. (2015). Nursing informatics education and use: Challenges and prospects in Nigeria. *Global Journal of Pure and Applied Sciences*, 21(2), 171. <https://doi.org/10.4314/gjpas.v21i2.9>
- Robinson-Bassey, G. C., & Edet, O. B. (2015). Nursing informatics education and use: challenges and prospects in Nigeria. *Global Journal of Pure and Applied Sciences*, 21(2), 171-179. <https://doi.org/10.4314/gjpas.v21i2.9>
- Rony, M. K. K., Parvin, M. R., & Ferdousi, S. (2023). Advancing nursing practice with artificial intelligence: Enhancing preparedness for the future. *Nursing Open*, 11(1), 10.1002/nop2.2070. <https://doi.org/10.1002/nop2.2070>

- Rosy, M. M. (2018). Assess the Level of Knowledge and Attitude among staff Nurses on Nursing Informatics in KVM Super Specialty Hospital, Cherthala with a view to Develop a Self-Instructional Module. *Asian Journal of Nursing Education and Research*, 8(2), 215. <https://doi.org/10.5958/2349-2996.2018.00044.7>
- Rouleau, G., Gagnon, M. P., Côté, J., Payne-Gagnon, J., Hudson, E., & Dubois, C. A. (2017). Impact of information and communication technologies on nursing care: Results of an overview of systematic reviews. *Journal of Medical Internet Research*, 19(4). <https://doi.org/10.2196/jmir.6686>
- Salameh, B., Eddy, L. L., Batran, A., Hijaz, A., & Jaser, S. (2019). Nurses' Attitudes Toward the Use of an Electronic Health Information System in a Developing Country. *SAGE Open Nursing*, 5, 2377960819843711. <https://doi.org/10.1177/2377960819843711>
- Samuel, O. A., Yahaya, S. A., Muhammed, U. F., Ademola, S.-A., & Oladoyinbo, O. T. (2023). Perception Of Student Nurses Towards Nursing Informatics In Two Selected College Of Nursing In Kogi State. *Global Scientific Journals*, 11(9), 1992–2005.
- Sari, N. K., Prihatiningsih, T. S., & Lusmilasari, L. (2021). Key elements of professional nursing practice: A scoping review. *Open Access Macedonian Journal of Medical Sciences*, 9(T4), 253–260. <https://doi.org/10.3889/oamjms.2021.5885>
- Shafiee, M., Shanbehzadeh, M., & Nassari, Z. et al. (2022). Development and evaluation of an electronic nursing documentation system. *BMC Nurs* 21, 15. <https://doi.org/10.1186/s12912-021-00790-1>
- Shin, E. H., Cummings, E., & Ford, K. (2018). A qualitative study of new graduates' readiness to use nursing informatics in acute care settings: Clinical nurse educators' perspectives. *Contemporary Nurse*, 54(1), 64–76. <https://doi.org/10.1080/10376178.2017.1393317>

- Shringi, V. V. T. (2024). Assessing the Nursing Informatics Competency among Registered Nurses of Selected Hospitals in India. *Tuijin Jishu/Journal of Propulsion Technology*, 45(01), Article 01.
- Singh, A., Jadhav, S., & Roopashree, M. R. (2020). Factors to Overcoming Barriers Affecting Electronic Medical Record Usage by Physicians. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*, 45(2), 168–171. https://doi.org/10.4103/ijcm.IJCM_478_19
- Sinha, R. K., & Joy, J. (2022). Nurses' knowledge of and attitude to nursing information systems. *British Journal of Nursing*, 31(12), 648–654. <https://doi.org/10.12968/bjon.2022.31.12.648>
- Slatyer, S., Coventry, L., Twigg, D., & Davis, S. (2016). Professional practice models for nursing: A review of the literature and synthesis of key components. *Journal of Nursing Management*, 24(2), 139–150.
- Smiley, R. A., Allgeyer, R. L., Shobo, Y., Lyons, K. C., Letourneau, R., Zhong, E., Kaminski-Ozturk, N., & Alexander, M. (2023). The 2022 National Nursing Workforce Survey. *Journal of Nursing Regulation*, 14(1), S1–S90. [https://doi.org/10.1016/S2155-8256\(23\)00047-9](https://doi.org/10.1016/S2155-8256(23)00047-9)
- Szabo, S., Nove, A., Matthews, Z., Bajracharya, A., Dhillon, I., Singh, D. R., Saares, A., & Campbell, J. (2020). Health workforce demography: A framework to improve understanding of the health workforce and support achievement of the Sustainable Development Goals. *Human Resources for Health*, 18(1), 7. <https://doi.org/10.1186/s12960-020-0445-6>
- Tsai, C. H., Eghdam, A., Davoody, N., Wright, G., Flowerday, S., & Koch, S. (2020). Effects of Electronic Health Record Implementation and Barriers to Adoption and Use: A Scoping Review and Qualitative Analysis of the Content. *Life (Basel, Switzerland)*, 10(12), 327. <https://doi.org/10.3390/life10120327>

- Tsarfaty, B., & Cojocaru, D. (2022). The Importance of Receiving Training in Computerized Technology for Nurses to Maintain Sustainability in the Health System. *Sustainability*, 14(23), Article 23. <https://doi.org/10.3390/su142315958>
- Tubaishat, A. (2018). Perceived usefulness and perceived ease of use of electronic health records among nurses: Application of Technology Acceptance Model. *Informatics for Health and Social Care*, 43(4), 379–389. <https://doi.org/10.1080/17538157.2017.1363761>
- Vos, J. F. J., Boonstra, A., Kooistra, A., Seelen, M., & van Offenbeek, M. (2020). The influence of electronic health record use on collaboration among medical specialties. *BMC Health Services Research*, 20(1), 676. <https://doi.org/10.1186/s12913-020-05542-6>
- Yehualashet, D. E., Seboka, B. T., Tesfa, G. A., Demeke, A. D., & Amede, E. S. (2021). Barriers to the Adoption of Electronic Medical Record System in Ethiopia: A Systematic Review. *Journal of multidisciplinary healthcare*, 14, 2597–2603. <https://doi.org/10.2147/JMDH.S327539>
- Yusif, S., Hafeez-Baig, A., & Soar, J. (2020). An Exploratory Study of the Readiness of Public Healthcare Facilities in Developing Countries to Adopt Health Information Technology (HIT)/e-Health: the Case of Ghana. *Journal of healthcare informatics research*, 4(2), 189–214. <https://doi.org/10.1007/s41666-020-00070-8>
- Zareshahi, M., Mirzaei, S., & Nasiriani, K. (2022). Nursing informatics competencies in critical care unit. *Health Informatics Journal*, 28(1). <https://doi.org/10.1177/14604582221083843>

APPENDIX: NURSING INFORMATICS QUESTIONNAIRE

UNIVERSITY OF GHANA-LEGON

You are hereby invited to participate in this study designed to obtain information on “**The Influence of Nursing Informatics on Nursing Practice (Decision-Making and Documentation) in 37 Military Hospital**” This information will be valuable for health institutions, as it will empower them to refine and improve their training programs, ensuring that nurses acquire the essential knowledge needed to use nursing informatics tools effectively.

All information obtained is for research purposes only and will be treated with utmost confidentiality. Your participation in this study is voluntary and your signed consent is required, you also have the right to withdraw from the study at any time you choose to. If you have any questions regarding this survey, please feel free to ask or contact me on **Phone number:** 0245321162.

I will greatly appreciate your help in responding to participate in this study.

Thank you for your cooperation and assistance.

Consent: I have read the foregoing information, or it has been read to me in a language that I understand. I have had the opportunity to ask questions, and any question I have asked has been answered to my satisfaction. I consent voluntarily to participate in this study and understand that I have the right to withdraw from the study at any time without in any consequences.

Signature/Thumbprint of respondent.....

Date.....

Interviewer's signature.....

Tick in the box as required

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

1. What is your age?
2. What is your gender? Male [☐] Female [☐]
3. How many years of experience do you have in clinical nursing? (Please specify number of years)
4. What is your working unit?

5. What is your professional rank? Nursing officer [☐] Senior nursing officer [☐]
Principal nursing officer [☐] Deputy Director of Nursing [☐]

SECTION B: LOGISTICS AVAILABLE FOR THE IMPLEMENTATION OF NURSING INFORMATICS

6. How would you rate the current IT infrastructure in your healthcare facility?
Excellent [☐] Very Good [☐] Good [☐] Average [☐] Poor [☐] Very Poor [☐]
7. Do all nursing staff have access to computers or devices for documentation? Yes [☐] No [☐]
8. Have the nursing staff received training on using informatics tools? Yes, regularly [☐] Yes, occasionally [☐] No, not at all [☐]
9. How well is nursing informatics integrated with other existing healthcare systems?
Very well [☐] Moderately well [☐] Not well at all [☐]
10. Are there established protocols for ensuring the security and confidentiality of nursing informatics data? Yes, comprehensive protocols [☐] Yes, basic protocols [☐] No specific protocols in place [☐]
11. How user-friendly are the nursing informatics tools? Very user-friendly [☐] Somewhat user-friendly [☐] Not user-friendly [☐]
12. To what extent do nursing informatics tools align with existing nursing workflows? Completely [☐] Partially [☐] Not at all [☐]
13. How satisfied are you with the technical support provided for nursing informatics tools? Very satisfied [☐] Satisfied [☐] Unsatisfied [☐]



SECTION C: NURSING INFORMATICS COMPETENCIES

Please select the number that best describes how true or false each statement is for you
 Note: Strongly Disagree=1, Disagree=2, Neither agree nor disagree=3, Agree=4, Strongly Agree=5

Statement	1	2	3	4	5
1. I am proficient in using electronic health record (EHR) systems.					
2. I understand the importance of data security and confidentiality in nursing informatics.					
3. I can generate accurate and meaningful reports from health informatics systems.					
4. I can integrate information technology into my nursing practice seamlessly.					
5. I can analyze and interpret data to improve patient outcomes					
6. I actively participate in training programs to enhance my informatics skills.					
7. I effectively communicate patient data to other healthcare professionals using technology.					
8. I am confident in my ability to educate other healthcare professionals on nursing informatics.					
9. I feel confident in troubleshooting common issues with nursing informatics tools.					
10. I regularly update my knowledge on emerging trends in nursing informatics.					
11. I can collaborate with interdisciplinary teams using digital communication tools.					

In which areas do you perceive having nursing informatics competencies? Please select all that apply.

- A. Electronic Health Record (EHR) utilization and navigation []
- B. Data analysis and interpretation for patient care []
- C. Implementation and optimization of clinical information systems []
- D. Integration of technology in nursing practice []
- E. Telehealth and remote patient monitoring []
- F. Cybersecurity and data privacy awareness []
- G. Continuing education and staying current with informatics trends []
- H. Collaboration with interdisciplinary teams on informatics initiatives []
- I. Patient education on health information technologies []
- J. Other (please specify): _____

SECTION D: CHALLENGES WITH THE USE OF AVAILABLE NURSING INFORMATICS TOOLS FOR DECISION MAKING AND DOCUMENTATION

Please select the number that best describes how true or false each statement is for you
 Note: Strongly Disagree=1, Disagree=2, Neither agree nor disagree=3, Agree=4, Strongly Agree=5

Statement	1	2	3	4	5
1. The complexity of nursing informatics tools hinders efficient use in daily tasks.					
2. Insufficient training and education on nursing informatics affect my proficiency.					
3. Limited access to up-to-date technology poses challenges in utilizing nursing informatics.					
4. Time constraints impede the effective incorporation of nursing informatics in patient care.					
5. Inadequate resources for continuous professional development in informatics.					
6. Resistance from colleagues to adopt nursing informatics practices affects collaboration.					
7. The absence of standardized protocols for data documentation creates challenges.					
8. Inadequate technical support and troubleshooting resources hinder utilization.					
9. The need for constant software updates and system maintenance disrupts workflow.					
10. Inconsistencies in data input and retrieval processes hinder smooth workflow.					

SECTION E: INFLUENCE OF NURSING INFORMATICS ON NURSING DECISION-MAKING AND DOCUMENTATION

Please select the number that best describes how true or false each statement is for you
Note: Strongly Disagree=1, Disagree=2, Neither agree nor disagree=3, Agree=4, Strongly Agree=5

Statement	1	2	3	4	5
Nursing Decision Making					
1. The use of nursing informatics enhances my ability to make informed decisions in patient care.					
2. I feel more confident in my decision-making when utilizing nursing informatics tools.					
3. The use of informatics in nursing has improved the accessibility and retrieval of patient records, aiding in faster decision making.					
4. The implementation of informatics systems contributes to better communication among healthcare professionals.					
5. I find nursing informatics valuable in reducing errors during the decision-making process.					
6. The implementation of informatics has improved the overall workflow in nursing decision-making.					

Statement	1	2	3	4	5
7. I perceive nursing informatics as a time-saving resource in my daily nursing tasks.					
Nursing Documentation					
1. The use of nursing informatics has improved the accuracy of nursing documentation.					
2. Nursing informatics has enhanced the efficiency of nurses in documenting patient care activities.					
3. Nursing informatics contributes to a more comprehensive and holistic approach in nursing documentation.					
4. Nursing informatics has positively influenced my perception of the importance of thorough documentation in patient care.					
5. The training provided for nursing informatics tools has adequately prepared me for effective nursing documentation.					
6. I find nursing informatics tools user-friendly and easy to navigate for documenting patient care.					
7. The use of nursing informatics has reduced errors and omissions in nursing documentation.					
8. I perceive nursing informatics as crucial for maintaining the confidentiality and security of patient information during documentation.					

Thank you for participating in this research

