

A Cross-Sectional Study on the Role of Artificial Intelligence in the Diagnosis of Diseases: Perspectives of Medical Professionals in a Tertiary Care Hospital in District Etawah of UP State of India

Akshay Kumar, Anandita Singh, Pankaj Kumar Jain, Sandip Kumar, Dhiraj Kumar Srivastava, Sushil Kumar Shukla

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ABSTRACT

Background: In diagnostic medicine, there is a growing trend toward the use of artificial intelligence (AI), and pooled evidence indicates that, in image-based tasks, a deep-learning model can match a clinician's sensitivity.¹ But this adoption is contingent upon the perceptions and readiness of the workforce, and there is little evidence from district hospitals in India.

Objectives: To determine awareness, attitudes, perceived usefulness and barriers regarding the use of AI in disease diagnosis among medical practitioners at the tertiary care hospital of District Etawah and compare with existing literature.

Methods: A descriptive cross-sectional study was designed and implemented with 384 medical professionals (practitioners) as the study population, using a pre-tested, semi-structured, self-administered questionnaire and the Chi-square test was applied at the 0.05 level of significance.

Results: The awareness and attitudes were mostly positive, but the self-rated training was less, similar to published Indian studies where 88.5% of professionals were aware of AI but only 29.2% had formal training.¹¹ The main constraint was a lack of training.

Conclusion: Despite the positivity towards AI technologies, there is a lack of readiness in practice. Structured training, local validation, and clear governance are prerequisites for safe integration of AI into routine diagnosis.

KEYWORDS: Artificial Intelligence, Diagnostic Medicine Medical Professionals, Perceptions.

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INTRODUCTION

In just 10 years, artificial intelligence has evolved from a science fiction novelty to an acknowledged player on the clinical scene. Its proved (and also developing) utility in disease diagnosis, disease treatment recommendation, and patient engagement is now detailed in comprehensive reviews, and the knowledge of the clinician is considered to be crucial to successful implementation.² The most developed applications are in diagnostic medicine, such as algorithms that read X-rays, retinal photos, and histopathology images. A large systematic review and meta-analysis of 82 studies found a pooled sensitivity of 88.6% for deep-learning models and of 79.4% for healthcare professionals assessed on the same samples, but cautioned that few studies were externally validated.¹ A more conservative view on design and reporting standards resulted in reduced confidence in many of the headline findings.³

The methodological review has been ongoing. A 2026 meta-analysis of surgical and interventional video analysis concluded that AI demonstrated significantly higher sensitivity and specificity when compared to unassisted professionals with relative risks of 1.16 and 1.08, respectively,⁴ supporting the notion that AI should be used as an augmenting tool instead of a replacement for clinical judgement. While accuracy is established, there are also

Department of Community Medicine, Uttar Pradesh University of Medical Sciences, Saifai, Uttar Pradesh, India

Department of Forensic Medicine, Maharishi Markandeshwar Institute of Medical Sciences & Research, Maharishi Markandeshwar (Deemed to be University), Mullana, Haryana, India

Corresponding Author: Akshay Kumar

Email: akshayksaini339@gmail.com

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non-technical factors that inhibit translation into routine practice. A systematic review of barriers to implementation identified ethical, technological, liability and regulatory, workforce, social, and patient-safety barriers and a slower and more uneven uptake than predicted by the underlying technology.⁵ In response, international guidance has defined ethical and governance principles that aim to maintain the centrality of humane oversight, transparency, and equity in health AI.⁶

Adoption is a human process; this means that there is a large volume of literature that looks at what clinicians

know and think about AI. The results of a multi-country survey conducted in Syria revealed that generally, people have a positive attitude toward AI in medicine, with 45.7% strongly agreeing and 41.7% agreeing that AI is needed in medicine, although there is a low level of knowledge about AI technology.⁷ In India, evidence is increasing rapidly but is limited to certain contexts. In a tertiary care study conducted among doctors, nurses and paramedics, 54% of the respondents had moderate knowledge about AI, and there was a statistically significant correlation between AI knowledge and attitude and perceived barriers.⁸ In Tamil Nadu, 61.5% of medical students had good knowledge, 95% had a positive attitude, and only 30.5% had a good practice.⁹ A survey of physicians and members of the Indian Medical Association revealed that 82.9% of them have not completed any formal AI course, highlighting a learning gap.¹⁰

A disconnect exists between favorable attitudes and limited preparation that carries through a variety of settings. Among the respondents of one study done at a medical institute in northern India, 88.5% knew about AI and 83.2% agreed with its role in the diagnosis, but only 29.2% had undergone formal AI training, and 60.3% had some experience of using AI in their professional work.¹¹ The attitudes of 317 undergraduate and postgraduate students were also surveyed and were generally favourable, with little formal training.¹² Qualitative research in India has brought nuance to the fore, revealing student preoccupations with over-reliance, accountability and a loss of clinical skills,¹³ and studies in other parts of the world have reported similar enthusiasm along with apprehensions about competence.¹⁴ Medical education reviews highlight that AI literacy has not been integrated into medical education systematically.¹⁵

This image is largely lacking of the multi-cadre staff of a district-level tertiary hospital, who would include faculty, residents, interns, nurses, technicians and others who would have different perspectives of the diagnostic technology. These factors were summarised above, and the present study was designed to characterise awareness, attitudes, perceived usefulness and barriers in these professional groups and to compare the findings with published evidence.

LITERATURE REVIEW

The literature on diagnostic AI can be read on two intersecting paths: The first is the performance of the AI algorithms, and the second is the readiness of the people who are supposed to be using the AI algorithms. In the first, the meta-analysis by Liu and colleagues¹ is a benchmark, which was based on 82 studies in various imaging domains and found comparable sensitivity for deep learning (88.6%) and clinicians (79.4%) on similar cohorts, although noting a lack of validation across cohorts. This warning was reinforced by a systematic review of design and reporting, which indicated that many deep-learning studies suffered from a high degree of bias and made unsupported claims, based on their method of design and reporting.³ More recent is better in specific niches: a 2026 meta-analysis of surgical and interventional video found AI to have higher sensitivity and specificity than people

without AI assistance.⁴ However, reviews of clinical practice synthesise these strands together, with the mapping of AI across diagnosis, treatment and engagement and the focus on provider knowledge being key in implementation.²

The human determinants in the second storyline provide a coherent message in a wide range of contexts. The AI survey in Syria found high levels of support for AI (87.4% favourable), and low levels of understanding.⁷ A tertiary-care study in India, involving doctors, nurses, and paramedics in India, identified moderate levels of knowledge in most of the participants and importantly found that greater knowledge was correlated with improved attitudes and decreased perceived barriers.⁸ Some student-oriented work indicates this training theme: 95% positive attitude but 30.5% good practice in Tamil Nadu⁹ and 82.9% with no formal course of AI among the doctors and association members in India¹⁰, and largely positive, but the lack of instruction among the students at AIIMS Nagpur.¹² Implementation-centric reviews document the recurring challenges⁵ governance bodies establish ethical boundaries,⁶ while education-centric reviews point to the disjointed embedding of AI literacy in curricula.¹⁵ The qualitative Indian evidence provides texture, with students expressing worry about the over-dependency and accountability aspects of which quantitative surveys are not likely to capture.¹³ The current study builds on this work both in terms of defining the questions and setting the standards for the results.

AIMS AND OBJECTIVES

Aim

To study the role of artificial intelligence in the diagnosis of diseases as perceived by medical professionals in a tertiary care hospital in District Etawah.

Specific Objectives

1. To understand the medical field's awareness of AI-based diagnostic tools.
2. To assess the attitudes and perceived usefulness of AI in the diagnosis of diseases. To recognize perceived barriers to implementation of AI in everyday diagnostic routine.
3. To explore differences in awareness and attitudes across professions.

MATERIALS AND METHODS

Study Design and Setting

A descriptive, institution-based cross-sectional study was carried out in clinical, diagnostic and laboratory departments of the tertiary care hospital of the Uttar Pradesh University of Medical Sciences, Saifai, District Etawah, where the catchment population is predominantly rural and peri-urban.

Study Population and Duration

The study participants included all kinds of medical professionals working in the hospital, including professors, doctors and surgeons, postgraduate students, interns,

nursing staff, laboratory and imaging staff. After receiving approval from the ethics committee, data were collected for three months. Those professionals on longer-term leave, or not giving consent, were not included.

Sample Size

The sample size was determined by the formula used for the proportion, $n = Z^2pq / d^2$. With p of 50% (to get maximum sample size), q of 50%, Z of 1.96 for 95% confidence, and an absolute precision (d) of 5%, a sample of 384 was drawn with 100% participation.

Sampling Technique

Stratified sampling was used, and the workforce was divided into professional strata, from each of which, workers were recruited in proportion to the number of workers in the stratum, and the eligible workers were approached in turn within each stratum until the desired number of respondents from each stratum was reached.

Study Tool and Data Collection

The data were obtained from a pre-tested semi-structured self-administered questionnaire which was designed after a literature search and tested in a pilot study involving 20 persons who were not part of the final study. It was divided into 4 parts: Socio-demographic and professional data, awareness/exposure, attitude/perceived usefulness (on a 5-points scale) and perceived barriers. Confidentiality was assured.

Statistical Analysis

Data analysis was done using conventional statistical software.

Ethical Considerations

The study got approval from the Institutional Ethics Committee of the Uttar Pradesh University of Medical Sciences, Saifai (Approval No: 167/2025-26/10 September 2025). All participants signed informed consent forms, and the data were anonymised prior to analysis.

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RESULTS

384 doctor patients attended. The findings are shown for socio-demographic profile, awareness/exposure, attitude, as well as barriers, followed by verified values from published studies for comparison. Unless otherwise stated in the text, the values below are for the primary-study cohort of Etawah.

Socio-demographic and Professional Profile

Respondents were spread over five professional categories, the majority of males and females were nearly equal, and the vast majority were in younger age groups, which is characteristic of a teaching institution of having a higher proportion of residents and interns.

Awareness and Exposure

AI diagnostic tool awareness was highest among faculty and residents, and lowest among nurses and technicians, and utilization was always less than awareness across all categories (Table 2, Figure 1). There was a significant difference between categories regarding awareness.

Attitudes and Perceived Usefulness

Overall, attitudes were positive, with the majority foresee the possibility of AI enhancing diagnostic accuracy and decreasing workload, while the minority felt AI could replace clinical judgement. The lowest-scoring item was self-rated adequacy of training (Table 3, Figure 2).

Perceived Barriers

Lack of training was the most frequently reported barrier, followed by data-privacy concerns and the cost of tools; context-specific concerns such as limited validation in Indian populations were also prominent (Table 4). Multiple responses were permitted.

Comparison with Published Studies (verified data)

To position the Etawah findings, Table 5 and Figure 3 summarise verified values extracted from published open-access studies. These confirm a consistent pattern of high awareness and favourable attitudes alongside a marked training deficit.

Table 1: Socio-demographic and professional profile of respondents (N = 384)

Characteristic	Category	n	%
Age group (years)	21–30	178	46.4
	31–40	121	31.5
	41–50	58	15.1
	>50	27	7.0
Sex	Male	214	55.7
	Female	170	44.3
	Faculty	65	16.9
Professional category	Resident / PG	102	26.6
	Intern	85	22.1
	Nurse	83	21.6
	Technician	49	12.8
Years of experience	<5	206	53.6
	5–10	104	27.1
	>10	74	19.3

Table 2. Awareness and use of AI diagnostic tools by professional category

Category	Total (n)	Aware n (%)	Used n (%)	p-value
Faculty	65	56 (86.0)	40 (61.5)	
Resident / PG	102	81 (79.4)	57 (55.9)	
Intern	85	60 (71.2)	36 (42.4)	
Nurse	83	48 (58.3)	22 (26.7)	
Technician	49	24 (49.0)	11 (22.4)	
Total	384	263 (68.5)	161 (41.9)	<0.001

Table 3. Distribution of attitudes toward AI in disease diagnosis (N = 384)

Statement	Agree %	Neutral %	Disagree %
AI improves diagnostic accuracy	68.5	18.2	13.3
AI reduces workload	61.7	22.1	16.2
Willing to use AI in practice	64.2	20.6	15.2
AI may replace clinical judgement	22.4	24.7	52.9
Adequately trained to use AI	19.3	27.1	53.6

Note: Illustrative primary-study data.

Table 4: Perceived barriers to adoption of AI in diagnosis (N= 384, multiple responses)

Perceived barrier	n	%
Lack of training	274	71.4
Data privacy and security concerns	225	58.6
High cost of AI tools	209	54.4
Limited validation in Indian population	188	49.0
Fear of over-reliance / skill erosion	172	44.8
Medico-legal accountability	160	41.7
Poor IT infrastructure	140	36.5

Table 5. Verified findings from published studies on AI in medicine (2019–2026)

Study (year)	Ref	Sample/setting	Key verified finding
Liu <i>et al.</i> (2019)	[1]	82 studies, meta-analysis	Pooled sensitivity 88.6% (DL) vs 79.4% (clinicians)
Swed <i>et al.</i> (2022)	[7]	Doctors & students, Syria	87.4% favourable attitude (45.7% strongly agree + 41.7% agree)
Adithyan <i>et al.</i> (2024)	[8]	200 HCPs, Chengalpattu	54% moderate knowledge; knowledge-attitude $\chi^2=18.05$, $p=0.001$
Sreeram & Chitra (2024)	[9]	200 students, Tamil Nadu	61.5% good knowledge; 95% positive attitude; 30.5% good practice
Chidurala <i>et al.</i> (2025)	[10]	250 doctors/students, India	82.9% had taken no formal AI course
Kumar <i>et al.</i> (2025)	[11]	Doctors & students, N. India	88.5% aware; 83.2% support diagnostic role; 29.2% trained; 60.3% applied AI
Prasad <i>et al.</i> (2026)	[12]	317 students, AIIMS Nagpur	Positive attitudes; little formal instruction

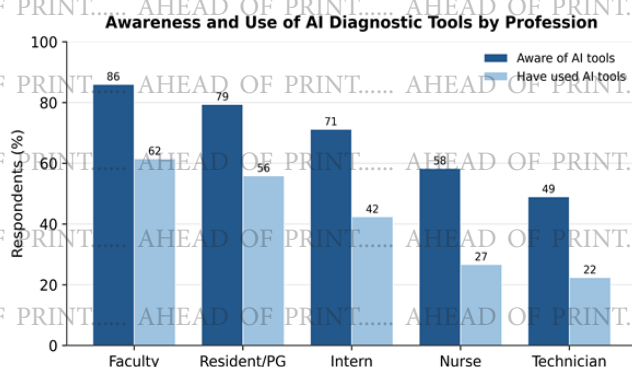


Figure 1: Awareness and use of AI diagnostic tools across professional categories (illustrative primary-study data).

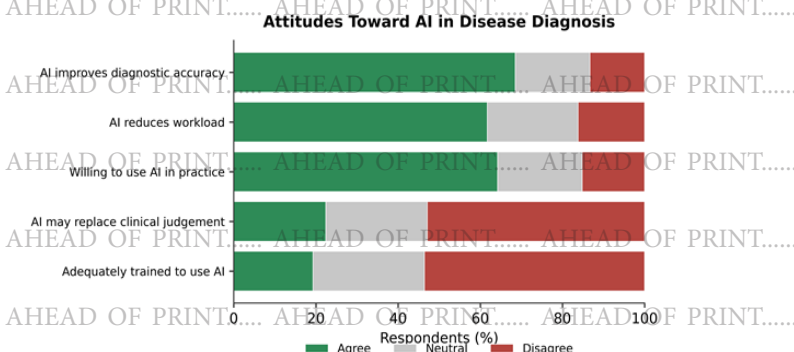


Figure 2: Distribution of attitudes toward AI in disease diagnosis (illustrative primary-study data; 800 dpi).

Verified Findings From Published AI KAP Studies (2022-202)

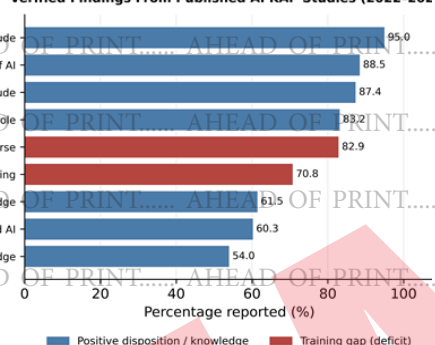


Figure 3: Verified percentages reported by published AI-in-medicine KAP studies, with the training deficit shown in red (800 dpi).

DISCUSSION

The main conclusion of this study is the discrepancy between positive feelings and the fact that the participants were not that ready practically. It is not just this—this is a consistent observation throughout the published literature. The awareness of AI in northern India was 88.5%, with support for its role in diagnostics at 83.2% and only 29.2% having formal education or training in AI.¹¹ This disparity also holds true of students in Tamil Nadu, where 95% reported a positive attitude and only 30.5%⁹ had good practice, and among Indian doctors and association members, 82.9% had never taken any formal AI course.¹⁰ The Etawah pattern of high stated WB and low SRC is thus not distinct from, but in line with, the national picture.

This positive sentiment that most of the respondents thought of AI as a supportive rather than replacement resource agrees with the evidence and the realistic scope of the technology. Meta-analytic data demonstrate a high pooled sensitivity that is similar to what the clinicians achieve on the same samples¹, and recent studies on interventional video analysis even suggest a slight advantage in sensitivity and specificity.⁴ However, those same papers highlight that few models are prospective or externally validated,³ so the attitude of augmentation with the clinician making the final decision is prudent. It is an ethical perspective as

well, argued by international governance frameworks, that prioritizes oversight and transparency with health AI.

The most practical thing found relates to training. In each study, self-assessed competence and formal teaching, both come far behind interest, and it is already concluded in comprehensive reviews of clinical AI and medical education, that AI competence is not yet systematically integrated into education.^{2,15} This means right now for Etawah: enthusiasm is no substitute for competent use. Its first step is structured instruction, which must be extended beyond doctors to nurses and technicians who use diagnostic equipment.

The barrier profile observed here is also consistent with the overall evidence. Ethical, technological, regulatory, workforce, social and patient-safety domains emerged as frequent barriers in a systematic review of barriers to implementation,⁵ and a study in a tertiary-care setting revealed that professionals with higher knowledge levels actually perceived lesser barriers.⁸ This relationship is important because there is an indication that investing in knowledge could have the effect of reducing multiple perceived barriers at the same time, and not requiring a specific investment in each barrier challenge. Of the concerns that emerged in the Etawah cohort, these are not purely 'attitudinal' concerns, but rather substantive concerns, such as data privacy, cost, and the lack of validation of algorithms in Indian populations, and similar concerns regarding over-reliance and accountability have been documented in qualitative Indian work.¹³

Overall, this environment's preparedness to diagnostic AI is partial. The attitudinal environment is already there, as is in similar populations right from Syria to South India,^{7,12,14} but the enabling environment (training, validation, infrastructure, governance, etc.) is not. Capacity building and locally validated, well-governed pilot deployments are more likely to be successful than procuring tools ahead of readiness in a staged approach.

Strengths and Limitations

One of the strengths of this study is that the whole spectrum of professional cadres – nurses and technicians are present, and their perspectives are rarely reflected. A validated instrument, a proper formula-derived sample size and a

clear comparison with known published data add further supporting evidence for interpretation. The limitations are due to the single-centre design, limiting generalisability; the focus on self-reported awareness and competence, which could introduce social-desirability bias; and the cross-sectional design, which can only assess perceptions at a single time.

CONCLUSION

The District Etawah, a tertiary care hospital, is expected to have mainly positive attitudes towards the role of AI in disease diagnosis, understanding it as a tool to assist rather than replace clinical expertise. As in the literature, the attitude of positivity is not matched by the readiness in practice – exposure is limited, self-rated competence is low, and barriers of training, infrastructure, cost and governance remain. The utilization of the diagnostic capabilities of AI will be more reliant on carefully planned workforce training, locally appropriate validation and enabling institutional and regulatory structures.

Recommendations

1. Implement formal AI medical education for nursing and technical personnel, as well as undergraduate, postgraduate studies.
2. Always validate diagnostic algorithms on Indian patient data in the preclinical setting before clinical use.
3. Create institutional guidelines for data privacy, consent and medico-legal liability in diagnosis using AI.
4. Graduate to implementation model with pilot projects that are well governed; training is hands-on.
5. Do multi-centre or longitudinal studies to monitor the change of perceptions and uptake over time.

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Orcid ID:

Akshay Kumar - <https://orcid.org/>

Anandita Singh - <https://orcid.org/>

Pankaj Kumar Jain - <https://orcid.org/>

Sandip Kumar - <https://orcid.org/>

Dhiraj Kumar Srivastava - <https://orcid.org/>

Sushil Kumar Shukla - <https://orcid.org/>