Perception and Attitudes of Nurse Managers toward Artificial Intelligence Technology at Selected Hospitals

Doha A. Ghazy[1], Gehan M. Diab2, Wafaa M. Shokry[3]

[1]B.Sc. Nursing Science, [2]Professor of Nursing Administration,
[3]Assistant professor of Nursing Administration
[2,3]Faculty of Nursing, Menoufia University

Abstract: Background: artificial intelligence has made many advances and developments in the field of nursing. Realizing the extent to which nurse managers know the advantages, problems and their attitudes of artificial intelligence is very important for all stages of artificial intelligence creation in health institution. **Purpose**: To explore the perception and attitudes of nurse managers toward artificial intelligence technology at selected hospitals.**Design**: A descriptive correlational research design was used. **Setting**: The study was conducted at different units at Menoufia University Hospital, National Liver Institute and El-Helal Insurance Hospital at Shebin El-Kom). **Sample**: Convenience sampling technique was used to select all available nurse managers working at the study settings (166).**Instruments**: Perception toward artificial intelligence questionnaire and attitude towards artificial intelligence questionnaire. **Results**: The Majority (84.3%) of nurse managers had moderate level of perceptions towards artificial intelligence and (58.4%) of nurse managers had negative attitude towards using artificial intelligence while (41.6%) of them had positive attitude towards using artificial intelligence technology. **Conclusion**: There was statistically significant positive correlation between nurse managers' perception towards artificial intelligence technology and their attitudes towards artificial intelligence technology. **Recommendations**: In-service training and education programs about artificial intelligence to increase nurse managers' knowledge about the benefits, challenges, and problems concerning implementation of artificial intelligence in health care settings.

Keywords: Artificial intelligence technology, Attitude, Nurse Managers, Perception

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Introduction

Artificial Intelligence (AI) has been transformative for many public and private industries, and we are currently observing an AI-led revolution in healthcare. AI is a fundamental paradigm shift in healthcare that is already affecting nurses in their everyday work, and its impact will be even more pronounced in the future. AI is embedded in nurses' daily life as algorithms, smart systems and in their education. Even though AI applications in healthcare date back to the late 1970s, technological advances in robotics and computing and the right social climate have created ideal conditions to take full advantage of what AI can contribute to improving the provision of care (Michalowski & Park, 2022).

Artificial intelligence (AI) is an umbrella term used to describe techniques developed to teach computers to mimic human-like cognitive functions like learning, reasoning, communicating and decision-making (Robert, 2019). In other words, AI refers to the simulation of human intelligence in machines that think like humans and imitate human actions (Frankenfield, 2022).

According to the definition of Marvin Minsky, the father of AI, AI simply means that a machine is able to do a task, which is considered to be an intelligent one by human beings. Indeed, AI is a discipline for which the applications fall into two categories: (1) the attempt to reproduce the capabilities of the human mind and 2) the creation of tools to carry out tasks, which today need a human action. AI has been divided into many sub-disciplines, focusing on very distinct problems (such as vision, problem solving, language comprehension, learning, etc.) (Laï et al., 2020).

Artificial intelligence (AI) is also defined as a collection of technologies that uses complex algorithms and software to emulate human cognition in the analysis, interpretation and understanding of complex healthcare data. AI can enhance the ability for nurses to better grasp the day-to-day patterns and needs of their patients. According to Eric Topol, (2019), the promise of AI is to provide a complete, panoramic view of an individual's health information; to improve decision making; to eliminate errors such as misdiagnosis and unnecessary procedures; to assist with ordering and interpreting appropriate tests; and to recommend treatment.

Perception toward artificial intelligence is defined as the integration of sensory impressions into information that is psychologically meaningful (Kundaliya et al., 2022). Various health care professionals, particularly clinicians, reportedly have mixed attitudes towards AI (Abdullah & Fakieh, 2020), and it has been claimed that they understand neither) how AI uses algorithms nor the inner workings of algorithms (Romero-Brufau et al., 2020). This lack of knowledge may increase anxiety and arouse conflicting emotions in clinical staff which may affect their perceptions of AI (Abdullah & Fakieh, 2020).

Attitudes toward artificial intelligence is defined as a learned association in memory between artificial intelligence and a positive or negative evaluation of artificial intelligence, and attitude strength is equivalent to the strength of this association (Brown, 2022). In the context of (digital) human–machine interaction, people are increasingly dealing with artificial intelligence in everyday life. Through this, we observe humans who embrace technological advances with a positive attitude. Others, however, are particularly sceptical and claim to foresee substantial problems arising from such uses of technology (Sindermann et al., 2021).

Hence, nurse leaders need to foster positive attitudes towards AI technologies (Ronquillo et al., 2021), and to assist AI's beneficial deployment in future health care there are clear needs to understand nurse leaders' and developers' current perceptions of AI. This would provide insights into how AI could be developed to best serve health care organizations, clinicians' workflows and patient care. Such insights would be highly valuable for developers of AI, health care organizations and decision makers seeking to develop and implement effective AI-based solutions.

Significance of the study

Technological breakthroughs occur at an ever-increasing rate thereby revolutionizing human health and wellness care. Technological advancements have drastically changed the structure and organization of the nursing industry: From the adoption of electronic health records, to advances in biomedical and engineering technologies that enable the development of ever more sophisticated technologies in health care, robotics technology, and artificial intelligence. Technology advancements have been made available to aid nurses in performing their jobs and caring for patients more efficiently and safely. Nursing today is not the same as it was 30 years ago (Criss & Gadepalli, 2018).

Robot nurses and artificial intelligence applications reduce the burden of all nursing staff including managers, increase the quality of patient's care, and reduce the risk of medical errors and malpractices. These technologies also have significant effects on nursing practices today (Çetin & Eroğlu, 2020). So, the purpose of the present study was to explore the perception and attitudes of nurse managers toward artificial technology at selected hospitals.

Purpose of the study

The purpose of this study is to explore the perception and attitudes of nurse managers toward using artificial intelligence technology at the three selected hospitals.

Research questions:-

1) What are the nurse managers' perception toward artificial intelligence technology at selected hospitals?

2) What are the of nurse managers' attitudes toward artificial intelligence technology at selected hospitals?

3) What is the relation between nurse managers' perception and attitudes toward artificial intelligence technologies?

Methods

Research design:

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

Research Setting:

The study was carried out at at different units (general units, critical care units and operating theatres) at selected hospitals (Menoufia University Hospital, National Liver Institute and El-Helal Insurance Hospital at Shebin El-Kom). They are affiliated to two different sectors of health hospitals in Menoufia Governate (University sector, Health Insurance sector).

The first setting is Menoufia University Hospital: The bed capacity of the University hospital is 1061 beds. The hospital is divided into four buildings. Three of these buildings are interlinked, and one separate building namely Oncology. The second setting is National liver Institute: It is a specialist for the treatment of liver diseases in Egypt and the Arab world and opened in 1987. The bed capacity of the Liver Institute is 300 beds. The institute constitutes of two buildings; new building and old building .The third setting is El-Helal Insurance Hospital: The bed capacity of El-Helal Insurance Hospital is 172 beds. It consists of ground floor and other five floors.

Study subjects:

The Study subjects included in the current study consisted of all available nurse managers (head nurses, nurse supervisors and nurse directors) who are working at the three selected hospitals. They were selected through convenient sampling technique to participate in this study (N=166).

Inclusion criteria:

Nursing managers who were holding managerial positions for at least one year in the three selected hospitals.

Instruments of data collection

The first instrument: Perception toward artificial intelligence questionnaire

Elsayed and Sleem (2021) developed it. It was adopted by investigator to determine nurse manager's perception toward Artificial intelligence at three hospitals .This questionnaire consisted of two main parts as the following:

▪ **Part one: Personal characteristics**

It included self-reported information was designed to obtain personal data of the nurse managers including "age, sex, marital status, education qualifications, job, years of experience, unit of work and hospital name.

▪ **Part two: Perception toward artificial intelligence questionnaire**

This instrument consisted of three dimensions with 14 items: the first dimension; knowledge about artificial intelligence contains (4) items. The second dimension; the advantages of using artificial intelligence includes (5) items. The third dimension; the

problems regarding the application of artificial intelligence in healthcare included (5) items.

The scoring system:

The studied nursing managers responses were rated by using a five points Likert scale ranged from (1 – 5) as; (1) for strongly disagree, (2) for Disagree, (3) for Neutral, (4) for Agree, and (5) for strongly agree. The questionnaire was evaluated giving a scores ranged from 14 -70. The total score of each studied nurse manager was categorized arbitrary into "low perception" when nursing managers achieved less than 60% (14- 41 marks) of the total score, "Moderate perception "when nursing managers achieved 60% to less than or equal 75% (42-53 marks) of the total score, and "High perception" was considered when nursing managers achieved more than 75% (54-70 marks) of the total score.

The second instrument: **Attitude towards artificial intelligence questionnaire**

Schepman and Rodway (2020) developed it. It was adopted by investigator to determine nurse managers' attitudes toward artificial intelligence at three hospitals. This questionnaire consists of positive attitudes (12 items) and negative attitudes (7 items).

The Scoring System:

The studied nursing managers' response were rated using a five points Likert scale ranged from (1 – 5) as (1) for strongly disagree, (2) for Disagree, (3) for Neutral, (4) for Agree, and (5) for strongly agree for the positive attitude items. The scoring was reversed in the negative attitude items .These scores were converted into a percent score. The score less than or equal to 60% were considered negative attitude and more than 60% were considered a positive attitude.

Validity of the study instruments:

The instruments of data collection were trasnslated into Arabic and reviewed for their content validity by five experts in the field of nursing administration to judge the content and face validity of the instruments. The panel of expertise included three professor in nursing administration from Menoufia University and two assistant professors in nursing administration department in Banha University .The investigator asked the panel to critique the instrument as a whole, including identifying areas of concern and reviewing the construction, flow and grammar. The panel examined the following criteria: relevant to the purpose of the study, clear and simple wording of research questions, instrument is easy to be understood, comprehensive questions, appropriate length of the instrument and of each question, appropriate ordering of questions, unbiased and no redundancy in questions. Necessary modifications are made in the translation of the Arabic version.

Reliability of the study instruments:

These instruments were tested for reliability to estimate the consistency of measurement. Reliability performed using Cronbach's alpha coefficient test.It was 0.82 for the first instrument

(Perception toward artificial intelligence questionnaire) which indicates that the instrument is reliable to detect the objectives of the study. And it was 0.79 for the second instrument (Attitude towards artificial intelligence questionnaire) which indicates that the instrument is reliable also to detect the objectives of the study.

Pilot study:

After reviewing of the instruments by the experts, the investigator conducted a pilot study before using the final questionnaire. The purpose of the pilot study was to ascertain clarity, relevance, feasibility and applicability of the study instruments and to determine obstacles that may be encountered during data collection. It was also helpful to estimate the time needed to fill the study instrument. The pilot study was carried on 19 nurses which presented (10%) of sample size. No modification was done, so sample of the pilot study was included in the study. Participants required at least 20 to 25 minutes to complete the questionnaires.

Data collection procedure:

An official letter was sent from the Dean of the Faculty of Nursing containing title and explaining the purpose and methods of data collection to the directors of studied settings. Then a short briefing was conducted to orient the respondents to the objectives, possible risks and benefits of the study to gain their cooperation to participate in the study. After explanation of the purpose and nature of the study, nurse managers who fulfilled the inclusion criteria were invited to participate in the study. Thereafter, data were collected through a self-administered questionnaire to ascertain all questions were answered and to clarify any inquiry and it took about 20-25 minutes to accomplish the two questionnaires.

Data were collected in a period of three months from the the middle of December 2022 till middle of March 2023 in the morning, afternoon and night shifts with average three days a week. In addition, data were collected from nurse managers at National Liver Institute at Sunday, Menoufia University Hospitals on Tuesday and El-Helal Insurance Hospital on Thursday. The average number of filled tools were 5-6 sheets per day.

Ethical considerations

An approval was obtained from Ethical and Research Committee of the Faculty of Nursing and an oral informed consent was gained from the study sample. Studied nurse managers were informed that participation in the study is voluntary. The respondents were assured that their data will be treated as strictly confidential and their anonymity were maintained. Additionally, each participant was notified about the right to accept or refuse to participate in the study.

Statistical analysis:

Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 20.

Graphics were done using Excel program.

Quantitative data were presented by mean (X) and standard deviation (SD). These data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square (χ2) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used(if the table was 4 cells) , or Likelihood Ratio (LR) test (if the table was more than 4 cells). Level of significance was set as P value <0.05 for all significant tests.

Results

Table (1): demonstrated percentage distribution of studied nurse managers according their personal characteristics. As evidence from that table, the most common age group (51.7%, and 38.6%) of nurse managers at MUH and NLIH was from 31 - 35 years, with mean ± SD (36.3 ± 3.7, and 32.1± 4.6), while the most common nurse managers age group at El Helal Health Insurance Hospital were from 26 – 30 years (45.4%) with mean ± SD (28.7 ± 3.5). The majority of studied manager nurses were female. The majority of studied nurses were married at MUH, NLIH and at El Helal Health Insurance Hospital. Regarding to educational qualification most of them had bachelor degree in nursing, regarding their position most of them work as an head nurses while (4.5%, 6.8%) of them work as nurse director at MUH, NLIH but (12.1%) work as nurse Supervisor in El Helal Health Insurance Hospital. Regarding their experience more than one third (33.7% &36.4%) ranged from 5- 10 years with

mean score± SD (8.6 ± 1.8 &9.1 ± 2.3) at MUH, NLIH but in El Helal Health Insurance Hospital (54.5%) of them had less than 5 years' experience with mean score± SD (4.7 ± 2.1)..

Table (2): shows mean score of total perception of artificial intelligence technology and each domains as reported by nurse manager. There was highly statistically a significance difference between studied selected hospitals regarding mean total scores of perception towards artificial intelligence technology, the advantages of using AI and grand total perception. There were no statistically significance differences between studied selected hospitals regarding problems for AI application in health care.

Table (3) & Figure (1): presented the nurse managers' levels of perceptions towards artificial intelligence technology distributed by studied Hospitals (N=166). Majority of nurse managers' levels of Grand total perceptions towards artificial intelligence technology showed moderate perception (84.3%), followed by High perception with (15.7%), and there were no manager nurses showed low perception (0%). Regarding levels of perceptions towards artificial intelligence technology in three selected Hospitals'levels of perception towards artificial intelligence technology among nurse managers, majority of them showed moderate perception with percentages of 92.1%, 97.7%, and 45.5% respectively. While El Helal Health Insurance Hospital showed the highest percentage of high perception (54.5%), the national Liver Institute Hospital showed the lowest percentage of high perception with

only 2.3%, this difference was highly statistically significant (P<0.0001).

Table (4): shows the nurse managers' levels of attitude towards artificial intelligence technology distributed by studied Hospitals. As evidence from that table, there were highly statistically significance differences between levels of attitude towards artificial intelligence technology and three selected hospitals. Most of nurse managers' (77.3% &64%) had negative attitude towards artificial intelligence technology at NLIH, MUH Hospitals while (22.7% & 36%) had positive attitude towards artificial intelligence technology. On the other hand, the majority of nurse managers' (81.8%) had positive attitude towards artificial intelligence technology while (18.2%) had negative attitude towards artificial intelligence technology at El Helal Health Insurance Hospital.

Table (5): showed there was high significant positive correlation between grand total perception as an Independent variable and grand total attitude or any of its two domains as dependent variables. The graph highlighted a good positive and high significant correlation between them (r= 0.37, and p<0.0001) that mean when Grand total Perception increase the total attitude improve.

Table (1): Personal Characteristics of the Studied Nurse Managers Distributed by their three Studied Hospitals (N = 166).

PERSONAL CHARACTERISTICS	MUH		NLIH		EHHIH	
	N0.	%	N0.	%	N0.	%
Age (in years) :						
20- <25	0	0	2	4.5	6	18.2
26 – <30	8	9	9	20.5	15	45.4
31 - < 35	46	51.7	17	38.6	3	9.1
36 – <40	17	19.1	8	18.2	9	27.3
≥ 40	18	20.2	8	18.2	0	0
Mean ± SD	**36.3 ± 3.7**		**32.1 ± 4.6**		**28.7 ± 3.5**	
sex:						
Male	0	0	9	20.	0	0
Female	89	100	35	79.5	33	100
Marital status:						
Married	75	84.3	36	81.8	30	90.9
Unmarried	14	15.7	8	18.2	3	9.1
Education qualification:						
Associate degree in nursing	4	4.5	0	0	5	15.2
Bachelor degree in nursing	69	77.5	38	86.4	18	54.5
Postgraduate certificate	16	18	6	13.6	10	30.3
Job:						
Head nurse	73	82	36	81.8	24	72.7
Nurse Supervisor	12	13.5	5	11.4	4	12.1
Nurse director	4	4.5	3	6.8	5	15.2
Experience in years :						
< 5	22	24.7	15	34.1	18	54.5
5 - 10	30	33.7	16	36.4	9	27.3
11 - 15	3	3.4	0	0	0	0
16 – 20	19	21.3	5	11.4	0	0
> 20	15	16.9	8	18.1	6	18.2
Mean ± SD	**8.6 ± 1.8**		**9.1 ± 2.3**		**4.7 ± 2.1**	
Total	89	53.6	44	26.5	33	19.9

MUH = Menoufia University Hospital   NLIH= National Liver Institute Hospital,
EHHIH = Health Insurance Hospital

Table (2): perception of artificial intelligence technology as reported by nurse manager in regarding to each domains (n=166).
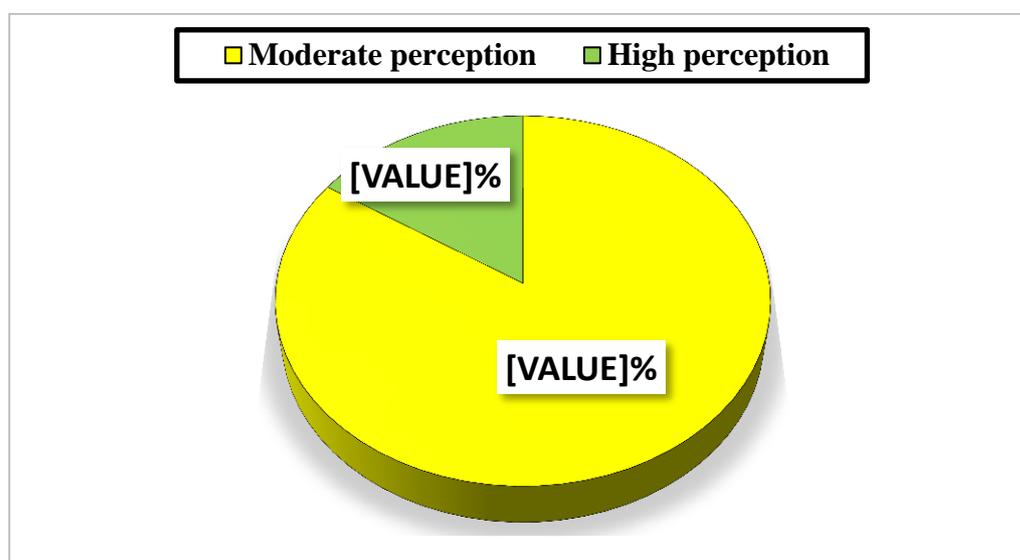
domains of perception toward artificial intelligence technology	Studied Selected Hospitals									F test	P value
	Menoufia University H (N=89)			National Liver Institute H (N=44).			ElHelal Health Insurance H. (N=33)				
	Min.	Max.	Mean±SD	Min.	Max.	Mean±SD	Min.	Max.	Mean±SD		
1. First domain:- knowledge about AIT	7	15	10.5±1.9	7	15	10.7±2.1	4	16	12.3±3.7	= 6.4	**<0.002** HS.**
2. Second domain: - The advantages of using AI.	12	22	17.5±3.5	12	22	17.3±2.8	10	59	23.0±12.2	= 0.8	**<0.0001** HS**
3. Third domain:- problems for AI application in health care	7	20	15.9±3.3	7	20	16.3±3.1	12	21	17.1±2.8	=1.7	0.17 NS
Grand total perception:	35	52	43.9±4.6	35	52	44.4±4.0	42	81	52.4±10.7	=23.8	**<0.0001** HS**

NS = Not significant   **HS= High significant   F test** = One-Way analysis of variance.

Table (3): perceptions levels of nurse managers towards artificial intelligence technology at studied Hospitals (N=166).

Studied Selected Hospitals	Levels of grand total Perception towards artificial intelligence technology						χ2	P value
	Moderate		High		Total			
	NO.	%	NO.	%	NO.	%		
1. Menoufia University H.	82	92.1	7	7.9	89	100	=29.9	<0.0001 HS
2. National Liver Institute H.	43	97.7	1	2.3	44	100		
3. ElHelal Health Insurance H.	15	45.5	18	54.5	33	100		
Grand total perception levels	**140**	**84.3**	**26**	**15.7**	**166**	**100**		

Fig. (1): Percent distribution of studied nurse managers regarding their total perception toward artificial intelligenc technology (N=166).

Table (4): levels of nurse managers attitude towards artificial intelligence technology at studied Hospitals (N=166).

Studied Selected Hospitals	Levels of grand total Attitude towards artificial intelligence technology						χ2	P value
	-ve attitude		+ve attitude		Total			
	NO.	%	NO.	%	NO.	%		
1. Menoufia University H.	57	64	32	36	89	100	13.9	**<0.0001 HS**
2. National Liver Institute H.	34	77.3	10	22.7	44	100		
3. ElHelal Health Insurance H.	6	18.2	27	81.8	33	100		
Grand total Attitude levels	**97**	**58.4**	**69**	**41.6**	**166**	**100**		

HS: High significant

Table (5): Correlation coefficient (r) between grand total perception and grand total attitude as well as its two Domain among studied nurse managers. (N=166).

Perception	Attitude					
	Positive		Negative		Grand total attitude	
	r	P	r	p	R	p
Grand total Perception	0.21	<0.007	0.39	<0.0001	0.37	<0.0001

r = Pearson correlation coefficient   p= probability of test of significance.

Discussion:

Artificial intelligence comprises many healthcare technologies transforming nurses' roles and enhancing patient care. AI technology is beginning to work with nursing to quickly synthesize information, finish tasks, help with clinical problem solving and decision-making, and enhance patient outcomes. Each of these new technologies has a great potential to advance healthcare on its own. Combining these approaches and educating nurses the best ways to work with technology will have an impact on their professional identities and create limitless opportunities for future improvements in productivity, capacity, quality, and healthcare (Ronquillo, 2021).

Concerning to personal characteristics of studied nurse managers which had been assumed, the results of the current study demonstrated that the most common age group of nurse managers at Menoufia university hospital, National liver institute was from 31 - 35 years, while the most common nurse managers age group at El Helal Health Insurance Hospital were from 26 – 30 years. The majority of studied manager nurses were female. The majority of studied nurse managers were married at Menoufia university hospital, National liver institute and El Helal Health Insurance Hospital respectively.

Regarding to educational qualification most of them had bachelor degree in nursing, concerning their position most

of them work as a head nurse while the few of them work as nurse director and Nurse Supervisor. Regarding their experience, more than one third ranged from 5- 10 years at Menoufia university hospital and National liver institute, but in El Helal Health Insurance Hospital more than half of them had less than 5 years' experience. Regarding to working departments of the studied nurse managers distributed by their three studied hospitals. The highest percentage of studied nurse managers was worked in generic departments at MUH, NLIH and at El Helal Health Insurance Hospital followed by critical care units and operating theaters respectively.

Regarding nursing manager's perception toward toward artificial intelligence technology at selected hospitals.

The findings of the current study revealed that the majority of nurse managers' levels of grand total perceptions towards AIT had moderate perception, while lowest percent of nurse managers had high perception regarding using AIT, and there were no nurse managers showed low perception. Regarding levels of perceptions towards AIT in three-selected hospitals 'levels of perception towards AIT among nurse managers, majority of them at Menoufia university hospital and national Liver Institute showed moderate perception, while El Helal Health Insurance Hospital showed that more than half of them had a high perception. This difference was highly statistically significant.

From the investigator point of view, this result might due to emerging of the artificial intelligence technologies such as digital or electronic devices such as computers, cellular devices or robots and new applications in health field especially after Corona virus pandemic. Egypt's Vision 2030 will focus on the term of digital health which using artificial intelligence in a variety of working settings including health care sector. Increasing high perception at El Helal Health Insurance Hospital might due to more than one third of nurse managers were post graduated and open to new technology and had good knowledge about artificial intelligence in their education, also El Helal Health Insurance Hospital had low number of nurse managers with low workload which facilitated the process of education and training about new technology.

The current study findings showed that the majority of nurse managers had moderate perception at Menoufia university hospital, from investigator point of view, this might due to it had large numbers of nurse managers with huge workload which made it difficult to nurse managers learn about a new topic such artificial intelligence and also understand it well. In addition, the most common age group at menoufia university hospital was from 31 - 35 years that made them less flexible and resist new technology than younger nurses. While the National Liver Institute Hospital showed, the little percentage of nurse managers had a high perception this might due to it is difficult to apply to arguable issues implementation of AI in health care.

This result of present study was congruence with Elsayed & Sleem, (2021) who reported that the more than three-quarters of studied sample had moderate perception towards using Artificial intelligence in nursing setting. While the minority of them had high perception. In addition, this result was congruent with Nicholaset al., (2021) who reported that, the majority of subjects consider AI beneficial in the medical field and had a moderate perception toward using artificial intelligence.

In the same line, this finding of present study was harmony with sabra et al., (2023) found that the more than three-quarters of studied sample had moderate perception towards using Artificial intelligence in nursing setting.

This finding of present study was incongruence with Abuzaid et al., (2022) who explored an inadequate understanding and knowledge of AI principles and technical potential in the nursing profession and concluded that higher education institutions and healthcare organizations must design and implement appropriate AI educational and training programs for nursing staff to improve their competency in promoting the safe integration and application of AI into nursing practice.

Regarding mean scores of nurse managers ' perception toward artificial intelligence technology, the findings of the current study indicated that the highest mean percent with the first ranking was related to advantages of using artificial intelligence. From the researchers' point of view, this may be due to nurse managers are aware of the importance and advantages of using AI in nursing settings, especially at after existence of the Corona virus. Which is considered a global epidemic threatening the whole world, especially as artificial intelligence can accelerate health care process, decision making, decrease medical errors, perform usual tasks, and deliver real time, clinically relevant, massive amounts of high-quality data.

On the other hand, the more critical problem for application of artificial intelligence is that the ability of artificial intelligence to sympathize and understand the patient's emotional well-being is low, which affect quality of patient care, also, artificial intelligence cannot be used to provide opinions in unexpected situations, moreover, artificial intelligence is not flexible enough to be applied to every patient". While the lowest mean percent with the last ranking was related to knowledge level about artificial intelligence. From the researchers' point of view, the massive workload in university hospital and national liver institute may made the nurse managers haven't time to self-development or learn new systems, poor planning from top administration level to insert artificial intelligence topic in their education program, also financial barriers that made emerging artificial intelligence application on a larger scale is difficult in their work setting currently.

This result of the study was in harmony with Elsayed & Sleem, (2021) who found that perception of advantages toward using artificial intelligence achieved the highest mean score followed by the problems

concerning artificial intelligence application in healthcare among nurse managers.In contrast, the results of Abd El-Monem et al., (2023) who demonstrated that the highest mean percent with the first ranking was related to (concept) of artificial intelligence technology, while the lowest mean percent with the last ranking was related to barriers for artificial intelligence technology.

Moreover, the result of Abdullah & Fakieh, (2020) who reported that the highest score was regarding concerning artificial intelligence application in healthcare followed by advantage toward using artificial intelligence among health care employees. Also, it was in contradictory with Alamanova, (2018) who found that HR professionals were enthusiastic about minimizing manual workloads while being sceptical about adding unnecessary functionality to computing machines also they possess different feelings about AI than they do about other new emerging technologies. HR professionals have concerns about technology pricing and interfaces in addition to electronic human resources management applications.

Regarding nurse managers' attitude towards artificial intelligence technology at selected hospitals.

This finding of the current study found that there were highly statistically significance differences between levels of attitude towards AIT and three selected hospitals. More than half of nurse managers had negative attitude toward using artificial intelligence. The highest percent of nurse managers

had negative attitude towards artificial intelligence technology at national liver institute and menoufia university hospitals while more than three quarter of had positive attitude towards artificial intelligence technology at El Helal Health Insurance Hospital.

from the investigator point of view, this might due to low knowledge about artificial intelligence as result of the topic of artificial intelligence is a new trend in health care and not involved in their education and training curricula as the most common age group (31-35) at national liver institute and menoufia university hospitals , also there were Some fears and doubts among nurse mangers about using artificial intelligence in health care huge workload that made them more resistance to change toward artificial intelligence. In addition to there were large numbers of nurses managers with a lot of responsibilities that made them hadn't time to develop themselves and cope with new topic . In addition to the top management at Menoufia University hospital didn't involve artificial intelligence on their strategies.

On the other hand, more than three quarter of had positive attitude towards artificial intelligence technology at El Helal Health Insurance Hospital this might due to little number of nurse manager with acceptable workload and the majority of them were postgraduate, they had good knowledge about artificial intelligence in their college and update with new topics, also they were enthusiastic for using it in their work environment.

This result come in accordance with Swan et al., (2021) who investigated

nursing staff knowledge and attitudes towards artificial intelligence in health care settings in the United States and discovered that the majority of nurses were unaware of or did not understand AI in clinical practice.

This result come in the same line with Jussupow et al., (2022) who reported that medical professionals, medical students were more resistant to AI and experienced stronger identity threats.

In contrast, The study conducted by the result of Elsayed & Sleem, (2021) who showed that more than half of nurse managers had positive attitude toward using AI in nursing setting. In addition, it was contradictory with Mehdipour, (2019) who demonstrated that the majority of nurse manager's attitude towards application of AI systems in nursing was positive.

The relationship between nurse managers' perception and their attitudes toward artificial intelligence technology.

The findings of the current study demonstrated that there was high significant positive correlation between grand total perception as an independent variable and grand total attitude or any of its two domains as dependent variables. From investigator point of view, this may regard to lack of information about artificial intelligence and its advantage and its problems leads to false impressions ,negative attitude and fearing to adopt artificial intelligence in the work environment and also make nurse managers less trust about it .on contrary, high perception and high awareness about artificial intelligence

lead to positive attitude toward it, faster the process of adoption and the nurse manger become enthusiastic to use it.

The result of the current study was supported by Elsayed & Sleem, (2021) who revealed that there was a highly significant positive correlation between nurse managers' perception and attitudes toward using artificial intelligence in nursing settings. In the same line sabra et al., (2023) who found that a highly significant positive correlation between nurse managers' perception and attitudes toward using artificial intelligence.

Conclusion

In the light of the current study results, it can be concluded that the highest percentage of studied nursing managers had moderate level of perception towards artificial intelligence technology. El Helal Health Insurance Hospital showed the highest percentage of high perception while National Liver Institute Hospital showed the lowest percentage of high perception. Furthermore, the highest percent of nursing managers had negative attitude towards artificial intelligence technology at National Liver Institute Hospital and Menoufia University Hospital. On the other hand, the majority of nursing managers had positive attitude toward using AIT at El Helal Health Insurance Hospital. Addititionally, less than half of nursing managers had positive attitude regarding using AIT. Finally, a highly significant positive correlation was found between total perception towards artificial intelligence technology and

total attitude towards artificial intelligence technology.

Recommendations

Provide appropriate funding for digitizing services. Enhance the readiness of organizations for artificial intelligence through good infrastructure and budget.Conduct workshop and training programs to increase nurses' knowledge about the benefits, challenges, and problems concerning implementation of artificial intelligence in health care settings and these technologies potentials to enhance processes and efficiencies of health care .Update nursing curricula for including all new trends in artificial intelligence technologies. Apply research study findings that related to artificial intelligence at hospitals.

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