Effect of Instructional Guidelines Implementation on Nurses' Managerial Knowledge, Attitude, and Flourishing at Work regarding Artificial Intelligence

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Abstract

Background: As artificial intelligence (AI) develops, head nurses ought to incorporate technology into their roles to enhance nursing management skills and practices, while also transforming the work of nurses to achieve success and flourish. **The current study** aimed to evaluate the effect of instructional guidelines implementation on nurses' managerial knowledge, attitude, and flourishing at work regarding artificial intelligence. **Design**: A quasi-experimental design was used to achieve the aim of this study. **Setting:** This study was conducted in surgical departments at Sohag University Hospitals. **Sample**: A convenience sample included (50) head nurses were selected from the previously mentioned settings. **Tools:** Three tools were used to collect the data: (I): A self-administered Artificial Intelligence Knowledge Questionnaire, (II): A General Attitudes towards Artificial Intelligence Questionnaire, and the Flourishing at Work Scale. **Results**: The total level of knowledge was satisfactory among 16% of studied head nurses during the instructional guidelines implementation, while it increased to be 92% post instructional guidelines implementation. Additionally, the total positive head nurses' attitudes mean score improved from 42.33 ±20.09 pre-instructional guidelines to 82.05±16.44 post-instructional guidelines with statistically significant differences. Moreover, highly statistically significant differences between total knowledge, attitude level, and flourishing at work regarding artificial intelligence post- implementation (P<0.001). **Conclusion:** This study concluded that the instructional guidelines had a positive effect on improving the studied head nurses' knowledge, attitudes and flourishing at work regarding artificial intelligence. **Recommendation:** Encourage head nurses to increase their knowledge, attitudes , and flourishing at work through attendance workshops and training programs regarding artificial intelligence, which are required to enable them to integrate artificial intelligence applications into nursing practices.

Keywords: Artificial Intelligence, Attitude, Flourishing at work, instructional guidelines, Nurses' knowledge

Introduction:

Artificial intelligence influences the responsibilities of senior management by enhancing their creativity and strategic thought processes. AI has numerous applications in the healthcare sector, such as aiding in disease evaluation, diagnosis, and addressing various clinical challenges. It helps minimize data loss, improves effective communication skills among nurses, enhances inpatient care management, reduces the workload of nurses, and increases patient safety (**Zhou et al., 2022).**

Additionally, **Liu et al. (2022**) explained that nursing interventions can benefit from AI-driven medical information processing. Artificial Intelligence Technology (AIT) is a field of computer science that aims to mimic human brain function by automating a variety of activities, such as learning and decision-making, and by accomplishing tasks or solving issues that are also utilized in patient care. Three types of artificial intelligence (AI) are used in hospitals: machine learning, which is a statistical technique set for problem-solving; deep learning, which is a machine learning approach and neural network extension; and natural language processing, which is the most recent and relates to the fusion of linguistics and artificial intelligence and includes intelligent analysis of written language ((**Altas, 2020**).

Artificial Intelligence (AI) has a wide range of applications in the healthcare sector, such as aiding in disease evaluation and diagnosis, addressing various clinical challenges, minimizing data gaps, enhancing nursing communication abilities, enhancing inpatient care coordination, reducing nursing workload, improving patient safety, and raising the standard of handoffs via electronic handover systems (**Zhou et al., 2022**). Additionally, AI can be used in education for functions like analysis, prediction, support, evaluation, and customized learning, as highlighted

by **Tang et al. (2021)**. Additionally, **Liu et al. (2022**) suggested that nursing management may benefit from AI-enabled medical data processing

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In practice, head nurses working in hospitals are expected to fulfill not only their clinical responsibilities but also the administrative tasks assigned to them as part of their managerial duties. They must possess the necessary skills to navigate this path effectively in order to carry out their roles successfully. Since an individual's performance is assessed based on specific behaviors or behavioral indicators, managerial skills are defined as attributes linked to enhanced job performance. Scholars have categorized managerial competencies into several groups, including influence, creativity, motivation, teamwork, achievement orientation, quality focus, customer focus, innovation, problem-solving and decision-making, as well as financial management. These categories encompass communication, leadership, staff management, analysis, and judgment (**Fanelli et al., 2020).**

The managerial abilities of the head nurse pertain to her proficiency in ensuring a high level of efficiency in the performance of her employees' daily tasks. These abilities can greatly decrease organizational expenses while simultaneously delivering higher-quality services. Conversely, the absence of competencies and skills among managers in hospitals has led to ineffective resource allocation and subpar quality and outcomes of healthcare services. The roles, competencies, and skills of the hospital manager directly influence the efficient management of the hospital, which in turn aids in sustaining services (**Azzi et al., 2020).**

Nursing management practice is of utmost importance. Therefore, nursing administrators should consider the implementation of AI technologies to improve healthcare quality and to save time by taking over this aspect of their responsibilities, executing it more swiftly, effectively, and at a lower cost. AI influences top management roles by enhancing their creative capabilities and strategic thinking (**Ronquillo et al., 2021).**

Consequently, for head nurses to achieve success and thrive, they must possess managerial skills and integrate AI into their work. With a long-standing history in digital technologies and a current application in framing the AI discourse, flourishing is an ethical concept related to virtue ethics (**Stahl et al., 2021).** The state referred to as "flourishing" is characterized by a sense of well-being (hedonic well-being) and effective performance (eudemonic well-being) identified eight characteristics of flourishing: purpose and meaning, healthy relationships, social contribution, engagement, self-respect, competence, social connections, and optimism.

Nursing staff usually display higher productivity levels when they are experiencing flourishing, which denotes a favorable mental condition. Recent research primarily connects flourishing to purposeful employment, suggesting that such settings may be ideal for nurturing and utilizing human abilities and attributes while fostering values like honor, pride, dignity, and self-respect. People typically feel more satisfied with life and show enhanced job performance when they feel they have attained their career values and acknowledge their advancements toward their goals **(Ahlstedt, et al., 2020).**

Moreover, **Bono et al. (2021**) discovered that individuals who excel in their professional lives due to their personalities maintain a positive perspective regarding themselves, others, and job-related situations. Furthermore, they tend to approach their work proactively and with a forward-thinking attitude, particularly in complex or unfamiliar scenarios. Consequently, this experience may enhance their motivation to exert greater effort in their roles and foster feelings of professional fulfillment. Another perspective suggests that meaningful work plays a significant role in fostering professional fulfillment and enhancing human flourishing (**Seibert et al., 2021)**.

Significance of the study:

To realize Egypt's Vision 2030, the nation has started implementing artificial intelligence and technology across several industries. Egypt has also become a safer place to live and conduct business. Through programs meant to promote research and development domestically, the government is becoming more involved in artificial intelligence development. The government of Egypt has established a general target that by 2030, 7.7% of Egypt's GDP will come from robotics and artificial intelligence **(Egypt's Artificial Intelligence Future, 2020).** This goal pertains to an Egyptian society that is powered by these technologies. Furthermore, artificial intelligence technologies have the potential to improve nursing performance and enable nurses to provide more customized, evidence-based care for

their patients by enhancing their professional skills **(Ronquillo et al., 2021).**

Artificial intelligence technologies have the potential to enhance nursing practice, allowing surgical nurses to deliver more personalized, evidence-based care to patients by improving nurses' professional individuality and their ability to solve problems. A significant digital transformation within the healthcare sector is essential to boost competitiveness in the job market. Since that time, artificial intelligence has garnered the interest of prominent healthcare executives and providers, who now face the challenge of deciding whether to fully or partially integrate it into their operations (**Elsayed & Sleem, 2021).** Factors such as cost, quality, nursing outcomes, and the ability to effectively analyze large volumes of data will propel the increased adoption and value of artificial intelligence technologies throughout the healthcare system. Nevertheless, there is a scarcity of studies investigating educational interventions for nurses concerning artificial intelligence technologies **(Shaik, 2020).**

Based on data indicating that some employees are more likely to succeed than others, it is posited that the implementation of AI can enhance the competencies of head nurses and lead to job success. Although individuals work within the same environment, they exhibit different behaviors, pursue various strategies, and interpret their experiences in unique ways due to factors such as technology, personality traits, values, and objectives. The hypothesis suggests that individuals who achieve significant goals and demonstrate positive evaluations of goal progress may exhibit varying levels of flourishing in their work. When individuals feel professionally fulfilled, they are more likely to engage in meaningful work, which is another indicator of a thriving workplace **(Stahl et al., 2021).**

With the advent of AI, nursing managers must now consider the utilization of AI technologies to improve healthcare quality and implement a training program to enhance nursing staff's understanding of AI to succeed and excel in their roles. Given that nurse managers constitute a substantial portion of healthcare managers in the many fields **(Moreno-Fergusson et al., 2021).**

Moreover, the efficiency of head nurses is essential for the seamless functioning of hospitals. Identifying and ranking the managerial skills required by these supervisors is essential, along with assessing their performance. Skilled first-line nurse managers can surely influence an organization's success greatly. The researchers state that there has been no effort to explore how nurses at El-Mansoura International Hospital view and react to artificial intelligence technology. Consequently, the ongoing research conducted to evaluate the effect of instructional guidelines implementation on nurses' managerial knowledge, attitude, and flourishing at work regarding artificial intelligence.

Hypotheses:

H1: Nurses' managerial Knowledge scores regarding artificial intelligence will be improved after instructional guidelines implementation than pre-implementation

H2: Nurses' managerial Attitude scores regarding artificial intelligence will be improved after instructional guidelines implementation than pre-implementation

H3: Nurses' managerial flourishing at work scores regarding artificial intelligence will be improved after instructional guidelines implementation than pre-implementation

Aim of the study:

This study aimed to evaluate the effect of instructional guidelines implementation on nurses' managerial knowledge, attitude, and flourishing at work regarding artificial intelligence.

Subjects and Methods

Research design:

A quasi-experimental design was used to achieve the aim of this study (a pre-and post- implementation study) to determine the effect of the instructional guidelines.

Setting:

This study was conducted in surgical departments at Sohag University Hospitals

Subjects:

A convenience sample included (50) head nurses were selected from the previously mentioned settings.

Tools of data collection:

Three tools were used to collect the data:

Tool (I): A self-administered Artificial Intelligence Knowledge Questionnaire is designed to assess AI knowledge among nurses. This questionnaire was developed by researchers to evaluate the understanding of artificial intelligence within the nursing profession. It consists of two sections:

Part I: This section gathers demographic information about the nurses, including their age, gender, educational background, years of professional experience, previous training in artificial intelligence, and the sources from which they obtained information about artificial intelligence.

Part II: To assess the levels of artificial intelligence knowledge among nurses before and after training sessions, the research team incorporated AI information derived from a review of relevant literature, guided by the works **of Lennartz et al. (2021) and Shimon et al. (2021).** The questions were categorized into twelve groups: the definition of artificial intelligence in nursing (2 marks), its functionality (2 marks), importance (2 marks), advantages (6 marks), disadvantages (6 marks), types of artificial intelligence (4 marks), fundamental components of AI (5 marks), challenges (5 marks), ethical principles (6 marks), applications (including examples of AI that can support medical and surgical nurses, as well as instances of AI in nursing) (10 marks). Additionally, this section addresses issues related to artificial intelligence in nursing (10 marks) and ethical principles (5 marks).

Scoring system:
Each true or false answer is awarded "two marks" for being fully accurate, "one mark" for being partially correct, and "zero" for being ambiguous. A score of 60% or above signifies that the nurse possesses satisfactory knowledge of artificial intelligence, while a score below 60% indicates insufficient understanding of the subject.

Tool (II): The General Attitudes Towards Artificial Intelligence questionnaire utilizes a five-point Likert scale, where 1 indicates strong disagreement, 2 indicates disagreement, 3 indicates neutrality, 4 indicates agreement, and 5 representing strongly agree, it was developed from **Schepman and Rodway (2020)**. It consists of 24 statements.

Scoring System:

The attitudes of nurses are classified as negative if they score ≤60 and positive if they score ≥61, based on a threshold of 60%.

Tool (III): Flourishing at Work Scale:

The Flourishing at Work scale, developed by **Diener et al. (2010),** consists of eight items designed to evaluate the work flourishing of head nurses. Each item is rated on a 7-point Likert scale, where 1 indicates "strongly disagree" and 7 indicates "strongly agree." To determine the mean score, the individual item scores are summed and divided by the total number of items. High flourishing at work is indicated by scores ranging from 31 to 56 on this scale, while low flourishing is indicated by scores from 1 to 31, based on the established cutoff point.

Administrative and Ethical Considerations:

This study received approval from the Human Research Ethics Committee of the Faculty of Nursing at Sohag University. An official request for permission to conduct the study was sent to the director of Sohag University Hospital by the dean of the nursing faculty. Written consent was obtained from head nurses who agreed to participate in the study, confirming that their involvement was voluntary. It was clearly communicated to the head nurses that they could withdraw from the study at any time without needing to provide a reason. Confidentiality was ensured through the implementation of anonymity protection.

Tools Validity and Reliability:

The researchers translated each tool from Arabic to English and then back to Arabic. A panel of five experts—two from the field of artificial intelligence and three from the nursing administration department at the faculty of nursing—assessed the face and content validity of the tools. The experts provided revisions based on criteria such as substance, clarity, simplicity, relevance, completeness, and applicability. No changes were made in response to their feedback, as the experts considered the instruments to be valid. The reliability of the tools was confirmed by a strong Cronbach's alpha value (internal consistency) of 0.923 for the nurses' knowledge , 0.884 for their attitudes, and the Flourishing at Work Scale scored 0.92.

Pilot study:
Five nurses, representing 10% of the study sample,

took part in the research. The objective was to assess the feasibility and clarity of the study's instruments. Analyses were conducted on the data from the pilot trial. The head nurses who participated in the pilot study were included in the main study sample.

Field work

From October 2023 to March 2024, a total of six months was required for the data collection process. The implementation of the artificial intelligence instructional guidelines intervention followed these phases:

I. Assessment phase:

After obtaining approval to proceed with the investigation, the researchers visited the study locations. They initiated the process of gathering the sample of nurses. The researchers approached the head nurses individually, inviting them to participate and outlining the study's goals and methods. Each study tool was read and explained to the nurses, with the researchers noting the reactions of each head nurse. Completing the questionnaire took the researchers approximately 30 to 35 minutes after they began filling it out. They conducted one-on-one interviews with each head nurse using the research questionnaire to gather baseline information on demographics, knowledge, attitude, and workplace flourishing. The primary aim of the data assessment was to establish a foundation for the intervention sessions. The confidentiality of the collected information was reiterated to the head nurses, ensuring it would only be used for research purposes.

II. Planning phase:

The researchers gained a comprehensive understanding of all aspects of artificial intelligence by reviewing relevant literature. Based on the results from the evaluation phase and the characteristics of the study sample, they developed the content for the intervention sessions. Additionally, the investigators created a booklet containing illustrations and verified content, which was provided to the nurses in the surgical department as a self-learning resource. Collaborating with the hospital principals, the researchers identified the lecture room as an appropriate venue for the educational intervention. The lecture room serves as a training and workshop space for nurses. The data display for any lectures is located in this room. A pamphlet was created and given to head nurses by the end of each session of the instructional guidelines.

The following procedures are how the researchers created the artificial intelligence instructional guidelines intervention for the studied head nurses:

- **Instructional guidelines objectives**

II. General objective: The primary aim of the instructional guidelines intervention was to enhance the knowledge levels of head nurses and to foster their positive attitudes and well-being at work regarding the applications of artificial intelligence.

Specific objectives: Following the current instructional guidelines intervention, head nurses should be capable of:

Defining artificial intelligence and its characteristics within the nursing domain.

Explaining the significance of artificial intelligence.

Discussing the operational mechanisms of artificial intelligence.

Listing the benefits of artificial intelligence and its strategic implementation.

Identifying the obstacles to the adoption of artificial intelligence.

Enumerating the drawbacks associated with artificial intelligence.

Discussing the four categories of artificial intelligence.

Explaining the fundamental components of artificial intelligence.

Discussing the various applications of artificial intelligence.

Listing the most critical challenges posed by artificial intelligence and their corresponding solutions in the healthcare sector.

Explaining the principles that govern artificial intelligence.

Demonstrating the challenges and solutions related to artificial intelligence in the nursing profession.

Discussing methods to enhance positive attitudes towards artificial intelligence.

II. Implementation phase:

The intervention was executed with each selected head nurse. A question-and-answer strategy was employed to effectively communicate the concepts. The researchers applied the teaching principles within the specified contexts. There were five groups of head

nurses, each consisting of ten individuals. The objectives and titles of each session were dictated by the content itself, which varied according to the head nurses' comprehension and retention of the information, the time available, and the content of the session. Identical materials were provided to all head nurses, and during the sessions, various methods such as role models, lectures, small-group discussions, and a brochure booklet were utilized**.**

In the present study, all computer users viewed four films on a laptop, which were supplemented by a PowerPoint presentation detailing the intervention. Following this, a group discussion took place concerning the content of the videos. Moreover, researchers provided assistance to head nurses in understanding feedback. Additionally, booklets featuring attractive images and clear, comprehensible text were distributed on CDs to support individuals after the intervention. Each session commences with a recap of the previous session's content and a clarification of the current session's objectives, articulated in simple language to align with the head nurses' level of understanding. To encourage active participation and enhance learning, reinforcement techniques such as praise were utilized throughout the sessions.

The sessions were structured as follows:

The initial session featured an overview of the instructional guidelines intervention presented by the researchers, which included the objectives, number of sessions, duration of each session, location of meetings, and timetable. Subsequently, a pre-test was conducted using data-collection tools.
In the second session, the researchers provided the nurses with an overview of artificial intelligence, encompassing its definition and importance. Artificial intelligence serves as the basis for developing and employing algorithms that are integrated into dynamic computing environments to replicate human intelligence processes. Simply put, artificial intelligence represents the effort to emulate human thought and behavior within computers. The researchers also discussed the essential characteristics of artificial intelligence and the various fields in which it can be applied within healthcare settings, as illustrated in the figure.

Third session: This session commenced with a summary of the previous discussion and transitioned into an exploration of the application of artificial intelligence in nursing care, along with its operational mechanisms. Within the healthcare sector, artificial intelligence is being leveraged to analyze complex medical and healthcare data, enabling the derivation of conclusions based solely on the input data. Applications of artificial intelligence include medication discovery, treatment protocols, diagnostics, personalized medicine, and patient monitoring and care. This technology can process vast amounts of data, such as claims data, population data, clinical trial data, and health records and images, to identify patterns and insights that would be impossible for people to find on their own **(Luca et al.,2023).**

By executing tasks that would typically be performed by humans in a significantly shorter time frame and at a reduced cost, artificial intelligence simplifies life for patients, nurses, doctors, and hospital administrators. It can enable remote monitoring, enhance patient autonomy through self-management, and improve the speed and precision of diagnoses. Furthermore, it offers practitioners quicker and more straightforward access to supplementary information. The field of medicine and the delivery of healthcare could be profoundly transformed by artificial intelligence **(Florida et al., 2023).**

The fourth session involved group discussions about the advantages of artificial intelligence, such as its capacity to minimize human errors, assume risks on behalf of individuals, be accessible 24/7, assist with repetitive tasks, provide digital support, make faster decisions, and be applied in everyday scenarios and innovative concepts. Additionally, strategies related to artificial intelligence were also discussed.

Fifth session: Following a review of the previous session, we addressed the challenges associated with artificial intelligence, including apprehension, cultural obstacles, a shortage of skilled personnel, and the absence of a strategic framework for its implementation. We also explored potential solutions, such as computing power, trust deficits, human-level expertise, data privacy and security concerns, bias challenges, and data scarcity.

The sixth session commenced with a summary of the earlier discussions, followed by the showing of videos that highlighted various types of artificial intelligence. The researchers then elaborated on the components of artificial intelligence. Key elements include expert systems, robotics, computer vision, natural language processing, and machine learning. These components enable machines to learn from, understand, and

interact with their environment in previously unattainable ways.

The seventh session started with a review of the earlier sessions.

Eighth session: This session focused on group discussions regarding the challenges and opportunities that artificial intelligence presents for the nursing profession. Additionally, there was a discussion on how to improve the positive perception of artificial intelligence.

The ninth session addressed group conversations about the potential of artificial intelligence to enhance practice and patient outcomes. Each discussion was allocated approximately fifteen minutes.

Tenth session: During this session, the researchers outlined the advantages of the instructional guidelines intervention and provided a summary of the discussions from all previous sessions with the nurses. It also included channels of communication between the researchers and the nurses to address their questions and express appreciation for their involvement.

VI. Evaluation phase

To assess the impact of the implementation of instructional guidelines on nurses' managerial knowledge, attitudes, and overall well-being in relation to artificial intelligence, the same pre-test tools were utilized and redistributed one month after the implementation of the instructional guidelines to compare the effects with the initial pre-test.

Statistical Analysis:

Version 20.0 of SPSS for Windows (SPSS, Chicago, IL) was utilized for all statistical analyses. The mean ± standard deviation (±SD) was employed to represent continuously distributed, normally distributed data. Both percentages and numerical values were utilized to convey categorical data. Variables containing categorical data were compared using the chi-square test. The internal consistency test, also known as the reliability test, for the study's questionnaires was calculated. The threshold for statistical significance was set at $p < 0.05$.

Results:

Table (1) indicates that 82% of the head nurses examined were female, with 42% of them being aged between 30 and 40 years, and an average age of 35.7±7.4. Moreover, 44% possessed 10–20 years of experience, and 42% held a Nursing institute degree in nursing education.

Figure (1): Demonstrates that 92% of the head nurses examined lacked prior training in artificial intelligence.

Figure (2) shows that the main sources of information regarding artificial intelligence for the head nurses examined were the internet (70%), then television (20%), and physicians (10%).

Table 2 illustrates the knowledge of artificial intelligence among the head nurses examined, comparing the periods before and after the implementation of instructional guidelines. It clarifies that notable variations existed in the mean difference scores of head nurses prior to and following the implementation of instructional guidelines (32.67*). This suggests that the head nurses' knowledge level increased following the instructional guidelines intervention across all areas. This showed that the post-implementation stage had the highest average scores in comparison to the pre-implementation stage (35.22 ±.87 and 9.66±10.23).

Figure (3) demonstrates that 10% of the head nurses showed a satisfactory total level of knowledge during the instructional guidelines phase, whereas this increased to 90% after the instructional guidelines were implemented.

Table (3) shows a highly significant difference ($p= <0.001$) and an enhancement in the mean attitude scores of surgical nurses regarding artificial intelligence before and after one month of implementing the instructional guidelines. Moreover, the mean score for positive nurses' attitudes increased from 43.45±25.06 before the instructional guidelines to 82.09±15.34 after the guidelines, showing statistically significant differences.

Figure (3) shows that the overall attitude was favorable in 20% of the head nurses examined during the pre-instructional guidelines phase, while it rose to 88% after the instructional guidelines were implemented.

Table 4 emphasizes the head nurses' successful work resulting from pre-implementation and post-implementation. According to this table, the post-implementation had a higher mean score for work flourishing than the pre implementation (30.77± 2.69 and 45.22± 2.66, respectively). With a significant difference between them pre and post implementation (p =.001).

Table (1): Demographic data of the studied head nurses (n=50)

Item s	N	%
Age (years)		
< 30	12	24.0
30 – 40	21	42.0
> 40	17	34.0
Mean ±SD	35.7±7.4	
Gender		
Male	9	18.0
Female	41	82.0
Educational qualifications		
Secondary nursing	13	26.0
Nursing institute	21	42.0
B.Sc.N,	16	32.0
Experience (Years)		
Less than 10	13	26.0
10 – 20	22	44.0
More than 20	15	30.0

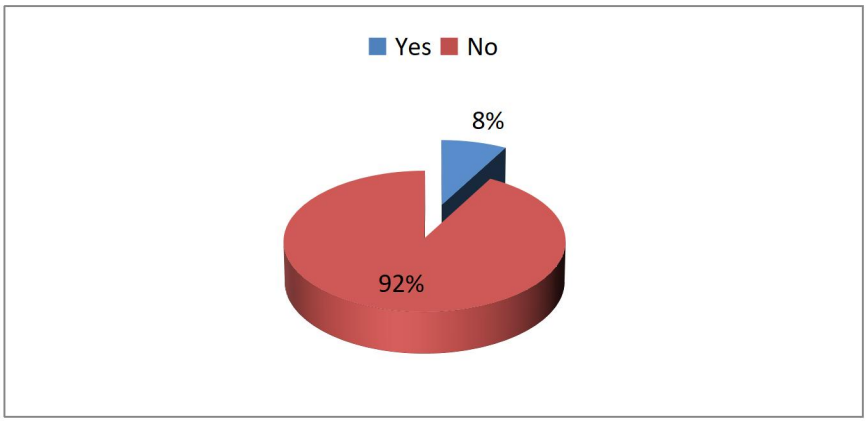

Figure (1): Previously training regarding artificial intelligence of the studied head nurses (n=50).

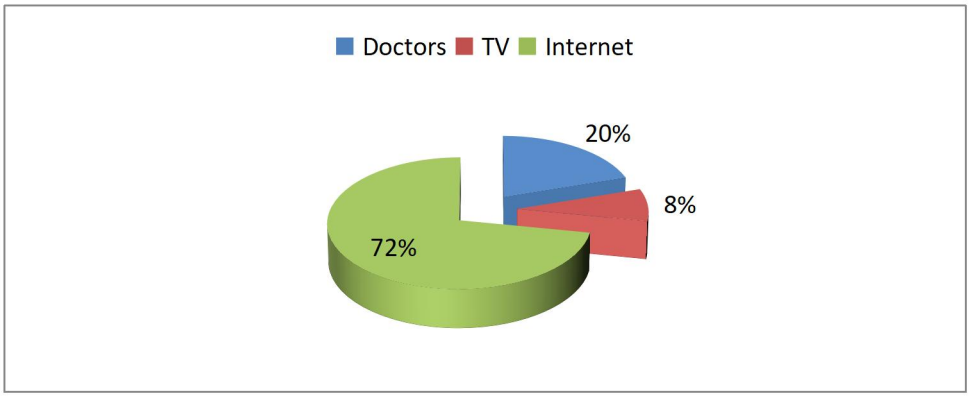

Figure (1): Sources of information regarding artificial intelligence of the studied head nurses (n=50).

Table (2): Differences in of the studied head nurses' knowledge mean scores related to artificial intelligence pre and post-one month of instructional guidelines implementation (n=50).

Items	Pre-test	Post-test	X2	P-value
Head nurses' knowledge mean scores	9.66±10.23	35.22 ±.87	32.67	<0.001

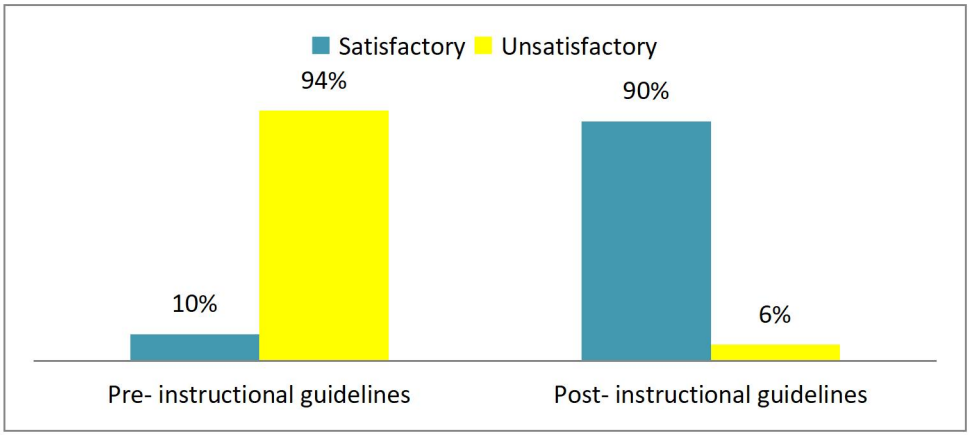

Figure (3) Head Nurses' Knowledge Total level regarding to artificial intelligence pre and post-one month of instructional guidelines implementation (n=50).

Table (3): Differences in the studied head nurses' attitudes mean scores regarding to artificial intelligence pre and post-one month of instructional guidelines implementation (n=50).

Items	Pre-test	Post-test	X2	P-value
The studied head nurses' attitudes mean scores	43.45±25.06	82.09±15.34	35.22	<0.001

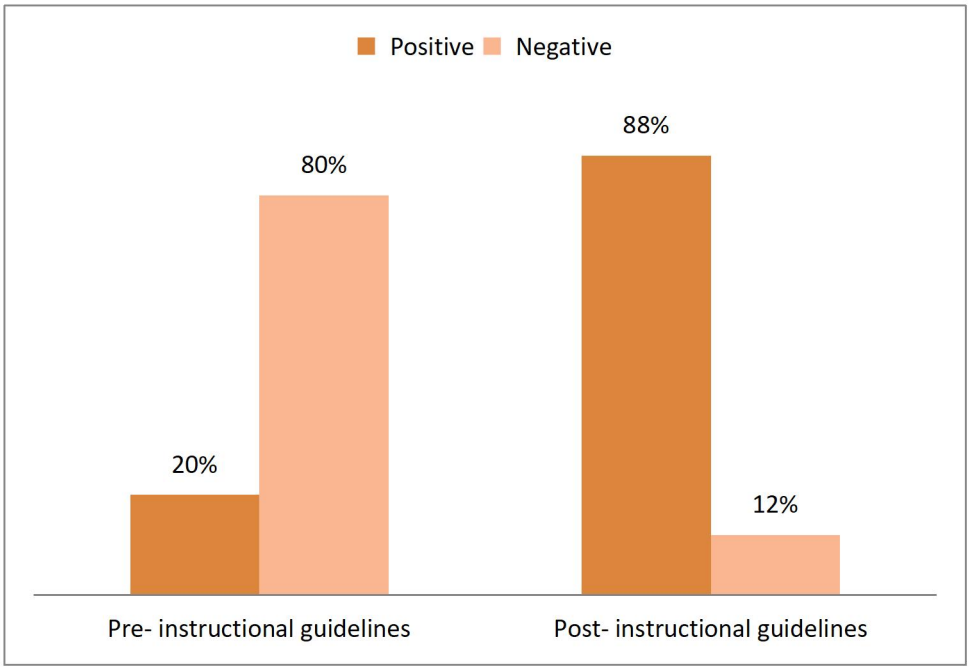

Figure (3) Head Nurses' attitude Total level regarding to artificial intelligence pre and post-one month of instructional guidelines implementation (n=50).

Table 4: The head nurses' work flourishing pre and post-one month of instructional guidelines implementation (n=50).

Program phases	Pre	Post	F	Sig.
	Mean ±SD	Mean± SD		
Work flourishing	30.77± 2.69	45.22± 2.66	74.98	.001

Discussion:

In order to incorporate AI expertise into clinical practice, it is essential for nurses to have the requisite skills and knowledge. AI has the potential to assist healthcare organizations in proactively treating patients, reducing future risks, and optimizing business operations. The integration of AI within healthcare institutions is imperative due to the swift advancements in technology, legal frameworks, and patient expectations. These challenges have rendered healthcare organizations crucial to the performance and evolution of the system, as they contribute to cost savings while upholding a high standard of care (**Ahlstedt et al., 2020).** Consequently, the objective of the study was to assess the impact of implementing instructional guidelines on nurses' managerial knowledge, attitudes, and overall well-being in relation to artificial intelligence. So, the study aimed to evaluate the effect of instructional guidelines implementation on nurses' managerial knowledge, attitude, and flourishing at work regarding artificial intelligence

The current study indicates that a significant proportion of head nurses were female, with approximately half falling within the 30 to 40-year age bracket. Furthermore, most of these head nurses possessed between 10 and 20 years of experience, held a bachelor's degree in nursing, and were married at slightly higher rates. This trend may be attributed to the fact that nurses place a high value on engagement. Historically, nursing careers were predominantly pursued by women. These findings align with an Egyptian study conducted by **Mohamed et al. (2023**), which revealed that all head nurses were women, and 51.1% fell within the 40 to under 50 age bracket. The majority possessed a bachelor's degree in nursing, and most of them had at least 15 years of experience.

The findings of the current study reveal that most head nurses had no prior exposure to artificial intelligence. The researchers noted that this confirmed the necessity for the maternity nurses involved in the study to adhere to the latest training guidelines concerning artificial intelligence. This observation may be further elucidated by the majority of nurses indicating that the nursing curriculum did not encompass the fundamentals of artificial intelligence and that they had not participated in any previous training courses on the subject. The head nurses involved in the study lacked foundational knowledge of artificial intelligence, as very few reported having acquired such knowledge through postgraduate education. Additionally, the absence of this training session can be attributed to the neglect of responsible media, which served as the primary source of information regarding artificial intelligence for head nurses in the current study. This may stem from the internet being an invaluable resource for knowledge and data. Due to its scope, availability, relevance, diverse perspectives, and social engagement, it serves as an essential tool for anyone interested in gaining more insight into the world around them. These findings align with those **of Robinson (2020**), who reported that the Internet represented 893.2% of the sources in Nigeria.

The implementation of artificial intelligence in healthcare is revolutionizing patient treatment and the responsibilities of nurses. It enhances the integration of information, task completion, therapeutic issue resolution, decision-making, and patient results. These technologies by themselves can enhance healthcare. Understanding technology will transform nurses' professional identities and create opportunities for future improvements in healthcare, efficiency, capability, and quality **(Ronquillo, 2021).** The insufficient study on measurable opinions and perspectives among healthcare professionals highlights the necessity of understanding these factors. Views on technology can hinder the success of its adoption.

This outcome contradicts the findings of **Abd El-Monem et al., (2023**), who showed that over two-fifths of nursing staff were aged from 25 to under 30 years old. In addition to their years of experience, just under two-fifths of staff nurses had between 5 and less than 10 years of experience.

The present study indicates that most of the head nurses had not encountered artificial intelligence previously. The researchers

confirmed that the maternity nurses involved in the study required adherence to the latest artificial intelligence training directives. The majority of head nurses indicating that the nursing curriculum lacked coverage of artificial intelligence principles and that they had never participated in any artificial intelligence training courses could clarify this finding. The nurses involved in the research had no previous understanding of artificial intelligence since hardly any of them reported having studied it in postgraduate programs.

In this study, the main sources of information for head nurses' understanding of AI were media. This could be because the Internet is an essential tool for information and education. Its enormity, availability, relevance, variety of viewpoints, and capacity to engage with others render it an essential resource for anyone looking to broaden their knowledge and comprehension of the surrounding world. These findings differ from those of **Abuzaid et al. (2022**) in Sharjah, USA, where 51% of participants indicated that their understanding of AI was acquired through self-education, while 20% learned it through different courses. Just 8% reported that they gained knowledge via postgraduate courses.

The study's results indicated enhancements and statistically significant differences in all artificial intelligence-related knowledge aspects between the pre-and post-one-month implementation of instructional guidelines. From the viewpoint of the researchers, it confirmed the positive effect of applying instructional guidelines that met the examined maternity nurses' need to enhance their understanding of artificial intelligence.

This outcome is consistent with the research of **Abuzaid et al. (2022**), who investigated the insufficient comprehension and awareness of AI concepts and technical capabilities within the nursing field, concluding that universities and healthcare organizations need to create and execute suitable AI educational and training initiatives for nursing personnel to enhance their skills in ensuring the safe incorporation and utilization of AI in nursing practice.

The findings of the present study indicated that a majority of the head nurses evaluated had inadequate total knowledge scores about artificial intelligence during the pre-test, whereas most achieved total satisfactory knowledge scores following the implementation of instructional guidelines. This outcome was supported by these findings, **Lai, et al. (2020),** who validated a widespread lack of understanding among AI participants in a study titled "A Qualitative Survey Study of French Actors' Perceptions of AI in Healthcare." Conversely. This outcome differed from the findings of **Mohamed et al. (2023),** who showed that merely a small fraction of head nurses possessed sufficient knowledge of artificial intelligence prior to the implementation of instructional guidelines in their research.

The current study validated the initial research hypothesis, which proposed that the instructional guidelines for applied artificial intelligence influence head nurses' understanding of artificial intelligence technologies. The findings of the current study indicated that, before the intervention, a minority of nurses possessed inadequate knowledge about AI. Nonetheless, following the educational intervention, significant statistical differences were observed in the scores across all domains regarding nurses' knowledge of artificial intelligence between prior to and right after intervention and follow-up. This suggests that the general knowledge level of nurses enhanced right after **Swan (2021**) examined nursing personnel's knowledge and perceptions of artificial intelligence in healthcare environments in the United States and found that most nurses were unfamiliar with or did not comprehend AI in clinical settings. These results oppose those of **Sheela (2022**), who discovered that over fifty percent of the participants possessed sufficient knowledge of AI.

Additionally, these findings aligned with those of **Abuzaid et al. (2022**) in Sharjah, USA, who discovered a deficiency in knowledge regarding AI. Seventy-five percent of all participants believed that the nursing curriculum ought to encompass fundamental understanding of AI. These outcomes corresponded with the results of a recent study conducted by **Mohamed et al. (2023**), which indicated significant differences in the mean difference scores of head nurses before and

after intervention and between pre-intervention and follow-up.

Following the instructional guidelines, the findings of the present study verified the second research hypothesis, indicating that implemented artificial intelligence instructional guidelines influence head nurses' positive attitude levels regarding artificial intelligence.

The pre-test findings indicated that the high mean score among head nurses' attitudes towards utilizing artificial intelligence was due to the excitement surrounding AI. These findings could indicate that artificial intelligence has the potential to accelerate the healthcare process and minimize medical errors, as AI can provide vast quantities of clinically pertinent, high-quality data in real-time. Additionally, artificial intelligence enables patients to receive immediate answers regardless of time or location, assists in completing monotonous administrative tasks that can be time-consuming, and aids in minimizing human error. Moreover, AI operates continuously without physical fatigue; can foresee surgical results for patients, and assists in public health and epidemiological research. Additionally, AI can boost patient involvement and adherence to treatment; it employs predictive modeling to manage patient traffic, hospital resources, and capacity, alongside AI applications that assist in forecasting, diagnosing, and addressing illnesses, ultimately enhancing care and alleviating workload.

The results of **El-Sayed and El-Salim (2021**) in Egypt corroborated these earlier findings, as their research aimed to evaluate nurses' perspectives and attitudes toward AI in healthcare and revealed that artificial intelligence was deemed exciting, receiving notably high scores for nurses' attitudes regarding its application. These findings align with those of **Dicuonzo et al. (2023**), whose comparable research focused on evaluating the evolution of healthcare through AI and its effects on the workforce and the organization, highlighting that AI could significantly change healthcare delivery.

Moreover, in the present research, the overall positive attitude score enhanced following the instructional guidelines intervention. Additionally, there were statistically notable differences across all items of the attitudes scale (P= 0.001) regarding nurses' perspectives on artificial intelligence. These outcomes may stem from the knowledge of artificial intelligence, which grew after the intervention, directly influencing their attitudes. Additionally, it has gained significant importance today because of the health sector's inclination to utilize it across its various disciplines.

The findings were akin to an Egyptian study conducted by **Mohamed et al. (2023),** which sought to assess the impact of the artificial intelligence program on head nurses' attitudes. They noted that the average scores from the pre-, post-, and follow-up phases of attitudes exhibited statistically significant differences. Additionally, this discovery was corroborated by research from **Kwak et al. (2022**), which indicated that favorable views on AI initially anticipated its use and implementation. Similarly, **Mehdipour (2019**) emphasized that nurses effectively utilizing AI can deliver improved, quicker, and safer services.

The findings of the present study indicated that a relationship existed between the overall knowledge and attitudes of **head** nurses. It explains that there exists a strong statistically significant correlation between overall knowledge and attitudes towards artificial intelligence applications. According to the researchers, this outcome could stem from the nurses being exposed to information and environmental factors that shape their thoughts and perceptions regarding AI. This outcome addresses the second question concerning the attitudes of head nurses toward artificial intelligence applications.

The findings of the present study emphasize the head nurses' successful work resulting from pre-implementation and post-implementation. According to this table, the post- implementation had a higher mean score for work flourishing than the pre implementation (30.77± 2.69 and 45.22± 2.66, respectively). With a significant difference between them pre and post implementation (p

=.001).

Johansson & **Björkman, (2018**) investigated what expectations managers in the technology field have about the impact of AI on their roles as managers in their master's thesis at Lunds University. They discovered that leaders are expected to grow by being adaptable and open to change, as well as by performing at a higher level of transformative leadership. According to the study, as AI performs technical tasks, future leaders will be more focused on motivating employees and fostering teamwork and creativity in the workplace.

According to the findings of **Oliviera- Silva & Porto (2021**), higher levels of professional competency and fulfilment are a predictor of higher levels of flourishing at work. People are happier and perform better at work when they believe they have achieved what they value in their jobs and are making positive, objective progress. One of the goals of using AI, according to **Stahl et al. (2021**), is to promote workplace flourishing. Flourishing is a virtue- ethics-based ethical principle that has a long history of application to digital technologies and has recently been used to frame the AI debate.

Conclusion:

Based on the study results, it was concluded that the instructional guidelines had a significant positive effect on improving the studied head nurses' knowledge, attitudes, and work flourishing regarding artificial intelligence application

Recommendations:

According to the results of the present study, the researchers proposed the following suggestions.

- Participating in workshops and training sessions focused on artificial intelligence applications to motivate head nurses to enhance their understanding and perceptions of artificial intelligence, allowing them to incorporate AI applications into nursing practices.

-Establish systems, protocols, rules, and strategies to raise the work flourishing of nursing managers in managing financial planning and hiring initiatives.

- Repeating the current research with a larger sample of head nurses in different contexts to broaden the applicability of the results.

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