Assessment of Nurses' Perception and Attitude toward Artificial Intelligence in Academy Hospital

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Abstract

Background: Artificial Intelligence (AI) is transforming nursing by enhancing efficiency, accuracy, and patient care. AI-powered tools assist nurses in tasks such as patient monitoring, early detection of health issues, and personalized care planning. **Aim:** This study aimed to assess nurses' perception and attitude toward artificial intelligence in academy hospital. **Design:** A descriptive study design was used to conduct the aim of this study. **Setting:** The study was conducted in intensive care units (ICUs) at Academy Hospital at Ain Shams University. **Sample:** A convenient sample of (n=100) nurses includes nurses working in intensive care units (ICUs) at Academy Hospital. **Tools:** three tools were used including the first tool: Interview questionnaire sheet, which consisted of two parts. Part I: It included on demographic characteristics for nurses about six questions .Part II: Assessment of nurses' general knowledge about artificial intelligence. The second tool: to measure and understand nurses' perception of Artificial Intelligence .The third tool: It included the attitude of Nurses toward Artificial Intelligence. **Results**: Based on the findings of the present study that 65% of the studied nurses have satisfactory knowledge about artificial intelligence, while 53% have a moderate perception, and 68% of them have a positive attitude regarding artificial intelligence. **Conclusion:** The current study concluded that more than two-thirds of the studied nurses have satisfactory knowledge about artificial intelligence, while more than two-thirds have a positive attitude regarding artificial intelligence, and more than half of them have a moderate perception. There is a highly significant positive correlation between nurses' knowledge, perception, and attitude regarding artificial intelligence. **Recommendation:** In-service training programs should be organized to foster problem-solving skills of nurses regarding artificial intelligence applications in the clinical environment.

Keywords--- Artificial Intelligence, Attitude, Nurses' Perception.

Introduction:

Artificial intelligence (AI) is created by creating computer systems that can mimic intelligent human behavior and commonly complete tasks that humans do **(Ronquillo et al., 2021).** The term artificial intelligence (AI) refers to methods for teaching machines to replicate cognitive processes like learning, reasoning, making decisions, and communicating. Artificial intelligence is defined as "software (and possibly hardware) systems created by humans that, when faced with a challenging task, act in the digital or physical realm by observing their surroundings through data collection, deciphering the organized or unstructured data, applying logic to the knowledge gained from the data, and selecting the appropriate course of action" **(von Gerich, 2022).**

The chief nurse's managerial abilities pertain to her ability to uphold a high standard of efficiency in the way her staff members carry out their daily responsibilities **(Fatima, 2022).** In addition to offering higher-quality services, these competencies have the ability to dramatically lower organizational expenses. Conversely, insufficient competences and skills among hospital managers led to ineffective resource distribution and subpar health care outcomes.

The roles, competencies, and skills of the hospital manager directly affect the hospital's effective management, which also contributes to the maintenance of services **(Abdullah 2023).**

Nursing administrators must consider the use of AI technologies to improve healthcare quality and free up time by taking on this part of their work and completing it more quickly, more effectively, and for less money because nursing management practice is crucial**.** AI affects positions in senior management by enhancing their capacity for creativity and strategic thinking **(Ronquillo et al., 2021).**

Therefore, head nurses need to apply AI in their work and possess managerial abilities to succeed. Having been utilized in digital flourishing is an ethical concept connected to virtue ethics and is currently used to frame the AI debate **(Stahl et al., 2022).**

Significance of the study

Over the past 10 years, nurses' perceptions of AI have changed, with more optimistic opinions about AI's potential for improving healthcare and increased concerns about its ethical repercussions, and a predictable gauge of nurses' opinions and perceptions toward the use of artificial intelligence in healthcare. Artificial intelligence is anticipated to support proactive patient care and reduce long-term risk for patients, nurses, and the field as a whole. As a result, research into using AI technology in healthcare settings is growing. Regarding the use of AI technology, nurses have a variety of attitudes and emotions **(Kulkarni S et al., 2020).**

AIM OF THE STUDY

The present study was conducted to fulfill the following and to assess nurses' perception and attitude toward artificial intelligence in academy hospital.

This aim achieved through:

1.Assess of nurses' general knowledge toward artificial intelligence Measure level of nurses' perception toward artificial intelligence.

2.Measure level of nurses' perception toward artificial intelligence

3.Evaluate of nurses 'attitude toward artificial intelligence.

Research Questions: The study was conducted to answer the following questions:

Q1. What is the level of nurses' perception and attitudes toward artificial intelligence in academy hospital?

Q2. Is there a significant difference in how nurses view artificial intelligence?

Research Design:-

A descriptive correlational research design was conducted to achieve the aim of this study.

Research Setting:-

This study was conducted at intensive care units (ICUs) at Academy Hospital at Ain Shams University. The hospital has six specialized intensive care units. The number of hospital nurses is 300, including 167 nurses working in intensive care in the hospital.

Study population:

A convenient sample of 100 available nurses working in intensive care units (ICUs) at Academy Hospital at Ain Shams University who have at least one year of experience.

Tools of the Study:-

Data was collected using the following three tools:

The first tool: Interview questionnaire sheet, which consisted of two parts.

- **Part I**: It included on demographic characteristics for nurses about six questions such as; (age, gender, social status, qualifications, experience years in nursing, and work settings).

- **Part II**: Assessment of nurses' general knowledge about artificial intelligence such as:

(Have you received training courses in artificial intelligence techniques in health care before, how long have you been aware of AI technologies in healthcare…etc) and consisted of 25-items Scoring was as follows; 1 = strongly disagree 5 = strongly agree".

Scoring system:

Unsatisfactory knowledge	< 60%
Satisfactory knowledge	> 60%

The second tool: It included the scale was developed by (Abdullah, 2020) consisted of 14-items to measure and understand nurses' perception of Artificial Intelligence, the scale classified under three subscales; Subscale one: nurse's view about AI. It contained 4 questions. Subscale two: Advantages of using Artificial Intelligence. It contained 5 questions. Subscale three: Problems related to application of Artificial Intelligence in health care. It includes 5 questions. Scoring of perception of Artificial Intelligence scale was as follows: 1 = strongly disagree, 5 = strongly agree.

Scoring system:

Low perception	0 - ≤ 40
Moderate perception	41 ≤ 80
High perception	≥ 81

The third tool: It included attitude of Nurses toward Artificial Intelligence developed by (**Sindermann, et al.2021**). This tool was to assess nurses' attitude regarding Artificial Intelligence, it consisted of 14 questions, and the responses were rated on a five-point Likert scale ranging from strongly disagrees to strongly agree, with scores ranging from 1 to 5, respectively. The total attitude score was calculated by adding up the scores.

Scoring system:

Negative attitude towards AI	0-60%
Positive attitude towards AI	> 60%

Validity:

The study tools were tested for validity (face and content validity). Face validity aimed to determine whether the tools measure what they were supposed to measure. Content validity was conducted to determine whether the content of the tools covered the aim of the study. It was measured by a jury of 7 experts from different academic categories: four professors, one assistant professor, and two lecturers of critical care nursing at the Faculty of Nursing at the Military Medical Academy. The experts reviewed the tools for clarity, relevance, accuracy, comprehensiveness, simplicity, and applicability, and necessary modifications were made.

Reliability:

Alpha Cronbach's was used to determine the internal reliability of the tools. Reliability of the tools was tested to determine the extent to which the tools' items are related to each other. Alpha Cronbach's reliability coefficient normally ranges between 0 and 1 with higher values (more than 0.7) denote acceptable reliability.

Pilot Study:

A pilot study was carried out on 10% of the participants (10 of nurses) to assess the clarity, applicability, and reliability of the instruments that will be used in the study, as well as to estimate the time required to answer the questions. The pilot study will also help to evaluate the suitability of the study locations. The data obtained from the pilot study will be analyzed, and no changes will be made to the instruments or study design.

Field work:

Data were collected within 3 months in the period from the beginning of April 2024 to the end of Jun 2024. At the beginning, the researcher obtained approval, and official permission will be obtained from the director of military institute of health and epidemiology, medical and nursing directors at Academy hospital to collect data. Consequently, the researcher explained the aim of the study, duration of data collection, sample size and how to collect the data from the nurses. After approval, the researcher began to use the study's tools to collect data.

The researcher visited the studied nurses two days / week at the morning shifts

(8:00 am to 12:00 md). The ratio of the nurses /day was 8-10 nurses / week.

A convenient sample of 100 ICU nurses was recreated and selected according to inclusion criteria and explaining simply the aim of the study as well as obtaining their approval to participate in the study before data collection for assessment using tools. The study's tools were completed and filled in by the researcher within an average time of (20-30) minutes for each nurse, The researcher interviewed every nurse alone to fill the tool at a time free from the nurse's time. The researcher collected data from the studied ICU nurses in the previously mentioned days at the morning shift, in which the data were collected from 100 ICU nurses each day from the ICU affiliated with the suggested hospital.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee obtained from the director of Military Institute of Health and Epidemiology, medical and nursing directors at the Academy hospital. Participation in the study was voluntary, and studied nurses were given complete information about the study and their role before oral approval. The researcher explained the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information, and that it would not be accessed by any other part without taking permission of the nurses. Ethics, values, culture, and beliefs were respected.

Results

Table (1): Illustrates that more than half, 58% of the studied nurses is between 25-<35 years with a mean age of 28.61±5.58 years. More than two-thirds, 68%, are females and married, while nearly one-third, 30%, are >5-10 years of experience. More than two-thirds, 62%, are Nursing Baccalaureate, while less than half, 42%, are working in the General ICU.

Fig (1): This figure shows that more than two thirds 65% of the studied nurses have a satisfactory knowledge about artificial intelligence while, more than one third 35% have unsatisfactory knowledge about artificial intelligence. **Fig (2):** This figure shows that more than half 53% of the studied nurses have a moderate perception regarding artificial intelligence while, less than one third 26% and 21% have high and low perception regarding artificial intelligence, respectively.

Fig (3): This figure indicates that more than two- thirds 68% of the studied nurses have a positive attitude regarding artificial intelligence while, more than one third 32% have a negative attitude regarding artificial intelligence.

Table (2): Represents that there is a highly statistically significance relation between qualification and level of knowledge of the studied nurses regarding artificial intelligence with p-value <0.001 while, there is a statistically significance relation between year of experience and level of knowledge of the studied students regarding artificial intelligence with p-value <0.05.

Table (3): Denotes that there is a highly statistically significance relation between years of experience and perception of the studied nurses regarding artificial intelligence with p-value <0.001while, there is a statistically significance relation between social status, qualification and type of department of the studied nurses regarding their perception about artificial intelligence with p-value <0.05.

Table (4): Shows that there is a highly statistically significance relation between years of experience and qualification of the studied nurses regarding their attitude about artificial intelligence with p-value <0.001.

Table (5): Indicates that there is a positive correlation between total score of knowledge, perception and total attitude of the studied nurses regarding artificial intelligence. In addition, there is a highly statistically significance relation between total score of knowledge, perception and total attitude of the studied nurses regarding artificial intelligence with p-value <0.001.

Part I: Demographic data:

Table (1): Number and percentage distribution of the studied nurses according to their demographic data (N=100).

Demographic data	No.	%
Age (years)		
<25 years	22	22.0
25-<35 years	58	58.0
≥35 years	20	20.0
Mean±SD	28.61±5.58	
Gender:		
Male	32	32.0
Female	68	68.0
Married and social status:		
Single	28	28.0
Married	68	68.0
Divorced	4	4.0
Experiences/ years		
1- 2 years	18	18.0
2-5 years	24	24.0
>5-10 years	30	30.0
>10 years	28	28.0
Mean±SD	6.85±2.17	
Qualifications		
Technical institute of nursing	34	34.0
Nursing Bachelor	62	62.0
Nursing Master	4	4.0
Department/Unit		
General ICU	42	42.0
PICU	20	20.0
Chest ICU	12	12.0
CCU	26	26.0

Fig (1): Percentage distribution of the studied nurses according to their level of total knowledge about artificial intelligence.

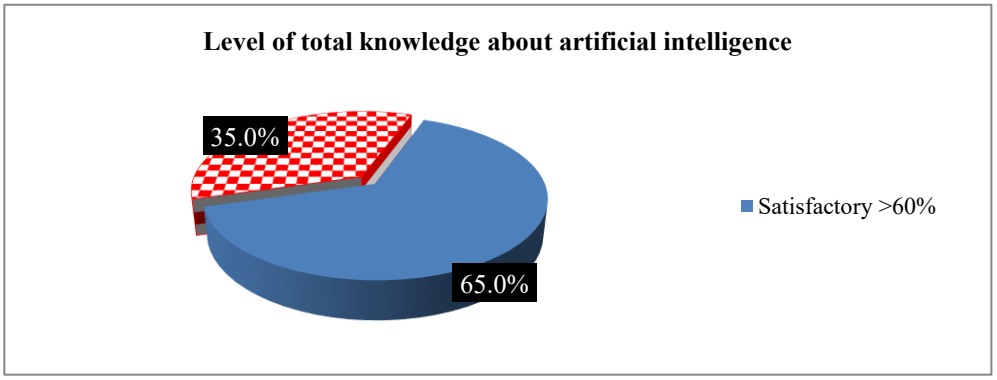

Fig (2): Percentage distribution of the studied nurses according to their level of total perception scale toward utilization of AI in health care subscales.

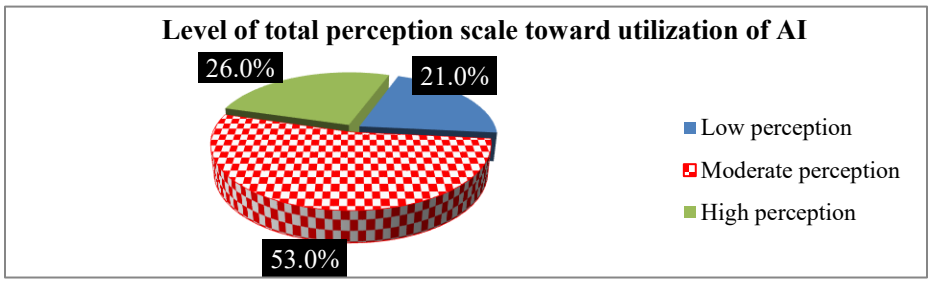

Fig (3): Percentage distribution of the studied nurses according to their level of total attitude scale of nurses toward AI.

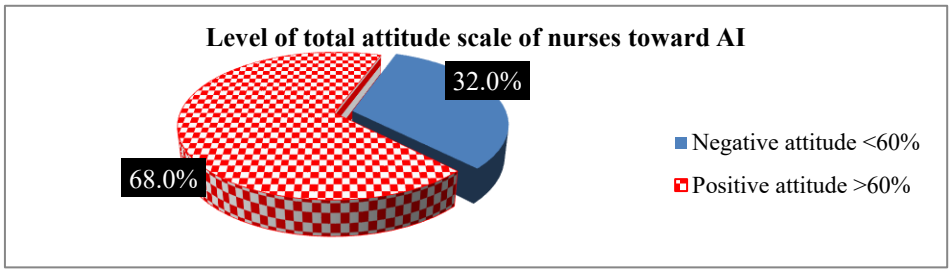

Table (2): Relation between level of studied nurses knowledge about artificial intelligence according to their socio-demographic data (N=100).

Socio-demographic data	Level of knowledge				Chi-square test	
	Satisfactory *(n=65)*		Unsatisfactory *(n=35)*			
	No.	%	No.	%	x2	p-value
Age (years)						
<25 years	14	21.5	8	22.9	4.936	0.085
25-<35 years	42	64.6	16	45.7		
≥35 years	9	13.8	11	31.4		
Gender:						
Male	22	33.8	10	28.6	0.291	0.590
Female	43	66.2	25	71.4		
Married and social status:						
Single	18	27.7	10	28.6	0.443	0.801
Married	45	69.2	23	65.7		
Divorced	2	3.1	2	5.7		
Widow	0	0.0	0	0.0		
Experiences/ years						
1- 2 years	11	16.92	7	20.00	13.839	0.003*
2-5 years	12	18.46	12	34.29		
>5-10 years	16	24.62	14	40.00		
> 10 years	26	40.00	2	5.71		
Qualifications						
Diploma in technical schools of nursing	6	9.23	0	0.00	17.506	<0.001**
Technical institute of nursing	10	15.38	18	51.43		
Nursing Bachelor	45	69.23	17	48.57		
Nursing Master	4	6.15	0	0.00		
Department/Unit						
General ICU	30	46.2	12	34.3	3.991	0.262
PICU	14	21.5	6	17.1		
Chest ICU	5	7.7	7	20.0		
CCU	16	24.6	10	28.6		

Using: Chi-square test p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (3): Relation between level of studied nurses' perception scale toward utilization of AI in health care subscales according to their socio-demographic data (N=100).

Socio-demographic data	Level of total perception						Chi-square test	
	Low perception *(n=21)*		Moderate perception *(n=53)*		High perception *(n=26)*			
	No.	%	No.	%	No.	%	x2	p-value
Age (years)								
<25 years	3	14.3	10	18.9	9	34.6	5.878	0.208
25-<35 years	15	71.4	29	54.7	14	53.8		
≥35 years	3	14.3	14	26.4	3	11.5		
Gender:								
Male	6	28.6	16	30.2	10	38.5	0.692	0.707
Female	15	71.4	37	69.8	16	61.5		
Married and social status:								
Single	5	23.8	14	26.4	9	34.6	13.695	0.008*
Married	16	76.2	39	73.6	13	50.0		
Divorced	0	0.0	0	0.0	4	15.4		
Widow	5	23.8	14	26.4	9	34.6		
Experiences/ years								
1- 2 years	2	9.52	14	26.42	2	7.69	45.291	<0.001**
2-5 years	6	28.57	16	30.19	2	7.69		
>5-10 years	10	47.62	18	33.96	2	7.69		
> 10 years	3	14.29	5	9.43	20	76.92		
Qualifications								
Diploma in technical schools of nursing	0	0.00	4	7.55	2	7.69	17.749	0.006*
Technical institute of nursing	10	47.62	12	22.64	6	23.08		
Nursing Bachelor	11	52.38	37	69.81	14	53.85		
Nursing Master	0	0.00	0	0.00	4	15.38		
Department/Unit								
General ICU	10	47.6	25	47.2	7	26.9	13.609	0.034*
PICU	3	14.3	6	11.3	11	42.3		
Chest ICU	1	4.8	7	13.2	4	15.4		
CCU	7	33.3	15	28.3	4	15.4		

Using: Chi-square test p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (4): Relation between level of studied nurses' attitude about AI according to their socio-demographic data (N=100).

Socio-demographic data	Level of attitude				Chi-square test	
	Negative attitude *(n=32)*		Positive attitude *(n=68)*			
	No.	%	No.	%	x2	p-value
Age (years)						
<25 years	6	18.8%	16	23.5%	4.444	0.108
25-<35 years	23	71.9%	35	51.5%		
≥35 years	3	9.4%	17	25.0%		
Gender:						
Male	11	34.4%	21	30.9%	0.122	0.727
Female	21	65.6%	47	69.1%		
Married and social status:						
Single	7	21.9%	21	30.9%	3.222	0.200
Married	25	78.1%	43	63.2%		
Divorced	0	0.0%	4	5.9%		
Widow	0	0.0%	0	0.0%		
Experiences/ years						
1- 2 years	10	31.25%	8	11.76%	16.506	<0.001**
2-5 years	12	37.50%	12	17.65%		
>5-10 years	8	25.00%	22	32.35%		
> 10 years	2	6.25%	26	38.24%		
Qualifications						
Diploma in technical schools of nursing	4	12.50%	2	2.94%	68.443	<0.001**
Technical institute of nursing	25	78.13%	3	4.41%		
Nursing Bachelor	3	9.38%	59	86.76%		
Nursing Master	0	0.00%	4	5.88%		
Department/Unit						
General ICU	15	46.9%	27	39.7%	0.591	0.898
PICU	6	18.8%	14	20.6%		
Chest ICU	3	9.4%	9	13.2%		
CCU	8	25.0%	18	26.5%		

*Using: Chi-square test p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS*

Table (5): Correlation between total score of knowledge, perception and total attitude regarding about artificial intelligence (N=100).

		Total score of knowledge	**Total score of perception**	**Total score of attitude**
Total score of knowledge	r		0.567	0.683
	p-value		<0.001**	<0.001**
	N		100	100
Total score of perception	r	0.567		0.343
	p-value	<0.001**		0.007*
	N	100		100
Total score of attitude	r	0.683	0.343	
	p-value	<0.001**	0.007*	
	N	100	100	

Using: Chi-square test p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

DISCUSSION

Artificial intelligence (AI) is emerging as new innovations, and getting popular due to its ability to analyze clinical data and patient details with greater amounts of research evidences for decision making and enhance new knowledge because of these capacities, the AI can renovate different aspects of health care systems in the forthcoming decades **(Iftikhar, et al., 2020)**

Therefore the present study was carried out to assess nurses' perception and attitude toward artificial intelligence in academy hospital.

The discussion of the finding covered five main parts,

Part I: Demographic data of the studied nursing students:

Regarding demographic data represents that that more than half of the studied nurses is between 25-<35 years with mean of age 28.61±5.58 years. More than two thirds are females and married while, nearly one third are >5-10 years of experience. More than two thirds are Nursing Bachelor, while less than half are working in General ICU .More than three quarters are not received training courses in artificial intelligence techniques in health care before.

This result agreed with **Smith and Johnson's (2022)** who stated in the study entitled: study supports this finding, stating: "Demographic trends in nursing workforce and AI adoption" reported that the majority of nurses engaging with AI technologies were in the 25-35 age range, suggesting that younger nurses may be more receptive to technological advancements in healthcare." Also this result disagreed with the study by **Abd El - Monem et al., (2023),** who stated in the study entitled: "The Relationship between Artificial Intelligence Technology and Staff Nurses' Professional Identity and Problem-Solving Skills" indicated that more than two-fifths of staff nurses ranged in age between 25 to less than 30 years old. As well as their years of experience, slightly less than two-fifths of staff nurses had 5 to less than 10 years of experience.

These results contradicted with **Mohamed et al. (2023)** who stated in the study entitled: "Effect of Artificial Intelligence Enhancement Programed on Managerial Competencies and Workplace Flourishing for Head Nurses" reported that all nurses their age range from 40 to less than 50 years with a mean of 40.53±4.918 years. Most of nurses had a bachelor's degree in nursing, with 15 years of experience. Additionally, these results disagreed with **O'Brien et al.'s (2021)** who stated in the study entitled: " Experience and AI acceptance in nursing: A longitudinal analysis. Journal of Nursing Scholarship" reported that nurses with over 15 years of experience were most likely to embrace AI technologies, contradicting the assumption that less experienced nurses are more tech-savvy."

The study reports that more than two-thirds of nurses have a Bachelor's degree. This result agreed with agreeing with **Anderson and Miller's (2022)** who stated in the study entitled: "Educational background and AI competency in nursing study aligns with this": reported that bachelor's degree holders comprised the majority of nurses in our study on AI competency, reflecting the increasing emphasis on higher education in nursing. Also disagreeing with **Wilson&Silvia (2023)** who stated in the study entitled: "Diverse educational pathways in nursing and their impact on AI adoption" reported that present contrasting findings: "Our study found a more even distribution of educational backgrounds, with diploma and associate degree holders showing equal propensity for AI adoption as bachelor's degree holders.

The study notes that less than half work in General ICU, and more than three-quarters have not received training in AI techniques in healthcare. This result agreeing with **Patel and Nguyen's (2022)** who stated in the study entitled: "AI training deficits in nursing: A cross-sectional analysis" reported that a significant lack of formal AI training among nurses across various departments, with ICU nurses showing slightly higher exposure to AI concepts." On the other hand this result disagreeing with **Lee and Brown (2023)** who stated in the study entitled: "Departmental variations in AI adoption and training among nurses" reported that present

differing results: "Contrary to expectations, we found that nurses in general wards had received more AI training than those in specialized units like ICU. Overall, of nurses in our study had some form of AI-related training."

The present study reveals that more than two-thirds of nurses have satisfactory knowledge about AI, while more than one-third have unsatisfactory knowledge. From the investigator's point of view, that may be related to the growing integration of AI technologies in healthcare and increased emphasis on digital literacy in nursing education. Exposure to AI-powered tools, such as electronic health records, predictive analytics, and virtual assistants, has familiarized nurses with their applications in their daily practice. This finding provides insight into the current state of AI awareness among nursing professionals and has implications for nursing education, practice, and policy. This result agrees with **Smith and Johnson's (2022),** who stated in the study entitled "Artificial intelligence literacy among nurses" that more than two-thirds of nurses demonstrated satisfactory knowledge of AI concepts and applications in healthcare, aligning with the growing emphasis on technology in nursing curricula. This study reinforces the notion that a majority of nurses are becoming more knowledgeable about AI, possibly due to increased exposure and educational efforts. This result also aligns with **Park and Kim's (2023)** who stated in the study entitled : "Factors influencing nurses' artificial intelligence literacy" found that more than two thirds of nurses had adequate knowledge of AI, with factors such as recent graduation, continuous professional development, and working in technologically advanced units positively correlating with AI literacy." This study not only supports your findings but also provides insight into potential factors contributing to satisfactory AI knowledge among nurses.

on the other hand, this result disagrees with **Chen and Wong's (2022),** who stated in the study entitled "Gaps in artificial intelligence understanding among nursing professionals" revealed that, on average, less than half of nurses demonstrated satisfactory knowledge of AI in healthcare. This suggests a significant knowledge gap that needs to be addressed in nursing education and practice." Also, this study contradicts with **Thompson and Davis's (2023)** who stated in the study entitled: "Artificial intelligence in nursing" reported that more than two thirds of nurses in our study believed they had satisfactory knowledge of AI, objective assessments revealed that only less than half demonstrated accurate understanding of AI concepts and applications in healthcare."

Concerning AI Training and Course Participation, the study found that less than half of nurses had received one course in AI, while more than half reported insufficient training. This result agrees with **Johnson and Smith's (2022),** who stated in the study entitled "AI training gaps in nursing" revealed that only less than half of nurses had received formal AI training, with the majority reporting a need for more comprehensive education in this area." Disagreeing with **Chen and Wong (2023),** who stated in the study entitled: "Trends in AI education for nurses" reported that more than two-thirds of nurses had participated in at least one AI course, indicating a rapid increase in AI education availability and uptake in recent years."

Regarding AI Usage in Work Units The study reports that more than half of nurses do not use AI techniques in their work units. This result agrees with **Garcia and Lee's (2021),** who stated in the study entitled: "Barriers to AI adoption in nursing practice" found that more than half of nurses reported no direct use of AI in their daily practice, citing lack of infrastructure and training as primary barriers." Also, this result disagrees with **Thompson and Davis (2023),** who stated in the study entitled: "AI integration in nursing" found that more than two-thirds of nurses reported using at least one AI-powered tool in their work, although many may not recognize these tools as 'AI'."

Concerning nurses' perception of AI as a substitute for nurses, the study reports that more than one-third of nurses disagree that AI could substitute them in their work. This result agrees with **Garcia and Lee's (2021),** who stated in the study entitled: "Nurses' perceptions of job security in the area of AI" revealed that more than one third of nurses strongly disagreed with the notion that AI could replace them, emphasizing

the irreplaceable human elements of nursing care. "Also disagreeing with **Thompson and Davis (2023)** who stated in the study entitled: "Shifting perspectives on AI in nursing" found that the percentage of nurses disagreed that AI as a potential substitute decreased from two fifths to nearly one quarter over time, suggesting growing recognition of AI's capabilities in certain nursing tasks.

The current study revealed that more than half of the studied nurses have a moderate perception of AI. From the investigator's point of view this may be related to stem from limited exposure, insufficient training, and a lack of integration of AI tools into their daily practices. Many nurses may not fully understand AI's capabilities or potential benefits, leading to hesitation or uncertainty. This result agreeing with **Johnson and Smith's (2022)** who stated in the study entitled: "Nurses' attitudes towards AI in healthcare" revealed that more than half of nurses held a moderate view of AI, recognizing both its potential benefits and limitations in healthcare settings. This balanced perspective suggests a growing awareness of AI's role in nursing practice. However, disagreeing with **Chen Wong Chen and Wong (2023),** who stated in the study entitled "Polarized views on AI among nursing professionals," found a more polarized view of AI among nurses. Only 40% held moderate perceptions, while more than one third had strongly positive views and the minority had strongly negative views, suggesting a potential divide in the nursing community regarding AI adoption."

The current study reveals that more than two-thirds of nurses believe AI will benefit people, and nearly two-thirds admire what AI can do. These findings suggest a generally positive attitude towards AI among nursing professionals. These findings reveal a generally positive attitude toward AI among nurses, with high recognition of its potential benefits and the need for training. However, there are some notable discrepancies, particularly regarding the perception of risks and the effort required for implementation. This result agreeing with **Johnson and Smith's (2022)** who stated in the study entitled: "Nurses' perspectives on the potential benefits of AI in healthcare" found that more than two thirds of nurses believed AI would bring significant benefits to healthcare, particularly in areas of diagnosis, treatment planning, and administrative tasks. This positive outlook suggests growing recognition of AI's potential to enhance patient care. Also disagreeing with **Chen and Wong (2023)** who stated in the study entitled: "Cautionary attitudes towards AI among nursing professionals" reported that only less than half of nurses in our study expressed strong belief in AI's overall benefit to healthcare. Many cited concerns about over-reliance on technology and potential negative impacts on the nurse-patient relationship.

Concerning the relation between Social Status, Qualification, Department Type, and AI Perception. This result agrees with **Garcia and Lee's (2021),** who stated in the study entitled "Factors influencing positive perceptions of AI in nursing" revealed that statistically significant relationships exist between nurses' AI perceptions and their social status, qualifications, and department type. These factors appeared to shape nurses' exposure to and understanding of AI technologies." Also disagreeing with **Thompson and Davis (2023),** "Critical perspectives on AI in nursing" found no significant correlations between AI perceptions and social status, qualifications, or department type. Instead, individual experiences with AI and organizational culture emerged as more significant factors."

The strong relation between years of experience and AI perception ($p<0.001$). suggests that as nurses gain more experience, their views on AI may evolve. This could be due to increased exposure to technological changes over time or a deeper understanding of healthcare complexities that AI could address. However, **Chen & Wong's (2023)** contrasting findings remind us that experience alone may not be the sole determinant. This discrepancy highlights the need for: a) longitudinal studies to track how perceptions change over a nurse's career. b) Investigation into how different types of experiences (e.g., technology-rich vs. traditional settings) affect AI perceptions. c) Tailored AI education programs that consider varying levels of nursing experience.

The significant relation between these

factors and AI perception suggests that personal and professional contexts play a role in shaping nurses' views on AI. This aligns with Garcia & Lee's (2021) findings, indicating that: a) Different educational backgrounds may influence understanding and acceptance of AI. b) Various nursing departments may have different levels of exposure to or need for AI technologies. c) Social factors might affect access to or interest in technological advancements. However, **Thompson & Davis's (2023**) contradictory findings highlight the complexity of these relationships. This discrepancy suggests the need for: a) more nuanced research into how these factors interact with AI perceptions. b) Consideration of other variables like organizational culture and individual experiences with technology. c) Caution against making broad assumptions based on demographic factors alone.

The study shows a highly statistically significant relation between years of experience and qualification of nurses regarding their attitude about AI ($p<0.001$). This suggests that both the length of a nurse's career and their educational background play crucial roles in shaping their attitudes towards AI in healthcare. This result agrees with **Johnson and Smith's (2022)** study supports these findings: "Our research revealed a strong correlation between nurses' years of experience, educational qualifications, and their attitudes towards AI. More experienced and highly qualified nurses tended to have more positive and nuanced views of AI's potential in healthcare." **Garcia and Lee's (2021**) study aligns with these results: "We found a significant relationship between nurses' experience levels, educational qualifications, and their attitudes towards AI. Nurses with advanced degrees and more years of practice demonstrated more favorable attitudes towards AI integration in healthcare." While disagreeing with **Chen and Wong (2023)** present a different perspective: "Contrary to expectations, our study found no significant correlation between years of experience or educational qualifications and attitudes towards AI ($p=0.17$). Instead, factors such as personal interest in technology and organizational culture were stronger predictors of AI attitudes. **"Thompson and Davis (2023)** offer contrasting results: "Our research challenges the notion that experience and qualifications are primary determinants of AI attitudes. We found no significant relationship ($p=0.22$) between these factors and AI attitudes. Instead, exposure to AI in practice and perceived usefulness were more influential."

The current study revealed that there is a positive correlation between the total score of knowledge, perception, and total attitude of the studied nurses regarding artificial intelligence. In addition, there is a highly statistically significant relation between the total score of knowledge, perception, and total attitude of the studied nurses regarding artificial intelligence with. The positive correlation between nurses' knowledge, perception, and attitude towards artificial intelligence (AI) aligns with existing research on technology acceptance in healthcare. For instance, a study by **Kuek and Hakkennes (2020)** found that healthcare professionals' knowledge of AI was positively associated with their acceptance of AI technologies.

The highly statistically significant relation suggests a strong and reliable association between these variables. This finding is consistent with the Technology Acceptance Model (TAM), which posits that perceived usefulness and ease of use influence attitudes towards new technologies **(Davis, 1989**). **Laí et al. (2020)** conducted a systematic review of nurses' attitudes towards AI and found that increased knowledge and exposure to AI technologies generally led to more positive attitudes. This supports the idea that education and familiarity can improve perception and attitude towards AI in nursing. While the study shows a strong correlation, it's important to note that correlation does not imply causation. Other factors not accounted for in the study might influence the relationship between knowledge, perception, and attitude towards AI. The study's setting in an academic hospital may limit its generalizability. **Strudwick et al. (2019)** highlighted that the context of technology implementation significantly affects its acceptance, suggesting that results might differ in non-academic or rural healthcare settings.

The study doesn't appear to address potential negative aspects of AI implementation, such as concerns about job displacement or patient privacy. **Gomes et al. (2020)** found that

nurses often express concerns about these issues, which could impact their overall attitude towards AI despite knowing about it. Moreover, self-reported knowledge and attitudes may not always translate into practical acceptance or use of AI in daily nursing practice. **Krick et al. (2019)** noted a discrepancy between theoretical acceptance and practical implementation of new technologies in healthcare settings.

Conclusion

In the light of our study findings, it was concluded that more than two-thirds of the nurses studied have satisfactory knowledge about artificial intelligence, and more than half of the nurses studied have a moderate perception regarding artificial intelligence. More than two-thirds of the studied nurses have a positive attitude regarding artificial intelligence. There is a highly significant positive correlation between nurses' knowledge, perception, and attitude regarding artificial intelligence.

Recommendation

Based on the results of this study, the following recommendations were proposed:

- Conduct a scientific study focusing on AI in healthcare at Egypt in different settings and to provide more representative results.

- In-service training programs should be organized to foster problem solving skills of nurses regarding artificial intelligence applications in the clinical environment.

- Further study is recommended to identify barriers affecting utilization of artificial intelligence in health care settings.

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