

**KNOWLEDGE, ATTITUDES, AND PERCEPTIONS OF ARTIFICIAL INTELLIGENCE  
AMONG HEALTHCARE PROFESSIONALS IN A TERTIARY CARE TEACHING  
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**ABSTRACT**

Artificial Intelligence (AI) has rapidly evolved into a transformative tool capable of enhancing diagnostics, optimizing treatment decisions, and streamlining healthcare delivery, yet its successful integration depends on the knowledge, attitudes, and practical readiness of healthcare professionals. This study aimed to evaluate these dimensions and identify key barriers influencing AI adoption. A prospective cross-sectional study was conducted over six months among 100 healthcare professionals at a tertiary care teaching hospital in South India, using a structured questionnaire covering demographic details, AI-related knowledge, attitudes, practices, and perceived challenges; descriptive statistics were applied, and age midpoints were used to estimate mean values. The participants had an approximate mean age of  $34.0 \pm 12.4$  years, with a male–female ratio of 1.32:1. Only 40% were familiar with basic AI principles, although 70% understood machine learning and deep learning concepts and 65% had interacted with AI tools, while formal training was received by only 45%. Despite limited foundational knowledge, attitudes were largely positive, with 84% recognizing AI's potential to advance research and 52% acknowledging its role in improving diagnostic accuracy. Major barriers included high implementation costs (72%), lack of structured training (66%), and regulatory uncertainties (68%). Overall, the findings highlight that although healthcare professionals exhibit encouraging attitudes toward AI, substantial gaps in knowledge and training persist, underscoring the need for targeted educational initiatives, institutional support, and clearer regulatory guidelines to facilitate effective AI integration in clinical practice.

**KEYWORDS:** Artificial Intelligence, Healthcare Professionals, Knowledge, Attitude, Practice.**INTRODUCTION**

Artificial Intelligence (AI) refers to a set of technologies that allow machines and computers to simulate human intelligence. AI technologies have been developed to analyse a diverse array of health data, including patient data from multitopic approaches, as well as clinical, behavioural, environmental, and drug data, and data encompassed in the biomedical literature. Because of the potential to automate many tasks currently requiring human intervention, AI has attracted considerable interest from a variety of fields. AI methodologies are now commonly used to aid in computer vision, speech recognition, and natural language processing (NLP).<sup>[1-3]</sup>

In healthcare, the rapid development of computer hardware and software applications has facilitated

digitization of health data, providing new opportunities to use AI systems to extract insights from data. AI has already been integrated into various fields of clinical practice, significantly enhancing diagnostic accuracy, treatment planning, and medical education. In oncology, AI helps in early and precise detection of malignancies; in gastroenterology, it improves lesion detection; and in radiology, it enhances the speed and accuracy of diagnosis.<sup>[4]</sup>

Beyond diagnostics, AI is increasingly applied in medical education through case-based e-learning and virtual simulation systems, providing interactive training for students. Despite these advancements, awareness of AI among medical professionals remains limited due to

insufficient inclusion in medical curricula and the absence of structured AI training.<sup>[5-7]</sup>

The use of AI in medicine is rapidly growing in developed countries, while developing nations like India and Pakistan are still in early stages of integration. Studies have shown positive attitudes among medical students but limited knowledge and exposure to AI. These findings emphasize the need for incorporating.

AI training into medical education to enhance preparedness among future healthcare professionals.<sup>[8,9,10]</sup>

Hence, this study was conducted to assess the knowledge, attitude, and practice of healthcare professionals toward Artificial Intelligence and to identify the barriers influencing its implementation in healthcare practice.

## MATERIALS AND METHODS

The present research was undertaken over a six-month period at Navodaya Medical College Hospital & Research Centre, Raichur. The study followed a questionnaire-based prospective cross-sectional design, allowing for the systematic collection of data and the assessment of variables at a single point in time while maintaining methodological rigor. All study activities were carried out within the premises of Navodaya.

Medical College, Hospital & Research Centre, ensuring a controlled and consistent research environment. The sample comprised 100 healthcare professionals, selected to provide a representative understanding of the target population and to facilitate reliable analysis and interpretation of the study outcomes.

### Sample Size Calculation

$$N = Z_{1-\alpha/2}^2 P(1-P)/d^2$$

Where Z = CI at 95% (1.96 is the constant value)

P = Estimated proportion of the population within the characteristic of interest d = Margin of error

$$= (1.96) \times 0.15 (1 - 0.15) / (0.05)^2$$

$$= 99.96 \cong 100$$

Sampling: Simple random sampling

**Study Period:** 6 months.

**Data Collection:** Data were collected using a structured validated questionnaire.

### Inclusion Criteria

- Healthcare professionals working in medical and paramedical institutes attached to a tertiary care teaching hospital.
- Participants willing to give consent and participate in the study.

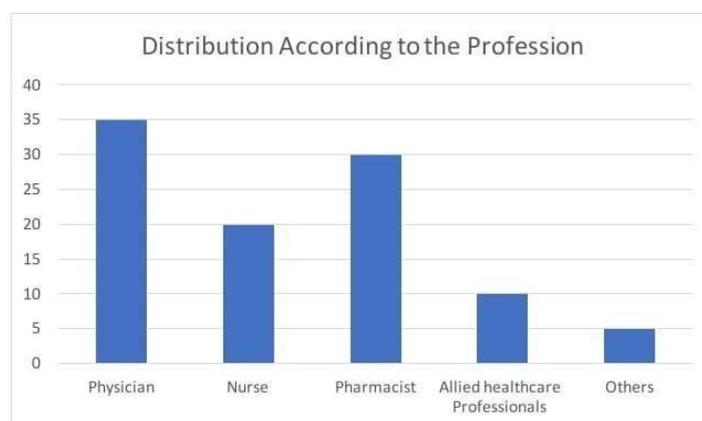
### Exclusion Criteria

- Healthcare professionals who were not willing to participate.
- Incomplete questionnaires.
- Students and trainees.

**Data Analysis:** Collected data were entered and analyzed using descriptive statistics such as percentage and mean. Microsoft Word and Excel were used to generate tables and graphs.

## RESULTS AND DISCUSSION

The demographic profile of the 100 healthcare professionals surveyed reveals a slight predominance of male participants (57%) compared to females (43%) with a male– female ratio of 1.32:1 reflecting the general gender composition within the healthcare workforce of the selected tertiary care hospital. In terms of age distribution, most respondents belong to the 35– 44 years age group, followed by those below 25 years, while fewer participants fall within the 45–54 years and above 55 years categories with the mean age of  $34.0 \pm 12.4$  years. The strong representation of mid- career professionals suggests active involvement in clinical practice, administration, or teaching roles, which likely enhances their exposure to and understanding of artificial intelligence applications in healthcare. This demographic pattern provides valuable insight into how knowledge, attitude, and practice related to AI may differ across age groups and professional experience levels. Data were shown in **Fig. 1**.



**Fig. 1: Distribution of Health Care Professionals according to Profession (n=100).**

**Table No. 1: Section B: Knowledge of Artificial Intelligence Among Healthcare Professionals(n=100).**

Sl. No	Questions	Percentage (%)
1	Are you familiar with the basic principles of artificial intelligence?	
	Yes	40
	No	60
2	Do you understand how artificial intelligence algorithms are trained to perform tasks?	
	Yes	55
	No	45
3	Have you explored the various applications of artificial intelligence in healthcare?	
	Yes	67
	No	33
4	Are you knowledgeable about the differences between machine learning and deep learning?	
	Yes	70
	No	30
5.	Have you ever used or interacted with artificial intelligence tools or systems in your professional capacity?	
	Yes	65
	No	35
6	Do you know how artificial intelligence can contribute to clinical decision-making processes?	
	Yes	60
	No	40
7	Have you attended any workshops or training sessions specifically focused on artificial intelligence in healthcare?	
	Yes	54
	No	46

The findings of **Table No 1** illustrated the level of knowledge healthcare professionals possess regarding artificial intelligence. Out of the 100 participants, only 40% were familiar with the basic principles of AI, while the remaining 60% lacked this foundational understanding. When asked about their awareness of how AI algorithms are trained to perform specific tasks, 55% responded positively, indicating moderately better understanding in this area. A considerable proportion, 67%, reported that they had explored various applications of AI in the healthcare sector, reflecting growing curiosity and exposure to AI-driven tools. Furthermore, 70% of the respondents were

knowledgeable about the differences between machine learning and deep learning, showing familiarity with advanced AI concepts. In addition, 65% had previously used or interacted with AI tools or systems in their professional work, demonstrating practical exposure to AI technologies. Regarding AI's contribution to clinical decision-making, 60% acknowledged understanding its role, whereas 40% did not. Finally, when questioned about formal training, 54% had attended workshops or training sessions related to AI in healthcare, suggesting that slightly more than half had received structured learning, while a significant portion (46%) had not yet undergone formal instruction.

**Table 2: Section C: Attitude Towards Artificial Intelligence Among Healthcare Professionals(n=100).**

Sl. No	Questions	Percentage (%)
1	Do you believe that artificial intelligence has the potential to improve healthcare delivery?	
	Yes	35
	No	65
2	Are you optimistic about the role of artificial intelligence in advancing medical research and innovation?	
	Yes	84
	No	16

3	Do you think that artificial intelligence can enhance diagnostic accuracy and patient outcomes in healthcare?	
	Yes	52
	No	48
4	Are you concerned about the ethical implications of integrating artificial intelligence into medical practice?	
	Yes	60
	No	40
5	Do you believe that artificial intelligence could lead to job displacement or changes in the roles of healthcare professionals?	
	Yes	75
	No	25
6	Are you confident in your ability to adapt to and effectively utilize artificial intelligence tools in your clinical practice?	
	Yes	68
	No	32
7	Do you perceive artificial intelligence as a valuable tool for personalized medicine and tailored treatment plans?	
	Yes	67
	No	33

We observed that only 35% of the participants believed that AI has the potential to improve healthcare delivery, while a larger proportion, 65%, did not share the same view. Despite this, a majority demonstrated optimism regarding AI's role in advancing scientific research, with 84% agreeing that AI can significantly contribute to medical innovation. Additionally, 52% felt that AI could enhance diagnostic accuracy and improve patient outcomes. Ethical considerations also emerged prominently, as 60% of respondents expressed concerns about the ethical implications associated with integrating

AI into medical practice. A substantial 75% believed that AI may lead to job displacement or changes in the roles of healthcare professionals, reflecting notable apprehension about the future workforce landscape. Nevertheless, 68% felt confident in their ability to adapt to and effectively utilize AI tools within clinical practice. Finally, 67% perceived AI as a valuable component in delivering personalized medicine and creating tailored treatment plans, indicating strong recognition of AI's potential benefits in individualized patient care. Details were depicted in **table 2**.

**Table 3: Section D: Practice Towards Artificial Intelligence Among Healthcare Professionals (n=100).**

Sl. No	Questions	Percentage (%)
1	Have you personally utilized artificial intelligence tools or technologies in your healthcare practice?	
	Yes	86
	No	14
2	Do you regularly incorporate artificial intelligence algorithms or systems into your clinical decision-making processes?	
	Yes	66
	No	36
3	Have you participated in any training or workshops focused on the practical application of artificial intelligence in healthcare?	
	Yes	55
	No	45
4	Do you collaborate with AI developers or data scientists to develop or implement AI solutions in your healthcare setting?	
	Yes	60
	No	40
5	Have you integrated AI-based diagnostic tools or platforms into your patient care workflows?	
	Yes	70
	No	30
6	Are you involved in research projects that utilize artificial intelligence methodologies in healthcare?	

	Yes	75
	No	25
7	Have you encountered any barriers or challenges when attempting to implement Artificial intelligence technologies in your clinical practice?	
	Yes	80
	No	20

The data depicted in **Table 3** highlights the practical engagement of healthcare professionals with artificial intelligence in their clinical settings. A significant majority, 86%, reported that they have personally utilized AI tools or technologies in their healthcare practice, whereas only 14% had not.

Additionally, 66% stated that they regularly incorporate AI algorithms or systems into their clinical decision-making processes. Participation in AI-related training activities was also notable, with 55% indicating that they had attended workshops focused on the practical application of AI in healthcare. Collaborative efforts were evident as well, as 60% of respondents

acknowledged working with AI developers or data scientists in developing or implementing AI solutions. The integration of AI based diagnostic platforms into patient care workflows was confirmed by 70% of the participants, demonstrating the growing influence of AI in routine clinical operations. Moreover, 75% reported involvement in research projects utilizing AI methodologies, reflecting increasing academic and clinical engagement. Despite these advancements, 80% of healthcare professionals indicated encountering barriers or challenges when attempting to implement AI technologies, highlighting the need for improved support systems and institutional readiness.

**Table 4: Section E: Factors discouraging Healthcare professionals from utilizing Artificial Intelligence(n=100).**

Sl. No	Questions	Percentage
1	Do you have concerns about data privacy and security deferred you from utilizing artificial intelligence in your health care practice ?	
	Yes	61
	No	39
2	Do you feel apprehensive about potential errors or biases in AI algorithms, which may discourage you from relying on artificial intelligence tools?	
	Yes	57
	No	43
3	Have you encountered challenges in integrating artificial intelligence systems with existing healthcare technologies, leading to reluctance in their utilization?	
	Yes	53
	No	47
4	Are you deterred from utilizing artificial intelligence due to concerns about the cost of implementation and maintenance?	
	Yes	72
	No	28
5	Have you experienced resistance from colleagues or superiors within your healthcare institution, which has discouraged you from adopting artificial intelligence technologies?	
	Yes	56
	No	44
6	Do you perceive a lack of adequate training and support as a barrier to utilizing Artificial intelligence effectively in your healthcare practice?	
	Yes	66
	No	34
7	Have regulatory uncertainties or compliance issues deterred you from embracing Artificial intelligence solutions in your professional work?	
	Yes	68
	No	32

As shown in **Table 4** several key barriers that hinder healthcare professionals from fully embracing artificial intelligence in their practice. A considerable proportion, 61%, reported concerns related to data privacy and security, indicating that fear of improper data handling

remains a major deterrent. Additionally, 57% expressed apprehension about potential errors or biases within AI algorithms, which may undermine their confidence in relying on such systems. Integration issues also emerged, with 53% stating that they faced difficulties

incorporating AI technologies with existing healthcare systems. Financial limitations were identified as another significant obstacle, as 72% of participants felt that the high cost of implementation and maintenance discouraged AI adoption. Furthermore, 56% reported resistance from colleagues or higher authorities within their workplaces, suggesting that institutional acceptance is still evolving. Lack of adequate training and support was emphasized by 66% of respondents, highlighting the need for more structured educational initiatives. Lastly, 68% noted that regulatory uncertainties and compliance issues created hesitation in utilizing AI technologies. Collectively, these factors illustrate the multifaceted challenges that healthcare professionals encounter when considering AI integration into clinical practice.

### CONCLUSION

The present study provides valuable insights into the evolving perception of artificial intelligence (AI) among healthcare professionals. Our findings suggest that while awareness and interest in AI are steadily increasing, there remains a considerable gap between conceptual understanding and practical implementation. Although a significant proportion of participants acknowledged the transformative potential of AI in clinical decision making and research, concerns regarding data privacy, algorithmic bias, high costs, and inadequate training continue to impede its widespread adoption.

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