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**ORIGINAL RESEARCH**

# Awareness and knowledge of artificial intelligence among doctors and their perception about its application in medical field: A cross-sectional survey

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**ABSTRACT**
Artificial Intelligence (AI) has emerged as a transformative force in the medical field, offering the potential for advancements in diagnosis, treatment, and overall healthcare delivery. The current study aims to evaluate the awareness and knowledge of AI among doctors, along with their perceptions regarding its applications in the medical sector. A cross-sectional online survey was conducted with medical professionals from a medical college in North Karnataka, India, covering a one-year period (2024-2025). The survey was distributed using Google Forms, gathering responses from 100 participants, with questions addressing demographic data, knowledge of AI, and attitudes toward its integration into healthcare. The results highlighted that while a majority of respondents were aware of AI as a concept, a significant portion lacked formal education in AI and its applications in medicine. Furthermore, the survey revealed a strong willingness among doctors to learn more about AI and integrate it into clinical practice, although challenges such as insufficient training, limited resources, and technical barriers were frequently noted. The study concluded that AI holds significant potential to improve various aspects of medical practice, including diagnosis, treatment planning, and personalized medicine. However, its full integration into the medical curriculum and practice is hindered by a lack of adequate education, ethical concerns, and logistical challenges. The study advocates for the incorporation of AI-focused courses in medical education and the development of practical AI training programs to address these issues. As AI continues to evolve, it will be essential for medical professionals to develop the necessary skills and knowledge to harness its full potential in healthcare.

**Key words:**Artificial Intelligence, medical professionals, awareness, medical education, survey, diagnosis, treatment planning, AI integration, healthcare, cross-sectional study



## INTRODUCTION

AI is an advanced expression of human brain intelligence in the field of science & technology. It is amalgamation of multiple disciplines like biomedical science, computer science with law & ethic component involved in it. AI has already made its presence in our daily lives with Amazon's Alexa, apple's siri, self-driven car's, Robotics etc.

It promises to have high applicability in the field of medicine. It has a vast scope as a cost-effective diagnostic & therapeutic tool especially in medical science branches like oncology, Radiology & pathology with better genomic analysis, prediction in genetic variation, genetic phenotype identification, assessment of bone age.[1]Being labelled as "Stethoscope of 21st C" & possibilities of future extension into various branches of medical science it is going to challenge the role of medical practitioners[1,2].

Academic Institutions & students should be prepared to introduce AI into their curriculum, especially medical schools & medical students, as they must address the patient quarries, confusions & anxiety related to AI application in health sector. Few Science & Technology institutions have already started AI

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colleges & courses in machine learning-AI application[2].

## PURPOSE AND SIGNIFICANCE OF RESEARCH

Medical schools need to have acceptable schemes, curriculum designing to optimize desired benefits & talent cultivation as per medical AI is concerned. The present study is an effort in understanding the general awareness, knowledge, attitude of medical students towards medical AI & their preparedness, willingness to systematic introduction of medical AI into the curriculum.

## REVIEW OF THE LITERATURE

AI grabbed the attention of world in 1943 when an attempt was made for first time to imitate the working of human brain by creating artificial neural network that was more advanced than conventional algorithms. In 1950 Alan Turing revolutionized the whole path of development in S & T of 21st C by giving the concept of thinking machine model. The term AI came to forefront in 1956 given by John McCarthy, where a computer was used as a modality to critically think & imitate intelligence as par with human brain[2, 3].

This machine model with human cognitive ability was an attempt to enhance or go beyond human mechanical capabilities in term of efficiency, precision, repetitiveness & work load capacity[2].AI is progressing rapidly & is inevitable in today's world. "Precision medicine" that takes into consideration patient genetics & environmental factors while approaching a patient & disease needs immense computing & algorithm skills that is promised by AI.

This advanced algorithm capacity has huge application in medical field as AI has learning & self-correction ability along with processing of vast health care data, improve & updated itself with recent advances. This can be applied in clinical practice for real-time situation assessment of health risks and better patient outcome, personalized medicine with minimal diagnostic & therapeutic errors[1, 2, 3].

AI has huge implication in radio-diagnosis like radiologic flow, quantitative radiology & genomic marker discovery. Also, digital pathology, an emerging branch is associated with immense efficiency in diagnosis due to digitalization of tests & histological slides[3].AI also has huge scope in development of drugs, treatment, delivery & drug personalization for critical care patient who needs constant monitoring which is of immense aid for nursing faculty[3].

AI is thus encroaching modern world from all sides. Hence it becomes necessary that our future medical institutions & practitioner be aware of it with updated knowledge & be prepared for its inclusion into medical curriculum & future practice.

Studies in the past have found moderate level knowledge about AI in medical professional & 70% of students agreed for need of inclusion of AI into medical curriculum. Ray Kruzweil, a Google expert had predicted that with current computer evolution & vast database, AI shall surpass human brainpower by 2023[2, 4].

As today's generation is techy savy, early exposure of medical undergraduates to AI helps them with problem-based learning compared to traditional curriculum. But challenges to this are in the form of lack of computer knowledge, Machine learning, deep learning, data management & computer language inclusion into medical curriculum. It is definitely a major task along with lack of subject expertise, limited digitalization, inadequate data & financial constraints that throws a big challenge to policy makers who themselves need to be convinced about implication of AI into health sector is going to bring a major leap[3].

## OBJECTIVES

1. Awareness and knowledge of artificial intelligence among doctors
2. Their perception about its applications in medical field.

## MATERIAL AND METHOD

This study is an online-based cross-sectional survey. We created an online survey questionnaire that consisted of two parts. The first part comprised questions to extract general information like age, gender, and job position. The second part contained questions to assess awareness about AI and their perception towards AI among doctors. Questionnaires are uploaded into the Google form. The Google form link was shared among the medical fraternity.The datacollected were tabulated in the Excel sheet, and the dataset was analysed using ChatGPT(March 2025 version).

**STUDY DESIGN:** A cross-sectional survey.

**STUDY AREA:**Medical college and hospital in north Karnataka.

**STUDY DURATION:** One year (2024 to 2025).

**SAMPLE SIZE AND SAMPLING METHOD:**Non purposive sampling.

**SAMPLING METHOD:** Simple random sampling method.

**INCLUSION/EXCLUSION CRITERIA:** All the doctors of ESICMC Kalaburagiwere included in the study, except those who were not willing to participate.

## RESULTS

The dataset contains 100 responses with 31 columns related to knowledge, awareness, willingness, and opinions about AI in medicine. Many columns contain

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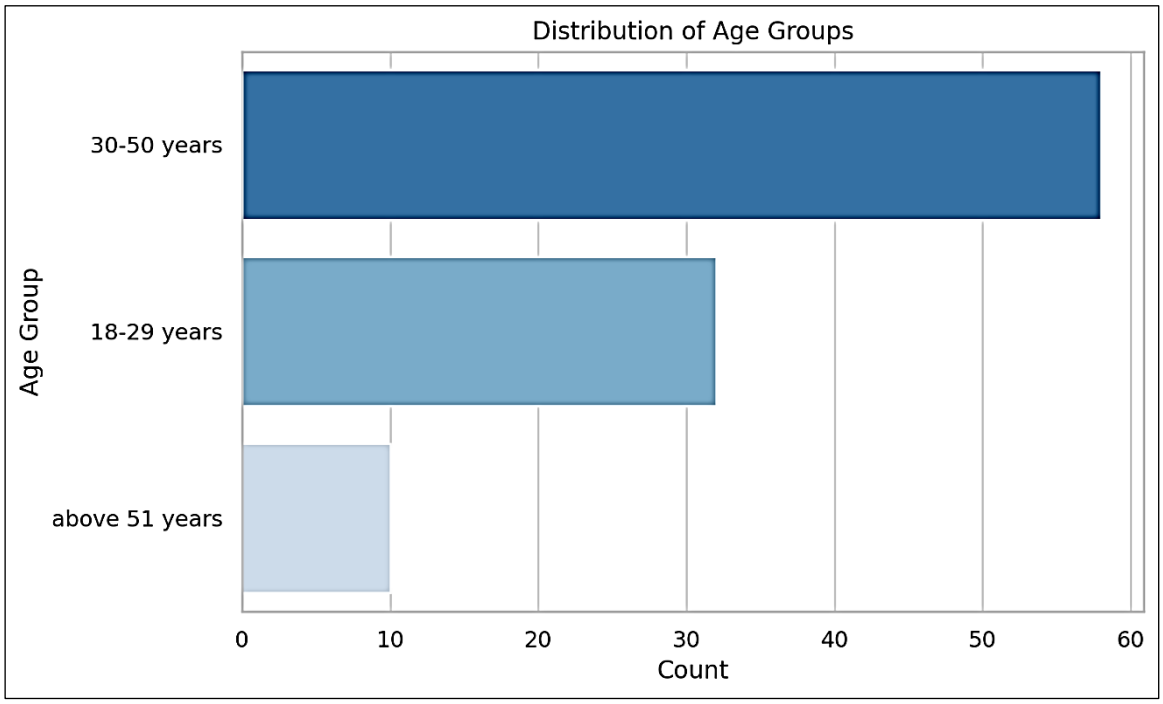
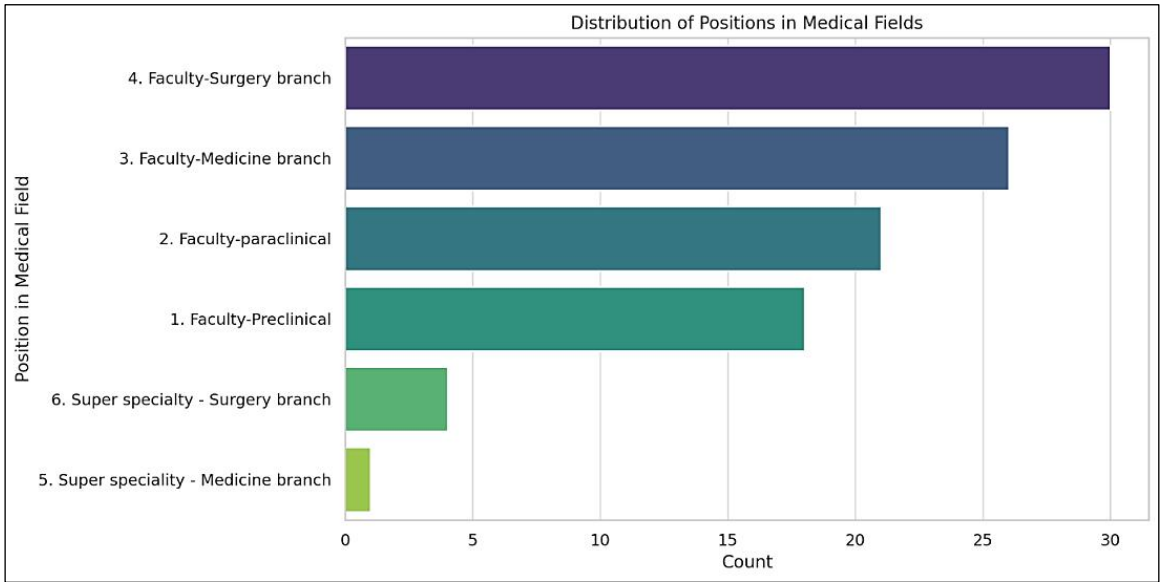
categorical data, including Likert-scale responses (e.g., "Agree", "Neutral", "Disagree") and multiple-choice responses.

1. **DEMOGRAPHICS:** Age group and position in the medical field.
2. **AWARENESS & KNOWLEDGE:** Responses on AI awareness, knowledge, and training.
3. **INTEREST & WILLINGNESS:** Willingness to learn AI, participate in research, and university involvement.
4. **OPINIONS ON AI's ROLE:** Perceptions about AI in diagnosis, treatment, and education.
5. **OBSTACLES & CHALLENGES:** Commonly reported barriers.




The graphs show the distribution of respondents by age group and medical field position:

1. **Age Group Distribution:** The majority of respondents are in the "18-29 years" category, followed by "30-50 years".
2. **Medical Field Positions:** There is a diverse representation, with a notable number from faculty (preclinical) and other medical roles.

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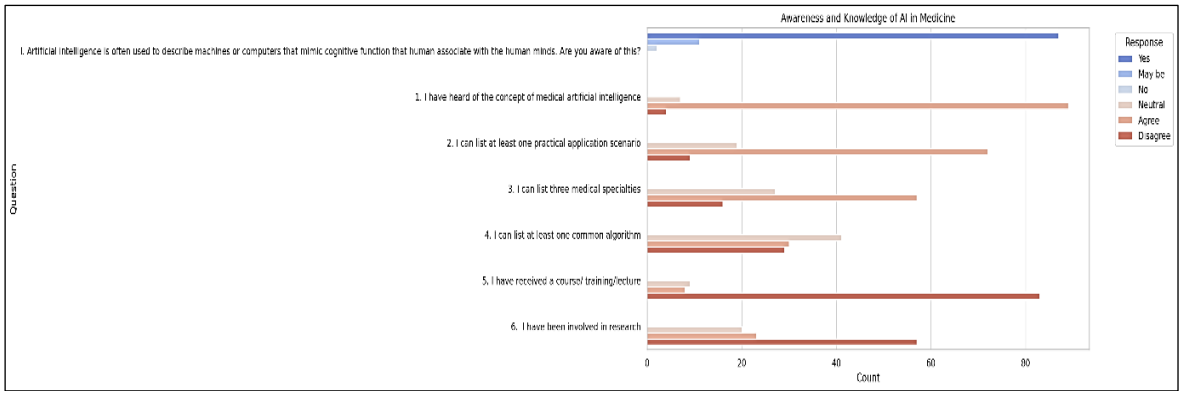
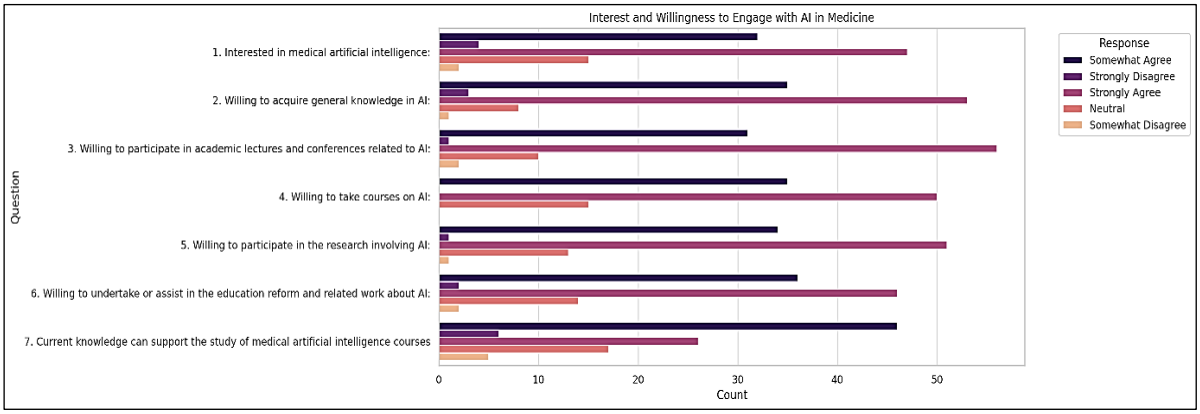


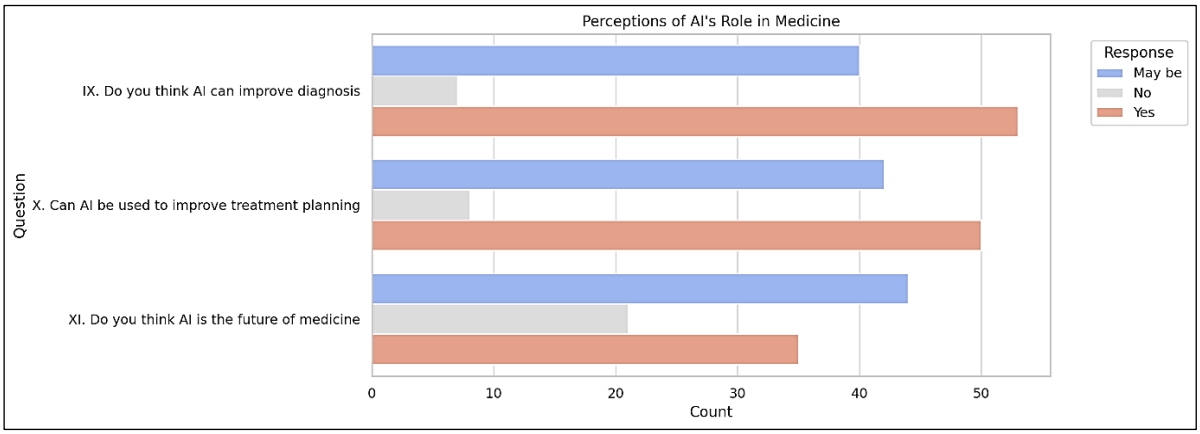

The graph illustrates respondents' awareness and knowledge of AI in medicine:

- Most respondents are aware of AI as a concept.
- Fewer respondents can list medical specialties or common algorithms.
- A significant portion has not received formal AI training or research experience.




The graph illustrates respondents' interest and willingness to engage with AI in medicine:

- A high percentage of respondents are interested in AI and willing to acquire general knowledge.
- Many are open to taking AI courses, attending academic lectures, and participating in research.
- However, fewer respondents feel that their current knowledge is sufficient to study AI-related courses.




The graph highlights perceptions of AI in medicine:

- Most respondents believe AI can improve diagnosis.
- A significant number also think AI can enhance treatment planning.
- Many agree that AI is the future of medicine.

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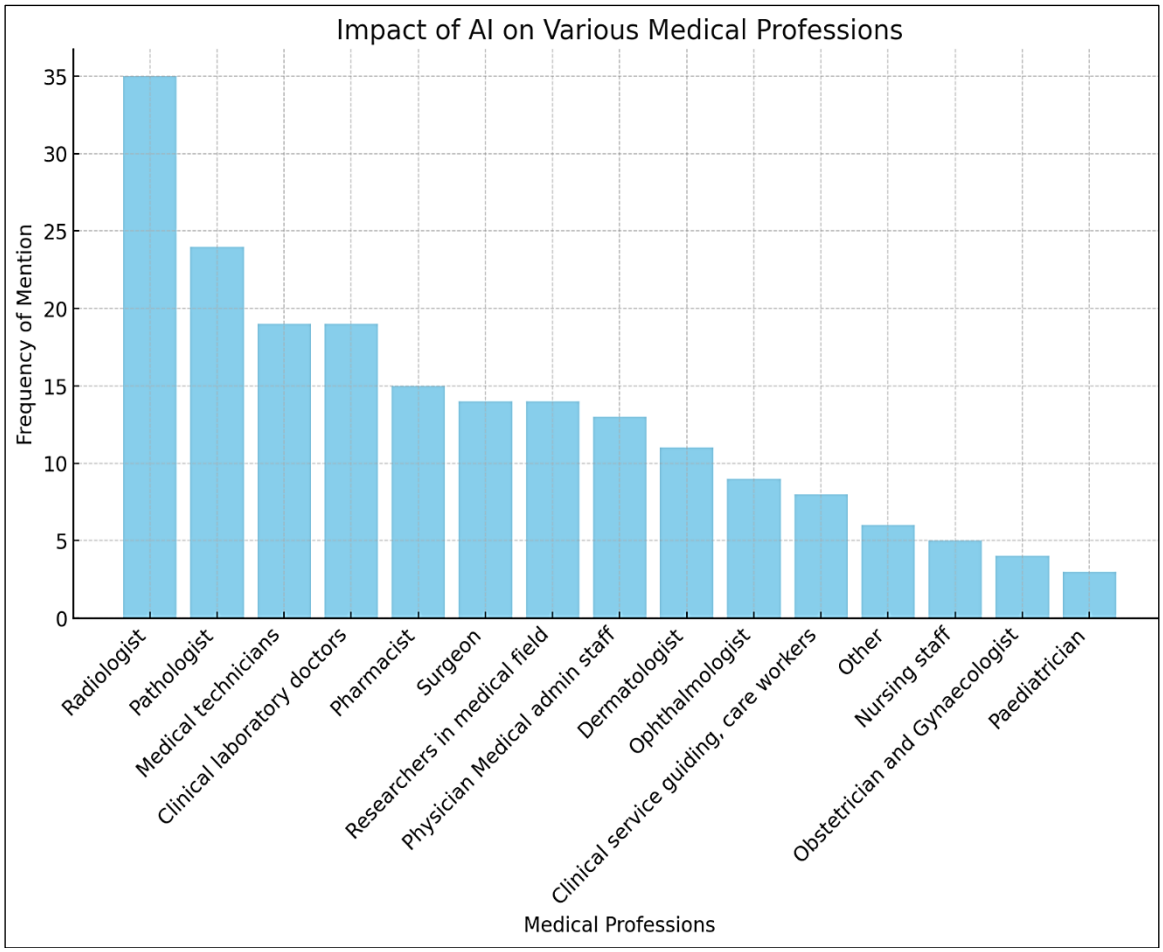


The graph shows the main obstacles in implementing AI in medical education:

- The most common barriers include **lack of training, limited resources, and insufficient awareness**.
- Other challenges include **technical difficulties and resistance to change**.

## DISCUSSION

Artificial Intelligence (AI) is rapidly reshaping modern medicine, promising improvements in diagnosis, treatment planning, and medical decision-making. However, integrating AI into healthcare comes with challenges, including limited awareness, insufficient training, and ethical concerns. This discussion compares our survey findings with those from previous studies to highlight key trends, barriers, and potential solutions for AI adoption in medicine.

### AI AWARENESS AND KNOWLEDGE-HIGH INTEREST, LOW TECHNICAL EXPERTISE

Our dataset reveals that while most respondents are aware of AI's presence in medicine, very few have received formal education or training in AI technologies. This aligns with a study conducted among Indian medical students, where 62.5% had heard of AI, yet 73% lacked programming knowledge[3].Similarly, a study among Korean physicians found that only 5.9% felt highly familiar with AI, although 83.4% acknowledged its usefulness in clinical practice[4].

The pattern is clear: AI awareness is high, but practical knowledge remains low. This suggests that while medical professionals recognize AI's potential, they are not equipped with the necessary technical skills to apply it effectively. Bridging this gap will require targeted AI education initiatives within medical curriculum.

### AI's ROLE IN MEDICINE-STRONG SUPPORT FOR DIAGNOSIS, SOME SCEPTICISM ABOUT ITS SUPERIORITY

Both our dataset and previous studies indicate that medical professionals and students see AI as an important tool, particularly for diagnosis and data-driven decision-making. In our survey, the majority of respondents agreed that AI could enhance medical diagnosis and treatment planning. This aligns with the **Korean physician survey**, where 83.4% of respondents believed AI was most useful in disease diagnosis[4].

However, scepticism remains about AI's ability to surpass human doctors. In the Korean study, **only 44% of physicians** believed AI could outperform human expertise in diagnostics[4].Our survey data echoes this sentiment-while respondents recognize

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AI's potential, they hesitate to fully trust it over human decision-making. This suggests that while AI is seen as a valuable support tool, many professionals remain cautious about its autonomy in patient care.

## BARRIERS TO AI IMPLEMENTATION-LACK OF TRAINING AND ETHICAL CONCERNS

One of the most significant barriers to AI adoption in medicine is the **lack of formal training and education**. In our survey, many respondents expressed a desire to learn about AI but reported little exposure to AI-related coursework. This finding mirrors the **Indian medical student survey**, where 85.9% wanted to learn AI, yet 73.4% were unaware of existing AI-related research publications[3].

Similarly, the **Chinese study on AI talent cultivation** found that most respondents supported AI education in medical schools, with 42.8% advocating for AI courses as **major electives[3].**However, these courses are largely absent from current medical curricula, leaving future doctors unprepared to work alongside AI systems.

Beyond education, **ethical and legal uncertainties** also hinder AI's adoption. Our dataset shows that respondents worry about AI's ability to handle unexpected situations-**a concern also expressed by 29.3% of Korean doctors[4].**Additionally, the legal responsibility for AI-driven medical decisions remains unclear. In the **Korean study**, nearly **50% of respondents were unsure who should be held accountable for AI errors**-the doctor, the patient, or the AI developers[4].Addressing these concerns will require clearer regulations and guidelines for AI use in healthcare.

## INTEREST IN AI CAREERS-ENTHUSIASTIC LEARNERS, BUT FEW AI SPECIALISTS

Despite the strong interest in AI education, very few respondents in our dataset considered AI as a career path. This matches findings from the **Indian student study**, where **none of the surveyed students planned to pursue AI-related careers[3]**.

This could be due to the lack of structured career pathways in medical AI. While physicians see AI as a useful tool, they may not view AI expertise as essential to their practice. However, as AI continues to evolve, the demand for medical professionals with AI proficiency will likely increase. Encouraging interdisciplinary collaboration between medicine and AI research could help bridge this gap.

## CONCLUSION AND FUTURE DIRECTIONS

The comparison between our dataset and previous studies highlights a global trend-AI is widely recognized as a transformative force in medicine, but its integration is still in its early stages. Key challenges, such as **limited AI education, scepticism about AI's diagnostic capabilities, and ethical uncertainties**, must be addressed to ensure AI's successful implementation.

1. **INCORPORATE AI INTO MEDICAL EDUCATION:** AI-focused courses should be introduced at the undergraduate and postgraduate levels to prepare future healthcare professionals.
2. **DEVELOP HANDS-ON AI TRAINING PROGRAMS:** Practical workshops and interdisciplinary collaborations with AI specialists can help medical professionals gain real-world AI experience.
3. **ESTABLISH LEGAL AND ETHICAL GUIDELINES:** Clear policies must define the responsibilities of AI-driven medical decisions to build trust and ensure accountability.
4. **ENCOURAGE AI RESEARCH AND CAREER PATHWAYS:** Medical students should be encouraged to explore AI-related research and career opportunities to meet the growing demand for AI specialists in healthcare.

In summary, while AI is already making an impact in medicine, its full potential can only be realized through **comprehensive education, ethical safeguards and interdisciplinary collaboration**. The future of AI in healthcare depends not only on technological advancements but also on how well the medical community adapts to this new era.

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