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Knowledge and Attitudes toward Artificial Intelligence in Nursing Managers.

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Dedication

To those who planted in my heart the love of knowledge, to those who have always been my support and strength, raising the banner of hope before me whenever fatigue crept in…

To my dear parents, the source of love and blessings, and the secret behind my perseverance, to my mother, who taught me that patience is a light, and to my father, who instilled in me the values of hard work and self-reliance

I dedicate the fruits of this effort as a token of my loyalty and deep gratitude that words can never fully express.

To my life partner, my beloved wife, who endured the hardships of the journey with me, who was my safe haven when stability was out of reach, And a glowing candle in the darkness of long nights…

Thank you for your patience, your love, and your faith in me. All my gratitude and love go to you. And to my beloved children, you are my greatest dream, and the brightest part of my future. For you, I toiled and stayed up through the nights. For you, I pave every step on the path of knowledge. I dedicate this thesis to you, in the hope that it will be the beginning of even greater achievements for all of us.

Declaration

I certify that this thesis which is submitted to the Deanship of Graduate Studies to get the degree of master in on filed Nursing Management, this is my own research and my own work and it doesn't submit to any other universities or any institutions

Signed:…… 

Name: Mohammad Ahmad Saed Sawaftah

Date: 29/7/2025

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Abstract

Introduction:

Artificial Intelligence (AI) is rapidly transforming healthcare systems worldwide, providing new avenues for improving clinical decision-making, operational efficiency and patient health outcomes. The successful incorporation of AI technologies in hospital settings, however, is highly dependent on the willingness and perceptions of healthcare leaders, mainly nursing managers.

Purpose:

This study intended to assess the knowledge, perceived advantages and challenges, and attitudes of nursing managers toward AI in Palestinian hospitals.

Method:

A descriptive cross-sectional design was used, utilizing a purposive sampling and a structured questionnaire distributed among 264 nursing managers and supervisors to measure knowledge and attitudes in four dimensions: AI-related knowledge, perceived advantages, perceived challenges and attitudes toward AI in nursing practices. Descriptive and inferential statistical analyses were conducted to identify the associations between demographic variables and AI-related perceptions.

Results:

Findings showed moderate levels of knowledge (M = 3.46) and overall high favorable attitudes toward AI (M = 3.81). Regression analysis revealed that perceived challenges significantly predicted attitudes toward AI adoption (p = .034). Attitudes remained consistent across demographic subgroups, underscoring systemic rather than individual influences.

Conclusion and Recommendation:

Nursing managers show positive attitudes toward AI indicating their willingness for technical and technological changes if appropriate support structures are in place. Concerns about system complexity, legal ambiguity and ethical issues significantly impede positive

perceptions. Awareness alone do not translate to acceptance; practical exposure is serious. Attitudes toward AI are stable among demographic groups, signifying systemic instead personal influences. These findings offer valuable insights into how nursing managers can actively guide digital transformation in Palestinian hospitals through tackling systemic barriers and strengthening organizational readiness for AI adoption.

Keywords: Artificial Intelligence, Nursing Managers, Attitudes, Knowledge, Healthcare Technology, Palestine, Hospital Leadership

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List of Abbreviations

Abbreviation	Full Term
AI	Artificial Intelligence
BSc	Bachelor of Science
MSc	Master of Science
Ph.D.	Doctor of Philosophy
MOH	Ministry of Health
EHR	Electronic Health Record
ICD-10	International Classification of Diseases, 10th Revision
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization
KAP	Knowledge, Attitudes, and Practices
PNIPH	Palestinian National Institute of Public Health
HTA	Health Technology Assessment
aHTA	Adaptive Health Technology Assessment
ROI	Return on Investment
ROE	Return on Equity
SATAI	Students' Attitudes Toward Artificial Intelligence
UNRWA	United Nations Relief and Works Agency

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Chapter One

Introduction

1.1 Background

In our contemporary era, artificial intelligence (AI) emerges as a transformative technology that alters the lives of millions. The concept of AI was introduced almost seventy years ago to refer to the use of computers to mimic human reasoning (Larentzakis and Lygeros, 2021). AI was firstly applied in 1956 in mathematics for demonstrating the validity of theorems (Kaul et al., 2020).

Abuzaid et al. (2022) define AI as computerized systems that are developed to stimulate and perform tasks that mimic humans. AI is defined as a branch of computer science, which employs computer technology to simulate, expand, and perceive the human mind in performing thinking activities, learning knowledge, and to help individuals to solve problems (Sapci and Sapci, 2020).

Similarly, Frankenfield (2022) defines AI as machines that emulate human intelligence in terms of imitating humans' mode of thinking and actions. Hashimoto et al. (2020) define AI as a software system that aims to mimic human intellect employing data sources to help people make decisions or to make independent decisions.

Other studies (Abeysiriwardana et al., 2022; Kaplan, 2016) define AI as advanced and highly effective computer system, which can execute tasks that resemble humans in a more effective manner. They add that these tasks are manifested in research, collecting information, making predictions, helping, acquiring knowledge, and decision-making. Robert (2019) indicates that AI is considered an umbrella term that is employed to describe techniques designed to teach computers to stimulate human-like cognitive functions in terms

of reasoning, learning, decision-making, and communicating. AI means simulating the processes of human intelligence by machines, particularly computer systems (Lim et al., 2022).

In their study, Van Bulck et al. (2023) define AI as a generic term for techniques employed to teach computers to imitate the cognitive functions of humans, such as learning, decision-making, communicating, and reasoning. Several studies (Ahmad et al., 2023; He et al., 2019) indicate that AI is tailored to match individual team member intelligence using computer systems for solving problems or completing tasks encountered in automating and teaching various courses such as decision-making and education. AI is generally designed to match the intelligence of individual team members with computer systems in completing tasks or solving problems faced in teaching and automating numerous courses, including education and decision-making (Ahmad et al., 2023; He et al., 2019).

The mechanisms of AI applications lie in reproducing the capabilities of human minds and creating tools to execute tasks that today require a human action (Ghazy et al., 2023). Laï et al. (2020) indicate that AI applications are classified into various disciplines that concentrate on a variety of problems; including problem solving, language comprehension, vision, and learning. Mousavi Baigi et al. (2023) point out that the main goal of AI lies in creating intelligent machines that are capable to understand calculations and implement tasks that require human intelligence; including speech recognition, timely decision-making, accurate visual perception, and translation among various languages.

AI has a paramount importance for private and public industries. Therefore, the majority of sectors without exception use AI to facilitate and improve their workflows, including education, organization, medicine, and healthcare. Therefore, several sectors use AI to facilitate and to leverage its potentials in transforming their workflows, among these sectors is healthcare. Although AI has been used in healthcare since the late 1970s, advancements in computing, robotics, a favorable social environment, have now provided ideal conditions for maximizing the potential of AI in promoting healthcare delivery (Michalowski & Park, 2022).

The impetus that prompt healthcare facilities to incorporate AI is driven by its capacity to interpret and analyze a large volume of data beyond human capability (Khaled & Elborai, 2024). Besides, AI has the capacity to adjust to new situations, answer questions, develop

plans, and address emerging circumstances that demand some level of intelligence (Chai et al., 2021).

The use of AI in healthcare shows potential to transform the workflow in healthcare by integrating data-informed insights into the processes of patient care (Alruwaili et al., 2024). Therefore, the incorporation of AI in healthcare is beneficial. In this respect, El-Maksoud (2024) maintains that integrating AI in healthcare has the capacity to revolutionize the delivery of healthcare by improving patients' outcomes and making healthcare more effective and accessible. This is supported by Amiri et al. (2024) statement regarding the use of AI in various fields; including ophthalmology, pathology, and radiology due to its importance in healthcare activities.

Moreover, Elsayed and Sleem (2021) point out that harnessing AI technologies can transform several aspects of healthcare; including, patient care, payer and pharmaceutical organizations, and administrative processes within provider. Furthermore, Nuffield Council on Bioethics (2018) indicates that using AI in healthcare is effective in supporting and upgrading the methods of analyzing diagnostic services, improving and managing the risky processes, and in detecting diseases. In addition, the use of AI in healthcare is beneficial in improving the quality of care and patients' outcomes (Sabra et al., 2023).

Van Bulck et al. (2023) point out that using AI in healthcare is advantageous in terms of improving patients' care and reducing hospital costs. Owing to the considerable importance of AI in healthcare, it is expected that the global spending on AI in the healthcare sector will reach $36.1 billion by 2025 (Robert, 2019). This implies that there will be huge investments in AI-driven technologies, services, and solutions sought to enhance the delivery, diagnostics, patient care, and other features of the healthcare industry. In the same vein, Ghazy et al. (2023) claim that AI is considered a groundbreaking shift in healthcare, thus, it is expected that its influence will be more pronounced in the future.

In addition, several studies (Kelly et al., 2019; World Health Organization, 2016) point out that leveraging AI technologies has the potential to face the challenges of delivering high-quality and effective care and in organizing large-scale transformations, which necessitates the incorporation of data-driven insights directly in delivering care to the patients. These studies further add that incorporating AI and technology in healthcare can also address the challenges related to supply and demand.

Additionally, AI technologies incorporate natural language processing and machine learning algorithms to revolutionize therapeutic and diagnostic processes by promoting decision-making using robust data-driven views and simplifying their automation in daily tasks (Kaplan, 2016; O'Connor et al., 2023). Within this context, Dash et al. (2019) points out that machine learning, as a subset of AI, is defined as a group of numerical methods for bottomless learning and problem-solving techniques. Another subset of AI is deep learning that employs a hierarchical algorithmic framework for data analysis (Bresnick, 2018).

It can be argued from the above that harnessing AI technologies in healthcare is beneficial for patients in improving their health, for hospitals in reducing the costs and for ameliorating the quality of services provides. The literature further indicates that leveraging AI technologies is beneficial for healthcare providers in general and novice healthcare providers in particular. To support this assumption, Schaefer et al. (2020) argue that AI can help novice healthcare professionals with fewer resources to provide superior medical care by learning from other experiences such as determination the symptoms of rare diseases via extensive data quires.

Within nursing context, the incorporation of AI in nursing progressed gradually, beginning with developing software programs, which guided doctors on using suitable antimicrobial therapy (Shortliffe et al., 1975). AI technologies revolutionize nursing practice and enhance patient outcomes (Khaled and Elborai, 2024). These technologies are in inherited in nurses' daily life in form of smart uses and algorithms (Ghazy et al., 2023). These algorithms that are embedded in AI applications have predictive analytics that are helpful in identifying patients who are at risks of declining medical conditions (Huang et al., 2022).

Furthermore, AI applications have the ability to analyze huge amounts of patient data that are helpful in recognizing patterns and alerting nurses to possible issues before they escalate to severe status, improving patients, and enabling proactive interventions (Buchanan et al., 2020; Chang et al., 2022). Moreover, AI applications can be used for treatment planning and diagnosis (Martinez-Ortigosa et al., 2023). Besides, AI applications can assist nurses in monitoring patients' conditions in clinical areas by providing information and support to patients, which promote their engagement and education (Khaled and Elborai, 2024).

More importantly, Ahmed (2024) indicates that AI algorithms can aid nurses in making accurate diagnosis due to their ability to analyze complex medical data; including test results and medical images, which can considerably enhance diagnostic accuracy and reduce human

errors. Besides, AI contains evidence-based insights that guarantee that patients receive the most suitable care designed to their individual needs (Ahmed, 2023).

Furthermore, Ahmad (2024) indicate that AI-powered applications contain chatbots and virtual assistants that have the capacity to enhance patient education and engagement. He adds that such tools equip patients with adequate medical information, offer guidance on post-discharge care, and answer queries, which facilitate the work of nurses to concentrate more on crucial aspects of care, while encouraging patient autonomy and well-being.

Topol (2019) further indicates that AI is effective for nurses as they provide a panoramic and a complete picture of a patient's health information that enhance decision making and decrease errors like unnecessary procedures and misdiagnosis to help in interpreting and ordering suitable tests and in recommending treatment.

The types of AI that are used in nursing are deep learning, natural learning processes, and machine learning (Al-Sabawy, 2023). There are a variety of AI applications that can be used in nursing to enhance nurses. To mention some, speech recognition technologies can be used to accelerate and promote nursing documentation (Monica, 2018). Besides, Machine learning can be used to enable nurses to use standardized technologies by providing alternatives for the most relevant concepts that can be employed according to the text written by nurses (Moen et al., 2020).

What so more, other AI applications are helpful in text mining by analyzing a variety of nursing notes to detect patients with a history of falls, alcohol or drug users (Topaz et al., 2019). They can be further used to support patient risk detection and care planning (Ronquillo et al., 2021).

The use of AI in nursing has made developments and advances in the field of nursing (Ghazy et al., 2023). In fact, the application of AI in nursing has far-reaching implications (Kulkarni et al., 2020). In this respect, Wang et al. (2024) indicate that AI plays a critical role in clinical care, nursing education, and nursing management. Owing to the importance of AI in nursing, nurse managers should keep abreast of the evolving AI technologies, up-to-date informatics competencies, and ongoing nursing education to meet the demands of increasingly intricate nursing practice (Ross et al., 2024).

To leverage the effectiveness of AI technologies in nursing, Alruwaili et al. (2022) indicate that nurses' knowledge and attitudes about should be increased. To do so, nursing

administrators and healthcare should work on promoting the awareness of AI applications and underscore the significance of incorporating this technology into nursing profession. In addition, they add that it is critical to address the concerns of nurses regarding the discomfort and control of AI by taking into account the generational differences were younger nurses exhibited higher positive attitudes towards using technology compared to older nurses.

Besides, it is fundamental to change management strategies to overcome any challenges that might emerge. For Khaled and Elborai (2024), they believe that nurses should be engaged in training courses, seminars, and webinars. Similarly, Amiri et al. (2024) asserted that educational intervention should be incorporated in nursing curriculum to raise the awareness of nurses about the effectiveness and the use of AI in nursing.

Regarding the knowledge and attitudes of AI among nurses, Khaled and Elborai (2024) point out that (65.6%) of nurses in Egypt have a moderate level of AI knowledge, while (82.6%) of them exhibited positive attitudes towards using AI in nursing. Similarly, Mousavi Baigi et al. (2023) revealed that nursing students exhibited positive attitudes towards AI in nursing.

However, the majority of them do not have sufficient knowledge and skills in dealing with AI. Nurses who have insufficient knowledge concerning the incorporation of AI in their work are more anxious compared to their counterparts who are familiar with AI (Gong et al., 2019), which in turn affect their career. Therefore, it is a necessary to examine the attitudes of nurses towards AI to highlight the aspects that require further improvement to be covered in their curriculum (Paranjape et al., 2019). Furthermore, developing training courses, seminars, and webinars can further increase nurses' knowledge (Khaled and Elborai, 2024).

In Palestine, Barghouthi (2024) points out that the electronic medical records and the health information system were recently executed. He adds that the use of AI in Palestine is in its first stages. Although AI in not fully applied in Palestine, the Palestinian nurses have moderate level of perception towards using AI and their willing to know more about it. However, some factors might obstruct them from adequately applying AI; including lack of preparation and training (Barghouthi, 2024).

The number of studies in Palestine addressing the knowledge and attitudes in healthcare are limited. In their study, Jebreen et al. (2024) indicate the lack of studies investigating the perceptions and knowledge of AI among medical students in Palestine. They add that

addressing this issue is essential for integrating AI in medicine and for identifying if additional training is required.

Furthermore, Mosleh et al. (2023) addressed the knowledge and perceptions of pharmacist and medical students about AI indicating that the respondents are aware of AI, however, they rarely use them in medical field. Based on the above, this study explores the knowledge and attitudes of nursing managers in Palestine towards the implementation of AI. This aim is carried out in Palestinian hospitals at Al-Quds University. To achieve this objective, the study has used two questionnaires, namely, perception toward artificial intelligence and general attitudes towards artificial intelligence. Therefore, this study is concerned with the knowledge and attitudes towards using AI among nurse managers in Palestine.

1.2 Problem Statement

It is widely acknowledged that AI plays a critical role in healthcare and nursing. The rapid evolution of AI in healthcare has changed several aspects of medical practice. Nevertheless, the adoption of AI in nursing management remains unexplored and limited, especially in Palestine. Notwithstanding that nursing managers have a paramount importance in bridging administrative and clinical functions. Therefore, they should be familiar with the implementation of AI in healthcare. Besides, their attitudes towards using AI should be addressed to capture the challenges, ease of use, and limitations of using AI in nursing management from their perspectives.

Although a plethora of studies (Elsayed and Sleem, 2021; Ghazy et al., 2023; Wang et al., 2024) have examined the knowledge and attitudes towards using AI among nursing managers, none of these studies addressed this topic within Palestinian context. Such lack of knowledge creates a gap in guaranteeing that nurse managers use AI technologies to their full potential to improve overall healthcare efficiency, patient outcomes, and nursing workflows. Therefore, nurse managers in Palestine should be equipped with the essential skills and tools to take advantage of AI in their work. This is due to the limited resources and high-pressured environment in Palestine. In this study, the researcher explores the knowledge and attitudes of nurse managers in West Bank, Palestine towards using AI.

1.3 Justification/ Significance of the Study

This study is concerned with investigating the perceptions and knowledge of nurse managers towards using AI in healthcare in Palestine. Accordingly, it sheds the lights on the integration of AI in healthcare, which means that this study has a theoretical contribution. It also emphasizes the connection between AI and the nursing field. However, the previous studies that were conducted in varying contexts and environments were performed on Egypt (Elsayed and Sleem, 2021; Ghazy et al., 2023) and China (Wang et al., 2024).

Unfortunately, none of these studies were carried out in Palestine. Hence, conducting this research in Palestine fills a gap in the literature regarding the awareness and applicability of AI among nurse managers in their nursing practice and management assignments. The utility of this research is shown by its ability to provide information on how to implement AI in nursing to help ensure better patient outcomes, efficient use of resources, and to make better decision-making processes.

The importance of this study is based on presenting useful advice on how to increase the use of AI in nursing management to the healthcare organizations and policymakers in Palestine. Besides, in this study, the prospects and possible difficulties of using AI in nursing management will be identified and described. Therefore, it is expected that the outcomes of this research will enhance the healthcare outcomes as well as the related systems.

1.4 Aim of the Study

The main study aims to assess the knowledge and attitudes of applying AI from nurse managers' perspectives at Palestinian hospitals.

1.5 Objectives of the Study

This study aims to achieve the following objectives:

- To assess the nurse managers' knowledge towards applying AI in their nursing profession at Palestinian hospitals.
- To assess the nurse managers' attitudes towards using AI in their nursing profession at Palestinian hospitals.
- To assess the correlation between nurse managers' knowledge and attitudes towards the implementation of AI in their nursing profession at Palestinian hospitals.

1.6 Research Questions

This study seeks to address the following questions:

1) What are the nurse managers' knowledge towards applying AI in their nursing profession at Palestinian hospitals?
2) What are the nurse managers' attitudes towards using AI in their nursing profession at Palestinian hospitals?
3) What is the correlation between nurse managers' knowledge and attitudes towards the implementation of AI in their nursing profession at Palestinian hospitals?
4) What are the predictors of nurse managers' attitudes toward using (AI) in nursing practice at Palestinian hospitals?

1.7 Study Hypotheses

This study postulates the following hypotheses:

H1: There is a statistically significant impact of nurse managers' knowledge on applying AI in their nursing profession at Palestinian hospitals.

H2: There is a statistically significant impact of nurse managers' attitudes on using AI in their nursing profession at Palestinian hospitals.

H3: There is a statistically significant correlation between nurse managers' knowledge and attitudes towards the implementation of AI in their nursing profession at Palestinian hospitals.

1.8 Definition of Terms

Nurse Managers: they are defined as nurses who perform the role of middle management role, nurse manager role, or nurse executive role (González-García et al., 2021). The researcher defines it as the nurse supervisors, head nurses, and nurse directors working at West Bank hospitals.

- **Artificial Intelligence**: it means a collection of technology that employs complicated software and algorithms to imitate human cognition in the interpretation, understanding, and analysis of complicated healthcare data (Ghazy et al., 2023). The researcher defines

it as smart systems that have a fundamental paradigm shift for nurse managers in facilitating and improving their job efficiency.

- **Knowledge towards AI:** it means the level of knowledge among nurse managers in using AI that can be low, moderate, or high (Ghazy et al., 2023). The researcher defines it as the knowledge that influences nurse managers in Palestine towards using AI in nursing, which integrates a wide range of applications, such as nurse education, patient education, predictive analytics, and diagnostic tools.
- **Attitudes towards AI:** they are defined as the positive or negative perceptions exhibited by nurses towards using AI in nursing (Wang et al., 2024). The researcher defines it as the attitudes of nursing managers towards using AI and the factors that influence their adoption of AI and their intention to use it in their nursing profession. These attitudes could be positive, negative, or neutral.

Chapter Two

Literature Review

2.1 Introduction

This chapter reviews the literature of the use of AI in nursing and the knowledge and attitudes of nurse managers towards the use of AI. This chapter presents the search strategy, summary of the studies, summary, conceptual framework, dependent variables, independent variables, operational definition, and conceptual definition.

2.2 Healthcare

Healthcare means facilities that provide care for patients to manage, treat, diagnose, and prevent disease for patients (Mahendradhata et al., 2021). Healthcare is defined as the organized provision of medical services to improve or maintain health (Almalawi et al., 2023). It consists of therapeutic, rehabilitative, diagnostic, and preventive services (Marques and Battistella, 2025). These services seek to enhance patients' well-being, treat health conditions, and prevent illness (Søvold et al., 2021).

Healthcare is considered a critical aspect of public sector (Scala and Lindsay, 2021). Healthcare sectors strive to provide the utmost care for patients to meet their expectations (Paul et al., 2023). In doing so, these sectors provide novel approaches to improve their quality of services (Holland et al., 2021). For instance, they incorporate technological tools that are effective for facilitating the work of healthcare providers and for improving patient care (Borges do Nascimento et al., 2023).

In Palestine, healthcare consists of governmental and private sectors that are available to the public (Morrar et al., 2021). The Israeli Military's Health Department of the Civil Administration (HDCA) in 1967 was responsible for managing healthcare in occupied

territories. Several organizations supported HDCA; including the private sector, the United Nations (UN), and non-governmental organizations (NGOs) (Asi et al., 2021). Following that, the Ministry of Health (MOH) was created after the transfer of jurisdiction and the Declaration of Principles (DOP) to manage healthcare in the West Bank and Gaza (Manenti et al., 2016).

Regardless of the structural development in the healthcare system, there remain significant challenges, especially in the interoperability and standardization of electronic health information (Amro, 2022). The healthcare institutions in Palestine operate under various independent providers; including governmental, private, non-governmental organizations, and UNRWA (Awashreh, 2020). Each of these institutions employs various health information systems that are not interoperable, resulting in limited information exchange and fragmented data (Najjar, 2022). To clarify, the AveCenna system is used by some governmental facilities to link their electronic health records (EHRs) (Alhelou, 2024).

However, private institutions and UNRWA maintain distinct systems that do not share data outside their network (Dahleez et al., 2021). Besides, Palestinian health information systems do not use standardized medical terminologies such as International Classification of Diseases, Tenth Revision (ICD-10), Logical Observation Identifiers Names and Codes (LOINC), Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT), and National Drug Code (NDC) hindering efforts toward quality assurance, data uniformity, and integration with international standards (Amro, 2022). Such lack of standardization hinders effective collaboration between healthcare institutions and provides a significant challenge to the implementation of a high-quality and a cohesive national health information infrastructure (Najjar, 2022).

2.2.1 Healthcare and Technology

Technology means the application of scientific tools, techniques, systems, and technologies to enhance efficiency, aid human capabilities, and to solve problems (Aithal, 2023). The integration of technology in healthcare is considered as driving force behind significant changes in the delivery of healthcare services (Khalid et al., 2023; Naik et al., 2022). Similar assertion was made by Morilla et al. (2017), which revealed that technology has caused significant changes in the operations of healthcare organizations.

Moreover, Ghaleb et al. (2023) points out that technology enables healthcare institutions to offer various services, give better care, cut costs, and create more efficient processes. The use of technology in healthcare provides a promising tool for organizing and developing new ways of providing effective healthcare services (Chandra et al., 2022). Therefore, there has been a dramatic increase in the use of technology in healthcare (Lee and Yoon, 2021). The importance of technology goes beyond enhancing the quality of services to encompass assisting healthcare providers in gathering and retrieving information (Haleem et al., 2022).

Several studies (Bharati et al., 2024; Sun et al., 2022) point out that implementing telemedicine, advanced diagnostic tools, and electronic health records has considerably enhanced the efficiency and delivery of healthcare. These technological tools pave the way for effortless fusion of artificial intelligence into modern medical practice (Agbo et al., 2019). However, healthcare providers who are unfamiliar with technological tools encounter challenges in applying these technological tools that are manifested in an increased likelihood of errors, a lack of confidence in using telemedicine platforms and electronic health records, and difficulties navigating digital systems (Attaran, 2022). To overcome these challenges, healthcare providers should be trained adequately to enhance their technological abilities (Aceto et al., 2018).

In Palestine, Nouri (2025) states that the incorporation of technological tools is limited due to the fact that Palestine is considered a country that has poor limited resources. She adds that the majority of healthcare providers work with minimal technological infrastructure, where they depend on manual processes for record keeping and inventory management. Moreover, the health sector is ascribed with fragmented practices in which pharmacists have to deal with unclear prescriptions by illegible handwriting, price negotiations, dosage double-checks, and high patient demand often under time pressure (Al-Halawa et al., 2023; Shraim et al., 2017).

Health Technology Assessment (HTA) is considered a crucial tool for evidence-informed decision-making in Palestine that is characterized by resource-limited settings (Alkhaldi et al., 2021). In Palestine, universal health coverage (UHC) is considered a policy goal that is hindered by infrastructural, political, and financial challenges (Alkhaldi et al., 2024). The Palestinian National Institute of Public Health (PNIPH), in collaboration with the Norwegian Institute of Public Health (NIPH) conducted in 2020 the first HTA feasibility study in the West Bank, which focuses on breast cancer screening using an adaptive HTA

(aHTA) approach (Isbeih et al., 2024). Such method enabled the team to adapt current international evidence to the local context given the lack of institutional frameworks and robust local data (Alnaqbi et al., 2024).

2.3 Nurse Managers

Nurse managers are defined as healthcare professionals who are responsible for monitoring the daily operations of nursing units (Sveinsdóttir et al., 2018). They guarantee the delivery of high-quality patient along with managing resources and nursing staff (Neves et al., 2020). They are considered as a bridge between hospital administration and clinical teams (Algunmeeyn et al., 2023). To maintain efficient healthcare services, nurse managers combine organizational skills, leadership, and clinical expertise (Lunden et al., 2017). Nurse managers play a crucial role in maintaining patient safety, implementing policies, and promoting a positive work environment for nurses (Mihdawi et al., 2020). Their responsibilities are not merely confined to provide care for patients but also it includes strategic planning, professional development initiatives, and administrative responsibilities within healthcare institutions (González-García et al., 2021).

The main tasks of nurse managers lie in staffing and scheduling and in guaranteeing that appropriate nurse-to-patient ratios are maintained for achieving utmost care delivery (Kennedy and Sandow, 2024). Nurse managers oversee resource allocation and budgeting and make decisions concerning departmental expenditures and medical supplies (Leger, 2017). In addition, nurse managers are responsible for monitoring and training staff, addressing workplace challenges, and conducting performance evaluations (Ali et al., 2024). They improve patient outcomes by enforcing hospital policies, adhering to healthcare regulations, and collaborating with interdisciplinary teams (Stucky et al., 2022). Nurse managers contribute to the overall efficiency and effectiveness of healthcare services by balancing clinical oversight with administrative duties (El Haddad et al., 2019).

Nurse managers in Palestine manage healthcare under unstable political conditions with limited resources and continuous disruption from military occupation that dramatically influence their leadership responsibilities as well as management approaches (Mosleh et al., 2020). Healthcare professionals in Palestine encounter substantial difficulties with workforce stability and employee motivation and resource distribution emerge from existing system limitations which include insufficient facilities and irregular financing, and segmented administrative frameworks (Hamshari et al., 2024; Mahamid et al., 2022).

Nurse managers must constantly enforce national health policy implementation and address field requirements through adaptive leadership and strategic problem-solving abilities (Marie et al., 2017). Under excessive work pressure and strong emotional strain as well as moral issues detonated by direct military threats nurse managers must sustain staff spirit and treatment standards in high-risk areas (Giacaman et al., 2003; Massad et al., 2009). Vehicle limitations along with institutional fragmentation in Palestinian healthcare make it challenging for nurses to access modern training opportunities with candidates for international networking and learning exchanges (Giacaman et al., 2009).

The diverse challenges faced by Palestinian nurse managers do not impede their ability to provide essential care because they implement local health strategies which consider the cultural norms while maintaining service delivery (Mataria et al., 2009). Nurses play a vital function by offering formal mentoring and psychological support to healthcare workers which solidifies their essential position in maintaining healthcare service delivery throughout prolonged crises (Fong et al., 2021).

2.4 Artificial Intelligence

The notion of utilizing computers to simulate critical thinking and intelligent behavior was introduced in 1950 by Alan Turing (Holmes et al., 2004). AI was first used in 1955; it is defined as the engineering and science of creating intelligent machines, particularly intelligent computer programs (Jevinger et al., 2024). The advent of AI traces back to John McCarthy in 1956, who was the pioneer in discovering AI (Sadek, 2007).

AI is a type of computer science in which its machines function as a human brain. It addresses issues that are challenging to understand using conventional computational methods (Abduljabbar et al., 2019). AI is further defined as electronic systems that has the capacity to execute cognitive functions, physical tasks, make decisions, solve a variety of problems without human interventions (Kaplan & Haenlein, 2019). AI means the creation and the research of software applications that can execute tasks that usually require human intelligence, including language processing, speech recognition, and judgment (Pan, 2016).

AI encompasses several subsets; one of its subsets is machine learning, which is considered effective in enabling computers to learn and analyze from data patterns, which in turn, promote their abilities to make decisions and predictions (Apell & Eriksson, 2023; Haug & Drazen, 2023). In addition, Salama et al. (2025) point out that AI-powered applications;

including natural language processing models and machine learning algorithms are effective in providing accurate and quick information.

Over the past few decades, AI capabilities have accelerated rapidly because of three factors, namely, improved data storage and modelling techniques, rapidly expanding data availability, tumbling costs of data storage and processing (Gesualdi, 2024).

As for the categories of AI, several studies (Ren et al., 2014) point out that AI consists of 3 categories, namely, analytical, human inspired AI, and humanized AI. The first one "analytical AI", employes historical data to inform future resolutions. The second one "human inspired AI", integrates perception and emotions into cognitive intelligence. The third one "humanized AI", which encompasses human emotions, cognitive, social intelligence, and perception.

When it comes to the advantages of AI, it is beneficial in the field of inference, pattern recognition, decision-making, classification, and sensing (Al Shobaki et al., 2023). Moreover, AI has several advantages in various contexts; including legal, military, security, educational, and medical (Price and Nicholson, 2019). AI is advantageous in scientific research in terms of accelerating development and growth in all scientific field and facilitating access to more discoveries (Wang et al., 2023).

With respect to the use and impact of AI in healthcare, Elsayed and Sleem (2021) point out that using AI in healthcare is beneficial for patient care and administrative processes. Moreover, Davenport and Kalakota (2019) indicate that using AI in healthcare is beneficial for patients' treatments and diagnosis. In nursing, AI is used to monitor client' information, report reforms, remember patient data, minimize hospitalization time, manage quality, perform interventions, enhancing care efficacy, and documenting patients' information (Buchanan et al., 2020). However, implementing AI in nursing is fraught with challenges that are exemplified in the continuous updates, the elevated costs of the system, and technology limitations (Mehdipour, 2019).

2.4.1 Nurse Managers and the Use of Artificial Intelligence

Technology provides a wide range of advantages in the field of healthcare (Vaz & Landeiro, 2022). Nurse managers are projected to manage the existing resources effectively using technological means (Gonzalez-Garcia et al., 2024). Nurse managers should harness available technologies that guarantee the quality of care, nursing practice, the quality of life

of patients and staff members (Santos, 2019). The advent of technologies has enabled nurse to make more effective and faster objective decisions, contributing to sustainable health systems, reducing the hospitals' costs, and increasing the quality of the provided services (Leonardsen et al., 2020).

Owing to the importance of technologies in nursing, nurse managers should understand the impact of technology on healthcare and harness technological tools to magnify management processes (Sharpp et al., 2019). This is driven by their responsibilities in decision-making, planning, resource management, and leadership (Gunawan & Aungsuroch, 2017). The use of AI by nurse managers is effective in facing numerous challenges in terms of resource management, quick decision-making, and work overload (Alves et al., 2024). The use of AI helps in overcoming these challenges by facilitating data-driven decision-making and reducing administrative burdens (Rajkomar et al., 2019). Accordingly, nurse managers should harness AI technologies to improve patient care (Sidey-Gibbons & Sidey-Gibbons, 2019).

In Palestine, little is known about the use of AI by nurse managers, the literature rather focused on the use of AI by nursing students in Palestine. To support this assumption, Salama et al. (2025) reveal that nursing students are aware of the effectiveness of AI in nursing in terms of streamlining administrative tasks, enhancing clinical decision-making, and improving patient care. However, they add that nursing students struggle with applying AI due to the absence of AI-based curricula. Within this context, several studies (Al Saad et al., 2022; Omar et al., 2024) come to conclusion that the use of AI in developing countries is limited due to the disparities in faculty expertise, institutional readiness, and infrastructure. This view is supported by (Demaidi, 2023), who reveals that using AI in nursing in Palestine is still in its infancy due to the existence of several barriers that obstruct its adoption; including, financial constraints, inadequate training opportunities, and limited institutional support.

2.4.2 Artificial Intelligence in Healthcare and Nursing

The dynamic junction of technology and healthcare has brought in a new era marked by revolutionary developments, with artificial intelligence (AI) becoming a major player changing the landscape of medical practice (Loh et al., 2022; Ueda et al., 2024).

AI in healthcare emerged due to the rise of machine learning algorithms, the advancements in computational power, and the availability of huge datasets for training AI models (Albahri et al., 2023; Pailaha, 2023).

It is worth mentioning that the integration of AI in healthcare varies between developed countries vs. developed countries. In developed countries like Germany, Canada, and the United States, the healthcare facilities incorporate clinical decision-support systems, virtual standardized patients, and AI-driven simulations into curricula (Randhawa & Jackson, 2020). By contrast, the developing countries such as the Middle East, the integration of AI is limited due to differences in faculty expertise, institutional readiness, and infrastructure (Al Saad et al., 2021).

The integration of AI in healthcare offers the potential for revolutionizing patient care (Rony et al., 2024). AI in healthcare plays critical role in defining the future of patient care (Kumar et al., 2023; Tung & Dong, 2023). Moreover, the use of AI is important in healthcare administration for managing large number of datasets, identifying patient demands, and facilitate predictive analytics (Meskó et al., 2018). Several studies (Hwang et al., 2022) indicate that AI can improve evolution of care, continuity, and administrative work. Besides, AI has been employed to categorize patients based on their needs, pressure ulcers, risks of ischemic stroke, and predict frailty and loneliness risks (O'Connor et al., 2022). Moreover, Salama et al. (2025) point out that AI can enhance medical practice, diagnostic efficiency, and staff shortages. Moreover, Alali et al. (2025) points out that the incorporation of AI in nursing education rapidly transforms learning methodologies by promoting technological readiness, academic performance, and decision-making.

However, there are some challenges related to the AI incorporation in healthcare. These challenges are exemplified in data privacy and security as AI systems depend on huge amount of data such as sensitive patient information to improve accuracy and train algorithms; such data often encompasses medical histories, personal identifiers, and genetic information, which make them more vulnerable to cyberattacks (Karaja & Abu-Naser, 2021). Another challenge associated with using AI in healthcare is data breaches that are manifested in loss of patient trust, financial fraud, and identity theft, which requires taking strong safeguards to protect the information of patients (Kashf et al., 2018). The third challenge is regulatory compliance, which requires healthcare providers to adhere to strict rules and policies for safeguarding data to guarantee compliance to enable AI system to

process and access essential data (El_Jerjawi et al., 2024). Fourth, de-identification and anonymization, data employed in AI systems is often de-identified and anonymized to protect patient privacy, which poses a considerable risk to patient confidentiality and heightens the need for developed data protection methods (Kashkash et al., 2005). What so more, the incorporation of AI in nursing profession is fraught with challenges that are exemplified in the ethical implications of AI and their impacts on clinical reasoning, which requires a holistic review of its role in nursing profession (Alali et al., 2025).

2.4.3 Artificial Intelligence in Healthcare and Nursing in Palestine

In Palestine, Israeli-Palestinian conflict affects the healthcare system in terms of the access to healthcare and the quality of healthcare provided (Keelan, 2016). To elaborate, Gaza and the West Bank face issues related to political instability, resource limitation, and limited mobility (Samara, 2025). Moreover, the lack of nursing workforce is considered one of the major challenges facing the nursing profession in Palestine which results from the rise in the annual turnover rate among nurses, the unattractive work conditions, and the high number of female nurses (Palestinian National Institute of Public Health PNIPH, 2019). What so more, several studies (Hamdan, 2017; Jawabreh, 2016; PNIPH, 2019) claim that poor work conditions, poor control and autonomy, work demands that exceed resources, unrealistic job expectations, and increased work hazards have a negative impact on the nursing profession in Palestine. Therefore, it becomes necessary to improve the healthcare in Palestine. One of the effective methods that can be used to achieve this objective is the incorporation of technologies in general and AI in particular.

When it comes to the use of technologies in healthcare and nursing in Palestine, Jabareen et al. (2021) indicate that the electronic medical records and the health information system have been implemented. Accordingly, the adoption of electronic health information systems (EHRs) is considered a significant step towards enhancing and modernizing healthcare (Salameh et al., 2019).

However, the implementation is still in its early stages and requires upgrading the infrastructure (Barghouthi, 2024). Moreover, Demaidi (2023) indicates that AI incorporation in nursing is considered in its early stages in Palestine as several barriers hinder its adoption; including financial constraints, inadequate training opportunities, and limited institutional support. Moreover, Salameh et al. (2019) mentioned other challenges that hinder the use of technology in Palestinian hospitals, such as lack of early involvement in system design,

limited training, and high costs. To overcome these challenges, it is critical to involve nurses in the planning stages, enhancing the nurses' and healthcare providers' knowledge of technology and equipping them with sufficient support and education to enhance usability and acceptance (Amer et al., 2023).

It is critical to evaluate the perceptions of advanced technology, such as AI from the perspectives of nurses in Palestine (Barghouthi, 2024). Therefore, the researcher in this section reviews the previous studies on the adoption of AI in nursing in Palestine showed several outcomes. In their study, Salama et al. (2025) showed that Palestinian nurses are aware of the importance of AI in nursing and optimistic towards the potential of integrating AI, however, the lack of formal education on the importance of AI highlights the need for holistic curricula. Moreover, they add that Palestinian nurses struggle with incorporating AI in their profession. Thus, they recommend addressing barriers related to the incorporation of AI in nursing, including financial constraints, limited curricula, and inadequate training. Similarly, Mosleh et al. (2023) study revealed that Palestinian students are aware of the importance of AI and they use it for drug information, writing research articles, and homework.

2.5 Search Strategy

Peer-reviewed scientific publications published within the last five years is among the research criteria for finding articles. PubMed, Google Scholar, Web of Science, and MEDLINE are the main search engines used in collecting information from scholarly journals and peer-reviewed articles for the literature search strategy. To fulfill the literature review of such an exploratory study, relevant books and websites regarding the knowledge, perceptions, and attitudes of nurse managers towards using AI are used. Most of the studies included in the literature review were written or published over the past five years, meaning they are recent. To retrieve articles, the following phrases and keywords are utilized, namely, knowledge, attitudes, perceptions, nurse managers, and AI, nurse managers' knowledge of AI and nurse managers' attitudes towards using AI. All of the references used in this study examine the knowledge and attitudes towards AI among nursing managers are reviewed in this study.

2.5.1 Attitudes, Knowledge, and Perceptions of Nurses and Healthcare Workers on the Use of AI in Nursing

Several studies (Abdullah & Fakieh, 2020; Abuzaid et al., 2022; Hamedani et al., 2023; Sabra et al., 2023; El-Maksoud, 2024; Rony et al., 2024; Alruwaili et al., 2024; Jebreen et al., 2024; Alsaedi et al., 2024; Yaseen et al., 2025; Sandanasamy et al., 2025; Oweidat et al., 2025) examined the attitudes, knowledge, and perceptions of nurses and healthcare workers regarding the use of AI in nursing.

Abdullah and Fakieh (2020) investigated healthcare providers' perceptions towards using AI in healthcare in Saudi Arabia. To this end, an online questionnaire was distributed to 250 healthcare providers; including doctors, technicians, and nurses at 4 hospitals in Riyadh, Saudi Arabia. The study found that the majority of the respondents exhibited moderate level of knowledge and acceptance regarding the use of AI in healthcare. The respondents acknowledged the positive impact of AI in speeding up healthcare process. However, they feared from the advent of AI technologies in healthcare settings to replace human beings.

Abuzaid et al. (2022) carried out a study on the integration of AI in nursing practice. The study assessed the attitudes, knowledge, organizational readiness, and willingness to incorporate AI into nursing practice in the United Arab of Emirates (UAE). To fulfill the purpose of the study, an online survey was distributed to (553) nurses working in health organizations in UAE. The majority of the respondents (51%) indicated that their knowledge about AI was obtained from self-education. However, approximately (20%) of the participants indicated that their knowledge was gained from several courses. The minority of the participants (8%) revealed that their postgraduate study acquired them knowledge pertained to the use of AI in nursing. However, (9%) of the participants indicated that they have poor knowledge about AI. Interestingly, the respondents agreed that nursing curriculum should encompass basic knowledge about AI. The study concluded that there is poor knowledge of AI principles across the nursing profession. Therefore, the study recommended further training and education to enable safe and seamless incorporation of AI in nursing practice.

Hamedani et al. (2023) examined the attitudes, knowledge, and acceptance towards AI and its application from the nurses' and physicians' perspectives in Iran. The sample consisted of 400 physicians and nurses who were recruited from eight public university hospitals. The data were collected using a questionnaire and analyzed using SPSS. The results revealed that

the respondents exhibited average knowledge and favorable attitudes towards the use of AI and average acceptance level of AI. The respondents acknowledged the importance of AI in nursing in terms of enhancing the diagnostic tests accuracy, helping to analyze medical tests and imaging, and identifying drug interactions.

Sabra et al. (2023) assessed the perspectives and attitudes of nurses towards using AI in healthcare in Egypt. To this end, the study recruited 200 nurses from Qena University Hospitals (QUHs) using AI scale and nurses' attitudes towards AI questionnaires. The study found that the majority of nurses had moderate attitudes towards using AI in nursing. Besides, the study found that more than half of the respondents exhibited positive attitudes towards using AI. The study found that social status and gender affected the participants' responses.

El-Maksoud (2024) carried out a study on nursing students' knowledge and attitudes of nurse managers towards integrating AI in healthcare in Saudi Arabia. To this end, the study used a cross-sectional design. The data were collected using a questionnaire distributed to (220) students who were selected using convivence sampling. The respondents were recruited from the Nursing College at King Khalid University. The questionnaire items addressed several issues; including, knowledge, attitudes, advantages, and barriers embedded in using AI in healthcare. The data gathered from the questionnaire were analyzed qualitatively. The study found that the majority of nursing students (68.2%) exhibited adequate knowledge regarding AI. As for the nursing students' attitudes regarding AI, the majority of nursing students (67.3%) demonstrated positive attitudes concerning AI. Interestingly, the study revealed that (38.6%) of nursing students indicated that their familiarity with AI was self-taught. Surprisingly, a moderate level of nursing students accounting for (36.6%) indicated that they do not have knowledge about AI. Others had basic understanding about AI with the percentage (40.8%). The study concluded that the majority of respondent had adequate knowledge about AI. The majority of them argued that their knowledge about AI was acquired through self-learning. They further indicated that their comprehension of AI was basic. More importantly, they hold positive views regarding AI in healthcare. In conclusion, the study recommended studies to incorporate AI in nursing curriculum to explore the applications of AI among nurses in their daily practices and to gain a solid understanding of AI.

Rony et al. (2024) investigated healthcare workers knowledge and attitudes concerning AI adoption in healthcare. The study was conducted in Dhaka city, Bangladesh. The study design was cross-sectional, which incorporated dual-method approach in recruiting the participants using convenience and randomness sampling technique. To achieve the aim of the study, a questionnaire was used. To analyze the data, a descriptive and inferential statistics were used such as Fisher's exact tests, Pearson correlation analysis, and multivariate logistic regression. The study revealed that younger healthcare workers aged 18–25 and 26–35 were more acknowledgeable regarding the use of AI in healthcare compared to older healthcare workers. Therefore, younger healthcare workers exhibited positive attitudes regarding the use of AI in healthcare opposed to older healthcare workers who exhibited negative attitudes. Those who had good knowledge about AI revealed that their familiarity with AI refers to several reasons; including learning through research articles/journals and attending AI conferences.

Alruwaili et al. (2024) explored the awareness and attitudes among nurses towards the use of AI. To this end, the study adopted across-sectional design to capture the responses of nurses towards this topic under investigation. To collect the data, an online questionnaire was administrated over four months to nurses working at three hospitals in Saudi Arabia. The questionnaire contained three sections; (1) demographic information, (2) nurses' knowledge about AI, and (3) nurses' attitudes about AI. In recruiting the participants, the study used convenience sampling where (220) registered nurses participated in the study. The results revealed that he majority of nurses exhibited moderate level of awareness regarding AI with percentage (70.9%). Only (58.2%) of nurses were aware of AI in healthcare practices. However, they exhibited some concerns about AI. Interestingly, females demonstrated negative attitudes towards using AI compared to their male counterparts. Moreover, younger participants were more inclined to use AI opposed to older participants.

Khaled and Elborai (2024) investigated the attitudes and knowledge of nursing students towards the use of AI in nursing. The study was applied in Ain Shams University, Egypt. The sample contained (222) students. Two questionnaires were used for collecting the data, namely, students' attitudes towards AI (SATAI) and knowledge regarding AI. The findings of the statistical analysis revealed that 65.6% of the nursing students exhibited moderate knowledge regarding AI. High number of them held positive beliefs towards using AI in nursing.

Amiri et al. (2024) conducted a study on the knowledge and attitudes of nurses towards AI from the perspectives of medical, dental, and nursing students. To this end, the study conducted a meta-analysis and a systematic review using PRISMA and referring to various databases; including Google Scholar, Scopus, and PubMed. The majority of the reviewed studies showed that the students' exhibited average moderate level regarding the incorporation of AI into nursing practice. Based on this result, the study stressed the necessity of incorporating educational intervention to raise nurses' awareness regarding the incorporation and the application of AI in nursing practice.

Alsaedi et al. (2024) investigated the perceived challenges in the adoption of AI among healthcare providers in Saudi Arabia. The sample consisted of (317) interns and administrative healthcare providers. The data were collected using a questionnaire that measured the attitudes, awareness, and concerns the use of AI among healthcare providers' perspectives. The results showed that the majority of the respondents were aware of the importance of AI. However, the majority of them exhibited low previous experience. The main concerns regarding the use of AI were data reliability and their influences of clinical decision-making

Yaseen et al. (2025) carried out a study on the knowledge of nurses regarding the application of AI in nursing practice in Saudi Arabia. To this end, a survey was distributed to (307) nurses that were analyzed quantitatively using statistical analysis. The study found that the participants' familiarity with AI in nursing was influenced by various demographic variables such as working locations, age group, and licensed years group. However, the study found that the nurses' level of education did not influence their familiarity. The study found that nurses' gender significantly affected the future use of AI where females are more inclined towards using AI than males. Interestingly, the study found that nurses exhibited positive attitudes towards the use of AI in nursing in terms of speeding up procedures and reducing medical errors.

Sandanasamy (2025) examined nurses' knowledge and attitudes towards AI and related factors. To attain this objective, the study reviewed (100) studies conducted on the topic under investigation using various databases; including, Web of Science, PubMed, and Scoups. The study found that the nurses reported poor knowledge regarding AI with the percentage 21.93%. Interestingly, the findings revealed that nurses' demographic variables; including their age, education level, and type of healthcare facility they work in affect their

knowledge and attitudes towards using AI. The study further revealed that the majority of nurses (67.19%) in the reviewed studies exhibited positive attitudes towards using AI in nursing.

Oweidat et al. (2025) investigated the knowledge, practices, barriers, and attitudes of AI among nurses and their intention to stay in Jordan. To this end, a total of (148) nurses from 50 hospitals in Jordan were recruited. The data were collected using two validated questionnaires and analyzed quantitatively using multivariate regression, Pearson correlation, and descriptive statistics. The results revealed that nurses in Jordan exhibited a high level of knowledge regarding AI with a mean score of (3.91), which indicates that they are generally knowledgeable concerning the applications and concepts of AI in healthcare. Moreover, nurses demonstrated positive attitudes toward AI, which reflects their readiness and openness to incorporate AI technologies into their professional roles.

In Palestine, Salama et al. (2025) investigated the attitudes, knowledge, and perceptions of nursing students towards using ChatGPT. The sample consisted of (367) students who were recruited from 8 governmental and private universities in the West Bank. To achieve this objective, the study distributed a questionnaire to the respondents. The results showed that the majority of nursing students (84.5%) were aware of AI technology. However, more than half of the respondents (69.9%) lacked formal training or education related to ChatGPT. Interestingly, the majority of the participants (79%) advocated the incorporation of AI into specialized training programs and nursing curricula. This demonstrates their positive attitudes towards the advantages of AI in nursing. However, the study found some challenges that hindered the respondents from effectively incorporating AI in nursing; including, the absence of AI-focused curricula, financial constraints, and insufficient training. This underscores the need for pedagogical and institutional reforms. The findings further reflected the complexities of integrating AI into nursing practice and education that are exemplified in AI's costs, potential diagnostic errors, and AI's reliability.

Jebreen et al. (2024) conducted a study on the perspectives of medical students towards using AI in medicine in Palestine using a mixed method approach. The quantitative data were collected using a questionnaire distributed to (362) undergraduate students and an interview was conducted with (15) participants. The results showed that the respondents did not receive formal education on AI. Interestingly, the majority of them exhibited positive attitudes towards the capacity of AI in nursing and healthcare. However, they argued that

they were not trained in using AI in medicine, which stresses the pressing need to incorporate AI training in medical curricula. Besides, the participants believed that AI education should be incorporated into nursing curricula to leverage the potential of AI. The qualitative results underscored the importance of integrating AI in medical curricula and the absence of AI learning opportunities.

2.5.2 Attitudes, Knowledge, and Perceptions on the Use of AI among Nursing Managers

Other studies ((Elsayed & Sleem, 2021; Ghazy et al., 2023; Wang et al., 2024; Al-Omari et al., 2024; Barghouthi, 2024) investigated the attitudes, knowledge, and perceptions of nursing managers regarding the use of AI in nursing.

Elsayed and Sleem (2021) carried out a study on the attitudes and perceptions of nurse managers towards using AI in healthcare. To achieve this aim, the study used a descriptive research design that was applied to nurse managers amounting to (130) working at Mansoura University in Egypt. The data were collected using two questionnaires, namely, perception toward artificial intelligence and general attitudes towards artificial intelligence. The results showed that the majority of nurse managers amounting to (84.6%) exhibited moderate attitudes towards using AI in nursing. Interestingly, (65.4%) of them demonstrated positive attitudes towards using AI in nursing. The study recommended future studies to investigate the challenges, benefits, and implementations of AI in healthcare settings.

Ghazy et al. (2023) conducted a study on the attitudes and perspectives of nursing managers towards using AI applications in their nursing profession in Egypt. The study was applied in different hospitals in Egypt, namely, El-Helal Insurance Hospital, National Liver Institute, and Menoufia University Hospital at Shebin El-Kom. The sample consisted of (166) nurse managers who were recruited using sampling technique. The data were collected using two instruments, namely, Elsayed and Sleem (2021) to measure participants' perception of AI and Schepman and Rodway (2020) to measure participants' attitudes towards using AI. The findings revealed that the majority of nurse managers exhibited moderate level of agreement regarding using AI in their profession. Moreover, the study found that (58.4%) of them had negative attitudes towards using AI in nursing. Approximately (41.6%) demonstrated positive attitudes towards using AI. The study concluded that nurses' perceptions and attitudes regarding using AI in nursing was statistically significant positive. The study recommended education programs and in-serve training to enhance nurse managers'

knowledge regarding the advantages, disadvantages, and challenges inherited in the implementation of AI in nursing.

Wang et al. (2024) carried out a cross-sectional study in the knowledge and attitudes among nurses and medical staff towards using AI in nursing in China. To this end, the study distributed a questionnaire consisting of (21) items to nurses, nursing students, and other healthcare professionals. The results revealed that the participants' knowledge regarding the use of AI in nursing was low with the percentage (64.7%). The results regarding participants' attitudes towards using AI in nursing showed that the participants exhibited positive attitudes towards using AI I nursing. However, the respondents expressed their concerns concerning the use of AI in nursing due to ethical issues. The study recommended strengthening medical ethics towards AI in nursing.

Within Arab contexts, particularly, Palestine, the studies investigated the perceptions and knowledge of using AI in nursing from nursing mangers' perspectives are limited. After a close reading of literature, the researcher found a semi-related study Al-Omari et al. (2024) that addressed investigated the perceptions and knowledge of using AI in nursing from nursing students' perspectives across 10 Arab countries; including the United Arab Emirates, Bahrain, Iraq, Saudi Arabia, Kuwait, Oman, Lebanon, Jordan, Egypt, and Palestine. The sample consisted of (1713) university students, who were recruited using convenience sampling. The data were collected using a questionnaire consisting of (5) parts, namely, demographic, knowledge, attitude, perception, and intention. To analyze the data, a multivariate regression analysis was used. The results revealed that the majority of university students have moderate knowledge, perception, attitude, and intention of using AI in nursing. The study further found that nursing students who are familiar with using AI were more inclined towards using it in nursing.

Moreover, Barghouthi (2024) carried out a study on the perceptions of nurses towards the use of AI in healthcare in Ramallah, Palestine. To this end, the study distributed a questionnaire to assess the perceptions and knowledge of AI among nurses in Palestine. The data were analyzed using a quantitative descriptive cross-sectional design. The sample encompassed (174) nurses who were recruited from private Palestinian hospitals. To measure the nurses' perceptions of AI, the study used SHAIP instrument by Shinners et al. (2022). The data of the study were analyzed quantitatively using SPSS version 26. The study found that the majority of the nurses (69%) understand the concept of AI. Moreover, two-

thirds of them were interested in learning about AI and its applications. However, the results revealed that the majority of Palestinian nurses were not prepared nor trained to use AI in nursing.

2.5.3 Comments on The Previous Studies

As indicated above, several studies (Abdullah & Fakieh, 2020; Abuzaid et al., 2022; Alruwaili et al., 2024; Alsaedi et al., 2024; El-Maksoud, 2024; Hamedani et al., 2023; Jebreen et al., 2024; Oweidat et al., 2025; Rony et al., 2024; Sabra et al., 2023; Sandanasamy et al., 2025; Yaseen et al., 2025) published between 2020 to 2025 addressed nurses' knowledge and attitudes towards using AI. All of these studies used a questionnaire to measure the nurses' level of knowledge and attitudes towards using AI. However, these studies were conducted in several countries and yielded several results that ranged between poor, moderate to high. To illustrate, Abuzaid et al. (2022) in the UAE showed that nurses demonstrated poor knowledge of AI principles across the nursing profession.

However, Abdullah and Fakieh (2020) in Saudi Arabia revealed that nurses exhibited moderate level of knowledge and acceptance regarding the use of AI in healthcare. Further, Amiri et al. (2024) indicated that the findings of the reviewed studies showed that nurses exhibited held average attitudes towards using AI in nursing. Likewise, Khaled and Elborai (2024) in Egypt indicated that nurses exhibited moderate level of knowledge towards using AI. Similarly, Hamedani et al. (2023) in Iran indicated that the Irani nurses exhibited average knowledge and favorable attitudes towards the use of AI and average acceptance level of AI. They advocate the role of AI in promoting diagnostic tests accuracy, analyzing medical tests and imaging, and determining drug interactions. Besides, El-Maksoud (2024) in Saudi Arabia showed that nurses' knowledge of AI is moderate and acquired through self-learning, underscoring the importance of incorporating AI in nursing curricula to familiarize the nurses with AI tools. Likewise, Alruwaili et al. (2024) in Saudi Arabia revealed that nurses demonstrated moderate level of knowledge towards using AI.

Interestingly, Sabra et al. (2023) in Egypt revealed positive attitudes towards using AI among Egyptian nurses. In the same vein, Khaled and Elborai (2024) revealed that nurses in Egypt held positive attitudes towards using AI in the nursing profession. Yaseen et al. (2025) in Saudi Arabia showed that nurses demonstrated positive attitudes towards using AI in nursing due to its ability to speed up procedures and reduce medical errors. Sandanasamy (2025) further stated that nurses held positive attitudes towards using AI. Moreover, Oweidat et al.

(2025) study in Jordan revealed that Jordanian nurses are willing to incorporate AI in nursing profession. Jebreen et al. (2024) and Salama et al. (2025) showed that Palestinian nurses exhibited positive attitudes towards incorporating AI in nursing.

Regarding the correlation between nurses' demographic variables and their knowledge and attitudes towards using AI, several studies address the impact of gender and social status in nurses' knowledge and attitudes. Sandanasamy (2025) revealed that nurses' demographic variables; including their age, education level, and type of healthcare facility they work in affect their knowledge and attitudes towards using AI. For Sabra et al. (2023) nurses' knowledge and attitudes towards AI are influenced by social status and gender. To clarify, Alruwaili et al. (2024) results revealed that females demonstrated negative attitudes towards using AI compared to their male counterparts. Nevertheless, Yaseen et al. (2025) found that nurses' gender significantly affected the future use of AI where females are more inclined towards using AI than males.

As for age, few studies Rony et al. (2024) in Bangladesh and Alruwaili et al. (2024) in Saudi Arabia highlighted the impact of age on nurses' knowledge and attitudes revealing that younger nurses are more knowledgeable and motivated towards using AI in nursing compared to older nurses. When it comes to educational level, Yaseen et al. (2025) showed that nurses' educational level does not influence their knowledge and attitudes towards using AI in nursing.

Regarding nurses' knowledge about AI, it comes from self-learning (El-Maksoud et al., 2024), attending AI conferences as well as reviewing articles and journals (Rony et al., 2024). However, the lack of knowledge in using AI in nursing is related to data reliability and their influences of clinical decision-making (Alsaedi et al., 2024).

With respect to the challenges of using AI in nursing, Salama et al. (2025) indicated some challenges that obstruct Palestinian nurses from using AI in nursing; including, insufficient training, financial constraints, and the absence of AI-focused curricula. To address these challenges, pedagogical and institutional reforms should be incorporated. Jebreen et al. (2024) further support this result by indicating that Palestinian nurses struggle with using AI due to the lack of adequate training and the absence of AI learning opportunities.

To overcome these challenges, further training and education as well as the incorporation of AI in nursing curricula are needed. In this process, Amiri et al. (2024) underscored the importance of using educational intervention to raise nurses' awareness regarding the

importance of integrating AI in nursing. Besides, Salama et al. (2025) further demonstrated the positive attitudes towards using AI among Palestinian nurses. Further, Jebreen et al. (2024) demand incorporating AI in medical curricula to mitigate the challenges facing Palestinian nurses in using AI.

When it comes to the knowledge and attitudes towards using AI among nurse managers, some studies investigated the use of AI among nursing managers. In Egypt, Elsayed and Sleem (2024) and Ghazy et al. (2023) examined the knowledge and perceptions of nurse managers towards using AI. Another similar study was conducted in China by Wang et al. (2023) addressed the perceptions and knowledge towards using AI in healthcare. In Palestine, Al-Omari et al. (2024) the perceptions and knowledge of using AI in nursing from nursing students' perspectives across 10 Arab countries, while Barghouthi (2024) investigated the perceptions of Palestinian nurses towards using AI.

Altogether, these studies used a questionnaire to collect data, Ghazy et al. (2023) used both Elsayed and Sleem (2021) to measure participants' perception of AI and Schepman and Rodway (2020) to measure participants' attitudes towards using AI. Barghouthi (2024) used SHAIP instrument by Shinners et al. (2022).

This study follows the footsteps of these studies by investigating the knowledge and perceptions of nurse managers towards using AI in nursing. This study is similar to Ghazy et al. (2023) in adopting Elsayed and Sleem (2021) to measure participants' perception of AI and Schepman and Rodway (2020) to measure participants' attitudes towards using AI.

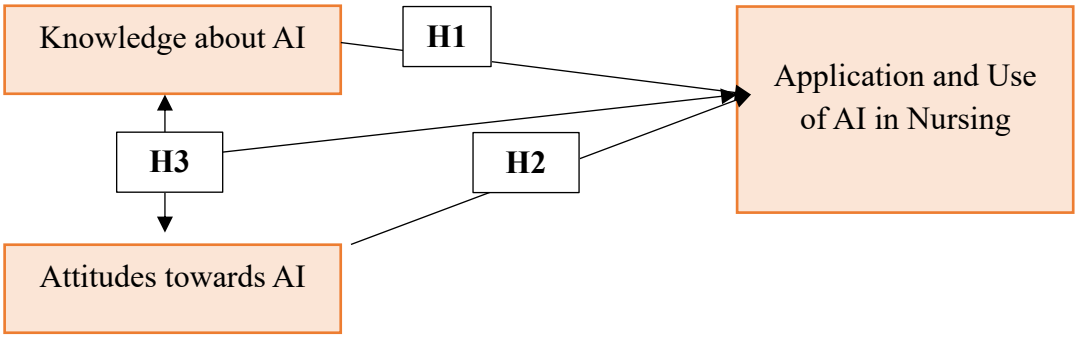
Although some studies as Al-Omari et al. (2024) and Barghouthi (2024) were conducted in Palestine, this study is different from them in several aspects. First, these studies investigated the perceptions of nurses in using AI in healthcare, however, the participants in this study are nurse managers not nurses. Second, Al-Omari et al. (2024) used a structured questionnaire consisting of (5) parts, namely, demographic, knowledge, attitude, perception, and intention adapted from literature, while Barghouthi (2024) adopted SHAIP instrument by Shinners et al. (2022). However, the researcher adopts two instruments in this study, namely, Elsayed and Sleem (2021) to measure participants' perception of AI and Schepman and Rodway (2020) to measure participants' attitudes towards using AI. Third, this study is conducted in West Bank, whereas the previous studies Barghouthi (2024) took place in Ramallah. Moreover, the sample size of recruited participants in this study is (264) who are recruited from 5 hospitals in Palestine. Accordingly, this study provides more comprehensive and generates more robust conclusion about the results to the knowledge and

perception of nurse managers towards using AI in healthcare. This topic was overlooked in literature within Palestinian context that focused only on nurses rather than nurse managers. Accordingly, the novelty of this study lies in assessing this topic in a developing country like Palestine that encounters various challenges in healthcare systems.

2.6 Conceptual Framework

The following conceptual framework highlights the correlational relationship between nurse managers' knowledge about AI and their attitudes towards AI. It further underscores the importance of understanding how these two independent variables are interconnected within the context of adopting AI technologies by nurse managers in West Bank, Palestine as shown in Figure (2.1) below:

Figure (2.1) Conceptual Framework



(**Source:** Researcher's Construction, 2024)

2.6.1 Dependent Variables

- **Application and use of AI in nursing:** it is defined as using AI applications to support nurses in performing clinical decision-making processes and in conducting tasks that does not require direct patient interaction like documentation process (Seibert et al., 2021). In this study, these variable measures the effectiveness, adoption, and use of AI by nurse managers; including nurse supervisors, nurse directors, and head nurses in West Bank hospitals in Palestine. It further measures assesses the extent of using AI by nurse managers to assist them in performing nursing tasks, administrative processes, and nursing tasks.

2.6.2 Independent Variables

The independent variables in this study are illustrated as follows:

- **Knowledge about AI**: the researcher defines it as the extent to which nurse managers understand AI tools, applications, and concepts related to healthcare practices.
- **Attitudes toward AI**: the researcher defines it as the beliefs, perceptions, and openness to incorporating AI technologies by nurse managers into nursing processes.

Chapter Three

Methodology

3.1 Introduction

This chapter presents the research design, study population, study setting, sample size and selection criteria related to the knowledge and attitudes of nursing managers regarding the use of AI in their profession.

3.2 Research Design

To achieve the purpose of the study, the research design that was used is descriptive cross sectional research design, which is defined as a type of research study that collects information related to population at a moment in time (Wang & Cheng, 2020). The study employed a quantitative format that followed a cross-sectional research design whereby all of the study variables were measured at the same point of time (Vogl, 2023). In this study, the researcher collected information pertained to the knowledge and attitude of nurse managers regarding the use of AI in their profession. More importantly, this study was carried out in a non-contrived setting to guarantee data collection in the natural work environment with minimal interference from the researcher.

3.3 Research Philosophy

This study followed the positivism approach, which is anchored on the scientific approach. French philosopher Auguste Comte was the first to bring the concept of positivism to the study of society by using scientific approaches developed for the natural world. Before strongly supporting positivism, Rubin and Rubin (2012) listed a number of reasons for their approach. At first, researchers believed there was one truth, and they aimed to measure it precisely and impartially. The second factor was that a theory was needed, as it forms the basis for the study's hypotheses, which get tested using deductive reasoning. Thirdly, researchers made sure to come across as neutral subjects using an authoritative voice in the report. Finally, the purpose was to move the findings into use as universal theories, behavioral estimations, and practical information.

This study suits the positivism research paradigm according to the justifications provided by Rubin and Rubin (2012). It sought to investigate the knowledge and attitudes of nursing managers towards using AI, which was a single, objective reality to be assessed by following standardized instrument. It also aimed to investigate relationships among variables based on a conceptual framework and set of hypotheses. The researcher acted as a neutral person during the data collection, analysis, and discussion. Ultimately, the results of this study promoted the conceptual understanding about the adoption of AI among nursing managers in Palestine and provided valuable insights to healthcare policymakers and administrators in Palestine to take appropriate measures for facilitating effective AI integration and supporting data-driven decision-making in nursing management.

As the ontological standing of positivism remained realism, Lawani (2021) indicates that a realism supported view where objects kept in an existence independently to the knower. To put it another way, the real truth was not based on what researchers believed. Although positivists took an objective stance, this meant that their research aimed to uncover the meaning from data instead of from their own knowledge (Allmark & Machaczek, 2018). Therefore, such phenomena enabled researchers to uncover existence as an independent entity through research. Maxwell (2017) points out that positivists addressed the reasons affecting the results, and scientific reasoning was applied in this study to explain the knowledge and attitudes of nursing managers towards using AI. Moreover, deductive reasoning was followed since the positivistic approach depends on deduction due to its ability to generalize findings and seek predictions (Žukauskas et al., 2018).

3.4 Study Population

Population means the entire group of events, people, or objects of interest that the researcher seeks to assess (Willie, 2024). Each member of the population is regarded as an element. The sampling frame represents all the elements in the population from which the sample is drawn (Alabi, 2017).

The population of the study included all nurse managers (nurse supervisors, nurse directors, and head nurses) working at Nablus Specialized Hospital, Al-Ithad Hospital, Al-Najah Hospital, Al-Arabi Hospital, Shaheed Dr. Khalil Suleiman Governmental Hospital, Al Razi Hospital, Thabet-Thabet Hospital, Alzakah Hospital, Tubas Turkish Governmental Hospital, Darwish Nazzal Hospital, Nablus MOH Directorate, Tulkarem MOH Directorate, Jenin MOH Directorate, Ibn Sina Hospital, and Qalqilia Hospital. The following Table 3.1 shows the number of nurse managers at each hospital:

Table 3.1 : Distribution of Nurse Managers by Hospital and Position

Hospital	**Nurse Directors**	**Nurse Supervisors**	**Head Nurses**
	n	**n**	**n**
Nablus Specialized Hospital	1	10	17
Al-Ithad Hospital	1	6	17
Al-Najah National Hospital	1	5	15
Al-Arabi Hospital	1	5	15
Shaheed Dr. Khalil Suleiman Governmental Hospital	1	5	14
Al Razi Hospital	1	5	12
Thabet-Thabet Hospital	1	5	12
Alzakah Hospital	1	4	12
Tubas Turkish Governmental Hospital	1	4	11
Darwish Nazzal Hospital	1	3	10
Nablus MOH Directorate	1	3	10
Tulkarem MOH Directorate	1	3	10
Jenin MOH Directorate	1	3	9
Ibn Sina Hospital	1	3	9
Qalqilia MOH Directorate	1	3	9
Total	15	67	182

3.5 Study Setting

This study was conducted on various units in the north west of the West Bank in Palestine. The selected hospitals are Nablus Specialized Hospital, Al-Ithad Hospital, Al-Najah Hospital, Al-Arabi Hospital, Shaheed Dr. Khalil Suleiman Governmental Hospital, Al Razi Hospital, Thabet-Thabet Hospital, Alzakah Hospital, Tubas Turkish Governmental Hospital, Darwish Nazzal Hospital, Nablus MOH Directorate, Tulkarem MOH Directorate, Jenin MOH Directorate, Ibn Sina Hospital, and Qalqilia MOH Directorate.

3.6 Sample Size and Selection Method

The sample of the present study consisted of all existed nurse managers; including, nurse supervisors, nurse directors, and head nurses who work at the fifteen selected hospitals. The nurse managers were selected using purposive sampling technique. This study used G-power program to carry out power analyses specific to model setups. The model contained up to six predictors to investigate the hypothesis that the path coefficients had significant impacts, requiring 146 observations to determine a medium effect size of 0.15 (Jobst et al., 2023), which assumes a significance level of five percent and a statistical power of 95%. Accordingly, the researcher aimed to gather a sample size than the required number.

In this study, (300) questionnaires were disbursed among nursing managers; including nurse supervisors, nurse directors, and head nurses of Palestinian hospitals operating in West Banks. The researcher received (264) filled questionnaires from the respondents, which is a (88) % response rate which were found to be usable for further statistical analysis, which surpassed the minimum threshold suggested by G*Power calculations. Accordingly, the number of nurse managers in the present study accounted for (N= 264).

3.7 Eligibility Criteria

The eligibility criteria for participation in this study encompassed nurse managers who are currently working in one of the fifteen selected hospitals in the West Bank, Palestine. The recruited participants should have a minimum (1) year of experience in their current managerial role. Moreover, they should be engaged in decision-making processes concerning administrative operations and patient care. Besides, they should have basic familiarity and knowledge with AI applications in healthcare. In addition, they should be

willing to provide their attitudes concerning their exposure and general awareness to AI technologies.

3.8 Inclusion Criteria

The study recruited nursing managers, who hold managerial positions at least one year in the selected hospitals. The recruited participants included nurse supervisors, nurse directors, and head nurses. Besides, the nurses who are willing to participate in this study are recruited.

3.9 Exclusion Criteria

Nurse managers with less than one year of experience in their current managerial role were excluded.

3.10 Study Instruments

This study used two instruments; the first one is the perception toward artificial intelligence questionnaire, while the second instrument is the attitude toward artificial intelligence questionnaire (See Appendix).

To begin with, the first section of the questionnaire consisted of seven 'demographic information', including, (1) age, (2) gender, (3) years of experience, (4) marital status, (5) location for graduation, (6) education, and (7) hospital, (8) unit of work and hospital name. The demographic questions are illustrated in Table 3.2 at appendices.

The second section entitled 'knowledge about artificial intelligence among nursing managers', was developed by the researcher after comprehensively review the previous studies as Elsayed and Sleem (2021) to explore the perceptions of nurse managers towards using AI at hospitals. It includes (3) dimensions knowledge (items 1–4), perceived advantages (items 5–9) and perceived challenges. 20 items of the second section are elaborated in Table 3.3 at appendices.

As for the third section of the questionnaire entitled 'attitudes toward artificial intelligence among nursing managers', it examines nursing managers' attitudes regarding AI. This instrument developed by the researcher after comprehensive review for the previous research studies as Schepman and Rodway (2020), it includes (20) items which used to examine nurse managers' attitudes towards using AI at the selected Palestinian hospitals at Palestine. If the mean score is lower than (2.33) it was considered low and negative attitudes,

while if it is (2.34-3.66) it considered moderate and high attitude when the mean scores are ranged from (3.67-5). The items of the third section are illustrated in Table 3.4 at appendices. Both the second and the third parts of the questionnaire consists of (20) items in form of 5-Point Likert scale, namely, (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. The study evaluated the scores of the respondents in light of Ghazy et al. (2023) study. To elaborate, the mean scores of the questionnaire range from 1 -5. It was further categorized into low, moderate, and high perceptions (Balio et al., 2024; Kim et al., 2024) as shown in Table 3.5 below:

Table 3.2: Scoring System for Levels of Perception Toward Artificial Intelligence

Level	Mean Score Range
Low Perception	1.00 – 2.33
Moderate Perception	2.34 – 3.66
High Perception	3.67 – 5.00

3.10.1 Validity of the Instrument

The measurement items in this study were adapted from previous research studies that were originally developed in the English language. The research instrument was used to collect data. The respondents of this study were nursing managers; including head nurses, nurse supervisors, and nurse directors who are influenced and understanding the English version of the questionnaire.

After that, the researcher demonstrated the instruments to three experts in the nursing administration field at Al-Quds University,number of agreement to review, judge, and face validate the content of the instruments. The experts were asked to comment and refine the content of the instruments in terms of grammar, flow, and construction. The experts further examined the existence of these criteria: (1) relevance to the study purpose, (2) simple and clear wording of research questions, (3) easiness to be understood, (4) comprehensiveness, (5) appropriateness of the questions and the length of the instruments, (6) no redundancy, unbiased, and appropriate ordering of questions. The researcher made the necessary modifications in the English version based on the experts' comments and corrections.

3.10.2 Reliability of the Instruments

The researcher tested the reliability of the instruments on 30 participants to assess the reliability of measurement. The study performed the reliability employing Cronbach's alpha coefficient test. The Cronbach alpha for the first instrument concerning nurse managers'

knowledge towards using AI accounts for (0.80), which implies that the instrument is reliable for detecting the study objectives; (knowledge (0.75) for 1–4 items, perceived advantages (0.74) for 5–9 items and perceived challenges (0.91) for 10–20 items). On the other hands the Cronbach alpha accounts for nurse managers' attitudes towards AI is (0.94), which reflects that the dimension is reliable to detect the study objectives.

3.11 Data Collection Procedure

The researcher sent an official letter to the Dean of the Faculty of Nursing. The letter will contain the title, purpose, data collection methods to the directors of the selected hospitals. To inform the participants about the potential risks, benefits, and objectives of the study, the researcher conducted a short briefing to obtain the participants' cooperation to take part in the study. Accordingly, the researcher began by explaining the nature and the purpose of the study to the participants. Following that, the researcher invited the nurse managers who met the inclusion criteria to participate in this investigation. After that, the study distributed the above-mentioned questionnaires (refer to study instruments) to the respondents. To do so, the researcher used a self-administered questionnaire to guarantee that all questions were answered by the respondents. The researcher expects that the respondents will take approximately (20-25) to fill the items of the questionnaires. The period of collecting the data lasted for three months; it began from may 2025 to end of july 2025. The researcher collected the questionnaires from the respondents to prepare them for analysis.

3.12 Data Analysis

The researcher coded and transformed the data using specially customized form to facilitate their entry into computer system. The researcher entered and analyzed the data using Statistical Package for Social Science (SPSS). The graphical representation of the data was created using Excel program. The data collected from the instruments were analyzed quantitatively by extracting the means and standard deviations. The emanated data were presented in a form of table that includes frequency, percentage, means, and standard deviations of each item of the questionnaire. Moreover, Pearson correlation coefficients assess the correlation between knowledge and attitudes. A multiple regression analysis conducts to determine the extent to which knowledge, advantages, challenges and demographic variables (age category, education level, and years of experience) predict

attitudes toward AI. For all statistical tests, the researcher took into account the significance level of $P < 0.05$.

3.13 Ethical Consideration

The researcher obtained from the administration of the selected hospitals. Besides, an approval from Ethical and Research Committee of the Faculty of Nursing was received (Ref. No.: RESC/2025-19). The researcher gained informed consent from respondents i.e., nurse managers who were informed that their participation in the study will be voluntarily. Moreover, the researcher will inform the participants that their anonymity will be maintained and that their data were strictly confidential. In addition, each respondent was notified regarding the right to either participate or refuse to take part in the study.

Chapter Four

Results

4.1 Introduction

This chapter presents the results of the statistical analyses conducted among 264 nursing managers, supervisors, and head nurses to assess the knowledge, perceived advantages and challenges, and attitudes of nursing managers toward Artificial Intelligence (AI) in Palestinian hospitals. The analysis includes analysis for demographic characteristics, descriptive statistics, reliability testing (Cronbach's alpha), inter-correlations among constructs, and a multiple regression analysis predicting attitudes toward AI based on knowledge, advantages, and challenges. All research questions and research objectives are answered in this chapter.

4.2 Demographic Characteristics of Participants

This section shows the demographic profile of the 264 nursing managers, supervisors and head nurses who participated in the study. The descriptive statistics in table 1 offer an overview of their age, gender, years of experience, marital status, graduation location, current position, education level and workplace.

4.2.1 Age Distribution

The ages of the participants ranged from 28 - 60 years, with a mean age about 43.1 years (SD ≈ 8.5), which mainly indicates mature and experienced nursing leadership cohort, that is appropriate for assessing attitudes and knowledge regarding advanced healthcare technologies as AI.

4.2.2 Gender

Among the 264 respondents, 53.4% (n=141) were female and 46.6% (n=123) were male

4.2.3 Years of Experience

The respondents stated an extensive range of professional experience, from 5 to 35 years. The average years of experience was 19.6 years (SD ≈ 7.2), which suggesting a highly seasoned sample skilled to provide insightful perspectives on AI system innovations.

4.2.4 Marital Status

The marital status distribution was: married: 57.2% (n=151), single: 24.6% (n=65), divorced: 10.6% (n=28) and widowed: 7.6% (n=20).

This diversity in marital status may relate to varying personal and professional commitments that impact exposure to continuing education and technology adoption.

4.2.5 Location of Graduation

Graduation institutions were varied, with participants reporting degrees from ten different universities across Palestine and neighboring countries. This expresses a heterogeneous educational background that may impact the variance in AI-related knowledge and attitudes.

4.2.6 Current Position

The participants' current positions were distributed as follows: nurse managers: 6% (n=15), supervisors: 25.4% (n=67) and head nurses: 68.6% (n=182)

This distribution confirms representation across leadership levels in nursing management, strengthening the study's validity in capturing institutional perspectives.

4.2.7 Educational Level

Educational qualifications were diverse: most of them were bachelor's degree (BSC): 76.5% (n=202), master's degree: 11.4% (n=30) and High diploma: 12.1% (n=32).

The high proportion of postgraduate degrees supports the expectation of baseline familiarity with evolving healthcare technologies.

4.2.8 Current Workplace

Participants were drawn from 15 different hospitals and healthcare directorates across the West Bank, including:

This wide geographical distribution improves the generalizability of the findings across Palestinian public and private healthcare settings

Table 4.1 -A- Socio-Demographic Characteristics of the Study Participants (N = 264)

Characteristic	**Category / Hospital Name**	**Frequency**	**Percentage**	**Mean**
		(n)	**(%)**	**(SD)**
Age		–		43.1 (8.5)
Gender	Female	141	53.4%	
	Male	123	46.6%	
Years of Experience		–		19.6 (7.2)
Marital Status	Married	151	57.2%	
	Single	65	24.6%	
	Divorced	28	10.6%	
	Widowed	20	7.6%	
Location of Graduation	An-Najah National University (Nablus)	80	30.3%	
	Al-Quds University (Jerusalem)	45	17.0%	
	Arab American University (Jenin)	30	11.4%	
	Bethlehem University	18	6.8%	
	Hebron University	16	6.1%	
	Universities outside palestine	75	28.4	
Current Position	Nurse Manager	15	6%	
	Supervisor	67	25.4%	
	Head Nurse	182	68.6%	
Educational Level	Bachelor's Degree (BSc)	202	76.5%	
	Master's Degree	30	11.4%	

Table 4.1 -B- Socio-Demographic Characteristics of the Study Participants (N = 264)

	High diploma	32	12.1%	
Work places (Hospital Name)	Al-Arabi Hospital	29	10.98%	
	Al-Ittihad Hospital	24	9.09%	
	Qalqilia MOH Directorate	21	7.95%	
	Darwish Nazzal Hospital	21	7.95%	
	Al-Zakah Hospital	20	7.58%	
	Tubas Turkish Governmental Hospital	18	6.82%	
	Ibn Sina Hospital	18	6.82%	
	Al-Najah Hospital	17	6.44%	
	Jenin MOH Directorate	16	6.06%	
	Shaheed Dr. Khalil Suleiman Governmental Hospital	14	5.30%	
	Al Razi Hospital	14	5.30%	
	Nablus MOH Directorate	14	5.30%	
	Nablus Specialized Hospital	13	4.92%	
	Tulkarem MOH Directorate	13	4.92%	
	Thabet-Thabet Hospital	12	4.55%	

SD= standard deviation

4.3 Descriptive Statistics

Descriptive statistics for the four dimensions measured in this study (Knowledge, Perceived Advantages, Perceived Challenges and Attitudes toward AI) are summarized in Table 4.2. The total knowledge about artificial intelligence questionnaire among nursing managers', was developed by the researcher after comprehensively review the previous studies as Elsayed and Sleem (2021). It includes (3) dimensions; knowledge (items 1–4), perceived

advantages (items 5–9) and perceived challenges. The results indicate relatively moderate-high levels of awareness and favorable perceptions regarding AI in healthcare.

The internal consistency (Cronbach's alpha) values were more than the acceptable threshold of 80% demonstrating strong internal reliability of the questionnaire dimensions; (knowledge: 0.876, advantages: 0.922, challenges: 0.961, attitudes: 0.979)

If the mean score is ranged from (1-2.33) it was considered low and negative attitudes, while if it is (2.34-3.66) it considered moderate and in case of high attitude when the mean scores are ranged from (3.67-5).

The descriptive analysis suggests that nursing managers showed high awareness of AI concepts and recognized its potential advantages in healthcare settings. The highest mean score was recorded for Attitudes (M ≈ 3.81), stating overall optimism regard AI implementation. Perceived Challenges, while lower in mean, remain revealed concerns among participants, suggesting areas for institutional enhancement.

Table 4.2: Descriptive Statistics of AI Questionnaire Dimensions (N = 264)

Dimension	Number of Items	Mean	Std. Dev.	Interpretation
Knowledge	4	3.76	0.60	High
Advantages	5	3.76	0.62	High
Challenges	11	2.87	0.64	Moderate
Total Knowledge	20	3.46	0.63	Moderate
Attitudes	20	3.81	0.65	High

4.4 Correlation Analysis

The intercorrelations among the study dimensions (Knowledge, Perceived Advantages, Perceived Challenges and Attitudes) toward AI were investigated using Pearson's correlation coefficient (see Table 4.3 and Figure 4.1).

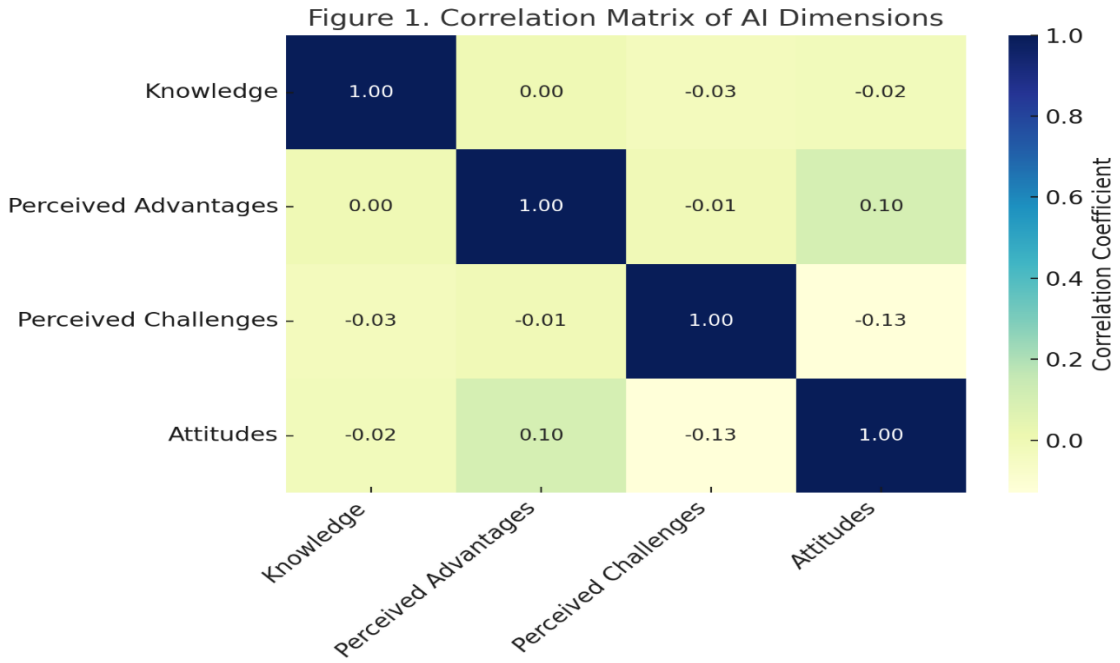
Table 4.3 Correlation Coefficients Between the Total Scores of the Four Dimensions (N = 264)

Variable	1. Knowledge	2. Advantages	3. Challenges	4. Attitudes
1. Knowledge	1.00	0.00	–0.03	–0.02
2. Advantages	0.00	1.00	–0.01	0.10
3. Challenges	–0.03	–0.01	1.00	0.13
4. Attitudes	–0.02	0.10	-0.13	1.00

Note: N = 264. Values represent Pearson correlation coefficients (r). Correlations near 0 indicate very weak or no linear relationship. None of the coefficients reach conventional significance thresholds ($p < .05$).

A visual correlation matrix (Figure 4.1) was used to further illustrate these relationships. Although most coefficients were weak and non-significant, they provide insights into patterns of association.

Figure 4.1: Visual Correlation Matrix



Perceived Advantages showed a weak positive correlation with Attitudes (r = 0.10), suggesting that the more benefits participants perceived from AI, the more positive their attitudes became.

Perceived Challenges were negatively correlated with Attitudes (r = -0.13), demonstrating that higher concern about AI barriers is associated with less favorable attitudes.

Knowledge had a few and non-significant relationship with Attitudes (r = -0.02), suggesting that mere awareness or familiarity with AI may not be enough to effect attitude change.

These results suggest that while participants acknowledged the effectiveness of AI (advantages), their concerns (challenges) significantly reduced overall enthusiasm. The weak correlations between knowledge and other variables more support the hypothesis that practical exposure, training and institutional support might play more critical roles in attitude formation.

The Pearson correlation between the composite mean of Knowledge, Perceived Advantages and Challenges (Composite Mean) and Attitude toward AI is

r = -0.031 (approximately)

This is a very weak negative correlation. It approves that while individual dimensions like perceived advantages had a slight positive impact and challenges a negative one, the overall composite of the three dimensions does not meaningfully predict and align with attitudes toward AI.

4.5 Multiple Regression Analysis: Predictors of Attitudes Toward AI

To identify the most significant predictors of nursing managers' attitudes toward (AI), two multiple linear regressions were conducted.

4.5.1 Attitudes Predicted by Knowledge, Advantages, and Challenges

As mentioned in table 4.4, it examined the effect of the three main dimensions knowledge, perceived advantages and perceived challenges on participants' attitudes toward AI.

Table 4.4: Multiple Regression Analysis Predicting Attitudes Toward AI (N = 264)

Predictor	B	SE	β (Beta)	t	p	95% CI for B
(Constant)	3.92	0.39	—	10.15	.001	[3.16, 4.68]
Knowledge	–0.03	0.07	–0.025	–0.39	0.696	[–0.15, 0.10]
Perceived Advantages	0.10	0.06	0.097	1.57	0.117	[–0.02, 0.22]
Perceived Challenges	–0.13	0.06	–0.132	–2.14	0.034*	[–0.25, –0.01]

Note. $p < .05$ is considered statistically significant and marked with an asterisk (*). The table indicates that perceived challenges significantly predict attitudes toward AI.

Summary: $R^2 = .027$, $F(3, 260) = 2.409$, $p = .068$

Although the overall model did not reach conventional statistical significance ($p > .05$), it showed insightful trends:

Perceived Challenges was the only statistically significant predictor (β = -0.132, p = .034), suggesting that concerns about AI (complexity, cost, reliability) are associated with more negative attitudes.

Perceived Advantages had a weak positive effect (β = 0.097), indicating that recognizing AI benefits may lead to slightly more favorable attitudes, although the impact was not statistically significant.

Knowledge showed a slight and non-significant relationship (β = -0.025), strengthening earlier correlation findings that awareness alone does not form attitudes.

Despite high reliability of measurement tools, this model accounted for only 2.7% of the variance in attitudes, suggesting that other contextual and organizational factors might explain nurses' stance on AI.

4.5.2 Attitudes Predicted by Knowledge, Advantages, Challenges and Demographic Variables

As showed in table 4.5, it was established to explore whether including demographic variables (age, education level, years of experience) would improve prediction of attitudes toward AI.

Table 4. 5 : Multiple Regression Analysis Predicting Attitudes Toward AI from Knowledge, Perceptions, and Demographics (N = 264)

Predictor	B	SE	t	p
(Constant)	3.964	0.405	9.78	0 .001
Knowledge	–0.029	0.065	–0.444	0.657
Perceived Advantages	0.099	0.062	1.594	0.112
Perceived Challenges	–0.132	0.062	–2.117	0.034*
Age Category	–0.009	0.035	–0.264	0.792
Education Level	–0.035	0.049	–0.720	0.472
Years of Experience	0.004	0.005	0.826	0.410

Note. $p < .05$ is considered statistically significant and marked with an asterisk (*). Among the predictors, perceived challenges remained a significant negative predictor of attitudes toward AI, even after controlling for demographics.

Summary: $R^2 = .032$, $F(6, 257) = 1.412$, $p = .210$

Table 5 described a slightly higher proportion of variance (3.2%) in attitudes toward AI. However, the overall model continued statistically non-significant (p = .210).

Perceived Challenges maintain its significant negative predictive value (p = .034). Age, education level and years of experience did not significantly predict attitudes, representing

that professional background factors may play a limited role in forming AI acceptance. Knowledge and Advantages continued to show non-significant relationships with Attitudes. These findings suggest that while perceived barriers to AI adoption (system integration, workload impact) play a role in shaping attitudes, demographic characteristics and perceived benefits do not exert significant independent effects.

In both tables, Perceived Challenges appeared as the strongest and only significant predictor of nursing managers' attitudes toward AI. These results highlight the importance of addressing institutional concerns and barriers in order to enhance AI acceptance in healthcare settings. Future training initiatives and organizational strategies should focus on minimizing apprehension about AI rather than just enhancing awareness.

Section 4.6: Group Comparisons Based on Demographics

To further consider whether attitudes toward AI differed across demographic groups, independent samples t-tests and one-way ANOVA analyses were performed. The findings are summarized in table 4.6 below.

4.6.1 Gender-Based Differences

An independent samples t-test was used to compare attitudes toward AI between male and female participants: $t(262) = 0.44$, $p = .660$

This result shows that there was no statistically significant difference in AI attitudes depend on gender. Both male and female nursing managers established comparable levels of openness toward AI technologies.

4.6.2 Education Level Differences

A one-way ANOVA was used to assess differences in AI attitudes across four educational categories (BSc, Master's, High diploma): $F(3, 260) = 0.69$, $p = .560$

This result suggests that educational qualification had no significant impact on attitudes toward AI. This could suggest that exposure to AI is not yet extremely embedded in academic curricula at any level.

4.6.3 Marital Status Differences

Attitude differences were checked across marital statuses (Single, Married, Divorced, Widowed): F (3, 260) = 0.63, p = .596

There were no statistically significant differences in AI attitudes among participants based on marital status. This result suggests that personal/family status is unrelated to professional perceptions toward AI.

4.6.4 Position Differences

Participants' attitudes toward AI were compared across their professional roles (Head Nurse, Supervisor, Nurse Manager): F (2, 261) = 0.26, p = .775

This result shows that leadership role in the nursing hierarchy did not significantly impact AI attitudes.

In summary, none of the demographic variables studied (gender, education, marital status, or position) showed significant effects on participants' attitudes toward AI. These findings support earlier regression results and suggest that perceptions of AI are relatively uniform across nursing leadership roles and backgrounds. The most prominent predictor remains the perceived challenges associated with AI use in practice.

Table 4.6 : Group Differences in Attitudes Toward AI Based on Demographic Variables (N = 264)

Demographic Variable	**Groups**	**Test Statistic**	
	(n, %)	**(df)**	**p-value**
Gender	Female (n = 141, 53.4%), Male (n = 123, 46.6%)	*t(262) = 0.44*	.660
Education Level	BSc (n = 202, 76.5%), Master (n = 30, 11.4%), High diploma (n = 32, 12.1%)	*F(3, 260) = 0.69*	.560
Marital Status	Married (n = 151, 57.2%), Single (n = 65, 24.6%), Divorced (n = 28, 10.6%), Widowed (n = 20, 7.6%)	*F(3, 260) = 0.63*	.596
Position (Job Title)	Nurse Manager (n = 15, 6.0%), Supervisor (n = 67, 25.4%), Head Nurse (n = 182, 68.6%)	*F(2, 261) = 0.26*	.775

Note. None of the demographic variables showed statistically significant differences in attitudes toward AI. Significance was determined at $p < .05$.

4.7 Summary

This chapter presented detailed statistical findings concerning nursing managers' knowledge, perceived advantages and challenges and attitudes toward AI and addressed all research questions posed in this study through a series of descriptive, correlational and inferential statistical analyses.

The research question regarding the level of nurse managers' knowledge about AI was answered through descriptive statistics, revealing a moderate to high knowledge level of awareness and favorable attitudes (M = 3.46 for knowledge), supported by strong internal consistency ($\alpha = 0.876$) although perceived challenges scored lowest.

The question, which explored nurse managers' attitudes toward AI, was also answered through descriptive analysis, showing a generally favorable attitude (M = 3.81), with excellent internal reliability ($\alpha = 0.979$).

The question concerning perceived advantages and challenges was addressed by presenting the respective means (advantages: M = 3.76; challenges: M = 2.87) and high reliability scores ($\alpha = 0.922$ and $\alpha = 0.961$, respectively).

The question exploring the relationships between knowledge, perceived advantages, challenges and attitudes, was addressed via Pearson's correlation analysis. Results showed a weak positive correlation between advantages and attitudes (r = 0.10), a negative correlation between challenges and attitudes (r = -0.13) and an insignificant correlation between knowledge and attitudes (r = -0.02). Total Mean for knowledge, perceived advantages and challenges combined dimensions = 3.46; this suggests that when combining knowledge, advantages and challenges into one composite perspective, the overall perception score is moderate.

The question regarding demographic impacts attitudes was answered through ANOVA and t-test analyses, as well as multiple regression (table 4.2), all of which showed no significant impact of age, gender, education level, marital status or job position on AI attitudes.

Finally, the question which sought to recognize significant predictors of attitudes, was answered through two regression tables. Both tables showed that perceived challenges were the only significant negative predictor of attitudes toward AI (p = .034), while knowledge, perceived advantages and demographic factors were not statistically significant.

Collectively, these findings suggest that while knowledge and positive perceptions of AI exist, institutional and practical challenges assist as the primary factors shaping nurse managers' attitudes toward AI implementation in Palestinian hospitals and suggest that institutional and system-level concerns must be identified to enhance successful AI adoption.

Chapter Five

Discussion

5.1 Overview

This chapter interprets the key findings from the quantitative analysis of 264 nursing managers' knowledge, perceived advantages and challenges, and attitudes toward (AI) in Palestinian hospitals. The results are contextualized within existing literature to identify alignments, contradictions and implications for policy, education and practice.

5.2 Interpretation of Key Results

5.2.1 High Attitudes Despite Moderate Knowledge

Although participants showed a relatively favorable and high attitude score toward AI (M = 3.81), the overall knowledge was moderate (M = 3.46). This proposes a generally favorable nature toward AI adoption in empirical settings, even in the absence of in-depth technical understanding. Similar findings were stated by Ahmed et al. (2022) in Pakistan and Al Saad et al. (2022) in Arab countries, who observed that enthusiasm for AI usually precedes actual familiarity and training. This phenomenon could be clarified by the growing visibility of AI in health discourse, rather than direct experience with AI tools (Ahmed, 2024; O'Connor et al., 2023).

5.2.2 Perceived Challenges as the Main Barrier

Regression analysis indicated that the perceived challenges of AI appeared as the strongest negative predictor of nursing managers' attitudes toward AI adoption ($\beta = -0.132$, $p = 0.034$). particularly, items related to job security, patient privacy, ethical concerns, decrease of the human touch and the risk of over-dependance on technology seem to weigh heavily on participants' perceptions. Although managers generally reported favorable and good attitudes toward AI, these findings propose that their acceptance is conditional and significantly weaken when threats to professional identity, ethics and patient-centered healthcare are perceived. This is consistent with Elsayed and Sleem (2021) research findings, which highlighted that ethical and organizational concerns usually exceed the potential benefits of AI in healthcare. Tackling such concerns through policy, regulation and transparent organizational strategies is therefore important for strengthening positive attitudes toward AI adoption in Palestinian hospitals.

On the other hands, participants who perceived AI as multifaceted, resource-intensive and ethically ambiguous were less likely to embrace it. This is aligned and associated with Alruwaili et al. (2024) and Barghouthi (2024) who discovered that implementation barriers involving absence of training, fear of job displacement and data security risks, were major deterrents to AI incorporation in nursing.

5.2.3 Weak Role of Demographic Variables

Neither gender, educational level, marital status, nor professional role significantly influenced attitudes toward AI (all $p > .05$). This uniformity across demographic groups suggests that attitudes may be formed more by institutional culture, policy and infrastructure than by individual characteristics. This consistent with findings from Algunmeeyn et al. (2023) and Al Omari et al. (2024) who concluded that demographic factors were not strong determinants of AI perceptions when organizational willingness and support was deficient.

5.2.4 Limited Predictive Power of Knowledge and Advantages

Differing to expectations, knowledge and perceived advantages did not significantly predict attitudes. This deviates from earlier studies (Abdullah & Fakieh, 2020; Al Saad et al., 2022) which found that greater familiarity with AI improved acceptance. One possible explanation is that awareness alone is inadequate in the Palestinian context where access to applied AI tools is restricted. As Elshami et al. (2022) and Amer et al. (2023) highlighted practical exposure and hands-on training are important to translate knowledge to confident attitudes.

5.3 Comparison with Regional and Global Studies

The findings of this study generally confirm wider trends in the Middle East and North Africa (MENA) regions and globally, involving high attitudes despite restricted exposure, perceived challenges as primary barriers and demographic neutrality in forming perceptions. These align and consistent with findings by Ahmed et al. (2024), Al Omari et al. (2024) and Elshami et al. (2022).

5.4 Implications for Nursing Management and Policy

Institutional investment in AI education and simulation-based training is important. Policies must prioritize addressing perceived barriers (workload burden, system integration). Nurse managers should receive designed leadership development to using safe and ethical AI use.

Chapter Six

Conclusions and Recommendations

6.1 Summary of the Study

This study discovered the knowledge, perceived advantages and challenges and attitudes of nursing managers, supervisors and head nurses toward (AI) in Palestinian hospitals. The research employed a cross-sectional design with 264 participants. Findings involved moderate knowledge levels, high attitudes toward AI and perceived challenges as the strongest predictor of attitude. Demographics did not significantly impact attitudes and knowledge alone did not confirm acceptance.

6.2 Conclusions

Nursing managers show generally positive attitudes toward AI demonstrating willingness for technological change if sufficient support structures are in place.

Concerns about system complexity, legal ambiguity and ethical issues significantly impede positive perceptions.

Awareness and theoretical understanding alone do not translate to acceptance, practical exposure is serious.

Attitudes toward AI are stable across demographic groups, signifying systemic rather than individual impacts.

6.3 Recommendations

6.3.1 For Hospital Administrators and Policymakers

Integrate AI into professional development through providing mandatory AI-related workshops and simulation-based learning units.

Develop clear AI policies and ethical guidelines through confirming that nurse managers understand the legal and professional frameworks of AI-supported care.

Address infrastructure and usability concerns through simplify interfaces and confirm interoperability across hospital systems.

6.3.2 For Nursing Education Institutions

Revise curricula to involve AI foundations through including AI theory and application in undergraduate and graduate nursing programs.

Strengthening interdisciplinary collaboration through encouraging learning environments that merge nursing, IT and bioethics training.

6.3.3 For Future Researchers

Conduct longitudinal and mixed-methods studies that capture how attitudes develop post-training or post-implementation.

Examine and inspect institutional culture as a moderator in AI adoption.

Discover AI's role in Palestinian-specific healthcare challenges as resource deficiencies and conflict-zone care coordination.

6.4 Study Limitations

The Israeli checkpoints have hindered the freedom of movement between the governorates, requiring additional time and effort, and exhausting the Palestinian people who work day and night to deliver their scientific research to the world."

This study has several limitations; it depends on self-reported data, which may have been affected by social favorability bias, as participants could have submitted answers, they believe more acceptable rather than expressing their true impressions. The study sample was restricted to hospitals in the West Bank, which may restrict the findings generalizability to other regions in Palestine and different healthcare systems. The study was performed during a period noticeable by political instability and the effect of war, which may have impacted nursing managers' perceptions of AI adoption, their priorities and their capability to

participate with technological revolution. The regression model showed comparatively low explanatory power, noting that there are further unmeasured factors as organizational culture, leadership type and availability of resources that likely contribute to forming attitudes toward AI beyond the variables studied in this study.

6.5 Final Remarks

As healthcare becomes progressively digitalized, the willingness of nursing leaders to adopt AI is a necessity and a challenge. This study underscores a promising level of openness among Palestinian nurse managers, but also the necessity for targeted education, policy support and infrastructure investment to turn potential to sustainable practice.

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Appendices (A)

I am conducting a research study entitled **"Knowledge and Attitudes toward Artificial Intelligence in Nursing Managers."** This study aims to assess knowledge and attitudes of nursing managers regarding the integration of artificial intelligence (AI) in healthcare settings. Your participation is highly valuable in helping to assess the current level of knowledge and attitudes of AI technologies and their potential impact on nursing management practices.

You are kindly requested to complete this questionnaire, which is designed to gather insights into your views and experiences related to AI applications in nursing. Your responses will remain **confidential** and will be used solely for **academic purposes.** Participation is entirely **voluntary,** and you may withdraw at any time without providing a reason.

Your reading of this questionnaire is considered implicit consent to participate in this study. Completing it will take approximately 10 minutes and it consists of three sections; the first section is ‘demographic information’, which consists of eight demographic questions, the second section revolves around “knowledge towards artificial intelligence among nursing managers”, which includes 20 items in a form of 5-point Likert scale. The second section consists of three dimensions, namely, knowledge about artificial intelligence, advantages of using artificial intelligence, and challenges related to using artificial intelligence. The third section is “attitudes toward artificial intelligence among nursing managers”, which includes 20 items in a form of 5-point Likert scale.

This questionnaire is prepared by the researcher For further inquiries, please contact this email

Section 1: Demographic Information

1. Age:(……)

2. Gender:

1. Female
2. Male

3.Years of Experience: (……)

4. Marital Status:

 Single

 Married

 Divorced

 Widowed

5. Location for Graduation: (…….)

6. Position:

1. Head Nurse
2. Supervisor
3. Nurse Manager

7. Education:

1. BSc
2. Master
3. High diploma

8. Hospital:

1-Nablus Specialized Hospital

2-Al-Ithad Hospital

3-Al- Najah Hospital

4-Al-Arabi Hospital

5- Shaheed Dr. Khalil Suleiman Governmental Hospital

6-Al Razi Hospital

7-Thabet-Thabet Hospital

8-Alzakah Hospital

9- Tubas Turkish Governmental Hospital

10-Darwish Nazzal Hospital

11-Nablus MOH Directorate

12-Tulkarem MOH Directorate

13-Jenin MOH Directorate

14-Ibn Sina Hospital

15-Qalqilia MOH Directorate

Section 2: Knowledge Toward Artificial Intelligence among Nursing Managers

Please indicate your level of agreement with the following statements using the 5-point Likert scale below: 1 - Strongly Disagree | 2 - Disagree | 3 - Neutral | 4 - Agree | 5 - Strongly Agree

Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
Dimension 1: Knowledge about Artificial Intelligence					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
1. I am familiar with the concept of Artificial Intelligence (AI).					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
2. I am aware of the existing applications of AI in the healthcare field.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
3. I understand the potential of AI in improving healthcare services.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
4. I keep myself updated with current developments in AI technology.					
Dimension 2: Advantages of Using Artificial Intelligence					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
5. I believe AI can improve the efficiency of nursing management tasks.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
6. I think AI can reduce nurses' workload by automating routine processes.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
7. I believe AI can support clinical decision-making in patient care.					

Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
8. I think AI has the potential to enhance patient safety.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
9. I believe AI can promote nurses' well-being by reducing stress and fatigue.					
Dimension 3: Challenges Related to Artificial Intelligence					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
10. AI systems may threaten job security for nurses.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
11. I am concerned that AI might compromise patient privacy					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
12. AI could lead to ethical issues in patient care					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
13. AI might cause dependency on technology in clinical practice					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
14. AI systems are not always reliable and may make serious errors.					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
15. I am concerned that AI might reduce the human touch in nursing care					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
16. Implementing AI requires significant training and support					

Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
17. I worry about how AI might affect the future role of nurses					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
18. I feel uncomfortable about the growing presence of AI in healthcare					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
19. Some organizations may misuse AI for surveillance or control					
Item Statement	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
20. Over-reliance on AI could affect nurses' critical thinking					

Section 3: Attitudes Toward Artificial Intelligence among Nursing Managers

Please indicate your level of agreement with the following statements using the 5-point Likert scale below: 1 - Strongly Disagree | 2 - Disagree | 3 - Neutral | 4 - Agree | 5 - Strongly Agree

Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1. I am open to learning how to use AI systems in my professional role.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
2. I have a positive attitude toward integrating AI into healthcare.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)

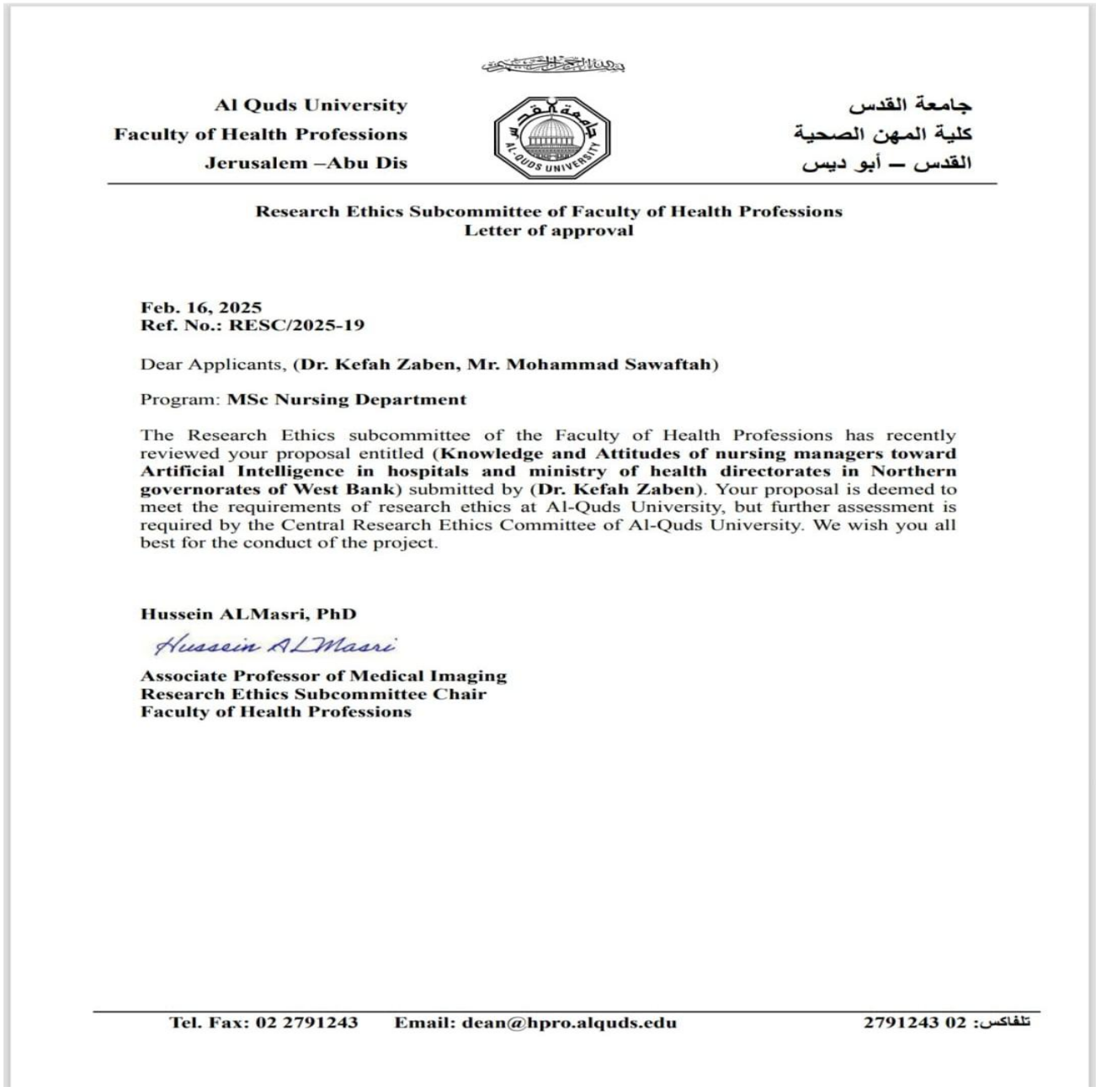
3. I am excited about the advancements AI can bring to the nursing field.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
4. I would consider using AI tools to support decision-making in nursing.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
5. I feel confident that AI can be a valuable resource in healthcare delivery.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
6. I believe AI can positively impact the future of the nursing profession					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
7. I am willing to undergo training on AI technologies relevant to my work.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
8. I support integrating AI into nursing education and development.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
9. I support AI as long as it does not replace human judgment.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
10. AI-nurse collaboration can enhance care outcomes					

Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
11.I trust AI systems if properly regulated					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
12. I am concerned about losing autonomy due to AI.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
13. Ethical implications of AI should be carefully addressed.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
14. I believe my role will evolve—not disappear—with AI.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
15. Nursing leadership plays a critical role in managing AI.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
16. Nurses should participate in AI-related policymaking.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
17. Patients' opinions about AI use should be respected.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
18. I feel responsible for understanding AI's impact on nursing.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)

19. AI can strengthen evidence-based nursing practice.					
Item Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
20. I am optimistic about AI's future in healthcare.					

Thank you for your valuable time and participation in completing this questionnaire

Appendices (B)



Al Quds University
Faculty of Health Professions
Jerusalem –Abu Dis

جامعة القدس
كلية المهن الصحية
القدس – أبو ديس

Research Ethics Subcommittee of Faculty of Health Professions
Letter of approval

Feb. 16, 2025
Ref. No.: RESC/2025-19

Dear Applicants, (**Dr. Kefah Zaben, Mr. Mohammad Sawaftah**)

Program: **MSc Nursing Department**

The Research Ethics subcommittee of the Faculty of Health Professions has recently reviewed your proposal entitled (**Knowledge and Attitudes of nursing managers toward Artificial Intelligence in hospitals and ministry of health directorates in Northern governorates of West Bank**) submitted by (**Dr. Kefah Zaben**). Your proposal is deemed to meet the requirements of research ethics at Al-Quds University, but further assessment is required by the Central Research Ethics Committee of Al-Quds University. We wish you all best for the conduct of the project.

Hussein ALMasri, PhD
Hussein ALMasri
Associate Professor of Medical Imaging
Research Ethics Subcommittee Chair
Faculty of Health Professions

Tel. Fax: 02 2791243 Email: dean@hpro.alquds.edu تلفاكس: 02 2791243

Appendices

Table 3.2 : Demographic Questions and Response Options

Item	Response Options
1. Age	(Open-ended)
2. Gender	1. Female 2. Male
3. Years of Experience	(Open-ended)
4. Marital Status	• Single • Married • Divorced • Widowed
5. Location for Graduation	(Open-ended)
6. Position	1. Head Nurse 2. Supervisor 3. Nurse Manager
7. Education	1. BSc 2. Master 3. High diploma
8. Hospital	1. Nablus Specialized Hospital 2. Al-Ithad Hospital 3. Al-Najah Hospital 4. Al-Arabi Hospital 5. Shaheed Dr. Khalil Suleiman Governmental Hospital 6. Al Razi Hospital 7. Thabet-Thabet Hospital 8. Alzakah Hospital 9. Tubas Turkish Governmental Hospital 10. Darwish Nazzal Hospital 11. Nablus MOH Directorate 12. Tulkarem MOH Directorate 13. Jenin MOH Directorate 14. Ibn Sina Hospital 15. Qalqilia MOH Directorate

Table 3.3; Knowledge About Artificial Intelligence Among Nursing Managers – Item Statements

Item	Statement
1	I am familiar with the concept of Artificial Intelligence (AI).
2	I am aware of the existing applications of AI in the healthcare field.
3	I understand the potential of AI in improving healthcare services.
4	I keep myself updated with current developments in AI technology.
5	I believe AI can improve the efficiency of nursing management tasks.
6	I think AI can reduce nurses' workload by automating routine processes.
7	I believe AI can support clinical decision-making in patient care.
8	I think AI has the potential to enhance patient safety.
9	I believe AI can promote nurses' well-being by reducing stress and fatigue.
10	AI systems may threaten job security for nurses.
11	I am concerned that AI might compromise patient privacy.
12	AI could lead to ethical issues in patient care.
13	AI might cause dependency on technology in clinical practice.
14	AI systems are not always reliable and may make serious errors.
15	I am concerned that AI might reduce the human touch in nursing care.
16	Implementing AI requires significant training and support.
17	I worry about how AI might affect the future role of nurses.
18	I feel uncomfortable about the growing presence of AI in healthcare.
19	Some organizations may misuse AI for surveillance or control.
20	Over-reliance on AI could affect nurses' critical thinking.

Table 3.4

Attitudes About Artificial Intelligence Among Nursing Managers – Item Statements

Item	Statement
1	I am open to learning how to use AI systems in my professional role.
2	I have a positive attitude toward integrating AI into healthcare.
3	I am excited about the advancements AI can bring to the nursing field.
4	I would consider using AI tools to support decision-making in nursing.
5	I feel confident that AI can be a valuable resource in healthcare delivery.
6	I believe AI can positively impact the future of the nursing profession.
7	I am willing to undergo training on AI technologies relevant to my work.
8	I support integrating AI into nursing education and development.
9	I support AI as long as it does not replace human judgment.
10	AI-nurse collaboration can enhance care outcomes.
11	I trust AI systems if properly regulated.
12	I am concerned about losing autonomy due to AI.
13	Ethical implications of AI should be carefully addressed.
14	I believe my role will evolve—not disappear—with AI.
15	Nursing leadership plays a critical role in managing AI.
16	Nurses should participate in AI-related policymaking.
17	Patients' opinions about AI use should be respected.
18	I feel responsible for understanding AI's impact on nursing.
19	AI can strengthen evidence-based nursing practice.
20	I am optimistic about AI's future in healthcare.

المعرفة والمواقف تجاه الذكاء الاصطناعي لدى مديري التمريض

اعداد: محمد احمد سعيد صوافطة

إشراف: د. كفاح زبن

الملخص

تُعد تقنيات الذكاء الاصطناعي من أبرز المحركات المعاصرة لتحول نظم الرعاية الصحية حول العالم، حيث توفر إمكانيات واسعة لتعزيز اتخاذ القرار السريري، ورفع الكفاءة التشغيلية، وتحسين نتائج المرضى. غير أن نجاح دمج الذكاء الاصطناعي في المؤسسات الصحية يعتمد إلى حد كبير على جاهزية وتصورات القيادات التمريضية، وعلى رأسهم مدراء التمريض.

يهدف هذا البحث إلى تقييم مستوى المعرفة، والإدراك للفوائد والتحديات، والاتجاهات العامة لدى مدراء التمريض نحو الذكاء الاصطناعي في عدد من المستشفيات الفلسطينية.

تم استخدام تصميم وصفي مقطعي، من خلال استبانة منظمة تم توزيعها على 264 مديراً ومشرفاً تمريضياً. تضمنت أداة الدراسة أربعة محاور رئيسية: المعرفة المتعلقة بالذكاء الاصطناعي، والفوائد المتصورة، والتحديات المتوقعة، والاتجاهات العامة نحو استخدام الذكاء الاصطناعي في الممارسة التمريضية.

أُجريت التحليلات الإحصائية الوصفية والاستنتاجية لدراسة العلاقات بين المتغيرات الديموغرافية وتصورات المشاركين. أظهرت النتائج وجود مستوى متوسط من المعرفة، واتجاهاً إيجابياً عاماً نحو الذكاء الاصطناعي، مع بروز بعض المخاوف المرتبطة بخصوصية البيانات، وإزاحة الوظائف، والبنية التحتية التقنية. كما بين تحليل الانحدار أن الفوائد والتحديات المتصورة تُعد من أهم العوامل المتنبئة بالاتجاهات نحو تبني الذكاء الاصطناعي.

توصي الدراسة بأهمية تنفيذ برامج تدريبية موجهة، وتعزيز الجاهزية المؤسسية لدعم دمج الذكاء الاصطناعي بفعالية في إدارة التمريض. وتقدم النتائج رؤى عملية لصناع السياسات ومدراء المستشفيات الساعين إلى التحول الرقمي في القطاع الصحي الفلسطيني.

الكلمات المفتاحية :الذكاء الاصطناعي، مدراء التمريض، الاتجاهات، المعرفة، التكنولوجيا الصحية، فلسطين، القيادة الصحية