

Role of Artificial Intelligence in Diabetic Crisis Care: A Study of Critical Care Nurses' Perceptions and Knowledge

Rania Abdallah Mohamed Ahmed¹, Mona Aly Mohammed² & Safaa Mohamed Adam³

¹. Clinical Instructor at Sohag Technical Institute of Nursing Faculty of Nursing, Sohag University, Egypt.

². Professor of Critical Care Nursing Department Faculty of nursing, Assuit University, Egypt.

³. Lecturer of Critical Care & Emergency Nursing Department Faculty of Nursing, New Valley University, Egypt.

Abstract:

Diabetic crises are acute, life-threatening complications of diabetes mellitus that require prompt and precise nursing interventions. Artificial intelligence has advanced considerably across various domains in recent years, particularly in healthcare and nursing. **Aim of the study:** This study aims to assess nurses' perception and knowledge regarding role of artificial intelligence in diabetic crisis care. **Research Design:** Descriptive correlational research design was used to attain the goal of this study. **Setting:** This study was conducted in the Intensive care unit and the emergency department at Sohag University hospital. **Subjects:** Convenience sample of 100 nurses who work in intensive care units and emergency department at Sohag University hospitals. **Tools:** Two tools were utilized. **Tool I:** Self-administered artificial intelligence knowledge questionnaire. **Tool II:** Nurses' perception of artificial intelligence in diabetic crisis questionnaire. **Results:** About 53% of the studied nurses had positive level of perception regarding artificial intelligence in diabetic crisis. Also, 66% of them had satisfactory level of knowledge regarding artificial intelligence. Moreover, there was a significant correlation between the studied nurses knowledge regarding artificial intelligence and perception of artificial intelligence in diabetic crisis with p value (.004). **Conclusion:** The majority of nurses reported satisfactory knowledge level regarding artificial intelligence, more of them had positive perception regarding using of artificial intelligence in diabetic emergencies. **Recommendations:** Monitor the newest artificial intelligence application for diabetic crisis and evaluate its effect on patient outcomes.

Keyword: Artificial Intelligence, Critical Care Nurses, Diabetic Crisis, Knowledge & Perceptions

Introduction

The rapid advancement of artificial intelligence (AI) is revolutionizing the landscape of modern healthcare, with the potential to change disease diagnosis, management, and treatment. Among the many medical fields primed for transformation, diabetology stands out as a strong candidate for AI integration (Bajwa et al., 2021). The chronic and complex nature of diabetes, along with the acute and potentially fatal hazards of diabetic crises, needs a continual and watchful approach to patient management. (Tronstad et al., 2023).

The application of artificial intelligence in diabetes control is not a distant future, but rather a contemporary reality. AI-powered systems are now being developed to predict hypoglycemia events, optimize insulin dose, evaluate continuous glucose monitoring (CGM) data, and identify patients who are at high risk of complications. These tools are intended to supplement the capabilities of healthcare workers by delivering increased data analysis and predicted insights that are frequently beyond human capacity. For a patient undergoing a diabetic crisis, such as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic condition (HHS), prompt and appropriate treatment is critical. The ability of an AI

system to assess a patient's physiological data in real-time and notify a nurse to a subtle, approaching deterioration might be the difference between a minor episode and a catastrophic consequence. (Thomas et al., 2024)

Artificial intelligence's practical application is dependent on acceptance by the experts who will utilize it on a daily basis. Nurses, as important implementers of these technologies, are central to the integration challenge. Their vision of AI is not uniform; it is affected by a complex interaction of clinical experience, technological knowledge, professional identity, and ethical concerns. The perceived utility of an AI tool is directly related to whether it streamlines their workflow or adds to their burden, making the design and execution of these systems a critical element. (Mahdi et al., 2023)

This perception is more than just a personal view; it has serious implications for patient safety and care quality. If nurses are doubtful about AI, they may be less inclined to trust its recommendations, potentially missing vital alarms or depending too heavily on their own judgment, which could be less accurate than an AI-driven analysis. Conversely, over-reliance on AI without knowing its limitations may result in "automation bias," in which nurses fail to do their

own critical assessments (Abdelkareem et al., 2024).

In this essential context, nurses are the frontline practitioners, acting as a constant liaison between the patient and the healthcare system. Their immediate and ongoing interactions with patients in both routine and emergency situations provide them with a unique and useful perspective on the benefits and drawbacks of new technologies. (Eltesh, 2024).

Significance of the study

Egypt is employing artificial intelligence and technology across various areas, including healthcare, to achieve Vision 2030. The government is vigorously advocating for the advancement of AI in the domains of health, research, and development (Egypt's AI Future, 2020). Artificial intelligence (AI) is swiftly revolutionizing healthcare, and its utilization in diabetes control holds significant promise. AI offers the potential for personalized, predictive, and accurate diabetes management, resulting in improved patient outcomes and reduced healthcare expenses. Jung et al. (2023).

Nursing profession's perception of AI's uses for diabetic crisis patients is a multifaceted and evolving landscape. It is characterized by a cautious optimism, where the potential for enhanced patient safety and streamlined workflows is balanced by legitimate concerns about trust, workflow disruption, ethics, and professional identity. To harness the full potential of AI in this critical domain, it is imperative to move beyond a purely technological focus and engage directly with the nursing community. By understanding their perspectives and integrating their insights into the design, implementation, and training of AI systems, we can ensure that these technologies serve to empower nurses, improve patient outcomes, and ultimately strengthen the human-centered core of healthcare. (Syed, et al 2024)

Thus, it is crucial to comprehend and address how the nursing profession perceives AI in order to successfully and safely include it into diabetes care. This calls for examining their goals, worries, and practical requirements to guarantee that AI turns into a genuine care partner rather than a cause of professional conflict.

Subjects and Method

Aim of the study

This study aimed to assess nurses' perception and their knowledge regarding role of artificial intelligence in diabetic crisis care.

Research questions:

- What is the level of critical care nurses' knowledge regarding artificial intelligence?

- What is critical care nurses' perceptions about artificial intelligence uses for diabetic crisis patient?
- What is the relation between knowledge and perceptions about artificial intelligence uses for diabetic crisis patients?.

Research design

Descriptive correlational research design was utilized to achieve the aim of this study.

Research setting

This research was conducted in the Intensive Care Unit (ICU) and the Emergency Department of Sohag University Hospital in Sohag Governorate. The Intensive Care Unit, located on the third floor of the hospital, consists of 10 rooms with a total of 20 beds, The Emergency Department, situated on the ground floor, includes multiple sections for triage, observation, and resuscitation, with 15 beds designated for emergency cases.

Subjects:

A convenience sample including 100 critical care nurses from both sexes who working in previous mentioned setting and consented to participate in this study. Nurses who were on yearly leave, ill, or engaged in other official tasks throughout the data collecting period were omitted.

Tools of data collection

To accomplish the study's objective, the following two tools were utilized:

Tool (I): Self-administered Artificial Intelligence Knowledge Questionnaire This questionnaire was developed by researcher based on review of literatures (Lennartz et al., 2021; Shimon et al., 2021) to assess critical care nurses' knowledge of artificial intelligence. It consisted of two parts:

Section (1): nurses' personal data: This section comprised five elements: age, gender, educational qualifications, years of experience and attending any training on Artificial intelligence.

Part (2): Critical care nurses' knowledge regarding artificial intelligence applications: This part was developed by the researchers after reviewing recent and relevant literature (Lennartz et al., 2021 & Shimon et al., 2021) to assess the artificial intelligence knowledge levels of critical care nurses. It consisted of 35 open -end questions about definition, importance, barriers and applications of AI.

Scoring System: One point was awarded for a correct response and zero for an incorrect answer. Nurses were deemed to possess satisfactory knowledge with a score of 75% or above, and unsatisfactory knowledge with a score below 75%.

Tool (II): Nurses' Perception of Artificial Intelligence in Diabetic Crisis Questionnaire: This tool was formulated by the researcher subsequent to an examination of pertinent literature (Aggar et al.,

2022; Shimon et al., 2021) to assess nurses' perceptions of artificial intelligence in managing diabetic crisis cases.

Scoring System:

Nurses' responses were measured using a 3-point Likert scale: 0 = disagree, 1 = neutral, 2 = agree. The total possible score was 20. A score of 13 or more ($\geq 75\%$) was considered a positive perception, while a score below 13 ($<75\%$) indicated a negative perception

Method

The researcher conducted a comprehensive review of the relevant literature, both locally and internationally, utilizing textbooks, scholarly articles, and reputable journals. The tools were developed based on the reviewed literature and standardized scales.

Pilot study

A pilot study was performed on 10% of the sample to assess clarity and applicability of the instruments used to identify obstacles and issues found during data collecting, along with the required modifications made. The pilot study was incorporated into the research.

Validity of the tools:

The study tools underwent content validity assessment by a panel of five experts in critical care nursing staff from Assiut and Sohag Universities.

Reliability of the tools:

Reliability of the developed tools were tested using the Cronbach's alpha and it was (0.893) for self-administered artificial intelligence knowledge questionnaire & (.931) for nurses' perception of artificial intelligence in diabetic crisis questionnaire

Ethical Considerations:

The Ethical Committee at the Faculty of Nursing, Assiut University, approved the study proposal on January 26, 2025, under reference number 1120250995. The study participants were not exposed to risk during its execution; oral consent was secured from them; participants retain the right to refuse participation or withdraw from the research at any time without justification; The collected data is confidential and anonymous the study complies with established ethical standards for clinical research; and the privacy of study participants is prioritized during data collection.

Filed work

- To carry out the study, an approval was obtained from Sohag University hospital. After, A letter was issued to them from the faculty of nursing, Sohag university explained the aim of the study in order to obtain permission and cooperation to conduct study.
- A questionnaire was translated into Arabic and created using Google Forms, containing details on

the study's objective and the anticipated completion time (about 15 minutes). The link was subsequently transmitted to nurses using WhatsApp. Responses from nurses who consented to participate were aggregated into an online spreadsheet to evaluate clever artificial intelligence as a self-educational resource for critical care nurses managing patients in diabetic crises.

- Data was collected within six months.

Statistical analysis

The recorded data were analyzed with the statistical package for social sciences, version (28). A questionnaire was translated into Arabic and developed using Google Forms, encompassing information regarding the study's purpose and the expected duration for completion (around 15 minutes). The link was later communicated to nurses via WhatsApp. Responses from consenting nurses were compiled into an online spreadsheet to assess the efficacy of advanced artificial intelligence as a self-educational tool for critical care nurses handling patients in diabetic emergencies.

Results

Table (1): Percentage distribution the studied nurses' personal data (n=100)

Personal data	No	%
Age		
< 25 years old	4	4.0
25–35 years old	70	70.0
36–45 years old	16	16.0
> 45 years old	10	10.0
Gender:		
Male	13	13.0
Female	87	87.0
Educational Qualifications:		
Diploma	3	3.0
Bachelor's degree	69	69.0
Master's degree	28	28.0
Years of Experience		
< 1 year	0	0.0
1–5 years	50	50.0
6–10 years	36	36.0
more than 10 years	14	14.0
Have you attend any training on Artificial intelligence?		
Yes	21	21.0
No	79	79.0

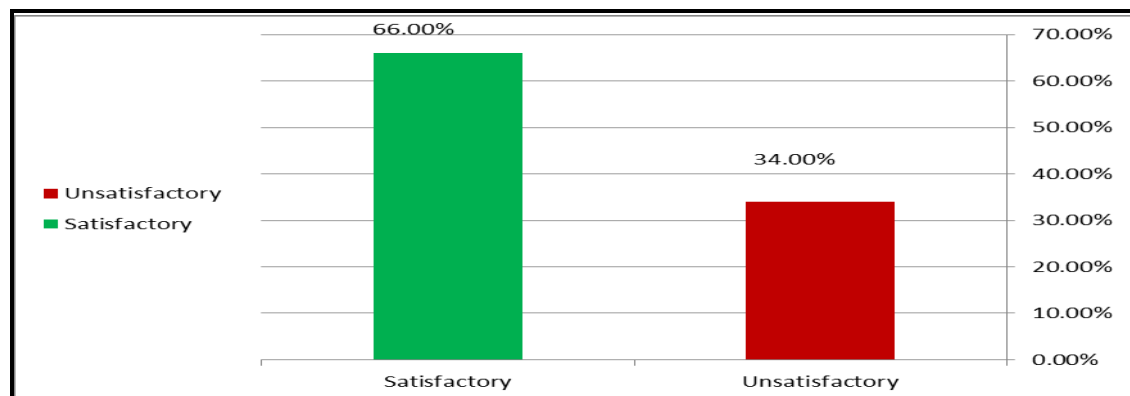


Figure (1): Percentage distribution the total studied nurses' knowledge level regarding artificial intelligence applications (n=100)

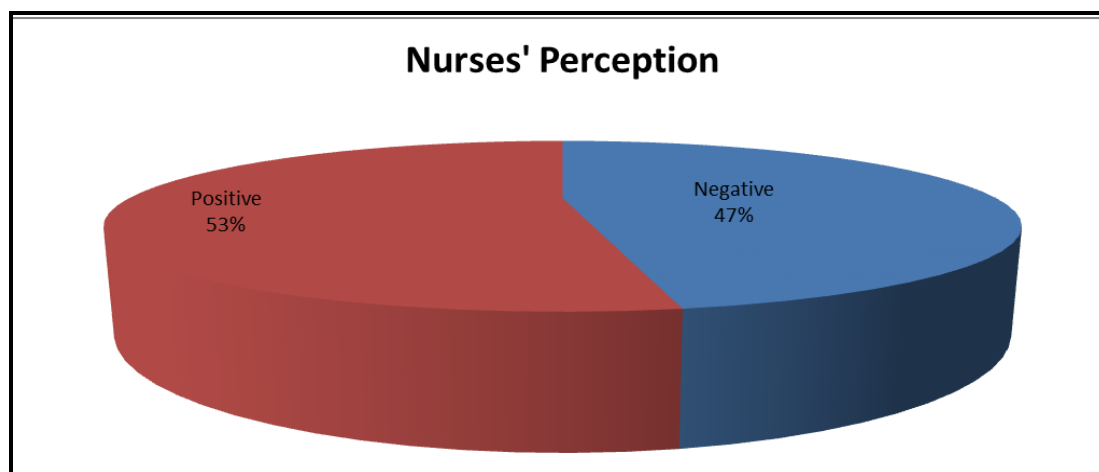


Figure (2): Percentage distribution of the total studied nurses' Perception regarding artificial intelligence's uses in diabetic crisis (n=100)

Table (2): Relation between the studied nurses knowledge regarding artificial intelligence applications and their nurses' personal data (n=100)

Socio-demographic	Satisfactory		Unsatisfactory		X2	P
	No	%	No	%		
Age						
< 25 years old	0	0.0	0	0.0	3.288	.070
25–35 years old	60	60.0	34	34.0		
36–45 years old	6	6.0	0	0.0		
> 45 years old	0	0.0	0	0.0		
Gender:						
Male	6	6.0	7	7.0	2.623	.105
Female	60	60.0	27	27.0		
Educational Qualifications:						
Diploma	3	3.0	0	0.0	2.330	.312
Bachelor’s degree	43	43.0	26	26.0		
Master’s degree	20	20.0	8	8.0		
Years of Experience						
1–5 years	31	31.0	19	19.0	.731	.694
6–10 years	25	25.0	11	11.0		
more than 10 years	10	10.0	4	4.0		
Have you attend any training on Artificial intelligence?						
No	45	45.0	34	34.0	17.413	.000**
yes	21	21.0	0	0.0		

* Statistically significant at $p < 0.05$.** Highly statistically significant at $p < 0.001$ **Table (3): Relation between the studied nurses Perception of artificial intelligence in diabetic crisis and their nurses' personal data (n=100)**

Socio-demographic	Positive		Negative		X2	P
	No	%	No	%		
Age						
< 25 years old	0	0.0	0	0.0	5.660	.017*
25–35 years old	47	47.0	47	47.0		
36–45 years old	6	6.0	0	0.0		
> 45 years old	0	0.0	0	0.0		
Gender:						
Male	6	6.0	7	7.0	.281	.596
Female	47	47.0	40	40.0		
Educational Qualifications:						
Diploma	3	3.0	0	0.0	3.238	.198
Bachelor’s degree	34	34.0	35	35.0		
Master’s degree	16	16.0	12	12.0		
Years of Experience						
1–5 years	22	22.0	28	28.0	6.112	.047*
6–10 years	25	25.0	11	11.0		
more than 10 years	6	6.0	8	8.0		
Have you attend any training on Artificial intelligence?						
Yes	15	15.0	6	6.0	17.413	.000**
No	38	38.0	42	42.0		

* Statistically significant at $p < 0.05$.** Highly statistically significant at $p < 0.001$ **Table (4): Correlation between the studied nurses Artificial intelligence applications knowledge and Perception of artificial intelligence in diabetic crisis care(n=100)**

Study variables		Perception of artificial intelligence in diabetic crisis
Artificial intelligence applications knowledge	r	.284**
	P	.004

** highly statistically significant at $p < 0.001$

Table (1): Shows that, 70% of the studied nurses had age 25–35 years old, 87% were female, 69% of them had bachelor degree in nursing and 50% had 1 to 5 year of experience in nursing field. Also, more than three quarter didn't attend any training on Artificial intelligence

Figure (1): Illustrates that, more than half of the studied nurses had a satisfactory level of knowledge regarding artificial intelligence, while about one third % of them had unsatisfactory level of knowledge regarding artificial intelligence

Figure (2): Illustrates that, 53% of the studied nurses had positive level of perception of artificial intelligence in diabetic crisis, while 47% of them had negative level of perception of artificial intelligence in diabetic crisis

Table (2): Reveals that there was statistical significant relation between total studied nurses knowledge regarding artificial intelligence application in diabetic crisis and attended any training on Artificial intelligence with $P < 0.05$

Table (3): Reveals that there was statistical significant relation between total studied nurses Perception of artificial intelligence in diabetic crisis and their age, years of experience and attended any training on Artificial intelligence with $P < 0.05$

Table (4): Show that there was significant correlation between the studied nurses knowledge regarding Artificial intelligence and perception of artificial intelligence in diabetic crisis

Discussion

The frequency distribution of the **nurses' personal data** revealed that less than three-quarters were aged between 25 and 35 years, the majority were female, over two-thirds possessed a bachelor's degree in nursing, and half had 1 to 5 years of experience in the nursing field. The majority of them did not participate in any training on artificial intelligence. From a researcher's perspective, this may be ascribed to the predominance of females in the nursing profession in Egypt.

The findings align with **Nagy et al. (2025)**, titled "Nurses' Opportunities and Challenges regarding Application of Artificial Intelligence in Intensive Care Units," which indicated that the majority of nurses were aged 25 to 30 years and predominantly held bachelor's degrees. Similarly, similar findings were corroborated by the study conducted by **Mekky et al. (2023)**, titled "Effect of an Educational Program on Nurses' Performance and Patients' Health Outcomes Regarding Diabetic Ketoacidosis," which indicated that approximately two-fifths of the nurses were aged between 25 and 35 years.

Furthermore, these findings were corroborated by the research conducted by **Alruwaili et al. (2024)**,

entitled "Exploring Nurses' Awareness and Attitudes Toward Artificial Intelligence: Implications for Nursing Practice," which indicated that fewer than two-thirds of nurses possess a Baccalaureate degree. The results corroborated the findings of **Khalil & Yasir (2025)** in their study titled "Evaluating Nurses' Knowledge of Artificial Intelligence Applications in Clinical Nursing," which indicated that over half of the nurses were female, possessed less than five years of experience, and the majority had not undergone any training in artificial intelligence.

The frequency distribution of nurses' knowledge on artificial intelligence applications revealed that most nurses had a substantial level of understanding of artificial intelligence. From a researcher's perspective, this may be attributed to nurses' awareness that such technologies do not adapt to new patient demographics or emerging patterns without manual updates.

The findings aligned with the research undertaken by **Mariano et al. (2025)** titled "Exploring Artificial Intelligence Knowledge, Attitudes, and Practices Among Nurses, Faculty, and Students in Saudi Arabia: A Cross-Sectional Analysis," which indicated that approximately three-quarters of nurses provided correct responses regarding artificial intelligence. Furthermore, similar findings were corroborated by **Al-Qudimat et al. (2025)**, who conducted a descriptive study on the perception and knowledge of medical personnel regarding the utilization of artificial intelligence.

The results were inconsistent with the study conducted by **Sommer et al. (2024)**, titled "Nurses' Perceptions, Experience, and Knowledge Regarding Artificial Intelligence: Results from a Cross-Sectional Online Survey in Germany," which indicated that a minority of nurses are familiar with the term AI, yet lack understanding of its meaning. Furthermore, I contested the study performed by **Elderiny et al. (2024)**, titled "Intensive Care Nurses' Knowledge and Perception Regarding Artificial Intelligence Applications," and elucidated that approximately two-thirds of nurses exhibited an inadequate level of knowledge concerning artificial intelligence applications, while over one-third demonstrated a satisfactory level of understanding regarding AI applications. Moreover, these findings contrasted with the research conducted by **Hamedani et al. (2023)**, entitled "Evaluation of Acceptance, Attitude, and Knowledge Towards Artificial Intelligence and Its Application from the Perspective of Physicians and Nurses: A Provincial Survey Study in Iran: A Cross-Sectional Descriptive-Analytical Study," which indicated that the participants possessed a moderate level of expertise.

The current study regarding the distribution of nurses' perceptions of artificial intelligence in diabetic crises care revealed that, although over half of the critical care nurses exhibited a positive perception, the proportion of those with a negative perception was comparable. From a researcher's perspective, this may stem from a deficiency in nursing trust regarding AI's capacity to meet the unique and dynamic healthcare demands of individual patients, coupled with insufficient exposure to AI applications that cater to varied patient demographics, requirements, and conditions.

This corresponds with **Kanekar (2023)**, who noted that the integration of AI technology in nursing practice has intensified concerns and public dialogue, with many wary of the possibility of this technology supplanting nurses. Other significant concerns are around the ethical application of these technologies, including the management of data bias and the imperative to cultivate new viewpoints on technology implementation, as well as recognizing obstacles in technology approval among nurses, which remain equally pertinent today.

The findings were corroborated by **Yoo et al. (2023)**, who discovered that Healthcare professionals view AI as a tool to improve healthcare outcomes and positively impact the field influence clinical performance. I concur with **Al-Sabawy (2023)**, who discovered that most nurses exhibited a favorable opinion of the integration of AI into their nursing practice. This conclusion is inconsistent with **Elderiny et al. (2024)**, who demonstrated that most of the surveyed nurses possessed a moderate perception of artificial intelligence applications in the ICU, while only a minority exhibited a low perception level for these applications. Furthermore, **Wang et al. (2024)** conducted a study titled "Knowledge and Attitudes Toward Artificial Intelligence in Nursing Among Various Categories of Professionals in China: A Cross-Sectional Study," which revealed that fewer than half of the nurses expressed acceptance of the application of artificial intelligence in healthcare.

The study revealed a statistically significant correlation between nurses' knowledge of artificial intelligence applications and their nurses' personal data, particularly highlighting that those who underwent training in artificial intelligence and employed AI applications exhibited superior knowledge concerning the diabetes crisis. This might be ascribed to the impact of AI training programs on augmenting nurses' comprehension and proficiency in AI applications.

This aligns with the findings of **Nagy et al. (2025)**, who identified a correlation between nurses' overall understanding of AI and their sociodemographic data.

The findings were corroborated by the research conducted by **Jalal et al. (2025)**, titled "Nurses' Perception of Artificial Intelligence-Driven Monitoring Systems for Enhancing Compliance with Infection Prevention and Control Measures in Al-Ahsa, Saudi Arabia," which demonstrated a significant correlation between knowledge level and AI technology-based training.

In contrast, the findings of **Hamedani et al. (2023)** indicated that there is no statistically significant correlation between knowledge and participation in an AI training course. This also contradicts the findings of **Abdullah & Fakieh (2020)**, who determined that there were no statistically significant differences in overall scores of nurses' knowledge of AI opportunities based on gender, age, or educational level.

Conclusion

This study indicated that over 50% of the surveyed nurses exhibited a favourable opinion of artificial intelligence in diabetic crises, while the majority shown a sufficient degree of understanding concerning artificial intelligence. A substantial association has been shown between the knowledge of nurses regarding artificial intelligence and their impression of artificial intelligence in diabetic crises.

Recommendations

Based on the findings of this study, several key recommendations are proposed:

- Provide educational program for nursing staff about AI in health care services
- Monitor the newest AI application for diabetic crisis and evaluate its effect on patient outcomes.
- Suggested continuous feedback from nurses should be collected through surveys and interviews to evaluate user satisfaction, and usability of artificial intelligence

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