



## Knowledge, Readiness, and Attitude toward AI in Healthcare Education among Undergraduate Students

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### Abstract

Artificial Intelligence (AI) has rapidly advanced in healthcare and is increasingly being integrated into health professions education. As an innovative technology, AI offers opportunities to support the learning process, strengthen clinical reasoning, and provide more personalized educational experiences. It also has the potential to transform traditional teaching methods by offering simulation-based learning, intelligent tutoring systems, and improved access to digital health information. Despite these promising developments, several challenges remain. Students' knowledge, readiness, and attitudes play a central role in determining how effectively AI can be adopted and utilized in educational settings. Limited digital literacy, concerns about ethical implications, and varying levels of confidence toward new technologies are some of the critical issues that may influence the acceptance of AI in education. This preliminary study aims to provide an initial overview of these aspects through a review of selected international literature focusing on undergraduate health students. Rather than presenting empirical findings, the study seeks to map existing perspectives and highlight the importance of preparing students for the digital transformation in healthcare education. By identifying key areas of opportunity and challenge, this early exploration is expected to serve as a foundation for future empirical research and to inform the development of adaptive strategies that will better equip students for the integration of AI into health education.

**Keywords:** artificial intelligence, digital literacy, healthcare education, students' readiness, attitudes

### Introduction

Artificial intelligence (AI) has rapidly developed in recent years and has begun to play a significant role in healthcare education. AI offers opportunities to support learning processes, strengthen clinical reasoning, and provide more adaptive and personalized educational experiences. The use of AI-based simulations, intelligent tutoring systems, and broader access to digital health information has started to transform traditional teaching methods into more innovative approaches [1].

Nevertheless, the integration of AI in healthcare education still faces several challenges. Students' knowledge, readiness, and attitudes are central factors in determining the successful adoption of this technology. Previous studies have highlighted issues such as limited digital literacy, ethical concerns, and varying levels of confidence toward technology that may hinder the acceptance of AI in educational settings[2,3]. Therefore, it is essential to better understand these aspects before AI can be effectively implemented in health education.

In Indonesia, research focusing on students' perspectives on AI remains limited. A study by Lugito et al. [4] found that although medical students expressed interest in AI, their readiness to adopt it varied considerably. This indicates the need for more comprehensive exploration to prepare students for digital transformation in healthcare education.

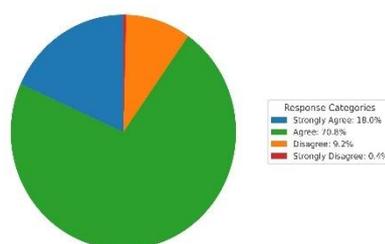
Based on this background, this study aims to provide an overview of students' knowledge, readiness, and attitudes toward AI in healthcare education. The findings are expected to offer initial insights that can inform curriculum development and serve as a foundation for future empirical research. What is the level of undergraduate healthcare students' knowledge regarding AI in healthcare education, what extent are students ready to integrate AI into the learning process. what are students' attitudes toward the use of AI in supporting healthcare education?

## Material and Methods

This study employed a quantitative descriptive design with a cross-sectional approach. This method was chosen to assess the knowledge, readiness, and attitudes of undergraduate students toward the application of Artificial Intelligence (AI) in healthcare education at a single point in time, without any specific intervention or manipulation of variables.

## Result and Discussion

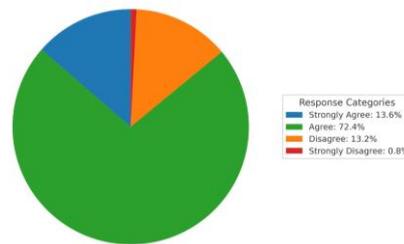
This section presents the findings from the questionnaire regarding students' knowledge, readiness, and attitudes toward the use of Artificial Intelligence (AI) in health education. The results are presented using descriptive statistics in percentage form and visualized through pie charts to provide a clearer understanding of the distribution of responses. Each figure below represents the proportion of students who selected "Strongly Agree," "Agree," "Disagree," and "Strongly Disagree" in relation to the given statement.



**Figure 1.** Distribution of Students' Knowledge about AI in Healthcare Education.

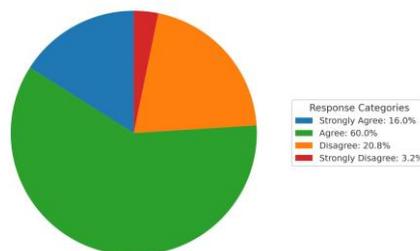
This figure 1, shows that most respondents indicated a good understanding of Artificial Intelligence (AI) in healthcare education, as reflected by the majority who selected "Agree" and "Strongly Agree." This suggests that students are becoming increasingly aware of AI concepts and their potential applications in healthcare learning environments. However, the presence of "Disagree" and "Strongly Disagree"

responses indicates that some students may still lack sufficient knowledge or exposure to AI-related topics.



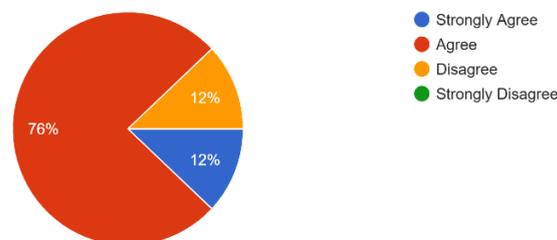
**Figure 2.** Distribution of Students' Readiness toward the Use of AI.

This figure 2, shows that the majority of students expressed readiness to integrate AI into their learning process, as evidenced by the high proportion of "Agree" and "Strongly Agree" responses. This indicates a generally positive level of readiness to adopt AI-based educational tools. However, the small proportion of "Disagree" and "Strongly Disagree" responses suggests that some students may feel unprepared or uncertain about the technical and ethical implications of using AI in health education.



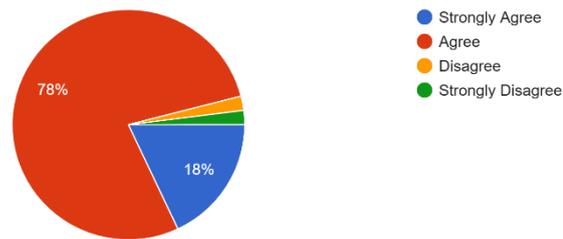
**Figure 3.** Distribution of Students' Attitude toward AI in Healthcare Education.

This figure 3, indicate that students generally have positive attitudes toward the use of AI in healthcare education. The predominance of "Agree" and "Strongly Agree" categories reflects openness and optimism regarding AI's role in improving learning outcomes and clinical decision-making. However, a small minority of those who disagreed highlighted the need for increased awareness and ethical discussions about AI applications in healthcare.



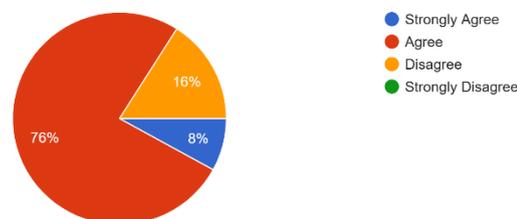
**Figure 4.** I am aware of examples of AI applications in the healthcare field.

This Figure 4, shows that most students know examples of the application of AI in the health sector, but there are still a small part that do not understand concretely how AI is used in medical practice.



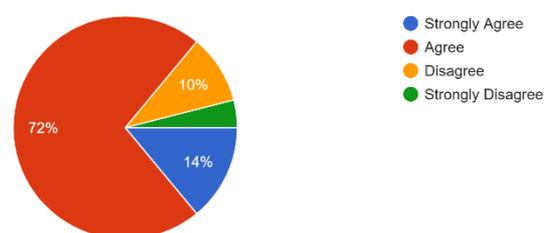
**Figure 5.** I understand the risks and limitations of using AI in healthcare services.

This Figure 5, shows that most students understand the risks and limitations of using AI in health services, but there are still a small number that are not fully aware of the potential ethical issues, data security, and reliability of AI technology.



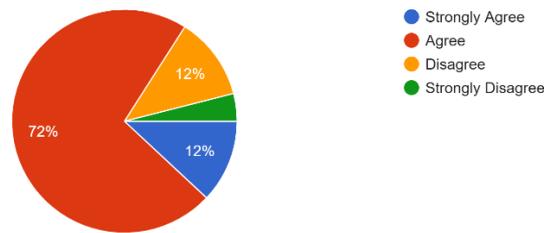
**Figure 6.** I have sufficient digital skills to use AI-based technologies.

This Figure 6, shows that some students feel that they have enough digital skills to use AI-based technology, but there are still those who feel that they are not technically prepared, indicating the need to improve digital skills among students.



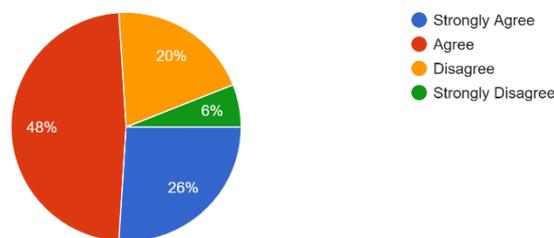
**Figure 7.** I believe my university supports the use of AI in the learning process.

This Figure 7, shows that most students judge that their university supports the implementation of AI in the learning process, although there are still a small number who have not felt the support in real way, for example in the form of facilities or curriculum.



**Figure 8.** I support the integration of AI into healthcare education curricula.

This Figure 8, shows that the majority of students support the integration of AI into the health education curriculum, but there is still a small part that is hesitant or not ready for the change, perhaps due to a lack of understanding or resource readiness.



**Figure 9.** I am concerned that AI might replace human roles in healthcare.

This Figure 9, shows that quite a lot of students feel worried that AI can replace the human role in health services, reflecting the anxiety about the ethical and social impact of the application of AI technology in the future.

This study reveals that undergraduate health students generally possess good knowledge, strong readiness, and positive attitudes toward the use of Artificial Intelligence (AI) in healthcare education. In terms of knowledge, most students understand the basic concepts and benefits of AI in the healthcare sector, including its role in data analysis and diagnostic support. However, a few remain uncertain about AI’s capabilities in clinical decision-making, indicating the need for deeper understanding of its limitations. These findings are consistent with Karaca [5] and Arora [1], who noted that while healthcare students are familiar with AI, their understanding remains general and still requires human supervision for safety and accuracy.

Regarding readiness, the majority of students feel confident in their digital skills and are eager to join AI-related training, though some still lack technical confidence. This highlights the need for foundational training and institutional support, as emphasized by Tung and Dong [6] and Topol [7], who found that readiness depends on both individual competence and university facilities.

In terms of attitude, most students have a positive perception of AI’s potential to enhance healthcare services and learning effectiveness. Nevertheless, some expressed concerns about AI replacing human roles, reflecting ethical anxiety similar to findings by Al Kuwaiti [14]. Thus, AI education should emphasize that technology functions as a supportive tool, not a substitute for human expertise, aligning with the views of Topol [7] and Sarkar et al. [8].

Further analysis (Figure 9) shows that many students worry about AI’s future impact on employment and ethics. Yet, when asked how AI can improve learning, respondents stated that AI enhances personalization, interactivity, and efficiency—supporting adaptive learning, virtual



simulations, and immediate feedback, consistent with Kang [15], Sriram et al. [16], and Aoudi Chance [17].

Students also recognized key challenges in adopting AI: concerns about data privacy and security, limited infrastructure, high costs, and potential overreliance on AI that could reduce critical thinking. These align with previous studies emphasizing the importance of ethical governance and balanced integration [19][20][21].

The survey found that most students (around 76% agree, 12% strongly agree) are aware of AI applications in healthcare, such as medical image analysis, diagnostic algorithms, and electronic medical records [9]. Meanwhile, 78% acknowledge AI's risks and limitations, such as bias, data quality, and algorithm errors, reflecting good but still general awareness [10].

Although most students believe their universities support AI implementation, some feel that institutional support is still lacking. This challenge is also reported by Ahsan [12], who highlighted curriculum gaps and infrastructure limitations. Therefore, stronger institutional support, including lecturer training and strategic policies, is essential to sustain AI integration.

Finally, the majority of respondents agree that AI should be integrated into healthcare education curricula. However, successful integration requires core competencies in data analysis, algorithmic understanding, and AI ethics, as emphasized by Gázquez-García et al. [13].

Overall, AI contributes significantly to improving healthcare education by enabling personalized, simulation-based, and data-driven learning. However, its success depends on ethical awareness, human supervision, and institutional readiness. Therefore, strengthening digital literacy, ethical education, and university support will ensure that future healthcare professionals can utilize AI responsibly and effectively.

## Conclusion

This study concludes that undergraduate students in health and education programs possess good knowledge, strong readiness, and positive attitudes toward the use of Artificial Intelligence (AI) in healthcare education. Most students understand AI concepts and recognize its applications in medical practice. They also show confidence in digital skills and interest in AI-related learning, indicating strong potential for AI integration into curricula.

Although some concerns remain about AI replacing human roles, students generally view it as a valuable tool to enhance learning and healthcare services. Therefore, educational institutions should integrate AI content, promote digital literacy and ethics, and encourage collaboration between health and technology disciplines to prepare future professionals who can use AI responsibly and effectively.

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