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Exploring Medical Students' Knowledge, Attitudes, and Practices on Artificial Intelligence: A Study at the University of Zambia

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Abstract

Introduction: The rapid advancement of artificial intelligence (AI) has significantly impacted various fields, including healthcare. As AI integration in medicine expands, medical professionals must develop a comprehensive understanding of its applications. This descriptive cross-sectional study assessed the knowledge, attitudes, and practices regarding AI among medical students at the University of Zambia. **Materials and Methods:** A structured questionnaire was administered to 335 medical students at the University of Zambia from August to September 2024. Data analysis was conducted using IBM SPSS version 23.0. **Results:** The findings revealed that 94.3% of participants demonstrated good knowledge, 77.0% exhibited positive attitudes, and 93.7% reported good practices regarding AI. However, 82.1% had never heard of AI before the study, and 73.4% were unaware of its applications in medicine. More than half of the participants (54.6%) recognized AI as essential in the medical field, while 48.7% supported its inclusion in the medical curriculum. Additionally, 90.1% had used AI in various domains, and 93.1% found it beneficial in simplifying tasks. **Conclusion:** Most medical students demonstrated strong knowledge, positive attitudes, and appropriate practices regarding AI. However, gaps in understanding its medical applications underscore the need to integrate AI education into medical curricula. Enhancing AI awareness and training among future healthcare professionals is crucial for improving adop-

tion and utilization in clinical practice.

Keywords

Artificial Intelligence, Medical Education, Healthcare Technology, Medical Students, Digital Health, Medical Curriculum, Zambia

1. Introduction

In recent decades, artificial intelligence (AI) has become a defining feature of the fourth industrial revolution, gaining significant global attention (Ahmed et al., 2022). AI refers to software systems designed to process data and make independent decisions or support human decision-making, mimicking human cognition in learning and problem-solving (Swed et al., 2022). A key subset of AI, Machine Learning (ML), focuses on developing algorithms that improve accuracy through data analysis and pattern recognition (Martín Noguerol et al., 2019; Lee et al., 2019). Within ML, Deep Learning (DL) has gained substantial prominence, especially in the medical field. By utilizing artificial neural networks, DL processes and analyzes vast datasets, proving particularly effective for tasks like image processing, diagnostics, and even robotic surgery (Egger et al., 2022).

AI has become a cornerstone of daily life, powering applications such as behavioral algorithms in phone conversations, personalized shopping recommendations on platforms like Amazon and eBay, self-driving cars, and virtual assistants like Google Alexa, Siri, and ChatGPT (Malodia et al., 2024). As AI systems evolve to become more user-friendly and reliable, they have the potential to significantly enhance quality of life (Ahmad et al., 2023). Beyond consumer applications, AI has found widespread use across sectors such as computer science, industrial manufacturing, cybersecurity, finance, and law (Doumat et al., 2022).

In healthcare, AI's influence has rapidly expanded, revolutionizing technologies such as radiography, medical diagnostics, remote patient monitoring, and drug development (Murdoch & Detsky, 2013). For instance, in oncology, AI assists with cancer diagnosis and grading (Londhe & Bhasin, 2019), while in gastroenterology, it aids in detecting pathological lesions via endoscopic imaging (Alagappan et al., 2018). Additionally, AI is being incorporated into medical education through case-based online learning platforms (Khumrina et al., 2017). Radiology, in particular, has undergone a transformation, as machine-based technologies have become integral to the field (Paré et al., 2023).

Despite its many benefits, concerns persist regarding AI's impact on the medical profession. Some studies suggest that AI could dampen enthusiasm among medical students, especially those in radiology, due to fears of job displacement. In the United States, 57% of medical students reported that online publications were their primary source of AI knowledge and expressed concerns that AI might replace radiologists, leading to negative perceptions of the technology (Park, Yi,

& Siegel, 2021). Similarly, a study in Lebanon found generally low AI knowledge among medical students, though those who received university-level training exhibited significantly higher levels of understanding (Doumat et al., 2022).

Research on the knowledge, attitudes, and practices (KAP) of AI among medical students in Africa is still limited. A study in North Africa revealed low knowledge levels about AI and DL, a moderate perception of AI, and a strong desire for its inclusion in the medical curriculum (Allam et al., 2023).

In Zambia, there is a lack of data on the knowledge, attitudes, and practices (KAP) of medical students regarding AI. A recent study among pharmacy students revealed limited knowledge, negative attitudes, and poor practices related to AI (Mudenda et al., 2024). As such, this study assessed the KAP of AI among medical students at the University of Zambia.

2. Materials and Methods

2.1. Study Design, Setting and Population

This descriptive cross-sectional study was conducted among medical students at the University of Zambia, Ridgeway Campus, in Lusaka, Zambia, from August to September 2024. The study population included all full-time undergraduate medical students enrolled at the University of Zambia during the 2023/2024 academic year. Participation was limited to those who provided informed, written consent. Medical students who were unavailable during the data collection period were excluded from the study.

2.2. Sample Size Determination and Sampling Technique

The sample size was calculated using Slovin's formula, based on a population of 1982 undergraduate medical students and a margin of error of 5%. This calculation determined a minimum required sample size of 333 students. A simple random sampling method was then employed to select a sample of undergraduate medical students from the University of Zambia, Ridgeway Campus.

2.3. Data Collection

Data were collected using a structured, self-administered questionnaire adapted from a previous study (Swed et al., 2022). The questionnaire was pre-validated by experts in the field of pharmacy for its simplicity, accuracy, clarity, understandability, and relevance. This pre-validation ensured that the questions were clear and easy to comprehend. The tool was then piloted with 30 medical students who were not included in the main study. The questionnaire consisted of four sections: Section A—Socio-demographic details; Section B—Knowledge of AI; Section C—Attitudes toward AI; and Section D—Practices related to AI. Knowledge, attitude, and practice scores were each rated on a five-point scale. A score of 60% or higher was categorized as "Good KAP". For statistical analysis, responses were coded as follows: for knowledge, "Yes" was coded as 1, "No" as 0, and good knowledge was defined as a score greater than 3 points (Swed et al., 2022). For attitude, "Neutral"

and "Disagree" were coded as 0, "Agree" as 1, and a good attitude was defined as a score greater than 3 points (Swed et al., 2022). For practice, "Yes" was coded as 1, "No" as 0, and good practice was defined as a score greater than 3 points (Swed et al., 2022).

2.4. Data Analysis

The collected data were reviewed for completeness and entered into Microsoft Excel 2013, before being exported to the Statistical Package for Social Sciences (SPSS) version 23.0 for analysis. Descriptive statistics were performed on all demographic, knowledge, attitude, and practice responses.

2.5. Ethical Considerations

Ethical approval for this study was obtained from the University of Zambia Health Sciences Research Committee (UNZAHSREC), with approval number 20231270138. Approval was also granted by the National Health Research Authority, under approval number NHRA5933/13/08/2024. Participants were informed about the purpose and nature of the study via an information sheet and consent form. Participation was voluntary, and anonymity was ensured through questionnaire coding. All collected information was kept strictly confidential and was not disclosed to any third party. No monetary compensation was provided to participants. The findings are expected to offer valuable insights to policymakers in Zambia for the development and implementation of AI initiatives in response to the evolving global landscape.

3. Results

3.1. Sociodemographic Characteristics of Participants

A total of 335 students participated in this study, with 57.6% (n = 193) identifying as male and 42.4% (n = 142) as female (**Table 1**). The majority of participants were aged between 18 and 22 years (52.5%, n = 176), with most being on government sponsorship (77%, n = 258) and in their third year of study (40.3%, n = 135). Most participants were unmarried (93.4%, n = 313) (**Table 1**). Overall, 94.3% of participants demonstrated a strong knowledge of AI.

3.2. Knowledge of Participants Regarding AI

In this study, 316 participants (94.3%) had heard of AI, while 19 (5.7%) had not. The primary sources of information were social media (189, 56.4%) and friends (111, 33.1%). Overall, most participants (275 or 82.1%) were unfamiliar with machine learning (ML) and deep learning (DL). The majority (73.4%) were unaware of AI's applications in the medical field (**Table 2**). Despite this, 77.0% of participants expressed positive attitudes towards AI.

3.3. Attitudes of Medical Students towards Artificial Intelligence

The majority of participants (183 or 54.6%) agreed that the implementation of AI

Table 1. Sociodemographic characteristics of participants.

Variables	Characteristics	Frequency (n = 335)	Percentage (%)
Gender	Male	193	57.6
	Female	142	42.4
Age (years)	18 - 22	176	52.5
	23 - 27	140	41.8
	28 - 32	14	4.2
	≥32	5	1.5
Marital Status	Divorced	1	0.3
	Married	21	6.3
	Single	313	93.4
Sponsorship	Government	258	77.0
	Self-sponsored	72	21.5
	Others	5	1.5
Year of Study	Second	61	18.2
	Third	135	40.3
	Fourth	88	26.3
	Fifth	37	11.0
	Sixth	8	2.4
	Seventh	6	1.8

Table 2. Medical students' knowledge of artificial intelligence.

Knowledge questions	Characteristics	Frequency (n = 335)	Percentage (%)
Have you heard of AI before this study?	Yes	316	94.3
	No	19	5.7
If yes, how did you know about it?	Social media	189	56.4
	Friends	111	33.1
	Formal education	14	4.2
	Others	4	1.2
	N/A	17	5.1
Have you ever heard of ML and DL?	Yes	60	17.9
	No	275	82.1
Do you know about AI's application in the medical field?	Yes	89	26.6
	No	246	73.4
If yes, then specify	ChatGPT	14	4.2

Continued

	Education Purposes	15	4.4
	Research	28	8.4
	Diagnosis	17	5.1
	Image analysis	6	1.8
	Robot-assisted Surgery	9	2.7
	N/A	246	73.4
Have you ever been taught about AI in medical school?	Yes	25	7.5
	No	310	92.5

is crucial for the medical field, while 163 (48.7%) believed it should be incorporated into the medical curriculum. Most participants (69%) felt that AI contributes to making life easier (Table 3).

3.4. Practices of Medical Students towards Artificial Intelligence

A substantial majority of participants (90.1%) had used AI across various fields, with 93.1% reporting that it simplified their tasks. Most participants (303 or 90.4%) found AI easy to use, and 61.5% expressed interest in working with it in the future (Table 4). Overall, 93.7% of participants demonstrated good practices concerning AI.

Table 3. Medical students' attitudes towards artificial intelligence.

Attitude questions	Characteristics	Frequency (n = 335)	Percentage (%)
Do you think AI is essential in the medical field?	Agree	183	54.6
	Disagree	17	5.1
	I don't know	34	10.1
	Strongly agree	73	21.8
	Strongly disagree	28	8.4
Do you think AI should be included in the medical school and professional training curriculum?	Agree	163	48.7
	Disagree	45	13.4
	I don't know	26	7.8
	Strongly agree	72	21.5
	Strongly disagree	29	8.7
Do you think AI will eventually replace humans in future?	Agree	109	32.5
	Disagree	75	22.4
	I don't know	44	13.1
	Strongly agree	52	15.5

Continued

	Strongly disagree	55	16.4
Do you think AI aids in making life easier?	Agree	231	69.0
	Disagree	7	2.1
	I don't know	3	0.9
	Strongly agree	86	25.7
	Strongly disagree	8	2.4
Do you believe AI aids in the assessment of the severity of disease and early diagnosis?	Agree	109	32.5
	Disagree	70	20.9
	I don't know	57	17.0
	Strongly agree	47	14.0
	Strongly disagree	52	15.5
Do you think AI would increase the ratio of errors in diagnosis?	Agree	125	37.3
	Disagree	55	16.4
	I don't know	57	17.0
	Strongly agree	75	22.4
	Strongly disagree	23	6.9

Table 4. Practice of medical students regarding artificial intelligence.

Practice questions	Characteristics	Frequency (n = 335)	Percentage (%)
Have you ever used AI technology in any field?	No	33	9.9
	Yes	302	90.1
Did AI simplify your task?	No	23	6.9
	Yes	312	93.1
Was it easy for you to use AI?	No	32	9.6
	Yes	303	90.4
Would you like to work on AI in future?	I don't know	63	18.8
	No	66	19.7
	Yes	206	61.5

4. Discussion

To the best of our knowledge, this is the first study to assess medical students' knowledge, attitudes, and practices regarding AI in Zambia. Our findings indicate that most medical students at the University of Zambia are aware of AI and demonstrate good knowledge, positive attitudes, and appropriate practices. However, notable gaps exist in their understanding of AI applications in the medical field, highlighting the need for greater integration of AI education in the medical curriculum.

Of the 335 participants, 57.6% (n = 193) were male, while 42.4% (n = 142) were female. The majority (52.5%, n = 176) were between 18 and 22 years old, with fewer participants in older age groups. Most students (77.0%, n = 258) were government-sponsored, and the largest proportion (40.3%, n = 135) were in their third year of study. Additionally, 93.4% (n = 313) of respondents were unmarried. These demographic trends align with findings from similar studies worldwide. For instance, a study conducted in Jordan reported that most participants were female (63.8%), aged between 21 and 22 years, and predominantly in their fifth year of study (Al-Qerem et al., 2023). Likewise, research in Nepal found that 57.9% of participants were female, with the highest representation (20.8%) among fifth-year students (Jha et al., 2022). These similarities suggest that medical student demographics across different regions share common characteristics, particularly in terms of gender distribution and academic progression.

This study found that the majority of participants (94.3%, n = 316) had at least basic knowledge of AI, while 5.7% (n = 19) had no prior exposure. However, only 26.6% were aware of AI applications in medicine, and just 17.9% had knowledge of machine learning (ML) and deep learning (DL), highlighting significant gaps in the medical curriculum. Our findings align with studies from other regions. In Syria, 70% of participants had basic AI knowledge, 23.7% were aware of its medical applications, and 34.7% had adequate understanding of ML and DL (Swed et al., 2022). Similarly, a study in Pakistan reported that 71.3% of students had fundamental AI knowledge, 23.2% understood its applications, and 35.3% were familiar with ML and DL (Ahmed et al., 2022). Additionally, research in Lebanon also found a high level of AI awareness among medical students (Kharroubi et al., 2024).

In contrast, findings from the MENA region revealed significant knowledge gaps, with 87.1% of students demonstrating poor AI knowledge and 83.7% having limited familiarity with ML (Allam et al., 2023). A separate study in Pakistan reported that 61.7% of medical students had no prior AI knowledge but expressed enthusiasm about its integration into their training (Abid et al., 2019). Therefore, these findings underscore the need for structured AI education within medical curricula to bridge existing knowledge gaps and better prepare future healthcare professionals for AI-driven advancements in medicine.

The study found that 77.0% (n = 258) of participants had a positive attitude toward AI, while 23.0% (n = 77) held negative views. More than half (54.6%) agreed that AI is essential in medicine, 48.7% supported its inclusion in the medical curriculum, and 32.5% believed it could eventually replace humans in certain roles. These findings are consistent with studies conducted in other regions. In Pakistan, 47.4% of participants recognized AI's importance in medicine, and 89% were optimistic about its implementation (Ahmed et al., 2022). A study in the UK also reported that medical students acknowledged AI's significant role in the field of medicine (Sit et al., 2020), while in Lebanon, 95.6% of students believed AI would have a substantial impact on healthcare (Doumat et al., 2022). Additionally,

another study in Pakistan found that 60.8% of students considered AI an effective learning tool, and 58.4% found it credible in medical education (Sami et al., 2025). Similarly, Abid et al. (2019) reported that most medical students in Pakistan had positive attitudes toward AI.

Negative attitudes toward AI in this study appeared to stem primarily from concerns about AI replacing human jobs, a misconception likely influenced by the lack of formal AI education. This aligns with findings from a study conducted among pharmacy students in Zambia, which highlighted similar fears and knowledge gaps (Mudenda et al., 2024). These results underscore the need to integrate AI education into medical training to dispel misconceptions and equip future healthcare professionals with the necessary skills to harness AI's potential in clinical practice.

In this study, 93.7% of participants demonstrated good AI-related practices, while 6.3% exhibited poor practices. Notably, 90.1% had used AI technologies across various fields, 93.1% acknowledged that AI simplified tasks, and 61.5% expressed interest in working with AI in the future. These findings indicate a higher level of AI engagement compared to studies conducted in other regions. For instance, in Syria, only 78.6% of participants expressed willingness to adopt AI in the future (Swed et al., 2022). Similarly, a study in Pakistan found that while 62.3% of participants were open to AI adoption, only 11.3% had practical experience using AI (Ahmed et al., 2022). The comparatively higher AI exposure and positive attitudes observed in this study highlight a growing awareness and readiness to integrate AI into medical practice, emphasizing the need for structured AI education within medical curricula.

The findings of this study, along with similar research, highlight the growing necessity of integrating AI into medical education, as reported in previous studies (Oluwadiya et al., 2023; Kolachalama and Garg, 2018; Chan and Zary, 2019; Pinto dos Santos et al., 2019). AI has the potential to enhance clinical decision-making, medical diagnostics, and personalized treatment approaches, making it an essential component of modern medical training. Given the increasing role of AI in healthcare, there is a pressing need for its systematic incorporation into medical curricula worldwide. Implementing AI education at an early stage will equip future healthcare professionals with the necessary skills to leverage AI-driven technologies effectively, ultimately improving patient care and healthcare outcomes on a global scale.

We acknowledge some limitations in this study. First, as it was conducted at a single university among medical students, the findings may not be generalizable to the student population at the University of Zambia or to other institutions. Second, the cross-sectional design limits the ability to establish causality or gain an in-depth understanding of the observed trends. Future research should incorporate a mixed-methods approach and longitudinal studies to provide more comprehensive insights. Nevertheless, this study offers valuable baseline information on AI awareness among medical students at the University of Zambia.

5. Conclusion

This study found that undergraduate medical students generally demonstrated good knowledge, positive attitudes, and appropriate practices regarding AI. However, gaps were identified in their understanding of AI applications in medicine, likely due to the absence of AI in Zambia's formal medical curriculum. To keep pace with global technological advancements, integrating AI into medical education is essential to better prepare future healthcare professionals.

6. Recommendations

- **Workshops and Seminars:** Organize campus events aimed at educating students on the significance of AI and its practical applications in the medical field.
- **Curriculum Integration:** Integrate AI education into the medical curriculum to enhance students' understanding and awareness of its healthcare applications.
- **Awareness Campaigns:** Launch educational campaigns to raise awareness about AI's potential impact on the medical sector and other industries.
- **AI Research Initiatives:** Encourage students to engage in AI-focused research projects, fostering innovation and critical thinking in addressing medical challenges.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Abid, S., Awan, B., Ismail, T., Sarwar, N., Sarwar, G., Tariq, M. et al. (2019). Artificial Intelligence: Medical Students' Attitude in District Peshawar Pakistan. *Pakistan Journal of Public Health, 9,* 19-21. https://doi.org/10.32413/pjph.v9i1.295

Ahmad, S. F., Han, H., Alam, M. M., Rehmat, M. K., Irshad, M., Arraño-Muñoz, M. et al. (2023). Impact of Artificial Intelligence on Human Loss in Decision Making, Laziness and Safety in Education. *Humanities and Social Sciences Communications, 10,* Article No. 311. https://doi.org/10.1057/s41599-023-01787-8

Ahmed, Z., Bhinder, K. K., Tariq, A., Tahir, M. J., Mehmood, Q., Tabassum, M. S. et al. (2022). Knowledge, Attitude, and Practice of Artificial Intelligence among Doctors and Medical Students in Pakistan: A Cross-Sectional Online Survey. *Annals of Medicine & Surgery, 76,* Article 103493. https://doi.org/10.1016/j.amsu.2022.103493

Alagappan, M., Brown, J. R. G., Mori, Y., & Berzin, T. M. (2018). Artificial Intelligence in Gastrointestinal Endoscopy: The Future Is Almost Here. *World Journal of Gastrointestinal Endoscopy, 10,* 239-249. https://doi.org/10.4253/wjge.v10.i10.239

Allam, A. H., Eltewacy, N. K., Alabdallat, Y. J., Owais, T. A., Salman, S., Ebada, M. A. et al. (2023). Knowledge, Attitude, and Perception of Arab Medical Students towards Artificial Intelligence in Medicine and Radiology: A Multi-National Cross-Sectional Study. *European Radiology, 34,* 1-14. https://doi.org/10.1007/s00330-023-10509-2

Al-Qerem, W., Eberhardt, J., Jarab, A., Al Bawab, A. Q., Hammad, A., Alasmari, F. et al. (2023). Exploring Knowledge, Attitudes, and Practices towards Artificial Intelligence among Health Professions' Students in Jordan. *BMC Medical Informatics and Decision*

Making, 23, Article No. 288. https://doi.org/10.1186/s12911-023-02403-0

Chan, K. S., & Zary, N. (2019). Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review. *JMIR Medical Education, 5,* e13930. https://doi.org/10.2196/13930

Doumat, G., Daher, D., Ghanem, N., & Khater, B. (2022). Knowledge and Attitudes of Medical Students in Lebanon toward Artificial Intelligence: A National Survey Study. *Frontiers in Artificial Intelligence, 5,* Article 1015418. https://doi.org/10.3389/frai.2022.1015418

Egger, J., Gsaxner, C., Pepe, A., Pomykala, K. L., Jonske, F., Kurz, M. et al. (2022). Medical Deep Learning—A Systematic Meta-Review. *Computer Methods and Programs in Biomedicine, 221,* Article 106874. https://doi.org/10.1016/j.cmpb.2022.106874

Jha, N., Shankar, P. R., Al-Betar, M. A., Mukhia, R., Hada, K., & Palaian, S. (2022). Undergraduate Medical Students' and Interns' Knowledge and Perception of Artificial Intelligence in Medicine. *Advances in Medical Education and Practice, 13,* 927-937. https://doi.org/10.2147/amep.s368519

Kharroubi, S. A., Tannir, I., Abu El Hassan, R., & Ballout, R. (2024). Knowledge, Attitude, and Practices toward Artificial Intelligence among University Students in Lebanon. *Education Sciences, 14,* Article 863. https://doi.org/10.3390/educsci14080863

Khumrina, P., Ryan, A., Judd, T., & Verspoor, K. (2017). Diagnostic Machine Learning Models for Acute Abdominal Pain: Towards an E-Learning Tool for Medical Students. In *MEDINFO 2017: Precision Healthcare through Informatics* (pp. 447-451). IOS Press.

Kolachalama, V. B., & Garg, P. S. (2018). Machine Learning and Medical Education. *npj Digital Medicine, 1,* Article No. 54. https://doi.org/10.1038/s41746-018-0061-1

Lee, S., Mohr, N., Street, N., & Nadkarni, P. (2019). Machine Learning in Relation to Emergency Medicine Clinical and Operational Scenarios: An Overview. *Western Journal of Emergency Medicine, 20,* 219-227. https://doi.org/10.5811/westjem.2019.1.41244

Londhe, V. Y., & Bhasin, B. (2019). Artificial Intelligence and Its Potential in Oncology. *Drug Discovery Today, 24,* 228-232. https://doi.org/10.1016/j.drudis.2018.10.005

Malodia, S., Islam, N., Kaur, P., & Dhir, A. (2024). Why Do People Use Artificial Intelligence (AI)-Enabled Voice Assistants? *IEEE Transactions on Engineering Management, 71,* 491-505. https://doi.org/10.1109/tem.2021.3117884

Martín Noguerol, T., Paulano-Godino, F., Martín-Valdivia, M. T., Menias, C. O., & Luna, A. (2019). Strengths, Weaknesses, Opportunities, and Threats Analysis of Artificial Intelligence and Machine Learning Applications in Radiology. *Journal of the American College of Radiology, 16,* 1239-1247. https://doi.org/10.1016/j.jacr.2019.05.047

Mudenda, S., Lubinda, R., Kasanga, M., Musakuzi, Z., Mohamed, S., & Mufwambi, W. (2024). Artificial Intelligence: A Knowledge, Attitude, and Practices Survey among Pharmacy Students at the University of Zambia. *Creative Education, 15,* 2582-2596. https://doi.org/10.4236/ce.2024.1512157

Murdoch, T. B., & Detsky, A. S. (2013). The Inevitable Application of Big Data to Health Care. *Journal of the American Medical Association, 309,* 1351-1352. https://doi.org/10.1001/jama.2013.393

Oluwadiya, K. S., Adeoti, A. O., Agodirin, S. O., Nottidge, T. E., Usman, M. I., Gali, M. B. et al. (2023). Exploring Artificial Intelligence in the Nigerian Medical Educational Space: An Online Cross-Sectional Study of Perceptions, Risks and Benefits among Students and Lecturers from Ten Universities. *Nigerian Postgraduate Medical Journal, 30,* 285-292. https://doi.org/10.4103/npmj.npmj_186_23

Paré, G., Raymond, L., Castonguay, A., & Wagner, G. (2023). Prospective Physicians' In-

tention to Adopt Artificial Intelligence: A Configurational Perspective. In *Proceedings of the 56th Annual Hawaii International Conference on System Sciences* (pp. 3005-3014). Otto-Friedrich-Universität. https://fis.uni-bamberg.de/handle/uniba/59670

Park, C. J., Yi, P. H., & Siegel, E. L. (2021). Medical Student Perspectives on the Impact of Artificial Intelligence on the Practice of Medicine. *Current Problems in Diagnostic Radiology, 50,* 614-619. https://doi.org/10.1067/j.cpradiol.2020.06.011

Pinto dos Santos, D., Giese, D., Brodehl, S., Chon, S. H., Staab, W., Kleinert, R. et al. (2019). Medical Students' Attitude towards Artificial Intelligence: A Multicentre Survey. *European Radiology, 29,* 1640-1646. https://doi.org/10.1007/s00330-018-5601-1

Sami, A., Tanveer, F., Sajwani, K., Kiran, N., Javed, M. A., Ozsahin, D. U. et al. (2025). Medical Students' Attitudes toward AI in Education: Perception, Effectiveness, and Its Credibility. *BMC Medical Education, 25,* Article No. 82. https://doi.org/10.1186/s12909-025-06704-y

Sit, C., Srinivasan, R., Amlani, A., Muthuswamy, K., Azam, A., Monzon, L. et al. (2020). Attitudes and Perceptions of UK Medical Students Towards Artificial Intelligence and Radiology: A Multicentre Survey. *Insights into Imaging, 11,* Article No. 14. https://doi.org/10.1186/s13244-019-0830-7

Swed, S., Alibrahim, H., Elkalagi, N. K. H., Nasif, M. N., Rais, M. A., Nashwan, A. J. et al. (2022). Knowledge, Attitude, and Practice of Artificial Intelligence among Doctors and Medical Students in Syria: A Cross-Sectional Online Survey. *Frontiers in Artificial Intelligence, 5,* Article 1011524. https://doi.org/10.3389/frai.2022.1011524