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Original Research Article

ASSESSING THE ROLE OF ARTIFICIAL INTELLIGENCE: KNOWLEDGE, PERCEPTION, AND EDUCATION IN ALLIED HEALTH SCIENCE

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ABSTRACT

Artificial Intelligence (AI) is rapidly transforming healthcare, offering significant advancements in diagnostics, decision-making, and optimization of patient care. Within the Allied Health Sciences (AHS), the integration of AI tools presents a unique opportunity to enhance clinical accuracy, streamline workflows, and support data-driven decision-making. This observational, cross-sectional study assessed the awareness, insights, and educational preparedness related to AI among AHS students and professionals. 185 students and 75 professionals from various AHS disciplines, responded to structured questionnaires. Quantitative responses were analysed based on awareness, learning interest, career relevance, ethical concerns, and preferred training modalities. Both students and professionals showed strong enthusiasm for learning AI and acknowledged its growing importance in healthcare delivery and professional development. Despite limited formal exposure, most participants supported integrating AI into the AHS curriculum, highlighting the need for structured AI training in modern healthcare education. Notably, half of the participants believed that programming knowledge is essential before learning AI, highlighting a common misconception that prior coding experience is necessary to learn AI. Ethical concerns such as loss of creativity, depersonalization of care, and fear of job displacement were evident, particularly among professionals. Additionally, while there was general awareness of AI's adoption in Indian healthcare companies, many professionals reported limited visibility of its application in routine healthcare services. This study underscores the growing demand for balanced, hands-on AI education in AHS programs to prepare a future-ready, ethically informed healthcare workforce capable of adapting to ongoing technological evolution. Designing structured, experiential AI training will be key to preparing AHS learners for a technology-driven healthcare future.

Keywords: Artificial Intelligence, Allied Health Sciences, Healthcare Curriculum, AI training.

INTRODUCTION

Artificial Intelligence (AI), a term broadly used for computer systems performing human-like cognitive tasks, is extensively being implemented in the healthcare sector by enabling data-driven diagnostics, predictive analytics, and personalized patient care, thus paving the way for more accurate corrective and preventive interventions.[1,2] AI applications are growing to strengthen clinical decision-making, optimize workflows, and minimize human errors particularly in the specialties of radiology, pathology, and biomedical analytics.[3,4] As an illustration, AI can automatically locate early-stage lung nodules on CT scans with a higher

sensitivity than the human eye, thereby greatly reducing missed diagnoses and allowing for treatment to be started at a more timely stage.[5-7] In a like manner, AI-powered haematology analysers nowadays can identify abnormal peripheral blood smear patterns within seconds, a task that previously needed manual review by highly skilled laboratory personnel.[8] These changes demonstrate how AI is reshaping the roles and responsibilities of professionals, thus increasing productivity without the minus of the human element. In the light of the adoption of AI by the healthcare sector, educational systems must be redesigned in order to provide the necessary skill set for future healthcare professionals, especially those in the AHS, who will be working with such advanced technologies.[9,10]

AHS professionals such as medical laboratory technologists, cardiac care technologists, medical imaging technologists, anesthesia and operation theatre technologists, are the very technical backbone of clinical services. Their roles require great accuracy, high level technical competence and very close interaction with diagnostic and therapeutic tools. As AI gets more and more integrated in downtacking diagnostic imaging (radiomics), laboratory automation, and robotic-assisted interventions, these professionals will have to be operationally familiar with and critically understand AI to be able to function effectively. It is a fact that the nature of biomedical instrumentation is changing to be more AI-assisted. This is why it is imperative that AHS professionals keep up with the latest developments. Closing this gap in knowledge is a must in order to ensure that innovation is adopted in a fair manner and that high standards of clinical care are maintained.[13]

AI education is becoming more and more relevant, yet it is still largely missing from the majority of AHS curricula, especially in India.[14-16] A lack of preparedness in AI may cause AHS graduates in the future to be less competitive and poorly-equipped.[10,16] This generates a disconnect between the expectations of pharma-based companies and academic preparation.[12] Besides insufficient training may result in over-dependence on AI systems, ethical neglects, clinical misinterpretations, or theft of automated tools.[4,17,18] This research was aimed to evaluate the knowledge, perceptions, and educational readiness in AI among AHS students and professionals. The results provide evidence-based recommendations for the successful implementation of AI in AHS education by identifying major gaps, ethical issues, and preferred training methods. In the end, this effort contributes to the creation of a technologically proficient and ethically sound allied health workforce, capable of meeting the challenges of a healthcare future driven by AI.

MATERIALS AND METHODS

Study Design: A cross-sectional, observational study was conducted between February and May 2025 at the Sapthagiri Institute of Allied Health Sciences, Bangalore, India after obtaining approval from the Institutional Ethics Committee. Data were collected using structured questionnaires administered through Google Forms, with separate versions designed for students and healthcare professionals. The primary objective was to assess the knowledge, perception, and educational preparedness regarding AI among students and professionals in AHS.

Participants: The study included 260 participants, comprising 185 students and 75 professionals from various AHS departments of the University. Participation was entirely voluntary, and responses were collected anonymously to ensure confidentiality.

Survey Instrument: Two independently validated and structured questionnaires were developed, one for students and the other for professionals. The student version included 14 questions specifically related to Artificial Intelligence, while the professional version included 5 additional questions to capture deeper insights into AI application, ethics, and educational planning. These questionnaires were designed to comprehensively assess awareness, perception, and educational needs regarding AI in healthcare. Each questionnaire was organized into five key thematic domains: (a) awareness and exposure to AI in healthcare, (b) interest in learning AI, (c) perceived relevance to professional development and academic growth, (d) ethical considerations and concerns, and (e) preferred learning modalities and expectations for AI integration. The content of both questionnaires was finalized through expert consultation and a comprehensive literature review to ensure clarity, content validity, and contextual relevance across both respondent groups.

Data Analysis: Responses were collected in Google Sheets, followed by visualization and analysis using GraphPad Prism. Percentage distributions were calculated for each response item across student and professional groups. Results were interpreted categorically to identify overall patterns in awareness, misconceptions, ethical orientation, and preferences regarding curriculum integration. Comparative interpretation between the two respondent groups added contextual depth to the findings.

RESULTS

A total of 260 participants took part in the study, comprising 185 students and 75 professionals from various AHS departments. Students were aged between 18 and 25 years, while professionals ranged from 30 to 55 years, reflecting a well-distributed

sample across academic and clinical experience levels.

Learning Interest and AI Familiarity Among Participants: Participants across both student and professional groups showed strong interest in learning about AI despite limited familiarity. Only 10% of students and 19% of professionals reported being truly familiar with AI, while the majority of them, 64% of students and 62.7% of professionals, described themselves as only 'somewhat familiar', indicating limited formal exposure or understanding **(Figure 1A)**. Despite this, enthusiasm for learning AI remained high as 87% of students and 84% of professionals expressed a clear willingness to engage with AI education **(Figure 1B)**. Interestingly, 4% of both students and professionals who were not at all interested in learning AI also reported being completely unfamiliar with the technology, suggesting a potential association between awareness and willingness to engage **(Figure 1C)**. Additionally, 68.5% of students and 62% of professionals found it fascinating to learn and apply AI in the healthcare setting. Nevertheless, a considerable number of students and professionals, 29% and 36% respectively, expressed a neutral stance toward learning and applying AI in healthcare, indicating uncertainty about its practical relevance or applicability within the healthcare system **(Figure 1D).**

Although interest was high, technical readiness varied. 44% of students and 59% of professionals reported some knowledge of computer programming (**Figure 1E**). Furthermore, 58% of respondents in both groups believed that programming knowledge was essential to begin learning AI (**Figure 1F**). This misconception highlights a lack of awareness regarding modern low-code or no-code AI tools and emphasizes the importance of designing accessible, non-technical AI curricula for healthcare learners.

Perceived Relevance to Professional Development and Academic Growth: Perceptions of AI's relevance to career development and academic growth were overwhelmingly positive. Approximately 81% of students and 81.3% of professionals agreed that AI will play an integral role in future healthcare systems. Additionally, 83% of students and 81.3% of professionals believed that AI knowledge would be beneficial for their professional growth. Regarding curriculum inclusion, 66% of students and 62.35% of professionals supported integrating AI into AHS training programs, indicating strong consensus on its academic relevance (**Figure 2A-2C**).

Ethical Considerations and Concerns: Despite widespread enthusiasm, ethical concerns were notable. A majority (83%) of both students and professionals feared that AI might suppress creativity in students (**Figure 3A**). Regarding the potential replacement of educators, 47% of students and 37% of professionals believed AI could take over teaching roles, raising concerns about reduced human involvement and weakening teacher–student relationships (**Figure 3B**). When evaluating AI's broader clinical role, 37% of students and 37.3% of professionals believed AI would complement, rather than replace, healthcare professionals (**Figure 3C**).

Preferred Learning Modalities and Expectations for AI Integration: Expectations for formal AI training were high across both groups. A notable 92% of students and 93% of professionals emphasized the need for structured AI training as an add-on program to build competence within the AHS curriculum (**Figure 4A**). Additionally, 84% of professionals agreed that AI could improve the precision and efficiency of formative assessments (**Figure 4B**). Furthermore, 95% of students and 87% of professionals reported that AI is already enhancing the overall quality of modern education (**Figure 4C**). In terms of preferred learning formats, 35% of students and 49% of professionals favored hands-on workshops, followed by project-based learning, lectures, and self-guided modules (**Figure 4D**).

Professional Insights on AI Adoption, Integration, and Ethical Use: A set of additional questions was administered exclusively to the professional group, focusing on national AI adoption trends, clinical integration, and ethical practices. When asked whether AI is currently being integrated into state-of-the-art healthcare and diagnostic technologies in India, only 19% of professionals responded affirmatively, while 53% believed such integration has not yet occurred (**Figure 5A**). By contrast, 58% acknowledged that private healthcare companies in India are in the process of adopting AI technologies for diagnosis and patient care (**Figure 5B**). Regarding ethical deployment, professionals were asked how AHS personnel could help ensure fair and unbiased outcomes when using AI-powered diagnostic tools. The most common response (44%) was training AI on diverse datasets. Other recommendations included manual human review to override AI decisions (27%), adherence to strict ethical protocols (19%), and minimizing sole reliance on human judgement (10%) (**Figure 5C**).

Open-Ended Insights: Qualitative responses from both groups closely aligned with the quantitative findings. Participants expressed concerns about the depersonalization of care, data privacy risks, overdependence on AI, and possible skill atrophy. Additional concerns included the loss of creativity, reduced empathy in patient interactions, misuse of AI technologies, and fears of workforce displacement and unemployment. Recommendations emphasized the need for interactive workshops, case-based learning sessions, and ethically guided curricula to ensure responsible AI use in real-world clinical and academic settings.

These comprehensive findings are summarized in **Table 1**, providing a side-by-side comparison of student and professional responses across the five thematic domains.

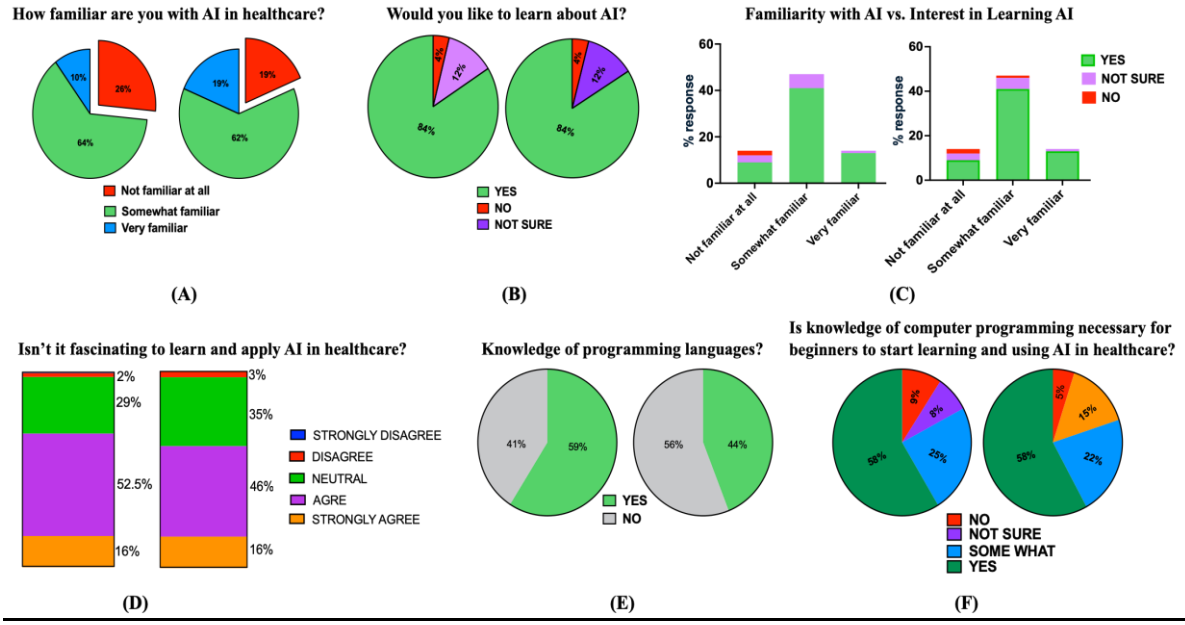

Figure 1. Interest in Learning and Awareness of AI in Healthcare among AHS Participants. (A) Willingness to learn about AI: student group (left) and professional group (right). **(B)** Perceived fascination with learning and applying AI in healthcare. **(C)** Participants unfamiliar with AI show least interest in learning. **(D)** Knowledge of computer programming. **(E)** Belief that programming knowledge is essential for learning AI. Bar charts represent the percentage distribution across response categories for both students (left) and professionals (right).

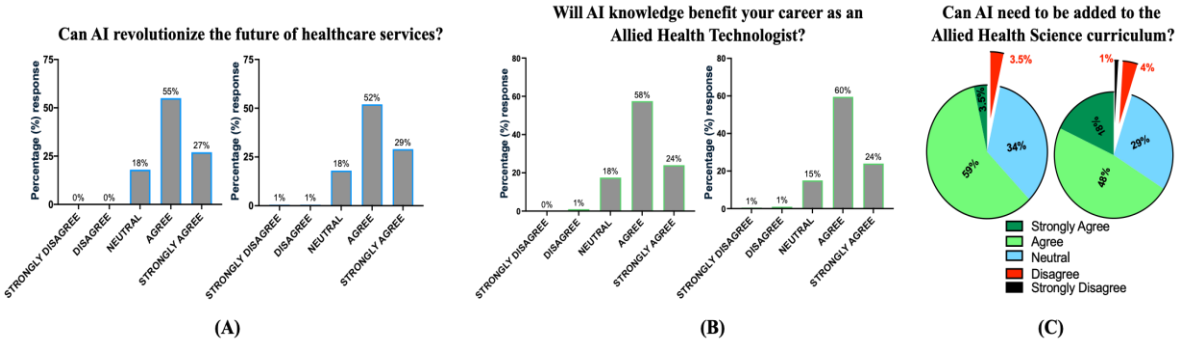

Figure 2. Perceived Relevance of AI to Career and Curriculum Integration. (A) Belief that AI will play an integral role in future healthcare. **(B)** Perceived benefit of AI for career growth. **(C)** Support for integrating AI into the AHS curriculum. Stacked bar charts display percentage distribution across response categories for students (left) and professionals (right).

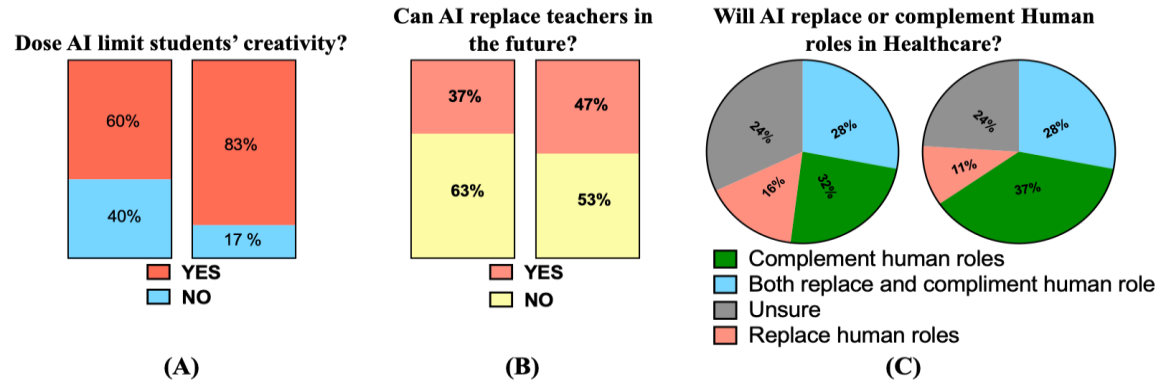

Figure 3. Ethical Perceptions and Views on AI's Role in Education and Healthcare. (A) Concern that AI could suppress students' creativity **(B)** Belief that AI could replace teachers **(C)** Perception that AI will complement rather than replace healthcare roles. Responses shown separately in bar charts for students (left) and professionals (right).

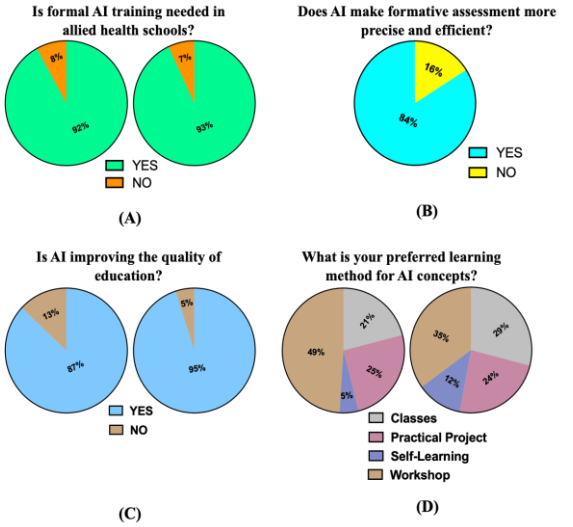

Figure 4. Learning Preferences and Expectations for AI Integration: (A) Support for structured AI training in AHS curriculum. **(B)** Professional belief that AI improves the precision and effectiveness of formative assessments. **(C)** Agreement that AI is already enhancing the quality of education. **(D)** Preferred learning modalities: hands-on workshops, project-based learning, lectures, self-guided modules. Bar charts represent comparative responses from students (left) and professionals (right)

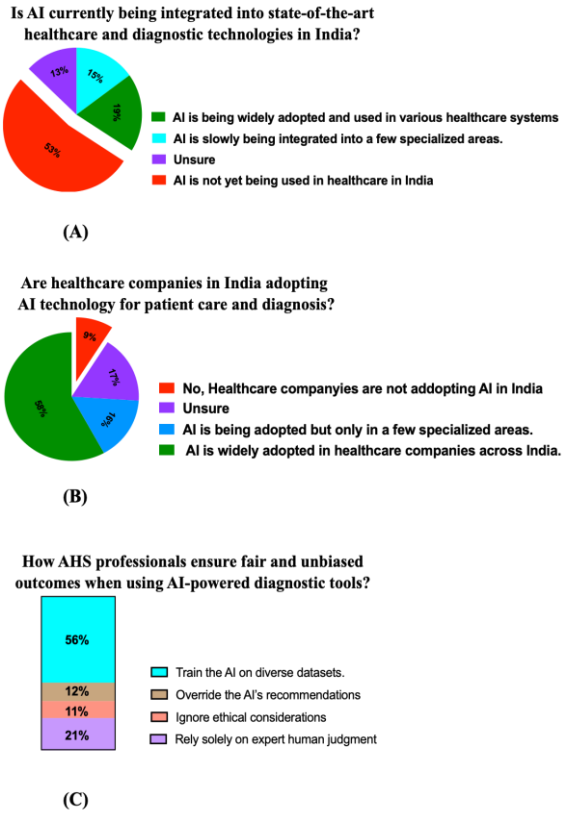

Figure 5. Professional Perspectives on AI Adoption and Ethical Best Practices.
(A) Perception of AI integration into state-of-the-art Indian healthcare systems. **(B)** Perception of AI adoption by private healthcare companies in India. **(C)** Recommended strategies to ensure fairness and ethical deployment in AI-powered diagnostics. Bar charts represent the percentage distribution of responses among professionals.

DISCUSSION

This study provides comprehensive insights into the perceptions, knowledge, and educational readiness regarding AI among students and professionals in AHS. A consistent trend emerged as participants were eager to learn about AI, despite reporting limited educational exposure and technical confidence to do so effectively.[9,10,17] This gap between enthusiasm and preparedness highlights a critical need for targeted educational reform. Interestingly, we observed a strong link between familiarity with AI and interest in pursuing further learning. Those unfamiliar with AI tended to show less interest in learning it, suggesting that prior exposure can influence willingness to engage.[10] Notably, many participants mistakenly believed that programming skills were essential for working with AI. Addressing this misconception through well-designed, beginner-friendly educational content and promoting low-code or no-code platforms can gently enhance learner confidence and participation, especially if introduced early in their academic journey.[16]

Interestingly, while participants lacked in-depth understanding, a significant majority found learning about AI and its application in healthcare fascinating and valuable for their future careers, signalling a strong foundation of curiosity and openness towards AI integration within healthcare.[14] However, a substantial proportion of students and professionals expressed a neutral stance, indicating uncertainty about its practical relevance within the system. This underscores the importance of contextualizing AI education with relatable healthcare scenarios to convert neutral perceptions into active engagement.[19]

Building upon this foundational interest and perceived value, participants also demonstrated a strong belief in AI's relevance in professional and academic paths. The majority of both students and professionals acknowledged that AI would play a pivotal role in shaping future healthcare systems and viewed AI proficiency as beneficial for their career growth.[1,3,9] A large proportion from both groups supported including AI in AHS curricula, reflecting readiness for formal integration.[14,19] Such integration would not only align academic pathways with evolving technological demands but also equip

Table 1: Comparative Survey Responses of Students and Professionals across Five Thematic Domains. This table summarizes the percentage distribution of responses from students (n = 185) and professionals (n = 75) to all structured survey questions, categorized under five thematic domains.

No.	Survey Domain	Survey Question	Professionals (%)	Students (%)	Fig:
1	Awareness and Exposure to AI in Healthcare.	How familiar are you with AI in healthcare?	Not familiar at all: 19%, Somewhat familiar: 62%, Very familiar: 19%	Not familiar at all: 26%, Somewhat familiar: 64%, Very familiar: 10%	1A
2	Awareness and Exposure to AI in Healthcare.	Do you have knowledge of programming languages?	Yes: 59%, No: 41%	Yes: 44%, No: 56%	1E
3	Awareness and Exposure to AI in Healthcare.	Is knowledge of computer programming necessary for beginners to start learning and using AI in healthcare?	Yes: 58.66%, Somewhat: 24%, Not Sure: 8%, No: 9.3%	Yes: 58%, Somewhat: 22%, Not Sure: 15%, No: 5%	1F
4	Awareness and Exposure to AI in Healthcare.	Is AI currently being integrated into state-of-the-art healthcare and diagnostic technologies in India?	Yes: 19 Not yet: 53 Very slowly:15 Unsure: 13	NOT ASKED	5A
5	Awareness and Exposure to AI in Healthcare.	Are healthcare companies in India adopting AI technology for patient care and diagnosis?	Widely adopted: 58% Only in very few specialized: areas: 16% Unsure: 17% Not adopting 9%	NOT ASKED	5B
6	Interest in Learning AI	Would you like to learn about AI?	Yes: 84%, Not Sure:12%, No: 4%	Yes: 87%, Not Sure: 9%, No: 4%	1B
7	Interest in Learning AI	Isn't it fascinating to learn and apply AI in healthcare?	Agree: 62%, Neutral:35%, Disagree:3%,	Agree: 68.5%, Neutral:29%, Disagree:2.5%,	1D
8	Interest in Learning AI	Will AI knowledge benefits your career as an Allied Health Technologist?	Agree: 57.33%, Strongly Agree: 24%, Neutral: 15.5%, Disagree: 1%, Strongly Disagree: 0.5%	Agree: 59.5%, Strongly Agree: 24%, Neutral: 15%, Disagree: 1%, Strongly Disagree: 0.5%	2B
9	Career Relevance and Academic Development	Can AI Revolutionize the Future of Healthcare Services?	Agree: 55%, Strongly Agree: 27%, Neutral: 18%, Disagree:0%	Agree: 52%, Strongly Agree: 29%, Neutral: 18%, Disagree:1 %	2A
10	Career Relevance and Academic Development	Should AI be included in the AHS curriculum?	Agree: 58.82%, Strongly Agree: 3.53%, Neutral: 34.12%, Disagree: 3.53% Strongly Disagree: 0%	Agree: 48%, Strongly Agree: 18%, Neutral: 29%, Disagree: 4%, Strongly Disagree: 1%	2C
11	Career Relevance and Academic Development	Is AI improving the quality of education?	Yes: 87%, No: 13%	Yes: 95%, No: 5%	4C
12	Career Relevance and Academic Development	Does AI Make Formative Assessment More Precise and Efficient?	Yes: 84%, No: 16%	NOT ASKED	4B
13	Preferred Learning Modalities and Expectations for AI Integration	What is your preferred learning method for AI concepts?	Workshop: 49%, Practical Project: 25%, Classes: 21%, Self-learning: 5%	Workshop: 35%, Practical Project: 24%, Classes: 29%, Self-learning: 12%	4D
14	Preferred Learning Modalities and Expectations for AI Integration	Is formal AI training needed in allied health schools?	Yes: 93%, No: 7%	Yes: 92%, No: 8%	4A
15	Preferred Learning Modalities and Expectations for AI Integration	How can AHS professionals ensure fair and unbiased outcomes when using AI-powered diagnostic tools?	AI Diversity Training:56% Human Review Over AI:12%. AI Unethical Risk:11%. Manual Judgment:21%	NOT ASKED	5C

the future workforce for AI-enabled environments. However, despite this optimism, participants raised valid ethical concerns. Many feared that AI might reduce students' creativity, and some expressed worries that AI could replace teachers, potentially weaken human interaction and hence affect the teacher-student dynamics that underpin effective learning.[10,18] Interestingly, a more balanced view has been observed when considering AI's role in healthcare delivery. Most participants favoured a complementary approach, viewing AI as an aid rather than a replacement for human professionals. This suggests a cautious yet hopeful outlook that values both technological advancement and the irreplaceable human elements in education and patient care.[3]

Extending from their recognition of AI's relevance to career growth, participants across both groups expressed a strong need for formal, structured training to be embedded in the AHS curriculum.[14,19] Over 92% supported formal integration as an add-on program, reflecting a clear readiness to acquire AI competencies. This enthusiasm extended to their

expectations for AI's role in modern education and its potential to improve formative assessments.[9] Practical, hands-on formats like workshops and project-based learning were preferred over traditional lectures, highlighting a demand for interactive approaches.[19] Most notably, a high percentage of students and professionals acknowledged that AI is already enhancing the quality of the overall education system. These findings underscore a readiness not just to adopt AI but to embed it meaningfully within educational frameworks.[11]

A particularly revealing insight came from the professional group. When asked about AI's use in Indian healthcare, many professionals acknowledged that private companies were investing in AI technologies.[21] However, significantly fewer believed that AI is actively being used in high-end diagnostics or daily clinical practice.[22,23] This gap reflects the difference between adoption and actual practical implementation. Investment in AI tools may be growing, but integration into everyday patient care requires additional steps including policy development, infrastructure readiness, and fundamentally, workforce learning and education.[3,11] Educational institutions can play a central role in bridging this gap by preparing learners to actively support this transition.[19]

CONCLUSION

In summary, this study demonstrates that AHS students and professionals are motivated to engage with AI. However, without well-structured, practical, and ethically grounded education, this motivation may not translate into preparedness. By designing curricula that respond to learner needs, address misconceptions, and align with healthcare realities, institutions can equip a new generation of health professionals to lead responsibly in an AI-enhanced healthcare environment. The study not only identifies key knowledge gaps and prevalent misconceptions but also uncovers strong interest and openness to AI integration. Moreover, the analysis provides actionable insights into how education can evolve to meet these needs through ethical, accessible, and profession-specific AI training. The integration of AI into healthcare is no longer a distant goal; it is an immediate necessity. Educational institutions must act swiftly to prepare AHS professionals with relevant, ethical, and practical skills. By fostering AI-literate, critically thinking, and ethically grounded professionals, we can ensure the responsible and impactful deployment of AI in the evolving landscape of global healthcare.

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