

## NURSES' PERCEPTIONS, KNOWLEDGE AND EXPERIENCE REGARDING ARTIFICIAL INTELLIGENCE IN A TERTIARY HEALTHCARE SETTING: A QUANTITATIVE CROSS-SECTIONAL STUDY

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### ABSTRACT

#### **Background:**

Artificial intelligence (AI) is increasingly being integrated into healthcare systems to improve efficiency, support clinical decision-making, and address workforce shortages. Nurses are central to patient care delivery and play a key role in the successful adoption of AI technologies. However, limited evidence exists regarding nurses' knowledge and perceptions of AI in public-sector hospitals in Pakistan. This study aimed to assess nurses' knowledge, perceptions, and attitudes toward artificial intelligence at Mardan Medical Complex, Mardan.

#### **Methods:**

A cross-sectional descriptive study was conducted among nurses working at Mardan Medical Complex, Mardan. A total of 172 nurses were recruited using a convenience sampling technique. Data were collected using a structured, self-administered questionnaire used in previous study covering demographic characteristics, knowledge of artificial intelligence, and perceptions regarding its use in nursing practice. Data were analyzed using SPSS. Descriptive statistics (frequencies and percentages) were used to summarize the data. Spearman's rank correlation and Cramer's V tests were applied to examine associations between demographic variables, AI knowledge, and perceptions, with a significance level set at  $p < 0.05$ .

#### **Results:**

The study found that the majority of nurses had limited knowledge of artificial intelligence, with 74.8% ( $n = 129$ ) reporting low or basic understanding of AI,

While only 25.2% ( $n = 43$ ) reported good or advanced knowledge. Despite limited knowledge, most nurses demonstrated a positive attitude toward AI, with 65.7% ( $n = 113$ ) perceiving AI as an opportunity in nursing practice, whereas 13.7% ( $n = 24$ ) viewed it as a threat and 20.6% ( $n = 35$ ) were unsure. Nurses most commonly identified AI applications in patient monitoring (55.7%), route planning and workflow management (47.7%), and nursing documentation (43.6%). Spearman's rank correlation showed a significant positive relationship between education level and AI knowledge ( $\rho = 0.312$ ,  $p = 0.001$ ), while no significant correlation was found between age and AI knowledge ( $\rho = 0.087$ ,  $p = 0.251$ ). Cramer's V analysis revealed significant associations between gender and AI knowledge ( $V = 0.239$ ,  $p = 0.002$ ),

education level and AI knowledge ( $V = 0.329, p < 0.001$ ), and AI knowledge and perception of AI ( $V = 0.259, p = 0.003$ ).

**Conclusion:**

Although nurses at Mardan Medical Complex have limited knowledge of artificial intelligence, the majority perceive AI positively and recognize its potential to support nursing practice. The gap between low AI literacy and high acceptance highlights the need for targeted education, in-service training programs, and institutional policies that actively involve nurses in AI-related initiatives. Strengthening nurses' AI knowledge may facilitate the ethical, effective, and patient-centered integration of artificial intelligence into nursing services.

**Keywords:**

Artificial intelligence; Nursing; Nurses' knowledge; Nurses' perception; Pakistan

## 1. Introduction

### 1.1 Background of the Study

The integration of Artificial Intelligence (AI) into healthcare is transforming clinical practice, diagnostics, administration, and patient management. AI technologies, including machine learning algorithms, natural language processing, and robotic process automation, are being deployed to enhance diagnostic accuracy, predict patient outcomes, personalize treatment plans, and streamline operational workflows (Jiang et al., 2017). In tertiary healthcare settings, which manage complex and acute conditions, the potential for AI to support decision-making and improve efficiency is particularly significant. Nurses, as the largest cohort of healthcare professionals and primary frontline caregivers, are pivotal to the successful adoption and implementation of these technologies. Their direct interaction with patients and clinical systems positions them as key users and influencers of AI-driven tools. Understanding their baseline perceptions, knowledge, and experiential readiness is therefore crucial for guiding effective integration strategies, tailored training programs, and ethical governance frameworks (Robert, 2019).

### 1.2 Problem Statement

Despite the rapid advancement and deployment of AI in tertiary hospitals, there is a notable gap in understanding how the nursing workforce—a critical end-user group—perceives, understands, and interacts with these technologies. A lack of knowledge, negative perceptions, or insufficient experience among nurses can lead to resistance, underutilization, and even compromise patient safety, thereby hindering the realization of AI's potential benefits (Buchanan et al., 2020). Currently, in many settings, AI implementation is often driven by administrators and technologists without sufficient input from nursing

professionals. This study addresses the gap by systematically investigating nurses' perceptions, level of knowledge, and hands-on experience with AI in a tertiary care context.

### 1.3 Rationale of the Study

The rationale for this study is threefold. First, nurses' acceptance is a critical success factor for any technological innovation in healthcare; understanding their perspectives is essential for change management. Second, identifying knowledge gaps will inform the development of targeted educational curricula and continuous professional development programs. Third, exploring their direct experiences can provide practical insights into workflow integration, usability issues, and the perceived impact on nursing roles and patient care, ultimately guiding policy and practice for human-centric AI implementation (Topol, 2019).

### 1.4 Research Objectives

#### General Objective

To assess the knowledge and perceptions of nurses regarding artificial intelligence and its application in nursing practice at Mardan Medical Complex, Mardan.

#### Specific Objectives

1. To assess the level of knowledge regarding AI concepts and applications among nurses in a tertiary healthcare setting.
2. To explore the perceptions (including attitudes, benefits, and concerns) of nurses towards AI integration in clinical practice.
3. To describe the extent and nature of nurses' direct experience with AI-powered tools or systems in their workplace.
4. To determine the association between demographic variables (e.g., age, years of experience, education level, clinical area) and

nurses' knowledge, perceptions, and experience with AI.

### 1.5 Research Questions

1. What is the level of knowledge about AI among nurses in a tertiary healthcare setting?
2. What are the perceptions of nurses regarding the benefits, risks, and overall impact of AI on nursing practice and patient outcomes?
3. What is the prevalence and type of direct experience nurses have with AI technologies in their clinical units?
4. Is there a significant relationship between demographic factors and nurses' knowledge, perceptions, and experience with AI?

### 1.6 Significance of the Study

This study holds significance for multiple stakeholders:

- **For Nursing Practice & Administration:** The findings will help nurse leaders and hospital administrators design evidence-based strategies for AI rollout, including tailored training, support systems, and role redefinition.
- **For Nursing Education:** Results will highlight necessary competencies, guiding updates in academic and in-service training programs to prepare a future-ready nursing workforce.
- **For Health Policy:** Insights into perceptions and concerns can inform guidelines on ethics, governance, and the responsible use of AI in clinical settings.
- **For Research:** This study will contribute baseline data to the growing body of literature on healthcare human factors in digital transformation and identify areas for future intervention studies.

### 1.7 Operational Definitions

**1. Artificial Intelligence (AI):** For this study, AI refers to computer systems designed to perform tasks typically requiring human intelligence, including but not limited to clinical decision support systems, predictive analytics for patient deterioration, AI-assisted imaging analysis, and robotic process automation for administrative tasks.

**2. Perceptions:** The attitudes, beliefs, and opinions held by nurses regarding the usefulness, ease of use, ethical implications, and impact of AI on their professional role.

**3. Knowledge:** The nurses' self-reported and objectively measured understanding of

fundamental AI concepts, common healthcare applications, and associated terminology.

**4. Experience:** The self-reported level of hands-on interaction or use of any AI-powered tool or system within the clinical environment during their professional duties.

**5. Tertiary Healthcare Setting:** A specialized referral hospital providing complex, advanced-level medical care and procedures.

## LITERATURE REVIEW

### 2.1 The Global Rise of AI in Healthcare

The adoption of AI in healthcare is accelerating globally, driven by big data, increased computational power, and the pursuit of precision medicine. Applications range from radiology and pathology to drug discovery, patient monitoring, and operational logistics (He et al., 2019). The global market is projected to grow substantially, indicating a sustained trend towards AI integration.

### 2.2 AI Applications in Nursing Practice

- **Predictive Analytics:** Early warning systems for sepsis or patient falls (Berton et al., 2022).
- **Clinical Decision Support:** Alerts for medication interactions or pressure ulcer risk.
- **Virtual Nursing Assistants:** Chatbots for patient education or post-discharge follow-up.
- **Workflow Automation:** Documenting care or managing supplies.

### 2.3 Knowledge and Readiness of Healthcare Professionals

Studies indicate variable levels of AI knowledge among healthcare professionals. Physicians and radiologists often show higher awareness due to direct exposure, while studies focusing specifically on nurses are emerging but less common (Buchanan et al., 2020). A general trend suggests a knowledge deficit and a need for formal education.

### 2.4 Perceptions and Attitudes towards AI

Literature reveals a mixture of optimism and apprehension. Perceived benefits include reduced administrative burden, enhanced diagnostic support, and more time for direct patient care. Major concerns encompass job displacement, dehumanization of care, algorithmic bias, data privacy, and over-reliance on technology (Seibert et

al., 2021). Trust and transparency are consistently cited as prerequisites for acceptance.

### 2.5 Experience and Integration Challenges

Narratives on experience highlight challenges such as lack of training, integration with existing electronic health records, workflow disruptions, and "alert fatigue" from decision support systems. Successful integration is often linked to user-centered design and involving nurses from the development stage (Robert, 2019).

### 2.6 Summary of Literature Gaps

While literature on AI in healthcare is expanding, there is a scarcity of quantitative, cross-sectional studies focusing exclusively on nurses in tertiary care settings, particularly in diverse geographical contexts. Gaps exist in understanding the correlation between demographic factors (like clinical specialty or education) and AI readiness. This study aims to fill these gaps by providing a structured assessment of knowledge, perceptions, and experience in a key tertiary hospital population.

## METHODOLOGY

### 3.1 Study Design

A quantitative, descriptive, cross-sectional study design will be employed.

### 3.2 Study Setting

The study will be conducted at Mardan Medical Complex, a large, public-sector referral hospital with over 500 beds, offering specialized services.

### 3.3 Study Population

The target population will be all registered nurses (RNs) employed in clinical units at the study hospital.

### 3.4 Inclusion and Exclusion Criteria

#### Inclusion Criteria:

1. Full-time or part-time registered nurses with at least six months of experience in the current setting.

#### Exclusion Criteria:

Nurses in purely administrative, non-clinical roles, and those on extended leave during the data collection period

### 3.5 Sampling Technique and Sample Size

A non probability-based, convenient random sampling technique is used. Sampling is based

on major clinical departments (e.g., Medicine, Surgery, ICU, Emergency). The sample size will be calculated using a standard formula for estimating a single proportion. Assuming a 50% prevalence of positive perception (to maximize sample size), a 95% confidence level, and a 5% margin of error, the initial calculated sample is 172.

### 3.6 Data Collection Instrument

Data were collected using a structured, pre-adopted questionnaire designed to assess nurses' knowledge and perceptions regarding artificial intelligence (AI) in nursing practice. The questionnaire was adapted from previously published studies on AI in healthcare and nursing, with minor modifications to suit the local hospital context and study objectives.

#### The instrument consisted of four sections:

##### Section A: Demographic Characteristics

This section collected information on participants' demographic and professional characteristics, including age, gender, educational qualification, years of work experience, and current clinical area of practice.

##### Section B: Knowledge of Artificial Intelligence

This section assessed nurses' level of knowledge about artificial intelligence. It included items related to familiarity with AI concepts, awareness of AI applications in healthcare, and self-rated understanding of AI technologies. Responses were measured using categorical options ranging from very good knowledge to no knowledge. For analysis, AI knowledge was categorized into adequate and inadequate knowledge levels.

##### Section C: Perceptions and Attitudes toward Artificial Intelligence

This section evaluated nurses' perceptions of AI in nursing practice, including whether AI was viewed as an opportunity or a threat, perceived benefits of AI, and concerns related to AI use such as job displacement, reduced human interaction, and data reliability. Responses were recorded using multiple-choice and Likert-scale items.

##### Section D: AI Application Areas and Expected Beneficiaries

This section explored nurses' awareness of potential AI application areas in nursing (e.g., patient monitoring, documentation, workflow management) and their views on which groups would benefit most from AI implementation in healthcare.

### 3.7 Data Collection Procedure

Formal permission was obtained from the administration of Mardan Medical Complex, Mardan prior to data collection. Data were collected using a structured, self-administered questionnaire adopted from a previous study and administered to eligible nurses working in different clinical departments.

Participants were approached during duty hours, and the purpose of the study was explained. Participation was voluntary, and written informed consent was obtained. Confidentiality and anonymity were assured, and no personal identifiers were recorded.

Completed questionnaires were collected after completion. A total of 172 questionnaires were successfully retrieved and included in the analysis. Data were checked for completeness, coded, and entered into SPSS for statistical analysis.

### 3.8 Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Prior to analysis, data were checked for completeness, coded, and cleaned. Descriptive statistics were used to summarize participants' demographic characteristics, knowledge of artificial intelligence, and perceptions regarding its application in nursing practice. Results were presented using frequencies and percentages.

Inferential statistical tests were applied to examine relationships and associations among variables. Spearman's rank correlation was used to assess the relationship between ordinal variables such as age, education level, and self-rated knowledge of artificial intelligence. Cramer's V test was applied to determine the strength of association between categorical variables, including gender, education level, AI knowledge, and perceptions of artificial intelligence.

A p-value of less than 0.05 was considered statistically significant for all inferential analyses.

### 3.9 Ethical Considerations

Approval will be sought from the Institutional Review Board (IRB) of the hospital. Participation will be voluntary, anonymous, and confidential. Informed consent will be mandatory. Participants will have the right to withdraw at any time without repercussion.

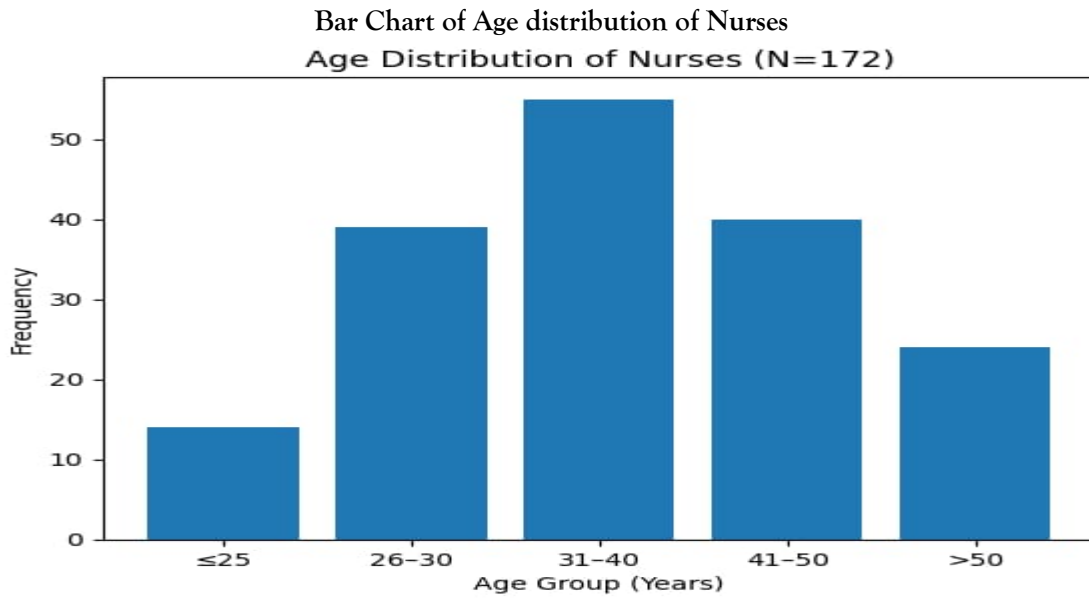
## RESULTS

### 4.1 Demographic Characteristics of Participants

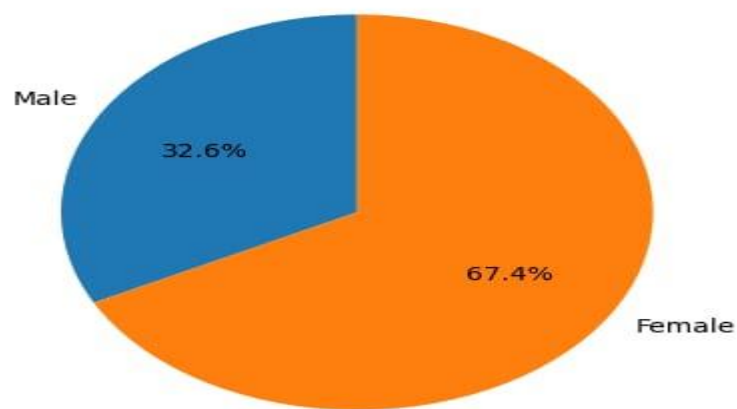
A total of 172 nurses participated in the study. The majority of respondents were female nurses (67.4%). Most participants belonged to the 31-40 years age group (32.0%), and nearly half held a bachelor's degree in nursing (47.1%).

**Table 4.1: Demographic Information of Participants**

S. No	Variable	Category	Frequency (%)
1	Age	20-30	39 (22.7%)
		31-40	55 (32%)
		41-50	40 (23.3%)
2	Gender	Male	56 (32.6%)
		Female	116 (67.4%)
3	Education Level	Diploma in nursing	67 (39%)
		Bachelor degree	81 (47.1%)
		Master degree	24 (13.9%)
4	Facility	Inpatient long term care	0 (0%)
		Outpatient care	0 (0%)
		Tertiary healthcare	172 (100 %)



**Pie Chart of Gender distribution of Nurses**  
**Gender Distribution of Nurses (N=172)**



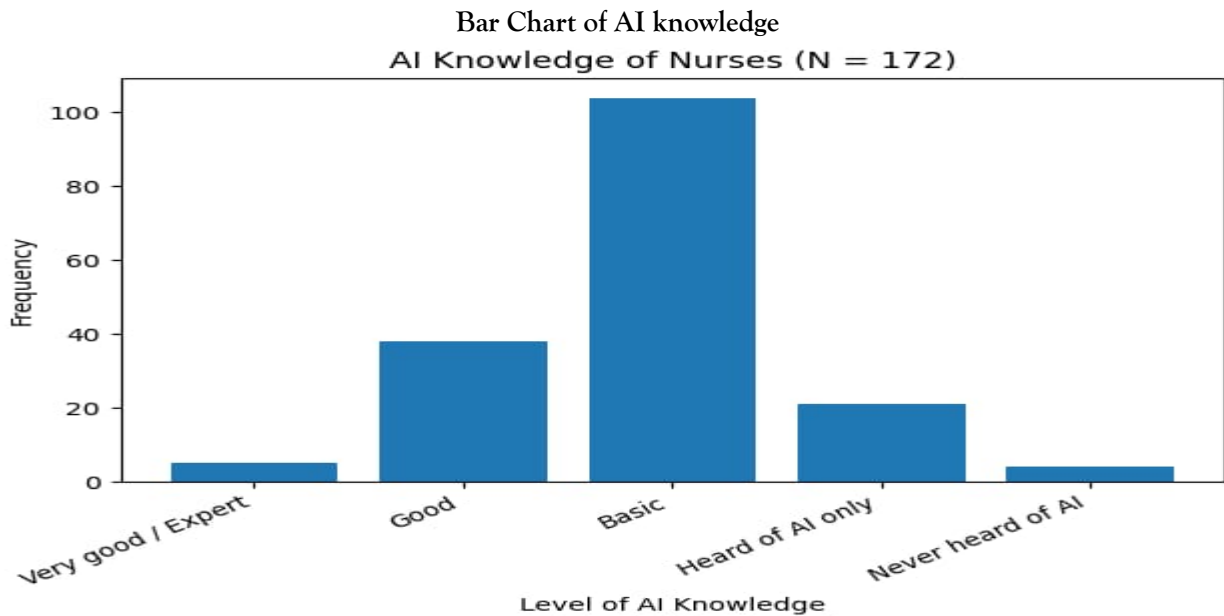
#### 4.2 Knowledge of Artificial Intelligence

Overall, 74.8% (n = 129) of nurses had low or basic knowledge of AI, while only 25.2% (n = 43) reported good or advanced knowledge.

**Table 4.2: Knowledge of Artificial Intelligence among nurses**

Q. No	Knowledge Level	Frequency n	Percentage (%)
1	Very good   Expert	5	2.9
2	Good	38	22.3
3	Basic	104	60.5
4	Heard of AI only	21	12.2

Q. No	Knowledge Level	Frequency n	Percentage (%)
5	Never heard of AI	4	2.3



#### 4.3 Perceptions of Artificial intelligence in Nursing Practice .....

The majority of nurses (65.7%) perceived AI as an opportunity to support nursing practice.

**Table 4.3: Perceptions of AI among Nurses**

Q. No	Perception	Frequency (n)	Percentage (%)
1	AI as an opportunity	113	65.7
2	AI as a threat	24	13.7
3	Unsure	35	20.6
4	Total	172	100.0

#### 4.4 Awareness of Application Areas

Nurses will highlight the key areas.

**Table 4.4: Awareness of AI Application areas (multiple response)**

Q. No	Application Area	Frequency (n)	Percentage (%)
1	Patient monitoring	96	55.7
2	Workflow or route planning	82	47.7
3	Nursing Documentation	75	43.6
4	Care prediction	66	38.4
5	Nursing diagnosis support	55	32.0

#### 4.5 Spearman`s Rank Correlation Analysis

Spearman's rank correlation was used to examine relationships between ordinal variables.

**Table 4.5: Spearman Rank Correlation between Education level and AI Knowledge**

Variables	Spearman `s p	P-value
Education Level x AI Knowledge	0.312	0.001

A statistically significant moderate positive correlation was found between education level and AI knowledge ( $\rho = 0.312$ ,  $p = 0.001$ ).

#### 4.6 Spearman`s Rank Correlation between Age and AI Knowledge .....

Variables	Spearman `s p	p-value
Age x AI Knowledge	0.087	0.251

No statistically significant correlation was observed between age and AI knowledge.

#### 4.7 Cramer`s V Analysis

Cramer's V test was applied to assess associations between categorical variables.

**Table 4.7: Association between Gender and AI Knowledge**

Test	Value	P-value
Chi square	9.864	0.002
Cramer`s V	0.239	0.002

A statistically significant association with a small to moderate effect size was observed between gender and AI knowledge.

#### 4.8 Association between Education Level and AI Knowledge

**Table 4.8:**

Test	Value	P-value
Chi square	18.742	<0.001
Cramer`s V	0.329	<0.001

Education level showed a moderate and statistically significant association with AI knowledge.

**Table 4.9**

#### Association between AI Knowledge and Perception of AI

Test	Value	p value
Chi square	11.526	0.003
Cramer`s V	0.259	0.003

Nurses with higher AI knowledge were more likely to perceive AI as an opportunity.

The results indicate that although most nurses at Mardan Medical Complex have limited knowledge of artificial intelligence, the majority hold positive perceptions toward its use in nursing practice.

Education level emerged as a key factor influencing AI knowledge, while gender and perception were also significantly associated.

## DISCUSSION

### 5.1 Summary of Key Findings

The study included 172 nurses from Mardan Medical Complex, of whom 67.4% were female and 32.6% were male. Most participants were aged 31–40 years (32.0%), and 47.1% held a bachelor's degree in nursing.

The majority of nurses had limited knowledge of artificial intelligence, with 74.8% reporting low or basic understanding, while only 25.2% demonstrated good or advanced knowledge. Despite this, 65.7% of nurses perceived artificial intelligence as an opportunity in nursing practice, whereas 13.7% viewed it as a threat.

Nurses most commonly identified AI applications in patient monitoring (55.7%), workflow management (47.7%), and nursing documentation (43.6%). A significant positive correlation was found between education level and AI knowledge ( $\rho = 0.312$ ,  $p = 0.001$ ). Significant associations were also observed between gender and AI knowledge ( $V = 0.239$ ,  $p = 0.002$ ) and between AI knowledge and perception of AI ( $V = 0.259$ ,  $p = 0.003$ ).

### 5.2 Nurses' Knowledge of Artificial Intelligence

The findings of this study indicate that the majority of nurses at Mardan Medical Complex have limited knowledge of artificial intelligence, with nearly three-quarters of respondents reporting low or basic understanding of AI concepts. This suggests that although AI is increasingly discussed in healthcare, formal education and structured training related to AI remain limited among nursing staff in public-sector hospitals.

These findings are consistent with previous studies conducted in both developed and developing countries, which have reported low levels of AI literacy among nurses. Similar research has shown that nurses often lack exposure to AI during their undergraduate education and rely mainly on informal sources for information. The limited knowledge observed in this study may be attributed to the absence of AI-related content in nursing curricula and a lack of in-service training opportunities at the institutional level.

### 5.3 Nurses' Perceptions toward Artificial Intelligence

Despite limited knowledge, most nurses in this study perceived AI as an opportunity rather than a

threat to nursing practice. This positive attitude suggests a general openness among nurses toward technological innovation, particularly when AI is viewed as a supportive tool rather than a replacement for human care.

This finding aligns with previous studies reporting that nurses tend to accept AI when it is associated with reducing workload, improving efficiency, and enhancing patient safety. However, a smaller proportion of nurses in the current study expressed concerns related to job displacement, loss of human interaction, and data reliability. These concerns reflect ethical and professional considerations that have been widely reported in the literature and highlight the importance of addressing nurses' fears during AI implementation.

### 5.4 Awareness of AI Application Areas in Nursing

The study revealed that nurses were most aware of AI applications in patient monitoring, workflow management, and nursing documentation. These findings suggest that nurses primarily associate AI with supportive and administrative functions rather than autonomous clinical decision-making.

This perception is consistent with previous research indicating that nurses are more comfortable with AI systems that assist with routine tasks and documentation. Such applications are viewed as beneficial because they allow nurses to spend more time on direct patient care. Limited awareness of advanced AI applications may again reflect gaps in education and exposure.

### 5.5 Relationship between Demographic Factors and AI Knowledge

Spearman's rank correlation analysis revealed a significant positive relationship between education level and AI knowledge, indicating that nurses with higher educational qualifications tended to have better understanding of AI. This finding is supported by existing literature, which suggests that higher education enhances exposure to digital health concepts and critical thinking skills.

In contrast, no significant relationship was found between age and AI knowledge, suggesting that AI literacy is not necessarily influenced by age but rather by access to education and training. This challenges the common assumption that younger

nurses are inherently more technologically competent.

Cramer's V analysis demonstrated a significant association between gender and AI knowledge, with male nurses reporting slightly higher levels of AI knowledge. Similar findings have been reported in previous studies and may be related to differences in access to technology or personal interest, although further investigation is required to fully understand this association.

### 5.6 Relationship between AI Knowledge and Perception

The study found a significant association between AI knowledge and perception of AI, indicating that nurses with better AI knowledge were more likely to perceive AI as an opportunity. This finding underscores the importance of education in shaping positive attitudes toward AI.

Previous studies have also emphasized that increased knowledge and hands-on experience with AI technologies reduce fear and resistance. Therefore, improving AI literacy among nurses may not only enhance knowledge but also promote acceptance and readiness for AI implementation.

### 5.7 Implications for Nursing Practice and Education

The findings of this study have important implications for nursing practice and education at Mardan Medical Complex and similar healthcare settings. The gap between low AI knowledge and high acceptance highlights an opportunity for targeted educational interventions. Incorporating AI-related content into nursing curricula and providing regular in-service training programs may improve nurses' readiness to engage with AI technologies.

Additionally, involving nurses in the planning and implementation of AI systems may ensure that these technologies are user-centered, ethically sound, and aligned with clinical needs. Hospital management and policymakers should consider developing clear guidelines and support systems to facilitate the effective integration of AI into nursing practice.

### 5.8 SUMMARY:

In summary, this study demonstrates that while nurses at Mardan Medical Complex have limited knowledge of artificial intelligence, they generally

hold positive perceptions toward its use in nursing practice. Education level emerged as a key factor influencing AI knowledge, and increased knowledge was associated with more positive attitudes. Addressing educational gaps and involving nurses in AI initiatives may support the successful and ethical integration of artificial intelligence into healthcare settings.

## CONCLUSION AND RECOMMENDATIONS

### 6.1 Conclusion

This study assessed nurses' knowledge and perceptions regarding artificial intelligence in nursing practice at Mardan Medical Complex, Mardan. The findings indicate that although most nurses currently have limited knowledge of artificial intelligence, they generally perceive AI as a positive and supportive tool in nursing practice. Nurses primarily associate AI with patient monitoring, workflow management, and documentation rather than autonomous clinical decision-making.

Education level emerged as a key factor influencing AI knowledge, and higher knowledge was associated with more positive perceptions of AI. These findings highlight a clear gap between nurses' willingness to accept AI and their current level of understanding, emphasizing the need for targeted educational and institutional support. Addressing this gap may facilitate the ethical, effective, and patient-centered integration of artificial intelligence into nursing services.

### 6.2 Recommendations

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

#### Nursing Education:

Artificial intelligence and digital health concepts should be incorporated into undergraduate and postgraduate nursing curricula to improve nurses' foundational knowledge.

#### In-Service Training:

Regular training programs and workshops should be conducted at the hospital level to enhance nurses' understanding and practical skills related to AI applications in healthcare.

#### Institutional Support:

Hospital management should involve nurses in the planning, development, and implementation

of AI technologies to ensure user-centered and ethically sound integration.

#### Policy Development:

Clear guidelines and policies should be developed to address ethical concerns, data privacy, and the appropriate use of AI in nursing practice.

#### Future Research:

Further studies involving multiple healthcare institutions and larger samples are recommended to explore nurses' readiness, competencies, and long-term outcomes related to AI implementation.

#### 6.3 Study Limitations

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted at a single public-sector hospital (Mardan Medical Complex, Mardan), which may limit the generalizability of the results to other healthcare settings. Second, the use of a convenience sampling technique may have introduced selection bias. Third, data were collected using a self-administered questionnaire, which relied on self-reported information and may be subject to response bias. Additionally, the cross-sectional design of the study limits the ability to establish causal relationships between variables. Despite these limitations, the study provides valuable insight into nurses' knowledge and perceptions of artificial intelligence in a resource-limited healthcare setting.

#### 6.4 Study Strengths

The quantitative cross-sectional design of this study allowed for an efficient evaluation of nurses' viewpoints, experiences, and comprehension of artificial intelligence in healthcare. By concentrating on nurses, important insights from a crucial professional group directly involved in patient care and the adoption of emerging technologies were obtained. Standardized data collection and unbiased analysis were guaranteed by the use of a structured questionnaire. Furthermore, the study offers baseline information that could guide future studies, instruction, and practice in a comparatively unexplored field of nursing research.

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