

Exploring Nurses' Perceptions And Readiness For The Integration Of Artificial Intelligence In Clinical Practice At Armed Forces Hospital Southern Region (AFHSR)

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Abstract

Background: Artificial Intelligence (AI) is increasingly being integrated into healthcare systems, with the potential to improve efficiency, clinical decision-making, and patient outcomes. Nurses, as frontline healthcare providers, play a critical role in the successful implementation of AI technologies. However, their readiness to adopt AI depends on their knowledge, attitudes, and perceptions toward these tools. Evidence on these factors remains limited, particularly within military healthcare settings in Saudi Arabia.

Objective: This study aimed to assess nurses' knowledge, attitudes, and perceptions regarding AI and to examine their readiness for AI integration at the Armed Forces Hospital Southern Region (AFHSR), Kingdom of Saudi Arabia.

Methods: A descriptive cross-sectional study was conducted among 290 nursing professionals at AFHSR using a structured online questionnaire. The survey collected demographic data and evaluated three domains: knowledge of AI, attitudes toward AI use in nursing practice, and perceptions of AI technological capabilities. Data were analyzed using descriptive statistics and Pearson correlation analysis.

Results: Participants were predominantly female (89.3%), held a Bachelor of Science in Nursing (64.5%), and had 6–15 years of clinical experience (57.6%). Although most nurses (90.7%) reported exposure to AI through media, notable knowledge and confidence gaps were identified: 44.5% reported having no basic understanding of AI, and 65.5% lacked confidence in applying AI in practice. Despite these limitations, most respondents expressed comfort with AI integration (74.8%) and demonstrated an overall knowledge was positive (mean score = 1.64), with higher scores indicating greater knowledge levels. Attitude toward AI showed the strongest positive correlation with overall perception ($r = 0.392$, $p < 0.001$), followed by perceptions of AI technology ($r = 0.357$, $p < 0.001$) and knowledge level ($r = 0.243$, $p < 0.001$). Age was weakly and negatively correlated with overall perception ($r = -0.123$, $p = 0.037$).

Conclusion: Nurses at AFHSR generally hold positive yet cautious attitudes toward AI and are receptive to its integration; however, their readiness is limited by insufficient knowledge and low confidence in practical application. These findings highlight a gap between favorable attitudes and the competencies required for effective AI adoption. Healthcare organizations should prioritize structured, targeted AI education and training initiatives and involve nurses in the planning and implementation of AI systems to support safe, effective, and ethically grounded integration into nursing practice.

Keywords: Artificial Intelligence; Nursing Practice; Technology Acceptance; Nurse Perceptions; Digital Health; Healthcare Innovation; Saudi Arabia

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I. Introduction

The global healthcare sector is undergoing a paradigm shift driven by the “quadruple aim,” which focuses on enhancing patient experience, improving population health, reducing costs, and improving the work life of healthcare providers. Within this framework, artificial intelligence (AI) has emerged as a transformative technology capable of analyzing large datasets, automating routine clinical tasks, and supporting data-driven decision-making¹. In nursing practice, AI applications such as predictive analytics, clinical decision support systems, and automated documentation have demonstrated potential to enhance efficiency, reduce medical errors, and allow nurses to focus on complex, patient-centered care².

AI technologies offer opportunities to strengthen nursing practice by facilitating personalized, evidence-based care and supporting professional decision-making. Studies conducted in Saudi Arabia show that nurses generally hold favorable perceptions of AI and recognize its potential to improve healthcare efficiency and safety. However, knowledge levels vary and appear to be influenced more by age, clinical experience, workplace setting,

and gender than by formal education alone. As a result, researchers emphasize the need for targeted training and further research to support effective AI integration within Saudi healthcare institutions³.

Despite its promise, AI integration presents notable challenges. Abuzaid, Elshami, and Fadden (2022)⁴, identified inadequate AI education in undergraduate nursing programs and continuing professional development as major barriers. Core competencies, including clinical information systems, data quality and standardization, data mining, and analytics, are often insufficiently addressed, limiting nurses' preparedness to engage with AI-enabled systems.

Globally, healthcare systems are rapidly expanding AI adoption to improve efficiency, quality, and equity of care. AI tools increasingly support clinical decision-making, particularly for less experienced healthcare professionals, by leveraging large datasets and shared clinical knowledge, such as in the identification of rare disease patterns⁵. However, successful implementation requires organizational readiness in addition to technological capability, including leadership that promotes digital literacy, adaptability, and innovation within healthcare teams⁶.

Artificial intelligence, a branch of computer science, aims to replicate cognitive processes such as learning, reasoning, and decision-making through computational systems. In healthcare, AI primarily includes machine learning, deep learning, and natural language processing^{7,8}. Despite growing exposure, knowledge gaps persist. A survey of U.S. nurses found that only 30% demonstrated adequate understanding of AI's role in clinical nursing practice⁹. Similarly, Castagno and Khalifa (2020)¹⁰, reported limited AI knowledge among UK healthcare professionals, alongside concerns related to data privacy and risk, despite generally positive attitudes toward AI.

Evidence from primary healthcare settings supports AI's potential when appropriately governed. A Delphi study by Liyanage et al. (2019)¹¹, identified AI value in clinical decision support, predictive modelling, imaging pattern recognition, and health system analytics, while emphasizing the importance of robust data protection and regulatory oversight.

As the largest professional group in healthcare, nurses play a central role in AI integration. Their engagement with patients and AI systems positions them as key stakeholders in ensuring ethical and effective implementation. In Saudi Arabia, where healthcare innovation is central to Vision 2030, AI adoption is accelerating¹². However, nurses' readiness—particularly within specialized and military healthcare settings such as the Armed Forces Hospital Southern Region (AFHSR)—remains insufficiently explored. Therefore, this study aims to assess nurses' perceptions, knowledge, and readiness for AI integration at AFHSR to inform evidence-based recommendations for successful and human-centered implementation.

II. Methods

Study Design and Setting: A descriptive cross-sectional study was conducted using an online survey to assess nurses' knowledge, attitudes, perceptions, and readiness regarding AI. The study was carried out at the AFHSR, a tertiary military hospital in Saudi Arabia.

Participants and Data Collection: All registered nurses employed at AFHSR for at least six months were eligible to participate. An invitation email containing study information and a survey link (Google Forms) was sent to 1,130 nurses via institutional email. Participation was voluntary and anonymous, and electronic informed consent was obtained prior to survey access.

Survey instrument: The questionnaire was developed based on a review of relevant literature and comprised four sections:

Demographics: gender, age, education level, and years of clinical experience.

Knowledge of AI: assessed using dichotomous items (Yes = 2, No = 1), with higher mean scores indicating greater perceived knowledge.

Attitudes toward AI: measured using dichotomous items, with higher scores reflecting more positive attitudes.

Perceptions of AI technology: assessed using a three-point Likert scale (1–3), categorized as low (1.00–1.66), moderate (1.67–2.33), or high (2.34–3.00).

Across all domains, higher mean scores indicated more favorable perceptions.

Validity and Reliability: Content validity was evaluated by two experts in nursing research and health informatics. All items demonstrated excellent content validity (I-CVI = 1.00; S-CVI/Ave = 1.00).

Reliability testing from a pilot study showed excellent internal consistency (Cronbach's alpha = 0.973). No items were removed.

Data analysis: Data were analyzed using SPSS version 26.0. Descriptive statistics summarized participant characteristics and survey responses. Pearson correlation analysis was used to examine relationships between knowledge, attitudes, perceptions, and overall AI perception. Statistical significance was set at $p < 0.05$

III. Results

Participant demographics: A total of 290 nurses completed the survey yielding a response rate of 25.7%. The majority of participants were female (89.3%). The most represented age groups were 31–35 years (33.1%) and 36–40 years (25.9%). Most respondents had substantial clinical experience, with 29.0% reporting 11–15 years of experience and 28.6% reporting 6–10 years. Regarding educational background, most participants held a Bachelor of Science in Nursing (64.5%), while 25.5% held a diploma qualification.

Table 1: Participants Demographics.				
	Category	Frequency	Percentages	Mean (SD)
Gender	Male	31	10.7	1.89(0.310)
	Female	259	89.3	
Age	20-25 years	10	3.4	3.49(1.101)
	26-30years	44	15.2	
	31-35 years	96	33.1	
	36-40 years	75	25.9	
	>40 years	65	22.4	
	0-5 years	64	22.1	2.57(1.215)
Experience	6-10 years	83	28.6	
	11-15 years	84	29.0	
	16-20 years	32	11.0	
	20+ years	27	9.3	
	Diploma	74	25.5	1.84(0.574)
Level of Education	BScN	187	64.5	
	Higher Diploma / Master	29	10.0	
Total		290	100%	

Knowledge, Exposure, and Confidence Related to AI: Most participants (90.7%, $n = 263$) reported being exposed to artificial intelligence through informal sources, including media, news outlets, posters, and social networking platforms. In terms of general understanding, 217 nurses (74.8%) reported being comfortable with what artificial intelligence means and expressed openness to its integration into intelligence ($M = 1.55$, $SD = 0.498$), while 129 (44.5%) agreed with the statement, “I don’t have the slightest idea about artificial intelligence.” Despite this exposure and perceived understanding, a majority of respondents (65.5%) reported lacking confidence in applying AI-related knowledge in their nursing practice. Overall, nurses demonstrated a positive perception of their AI knowledge, with a mean score of 1.64 ($SD = 0.425$).

Table 2: Respondents Knowledge, Exposure, and Confidence of Artificial Intelligent						
No.	Item		Frequency	Percentages	Mean (SD)	Perception
1	I don't have the slightest idea about artificial intelligence. *	Yes	129	44.5	1.55(0.498)	No
		No	161	55.5		
2	I learned about artificial intelligence through the news, posters, media, and social networking sites.	Yes	263	90.7	1.91(0.291)	Yes
		No	27	9.3		
3	I wouldn't apply artificial intelligence knowledge with high confidence as one does himself. *	Yes	190	65.5	1.34(0.476)	Yes
		No	100	34.5		
4	I'm comfortable with what artificial intelligence means, and I hope it will be in all nursing practice.	Yes	217	74.8	1.75(0.435)	Yes
		No	73	25.2		
Total (Overall Knowledge Perception)			290	100	1.64(0.425)	Positive

Attitudes toward artificial intelligence: Overall, nurses demonstrated a positive attitude toward AI, with an overall mean attitude score of 1.69 ($SD = 0.430$). Most respondents acknowledged the potential benefits of AI in healthcare. Specifically, 87.9% recognized AI as beneficial to healthcare practice ($M = 1.88$), 86.6% reported being impressed by AI capabilities ($M = 1.87$), and 85.5% perceived AI as creating new economic opportunities for healthcare organizations ($M = 1.86$). Additionally, 84.8% believed that AI could contribute to improving nurses' wellbeing ($M = 1.85$).

However, concerns were also evident. Exactly half of the respondents (50.0%) perceived AI as dangerous, and 49.7% believed that AI may be used unethically by organizations. Furthermore, 48.6% described AI as “sinister,” representing the lowest mean score among negative attitude items ($M = 1.49$). Participants also expressed concerns about the potential for AI systems to make errors ($M = 1.52$).

Table 3: Respondents Attitudes and Perceptions of Artificial Intelligent						
No.	Item		Frequency	Percentages	Mean (SD)	Perception
1	I am interested in using artificially intelligent systems in my daily life.	Negative	52	17.9	1.82(0.384)	Positive
		Positive	238	82.1		
2	There are many beneficial applications of Artificial Intelligence.	Negative	35	12.1	1.88(0.326)	Positive
		Positive	255	87.9		

3	Artificial Intelligence can provide new economic opportunities for My organization.	Negative	42	14.5	1.86(0.353)	Positive
		Positive	248	85.5		
4	I would like to use Artificial Intelligence in my job.	Negative	62	21.4	1.79(0.411)	Positive
		Positive	228	78.6		
5	I am impressed by what Artificial Intelligence can do.	Negative	39	13.4	1.87(0.342)	Positive
		Positive	251	86.6		
6	Artificial Intelligence can have positive impacts on Nurses' wellbeing.	Negative	44	15.2	1.85(0.359)	Positive
		Positive	246	84.8		
7	For routine transactions, I would rather interact with an artificially intelligent system than with a human.	Negative	103	35.5	1.64(0.479)	Positive
		Positive	187	64.5		
8	I think Artificial Intelligence is dangerous. *	Negative	145	50.0	1.50(0.501)	Negative
		Positive	145	50.0		
9	I find Artificial Intelligence sinister (threatening). *	Negative	149	51.4	1.49(0.501)	Negative
		Positive	141	48.6		
10	I shiver with discomfort when I think about future uses of Artificial Intelligence. *	Negative	133	45.9	1.54(0.499)	Positive
		Positive	157	54.1		
11	I think artificially intelligent systems make many errors. *	Negative	138	47.6	1.52(0.500)	Positive
		Positive	152	52.4		
12	Organizations use Artificial Intelligence unethically. *	Negative	146	50.3	1.50(0.501)	Negative
		Positive	144	49.7		
Total			290	100	1.69(0.430)	Positive

Perceptions of AI Technology: Nurses reported an overall moderate perception of AI technology use in nursing practice, with a mean score of 1.94 (SD = 0.404). Participants indicated moderate agreement that AI could speed up the nursing care process (M = 2.08), improve nursing care outcomes (M = 2.05), and play an important role in nursing practice (M = 2.01). They also perceived AI as potentially reducing medical errors (M = 1.96) and possessing capabilities that could complement human clinical experience (M = 2.03).

At the same time, respondents expressed reservations regarding AI's limitations. Moderate perceptions were reported for concerns related to AI's reduced ability to demonstrate empathy and consider patients' emotional wellbeing (M = 1.98), difficulty in addressing controversial or complex topics (M = 1.91), and limited flexibility in adapting to individual patient needs (M = 1.88). Lower agreement was observed regarding concerns that AI could replace nurses' jobs (M = 1.67) or be relied upon in unexpected clinical situations (M = 1.68).

Table 4: Respondents' frequencies, percentages, means, standards deviation and perceptions regards Perception toward Artificial Intelligent Technology.

No.	Item		Frequency	Percentages	Mean(SD)	Perception
1	The capabilities of artificial intelligence are superior to human experience.	Low Perception	47	16.2	2.03(0.593)	Moderate
		Moderate Perception	188	64.8		
		High Perception	55	19.0		
2	I have high hopes for the applications of AI in nursing care.	Low Perception	55	19.0	2.05(0.653)	Moderate
		Moderate Perception	166	57.2		
		High Perception	69	23.8		
3	Artificial intelligence plays an important role in nursing care.	Low Perception	54	18.6	2.01(0.620)	Moderate
		Moderate Perception	179	61.7		
		High Perception	57	19.7		
4	Artificial intelligence can speed up the nursing care process.	Low Perception	44	15.2	2.08(0.617)	Moderate
		Moderate Perception	178	61.4		
		High Perception	68	23.4		
5	Artificial intelligence can help reduce the number of medical errors.	Low Perception	66	22.8	1.96(0.640)	Moderate
		Moderate Perception	171	59.0		
		High Perception	53	18.3		
6	Artificial intelligence can replace my job. *	Low Perception	121	41.7	1.67(0.633)	Moderate
		Moderate Perception	143	49.3		
		High Perception	26	9.0		
7	AI cannot be used to provide opinions in unexpected situations. *	Low Perception	80	27.6	1.86(0.622)	Moderate
		Moderate Perception	172	59.3		
		High Perception	38	13.1		
8	AI is not flexible enough to be applied to every patient. *	Low Perception	73	25.2	1.88(0.604)	Moderate
		Moderate Perception	180	62.1		
		High Perception	37	12.8		
9	Artificial intelligence is difficult to apply to controversial topics. *	Low Perception	68	23.4	1.91(0.614)	Moderate
		Moderate Perception	179	61.7		
		High Perception	43	14.8		
10	The AI has a reduced ability to empathize and consider a patient's emotional well-being. *	Low Perception	66	22.8	1.98(0.663)	Moderate
		Moderate Perception	163	56.2		
		High Perception	61	21.0		
Total			290	100	1.94(0.404)	Moderate

Correlational analyses: Pearson correlation analysis demonstrated statistically significant positive relationships between all perceptual domains and overall perception toward AI use in nursing practice ($p < 0.001$). Attitude toward AI showed the strongest association with overall perception ($r = 0.392$), followed by perceptions of AI technology ($r = 0.357$). Knowledge demonstrated the weakest, though still significant, positive correlation with overall perception ($r = 0.243$).

Analysis of demographic variables revealed no significant associations between gender or years of experience and overall AI perception. However, age showed a weak but statistically significant negative correlation with overall perception toward AI use ($r = -0.123$, $p < 0.05$), indicating that younger nurses tended to hold slightly more positive perceptions of AI.

IV. Discussion

This study provides insight into nurses' perceptions, knowledge, and readiness for artificial intelligence (AI) integration at the Armed Forces Hospital Southern Region (AFHSR). The findings indicate a workforce that is generally optimistic toward AI yet insufficiently prepared for its practical implementation. The identified gap between positive attitudes and limited knowledge and confidence reflects a pattern that has been reported internationally and suggests that readiness for AI adoption extends beyond awareness alone.

The high reliance on informal sources such as media and social networking platforms for AI-related information (90.7%) mirrors findings from previous studies conducted in comparable settings, including research from Kirkuk, Iraq, where a substantial proportion of nurses reported similar learning pathways. While such exposure may increase familiarity with AI concepts, it is unlikely to provide the depth of understanding required for confident clinical application. This is supported by the present finding that 65.5% of nurses reported low confidence in applying AI in practice, despite widespread exposure.

Consistent with existing literature, nurses at AFHSR demonstrated generally positive attitudes toward AI, with most respondents expressing comfort with its integration into nursing practice. At the same time, notable concerns were evident, with half of the participants perceiving AI as potentially dangerous and expressing ethical reservations. This coexistence of enthusiasm and concern has been widely reported and reflects apprehensions related to patient safety, ethical accountability, loss of human interaction, and potential job displacement. These findings reinforce the notion that nurses perceive empathy, holistic judgment, and human connection as core elements of nursing practice that cannot be fully replicated by technological systems.

The correlational analysis offers important insight for implementation strategies. Attitude toward AI showed the strongest association with overall perception, suggesting that nurses' beliefs and feelings about AI may play a more influential role in shaping readiness than knowledge alone. While technical competence remains essential, these findings imply that initiatives aimed solely at increasing factual knowledge may be insufficient unless accompanied by efforts to address nurses' concerns, values, and expectations. Similar studies have identified inadequate training as a major barrier to AI adoption, and the low confidence reported by nurses at AFHSR highlights the need for structured educational interventions.

Implications for practice at AFHSR: The findings of this study have practical implications for AFHSR and similar healthcare institutions. First, there is a clear need to move beyond passive and informal exposure to AI toward structured, evidence-based education and training programs. Such initiatives should incorporate hands-on learning, simulation, and ethical discussions to enhance both competence and confidence.

Second, leadership plays a critical role in shaping perceptions of AI. Framing AI as a supportive tool designed to augment nursing practice—rather than replace clinical judgment—may help mitigate fears and resistance. Early implementation efforts may benefit from focusing on administrative and routine tasks, where AI can reduce workload and demonstrate tangible benefits without threatening professional roles.

Finally, a participatory approach to AI implementation is essential. Actively involving nurses in the selection, development, and evaluation of AI systems can promote transparency, foster trust, and ensure that technologies align with clinical workflows and patient care priorities. Such engagement may enhance acceptance and sustainability of AI initiatives within nursing practice.

Limitations: Several limitations should be considered when interpreting the findings. The cross-sectional design limits the ability to infer causality, and the study was conducted at a single institution, which may affect generalizability. Additionally, the use of self-reported data introduces the potential for response and social desirability bias. Future research should consider multi-center and longitudinal designs to examine changes in perceptions and readiness over time as AI integration progresses.

V. Conclusion

Nurses at the Armed Forces Hospital Southern Region demonstrate openness and generally positive attitudes toward the integration of artificial intelligence into nursing practice; however, their readiness is

constrained by gaps in formal knowledge, practical skills, and confidence. This combination of optimism and caution presents both a challenge and an opportunity for healthcare leaders. Capitalizing on nurses' positive attitudes while addressing educational and ethical concerns through structured training, transparent communication, and inclusive implementation strategies may support more effective AI adoption. Ultimately, the successful integration of AI in nursing practice will depend not only on technological capability but also on the preparation, engagement, and empowerment of the nursing workforce.

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