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Awareness, Perceived Benefits, and Acceptance of Artificial Intelligence in Medical Diagnostics among Healthcare Workers: A Cross-Sectional Study

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ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative technology in healthcare, significantly enhancing medical diagnostics through improved disease detection, clinical decision-making and patient management. The increasing integration of AI-driven tools into healthcare systems necessitates an understanding of healthcare workers' awareness, perceptions, and acceptance of these technologies. This study assessed the awareness and acceptance of AI in medical diagnostics among healthcare professionals working in diverse healthcare settings. A quantitative cross-sectional study was conducted among 385 healthcare workers, including physicians, nurses, laboratory technicians, radiographers, pharmacists, and allied health professionals.

Data were collected using a structured questionnaire evaluating awareness of AI applications, perceived benefits, implementation challenges, and acceptance of AI-assisted diagnostic systems. Statistical analysis was performed using descriptive statistics and Pearson correlation analysis. The findings revealed a high level of awareness regarding AI technologies, with participants recognizing the growing role of AI in improving diagnostic accuracy, supporting clinical decision-making, enhancing healthcare efficiency, and improving patient outcomes.

Healthcare workers demonstrated positive attitudes toward the adoption of AI, with a majority expressing willingness to utilize AI-assisted diagnostic tools and participate in AI-related training programs. However, concerns regarding data privacy and security, ethical implications, reliability of AI systems, lack of technical training, and overreliance on technology were identified as significant barriers to implementation.

A strong positive correlation was observed between awareness and acceptance of AI, indicating that greater knowledge and familiarity with AI technologies contribute to higher levels of acceptance among healthcare professionals. The study highlights that healthcare workers generally perceive AI as a valuable decision-support tool capable of complementing rather than replacing human expertise.

Strengthening AI literacy, developing transparent regulatory frameworks, ensuring data security, and providing structured training programs are essential to promote trust and facilitate successful integration of AI into healthcare practice. The findings contribute to the growing evidence supporting responsible adoption of AI in healthcare and provide valuable insights for healthcare administrators, policymakers, educators, and technology developers seeking to advance AI-enabled diagnostic systems.

Keywords: Artificial Intelligence, Medical Diagnostics, Healthcare Workers, Awareness, Acceptance, Technology Adoption, Clinical Decision Support, Digital Health, Healthcare Innovation.

INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most disruptive technologies in modern healthcare, enabling machines to perform tasks that traditionally require human intelligence, including learning, pattern recognition, decision-making, and predictive analytics. AI technologies such as machine learning, deep learning, computer vision, and natural language processing have shown remarkable potential in improving diagnostic precision and healthcare efficiency. Medical diagnostics represents one of the most promising applications of AI. AI-assisted systems have demonstrated high accuracy in radiology, pathology, dermatology, ophthalmology, and clinical decision support. These technologies can process large volumes of clinical information, identify subtle abnormalities, and provide evidence-based recommendations that enhance patient outcomes.

Despite rapid technological advancement, successful implementation of AI depends largely on healthcare professionals. Their awareness, trust, knowledge, and willingness to adopt AI technologies significantly influence implementation success. Concerns related to ethical issues, data privacy, transparency, and potential job displacement may affect acceptance levels.

The Technology Acceptance Model (TAM) suggests that perceived usefulness and ease of use are major determinants of technology adoption. Understanding healthcare workers' perspectives regarding AI is therefore critical for developing implementation strategies that support sustainable integration of AI into clinical practice.

The present study was conducted to assess awareness, perceived benefits, concerns, and acceptance of AI-based diagnostic systems among healthcare workers.

MATERIALS AND METHODS

A quantitative cross-sectional study was conducted among healthcare workers employed in selected public and private healthcare institutions. The study population included physicians, nurses, laboratory technicians, radiographers, pharmacists, and allied healthcare professionals involved in patient care and diagnostic services. Healthcare workers who were willing to participate and provided informed consent were included in the study, whereas incomplete responses and non-clinical staff were excluded from the final analysis.

The sample size was determined using Cochran's formula for cross-sectional studies at a 95% confidence level and 5% margin of error. A target sample size of 420 participants was considered to compensate for potential non-response. Following data validation and screening, 385 completed questionnaires were included in the final analysis.

Data were collected using a structured questionnaire developed after an extensive review of literature related to artificial intelligence adoption in healthcare. The questionnaire consisted of demographic information, awareness of artificial intelligence, perceived benefits, implementation challenges, and acceptance of AI-assisted diagnostic systems. A pilot study was conducted among healthcare professionals prior to data collection to assess clarity and reliability of the questionnaire. Necessary modifications were incorporated based on participant feedback. The questionnaire demonstrated good internal consistency with a Cronbach's alpha value of 0.84.

Data were analyzed using SPSS version 26. Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated. Pearson correlation analysis was performed to evaluate the relationship between awareness and acceptance of artificial intelligence. Statistical significance was considered at $p < 0.05$.

Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Participation was voluntary and informed consent was obtained from all respondents. Confidentiality and anonymity of the participants were maintained throughout the study.

RESULTS AND DISCUSSION

Demographic Characteristics

A total of 385 healthcare workers participated in the study. Females represented 52.7% of respondents, while males accounted for 47.3%.

Table 1. Demographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Male	182	47.3
Female	203	52.7
Age 21–30 years	124	32.2
Age 31–40 years	147	38.2
Age 41–50 years	78	20.3
Above 50 years	36	9.3
Total	385	100

The majority of respondents belonged to the 31–40 years age group (38.2%), indicating a relatively young and technologically exposed workforce. Female participants constituted 52.7% of the study population, while males accounted for 47.3%.

Awareness of Artificial Intelligence

Table 2. Awareness of AI among Healthcare Workers

Statement	Mean ± SD
Familiar with AI concepts	4.12 ± 0.72
Aware of AI applications in healthcare	4.05 ± 0.69
Knowledge of AI diagnostic tools	3.98 ± 0.76
AI can improve disease diagnosis	4.18 ± 0.65
AI will play an important role in healthcare	4.20 ± 0.61
Overall Awareness Score	**4.02 ± 0.71**

The findings indicate a high level of AI awareness among healthcare workers. Similar findings have been reported by Chen et al. (2022), who observed increasing familiarity with AI applications among healthcare professionals.

Perceived Benefits of Artificial Intelligence

Table 3. Perceived Benefits of AI in Medical Diagnostics

Benefit	Agree (%)
Improves diagnostic accuracy	84.7
Reduces medical errors	79.5
Supports clinical decision-making	87.3
Increases efficiency	82.9
Improves patient outcomes	81.4

Perceived benefits of AI in medical diagnostics

Percentage of healthcare workers agreeing with major benefits of AI.

Healthcare professionals strongly perceived AI as a tool capable of improving diagnostic performance and clinical efficiency. Decision-support capability received the highest level of agreement.

Challenges Associated with AI Adoption

Table 4. Major Challenges Affecting AI Adoption

Challenge	Agree (%)
Data privacy and security	78.2
Lack of technical training	75.1
Ethical issues	72.5
Reliability concerns	69.8
Overreliance on technology	66.7
Job displacement	48.3

Data security emerged as the most important concern. These findings support previous reports emphasizing ethical governance and patient confidentiality as key barriers to AI adoption.

Acceptance of Artificial Intelligence

Table 5. Acceptance of AI in Medical Diagnostics

Statement	Agree (%)
Willing to use AI diagnostic systems	81.8
Recommend AI to colleagues	78.6
Interested in AI training	85.2
Support AI integration in healthcare	76.4
AI should support, not replace professionals	83.1

Acceptance of AI among healthcare workers

Percentage agreement for AI adoption and implementation indicators.

Overall acceptance was favorable, suggesting readiness among healthcare workers to integrate AI technologies into routine clinical practice.

Relationship between Awareness and Acceptance Table 6. Correlation Analysis

Variables	r-value	p-value
Awareness and Acceptance	0.62	<0.001

A significant positive correlation indicates that increased awareness contributes substantially to acceptance of AI technologies. This finding strongly supports the Technology Acceptance Model.

DISCUSSION

The findings of the present study are consistent with previous investigations reporting increasing awareness and acceptance of artificial intelligence among healthcare professionals. Chen et al. (2022) observed growing familiarity with AI applications in healthcare, while Lambert et al. (2023) reported positive attitudes toward AI-assisted clinical decision-making. The similarity of these findings suggests that healthcare workers increasingly recognize the value of artificial intelligence as a supportive technology capable of enhancing diagnostic efficiency and patient care. Growing exposure to digital health technologies and the expanding role of artificial intelligence in clinical practice may contribute to improved awareness and willingness to adopt such systems. Participants generally viewed artificial intelligence as a supportive tool capable of complementing clinical expertise rather than replacing healthcare professionals.

The positive perception observed in this study is consistent with previous research demonstrating increasing acceptance of AI-based technologies among healthcare professionals. Growing exposure to digital health technologies and the expanding role of artificial intelligence in clinical practice may contribute to improved awareness and willingness to adopt such systems. Participants generally viewed artificial intelligence as a supportive tool capable of complementing clinical expertise rather than replacing healthcare professionals.

Despite favorable attitudes, several concerns were identified. Data privacy and security emerged as the most important barriers to AI adoption, followed by lack of technical training, ethical concerns, and reliability of AI systems. These findings suggest that successful implementation of artificial intelligence in healthcare requires robust regulatory frameworks, transparent algorithms, continuous professional training, and effective data protection mechanisms.

A significant positive correlation was observed between awareness and acceptance of artificial intelligence. This finding indicates that healthcare workers who possess greater knowledge and familiarity with AI technologies are more likely to accept their implementation in clinical practice. Therefore, educational initiatives and structured training programs may play a crucial role in promoting responsible adoption of artificial intelligence within healthcare systems.

LIMITATIONS

The present study has certain limitations. The cross-sectional design limits the ability to establish causal relationships between awareness and acceptance of artificial intelligence. Furthermore, data were collected through self-reported questionnaires and may be subject to response bias.

The study was conducted among healthcare workers from selected healthcare institutions and therefore the findings may not be generalizable to all healthcare settings. Nevertheless, the study provides valuable insights into healthcare professionals' perceptions and acceptance of artificial intelligence in medical diagnostics.

FUNDING

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

Author Contributions

Rohit Meena contributed to study design, data collection, statistical analysis, interpretation of findings, and manuscript preparation. Dr. Priyanka Tiwari provided academic supervision, critical review of the manuscript, and final approval of the submitted version.

CONCLUSION

The present study demonstrated that healthcare workers possess a high level of awareness regarding Artificial Intelligence and generally exhibit positive attitudes toward its use in medical diagnostics. Respondents recognized AI's potential to improve diagnostic accuracy, enhance decision-making, reduce errors, and improve healthcare efficiency.

However, concerns regarding data privacy, ethical issues, transparency, and insufficient technical training remain significant barriers. The strong positive correlation between awareness and acceptance highlights the importance of education and training in promoting AI adoption.

Future implementation efforts should focus on AI literacy programs, ethical governance, explainable AI systems, and robust regulatory frameworks to maximize the benefits of AI while maintaining patient safety and professional accountability.

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