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Medical Students' Perspectives on Trust in Medical AI: A Quantitative Comparative Study

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Abstract

Artificial intelligence (AI) is expected to become an integral component of clinical practice in the near future. This technological shift will inevitably influence the education and perspectives of current medical students. The present research explores how trust in medical AI is perceived by three groups of students: those studying in Croatia, students enrolled in Slovakia, and international students pursuing medical studies in Slovakia. Data were gathered in the latter half of 2022 through a paper-based questionnaire administered to a non-randomized convenience sample. A total of 1715 participants from five Croatian and three Slovak medical faculties took part in the survey. Only 38.2% of respondents reported familiarity with AI concepts, whereas 44.8% anticipated future use of AI in their professional work. Students generally assessed patient preparedness for adopting such technologies as low. A majority (59.1%) expressed concern that AI could harm the physician–patient relationship, and 51.3% believed patients' trust in doctors would decline. International students were least likely to share these views, while Croatian and Slovak students indicated stronger agreement. Regarding confidence in the healthcare system, 40.9% of Croatian and 56.9% of Slovak respondents perceived low public trust, compared with just 17.3% of international students. Differences were also significant in students' confidence to explain AI applications to patients, with international students reporting the lowest levels, whereas Slovak and Croatian peers showed greater readiness. The findings highlight contrasting perspectives among medical students from different backgrounds regarding AI in healthcare, particularly in relation to trust. International students' views diverged considerably from those of Croatian and Slovak participants. The results underscore the need for medical curricula to incorporate AI education while accounting for sociocultural contexts that may influence acceptance and implementation.

Keywords: Patient- physician relationship, Trust, Medical AI, Artificial intelligence, Medical students, Medical ethics, Quantitative study

Introduction

In recent years, rapid technological progress—particularly in artificial intelligence (AI)—has brought considerable change to healthcare. Applications of AI in medicine range from routine administrative functions such as scheduling and digitizing records to more complex tasks like drug dosage calculations [1]. Growing enthusiasm for AI has also influenced numerous clinical disciplines, including radiology [2, 3], oncology [4], neurology [5], and nephrology [6]. These developments have inspired studies that examine how medical students view AI and how their career choices may be shaped by it. Research findings point to shifting interest in certain specialties, evolving expectations about daily clinical work, and the emergence of both hopes and apprehensions [7–9].

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Medical students represent a key group for investigating the future of healthcare since their outlook on AI will shape its adoption. Although many report understanding what AI is [10, 11], most struggle to define it accurately when asked [12]. Literature consistently emphasizes that training on AI within medical programs is insufficient and that curricula need strengthening in this area [11–14]. Students widely expect AI to reshape healthcare yet simultaneously stress that current instruction is inadequate [15]. In Croatia, medical informatics is generally offered as a compulsory subject (during the 2nd or 5th year of study), though no standalone course on AI exists. Instead, elective subjects such as Robotics in Medicine and Digital Technologies in the Healthcare System and E-Health expose students to AI through applied learning. In Slovakia, there is likewise no dedicated AI course in medical curricula, but faculties conduct lectures and workshops. At the largest Slovak medical faculty in Bratislava, AI has been included in the first-year medical ethics course for the past four years. To evaluate how students are preparing for AI integration, instruments such as the Medical Artificial Intelligence Readiness Scale for Medical Students (MAIRS-MS) have been developed [16]. Some research outlines what students should ideally know about AI in medicine [17], while others highlight the importance of addressing AI ethics within medical education [18]. Students generally anticipate that AI will enrich the medical profession and regard it as a collaborative partner rather than a competitor [19], with many believing that AI education will enhance career prospects [20]. Nevertheless, despite progress, current AI applications remain at an early stage, requiring further validation as well as strategies to confront emerging social and ethical challenges [21]. Reported student concerns include reduced patient contact due to AI integration [14], potential job displacement, and heightened risks to patient safety, along with a decline in physicians' clinical skills [10, 22]. The adoption of AI is also expected to reshape the physician–patient relationship [23]. Successful implementation requires a patient-centered approach that fosters autonomy and informed decision-making [24]. Traditionally, this relationship evolved from a paternalistic model, in which doctors held exclusive control over medical knowledge, to one where patients—empowered by digital tools—participate as active co-decision makers [25, 26].

At the heart of this relationship lies trust, an essential determinant of both health outcomes and the quality of patient–physician interaction [27]. Because trust defines the fiduciary nature of this bond, introducing AI as an additional actor may disrupt existing dynamics. This could generate entirely new forms of trust, such as between physician and AI, patient and AI, or within a triad involving patient, physician, and AI [28]. As healthcare grows increasingly reliant on technology, the nature of trust requires ongoing critical reflection and practical responses [29].

Among the ethical values relevant to medical AI, transparency is paramount. It is tied to the physician's informed consent when using algorithm-driven tools, despite limited understanding of their inner workings. Closely related is explainability, another pressing issue in AI design and deployment [30]. Both transparency and explainability influence perceptions of trust and trustworthiness. Trust itself implies confidence in the reliability of another agent or system, which may grow incrementally as dependability is demonstrated [31]. From a phenomenological standpoint, trust in AI represents an affective-cognitive condition involving a trustor—the individual placing trust, such as a physician—and a trustee, in this case the AI system [32]. Whether medical AI can genuinely be trusted, or merely relied upon, remains debated [33–35]. Against this backdrop, an important research question arises: do future physicians believe AI can be a trustworthy partner, or will its introduction prove disruptive?

Methods

Research objectives

The present study set out to examine medical students' perspectives on the integration of artificial intelligence (AI) into future healthcare, with particular attention to the notion of trust.

The investigation specifically sought to address:

1. How students understand and interpret trust within the physician–patient relationship.
2. Their views on the relevance of their own medical expertise when AI is incorporated into practice.
3. Their assessment of how prepared patients are to accept AI as part of routine healthcare delivery.

In addition, the study explored whether trust should be regarded as an essential foundation of the physician–patient relationship once AI becomes part of medical practice.

Table 1. Medical student's demographic characteristics ($N = 1701$)

Characteristic	Values		Country		
	n	%	Croatia	Slovakia	International students
Gender					
Female	1084	63.7%	495	391	198
Male	587	34.5%	258	194	135
N/A	30	1.8%	18	2	10
Year of study					
First year	631	37.1%	216	262	153
Second year	222	13.1%	149	72	1
Third year	184	10.8%	74	62	48
Fourth year	288	16.9%	80	137	71
Fifth year	283	16.6%	161	54	68
Sixth year	93	5.5%	91	0	2
School of Medicine			**Total**		
Catholic University of Croatia	76	4.5%	771	587	343
University of Zagreb	172	10.1%			
University of Rijeka	207	12.2%			
University of Split	137	8.1%			
Josip Juraj Strossmayer University of Osijek	179	10.5%	**Age**		
Comenius University Bratislava	540	31.7%	Mean	21,73	
Comenius University Jessenius School of Medicine	166	9.8%	Mode	20	
Pavol Jozef Safarik University of Medicine	224	13.2%	Range	18–36	

Participants and Data Collection

The study recruited medical students from Croatia and Slovakia—two Eastern European countries with comparable historical backgrounds, social conditions, and healthcare challenges. In addition, international students enrolled in Slovak faculties, representing diverse cultural contexts, were analyzed as a separate group. Data collection was carried out between May and November 2022 across five Croatian and three Slovak medical schools **(Table 1)**.

A non-probabilistic convenience sampling strategy was applied. Eligible participants were those currently studying medicine at one of the selected institutions and present at the lectures where the survey was administered. Students from all academic years were included, following the approach adopted in earlier investigations on this topic [15, 20, 34, 36, 37, 39]. The primary method of administration was a paper-and-pencil survey. However, at one Slovak university, the questionnaire was distributed online via LimeSurvey; students received the link after providing written informed consent. Researchers introduced the study at the beginning of lectures and invited students to participate voluntarily. Informed consent was obtained prior to participation. Of the 1715 students initially enrolled, 14 questionnaires were excluded due to incomplete responses, leaving a final analytic sample of 1701 students.

Questionnaire design

The instrument was developed by the research team, with the full English version provided in the supplementary files (Additional file 1). Its content was grounded in a previous qualitative investigation conducted in Croatia in 2021 [28], supplemented by a literature review of earlier surveys targeting medical students, patients, and physicians [23, 36–41]. Consistent with the earlier study [28], the anticipatory ethics framework [42] was applied, including the use of the same hypothetical scenario. In

order to maintain continuity and emphasize ethical, legal, and social dimensions, the team opted not to employ the MAIRS-MS instrument [16].

The final survey encompassed six broad domains:

1. Students' motivations for studying medicine and their self-reported familiarity with ethics/bioethics.
2. Perceptions of how AI may influence the physician–patient relationship.
3. Self-assessed understanding of AI concepts.
4. Willingness to integrate AI and digital technologies into future clinical practice.
5. Views on the utility of AI, along with perceptions of societal readiness for its adoption.
6. Demographic details.

The questionnaire primarily used multiple-choice items on a five-point Likert scale, where respondents indicated their level of agreement with given statements. At the start of the survey, participants were presented with a brief scenario (Additional file 2), describing an AI-based hospital assistant projected for the year 2030, designed according to the anticipatory ethics approach [42]. A pilot test with first-year students from the researchers' institution was conducted to ensure clarity, comprehensibility, and appropriate completion time. The instrument was available in Croatian, Slovak, and English, with the English version targeted at international students. For the subscale assessing perceptions of patient readiness, four items were retained for analysis, yielding strong internal consistency (Cronbach's alpha = 0.810).

Data analysis

All analyses were performed using SPSS version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics were summarized as percentages. To explore group differences across demographic characteristics, independent t-tests and one-way ANOVAs were applied. Additionally, principal axis factoring was conducted on items concerning students' attitudes toward future use of AI technologies in clinical practice.

Results

Demographic characteristics

In total, 1701 valid responses were gathered across eight medical faculties **(Table 1)**. Of these, 771 respondents (45.3%) were from Croatia, while 930 (54.7%) studied in Slovakia. The Slovak group included 587 domestic students (34.5%) and 343 international students (20.2%), the latter primarily from Western Europe and Scandinavia. The sample was predominantly female, with 1084 women (63.7%) compared to 587 men (34.5%); 30 students (1.8%) did not report gender. This gender imbalance reflects broader trends in medical education, where women generally outnumber men. For instance, the Eurostudent VI survey in Croatia (2019) indicated that 77.6% of students in medicine and social care were female, compared with 22.1% male [43]. Other Croatian studies have confirmed a similar gender distribution [44, 45], and comparable findings have also been reported in Slovakia [46, 47]. By year of study, first-year students were the largest subgroup, followed by those in their fourth and fifth years. Sixth-year students were least represented, largely due to the sampling design, since these students were often based in clinical and hospital settings rather than in lecture halls where data collection occurred.

Perceptions of AI and trust in the physician–patient relationship

When asked about their familiarity with the concept of AI, 38.6% of participants selected a neutral response (neither agreeing nor disagreeing) **(Figure 1)**. Meanwhile, 38.2% agreed that they were acquainted with AI, whereas 23.2% indicated the opposite. A significant gender difference emerged: men reported higher levels of familiarity than women, $t(1162.09) = 7.928$, $p < .001$, with male students scoring an average of 3.45 (SD = 1.014) compared to 3.05 (SD = 0.977) among female students. Comparable patterns were observed for the statement, "I expect to actively use artificial intelligence in my medical practice." In this case, 39% of respondents were neutral, 44.8% anticipated incorporating AI into their future work, and 16.2% disagreed with the statement.

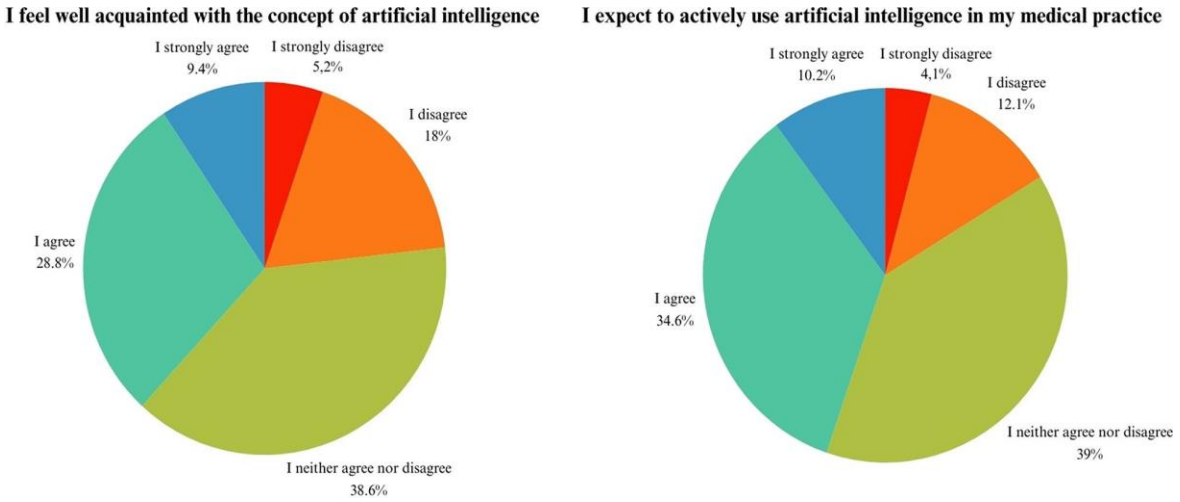

Figure 1. Student's attitudes toward AI

Students demonstrated overwhelmingly positive views on the role of trust in clinical interactions **(Figure 2)**. For the statement "The patient and the physician should trust each other," 80 percent expressed strong agreement, 16.8% agreed, 2.1% selected a neutral response, and only 1.1 percent disagreed. Similarly, when asked whether "The patient should trust the physician upon consultation," 96.2% of participants agreed, 3% were neutral, and just 0.8% disagreed. Regarding the statement "The physician is required to explain to the patient how a particular conclusion was reached," 89.2% agreed, 8.9 percent were neutral, and 2.9% disagreed.

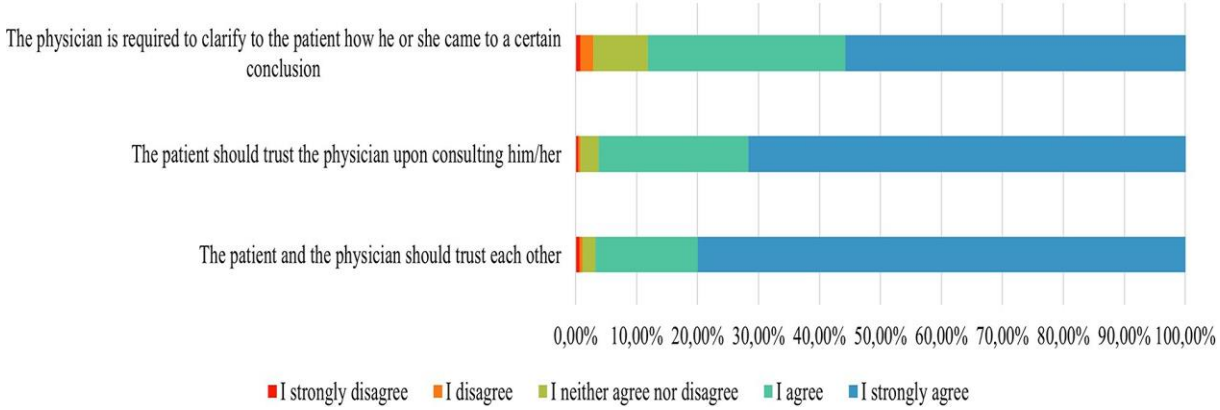

Figure 2. Student's attitudes toward different aspects of patient-physician relationship

Analysis of the statements revealed statistically significant differences across the three student groups **(Table 2)**. Compared with their Croatian and Slovak peers, international students expressed lower levels of agreement with the idea that patients should place trust in physicians during consultations or depend fully on the physician's judgment. In contrast, international students showed stronger agreement with the view that patients value physicians' time, a position less commonly endorsed by Croatian and Slovak students.

Table 2. Multiple comparisons

				Multiple comparisons		
				Tukey HSD		
	Mean	SD	Sig.	Student group*student	Mean difference, SD	Sig.

					group		
The patient is expected to place trust in the physician during consultation	Croatian students (CS)	4.73	0.483	*P* < .001	CS*IS	0.296, 0.037	*P* < .001
	Slovak students (SS)	4.73	0.550		SS*IS	0.298, 0.039	*P* < .001
	International students (IS)	4.43	0.770				
Patients are expected to depend completely on the physician's guidance	Croatian students (CS)	3.61	0.920	*P* < .001	CS*SS	(-)0.293, 0.051	*P* < .001
	Slovak students (SS)	3.62	0.879		CS*IS	(-)0.550, 0.061	*P* < .001
	International students (IS)	3.06	1.047		SS*IS	(-)0.257, 0.063	*P* < .001
The physician must explain to the patient the reasoning behind their conclusion	Croatian students (CS)	4.53	0.712	*P* < .001	CS*SS	(-)0.268, 0.043	*P* < .001
	Slovak students (SS)	4.26	0.860		CS*IS	0.167, 0.051	*P*.003
	International students (IS)	4.36	0.841				
Patients value and respect the time of their physician	Croatian students (CS)	2.60	0.978	*P* < .001	CS*SS	(-)0.194, 0.058	*P*.002
	Slovak students (SS)	2,79	1.164		CS*IS	(-)0.804, 0.068	*P* < .001
	International students (IS)	3,40	1.011		SS*IS	(-)0.610, 0.072	*P* < .001

* The mean difference is significant at the 0.05 level

Trust in the healthcare system

Students' perceptions of how much users trust the healthcare system in their country of study varied considerably **(Table 3)**. Among Croatian students, 40.9% felt that the healthcare system is generally not trusted by users, while a higher proportion of Slovak students (56.9%) shared this view. In contrast, only 17.3% of international students perceived a lack of trust in the system.

To examine differences across the three groups, a one-way ANOVA was conducted, revealing a statistically significant variation in perceived patient trust, Welch's $F(2, 106.211) = 901.153$, $p < .001$. Mean scores showed Slovak students reported the lowest perceived trust ($M = 2.51$, $SD = 0.737$), Croatian students slightly higher ($M = 2.75$, $SD = 0.847$), and international students the highest ($M = 3.28$, $SD = 0.798$). Of particular interest, international students believed that users place greater trust in the Slovak healthcare system than Slovak students themselves, with a mean difference of 0.77 (95% CI [0.64, 0.9]).

Table 3. Student perception of trust in the healthcare system among patients

How much do users trust the healthcare system in their country of study?							
	They do not trust the health care system at all	They do not trust the health care system	They neither trust nor distrust the healthcare system	They trust the health care system	They completely trust the health care system	Mean	SD
Croatian students	4.8%	36.1%	38.7%	19.8%	0.6%	2,75	0,847
Slovak	3.2%	53.7%	32.0%	10.9%	0.2%	2,51	0,737

students							
International students	1.5%	15.8%	37.4%	43.9%	1.5%	3,28	0,798

Patient readiness to Use AI

The concept of patient readiness was assessed based on students' perceptions of patients' trust in technology, adaptability, digital literacy, and medical knowledge—factors recognized as essential for effective adoption of AI. Scores on this construct ranged from 4 (indicating "strongly disagree" on all items) to 20 ("strongly agree" on all items). A statistically significant difference in perceived patient readiness was observed among Croatian, Slovak, and international students ($p < .001$). Croatian students rated patient readiness the lowest on average ($M = 8.40$, $SD = 2.814$), followed by Slovak students ($M = 8.79$, $SD = 2.689$), whereas international students were the most confident in patients' readiness for AI ($M = 9.62$, $SD = 2.829$).

Regarding the potential impact of digital technologies on the patient–physician relationship, 59.1% of students agreed that AI implementation could negatively affect this relationship ($M = 3.62$, $SD = 1.009$), with no significant difference by student group. However, when asked whether patients would trust physicians less as digital technologies became more prevalent, 51.3% of students agreed, with significant differences among groups ($p < .001$). International students were least likely to agree ($M = 3.09$, $SD = 1.006$), while Slovak ($M = 3.50$, $SD = 1.030$) and Croatian students ($M = 3.51$, $SD = 1.006$) expressed stronger agreement.

Students were also asked about their confidence in explaining AI to patients if requested. Here, 53.6% believed they could provide an explanation. This measure showed significant variation between groups, Welch's $F(2, 856.821) = 12.294$, $p < .001$. International students reported the lowest confidence ($M = 3.09$, $SD = 1.215$), whereas Slovak ($M = 3.41$, $SD = 1.048$) and Croatian students ($M = 3.47$, $SD = 1.096$) indicated higher confidence.

In the study scenario (Annex I), AI was represented through a virtual assistant, Cronko. Students were asked to indicate how likely they would be to maintain their own diagnostic conclusion if it differed significantly from the AI's assessment **(Table 4)**. Significant differences emerged among Slovak, Croatian, and international students. Notably, international students were less likely to adhere to their own conclusions and more inclined to defer to the AI's recommendation.

Table 4. Multiple comparisons - reaction to the difference in diagnosis

How would you respond if your diagnosis differed significantly from Cronko's suggestion?		**Mean**	**SD**	**Sig.**	**Multiple comparisons**		
					Tukey HSD		
					Student group* student group	**Mean difference, SD**	**Sig.**
I would maintain confidence in my original diagnosis.	Croatian students (CS)	3.50	0.929	*P* < .001	CS*IS	0.352, 0.062	*P* < .001
	Slovak students (SS)	3.59	0.940		SS*IS	0.448, 0.065	*P* < .001
	International students (IS)	3.14	1.036				
I would re-evaluate my diagnosis and seek additional confirmation.	Croatian students (CS)	4.36	0.835	*P* < .001	CS*SS	0.263, 0.051	*P* < .001
	Slovak students (SS)	4.09	0.977		CS*IS	0.371, 0.060	*P* < .001
	International students (IS)	3.99	1.012				
I would review my diagnosis and attempt	Croatian students (CS)	2.34	1.016	*P* < .001	CS*SS	0.304, 0.053	*P* < .001

to align it as closely as possible with Cronko's recommendation.	Slovak students (SS)	2.03	0.844		IS*SS	0.453, 0.066	$P < .001$
	International students (IS)	2.49	1.067				
I would discard my diagnosis and accept Cronko's conclusion.	Croatian students (CS)	1.45	0.788	$P < .001$	IS*CS	0.288, 0.053	$P < .001$
	Slovak students (SS)	1.28	0.726		IS*SS	0.356, 0.056	$P < .001$
	International students (IS)	1.74	0.996				

* The mean difference is significant at the 0.05 level

** Cronko = AI virtual assistant from the scenario presented in the survey

Students were also asked to indicate how patients ought to respond when a physician's diagnosis and an AI's assessment differ significantly **(Table 5)**. Nearly half of the students (49.4%) suggested that patients should obtain a third, expert opinion. A slightly smaller proportion (42.1%) believed that patients should place their trust in the physician, while 7.4% felt that patients should weigh both diagnoses and make their own decision. Only a very small minority recommended trusting the AI (0.7%) or consulting a second AI system for another opinion (0.4%).

Table 5. Crosstabulation of whom to trust and the country from which the students come

In the event that Cronko were to provide the patient with a very different diagnosis from the physician's assessment, who do you think the patient should trust:					
	The physician	Cronko-algorithm (AI)	They should consider both diagnoses and decide for themselves	They should seek a third (expert) opinion	They should seek a third opinion (from another artificial intelligence system)
Croatian students	45.1%	0.7%	9.%	45.1%	0.1%
Slovak students	40.8%	0.3%	2.9%	55.5%	0.5%
International students	37.4%	1.5%	11.7%	48.8%	0.6%

The crosstabulation analysis indicated that a smaller proportion of international students believed that patients should trust the physician compared to their Croatian and Slovak peers. Pearson's Chi-square test confirmed a significant association between students' country of origin and their view on patient trust ($\chi^2 = 43.731$, df = 8, $p < .001$). The strength of this relationship, as measured by Cramer's V, was statistically significant but weak ($\varphi = 0.114$, $p < .001$).

Discussion

To the authors' knowledge, this is the first study examining medical students' attitudes toward AI in healthcare from the perspective of Eastern European countries. Previous research has primarily focused on Western nations such as Germany [48–50], Switzerland [37], the United Kingdom [39, 40], Canada [7, 10, 12], and various Asian countries [11, 13, 51–58]. Despite widespread anticipation that AI will become increasingly integrated into healthcare, only 44.8% of students expected to use AI in their future practice. Furthermore, 53.6% felt confident that they could explain AI technology to patients, while just 38.2% reported current familiarity with the concept of AI. These findings are consistent with a German study in which 64.3% of medical students reported feeling inadequately informed about AI in medicine [48]. Prior research has also highlighted a gap between students' perceived understanding of AI and their actual knowledge [9]. In the contemporary educational context, medical curricula should aim to equip students with the skills necessary to comprehend AI and communicate its applications effectively to patients [59].

Among Croatian and Slovak students, the dominant perception was that patients do not trust their healthcare system, a view consistent with broader population-level data. The European Values Study (EVS) found that only 43% of Croatian citizens trust their healthcare system [60]. Other studies indicate that approximately 25% of the population consider the system entirely ineffective, and a majority feel fundamental reforms are necessary, with the lowest trust observed among groups with lower educational attainment [61]. In Slovakia, overall satisfaction with healthcare recently reached 44%, and when asked about trust in conventional medicine, only 55% of Slovaks reported confidence in doctors and hospitals, below the European average. Key sources of dissatisfaction included difficulty securing appointments (57%) and negative personal or mediated experiences with care (51%) [62].

Most international students in the study come from Norway and other Scandinavian countries, where trust in healthcare is typically very high [63–65]. Consequently, these students are likely to carry this perception of high trust into their assessment of healthcare systems in countries other than their own.

In Croatia and Slovakia, where overall trust in the healthcare system is relatively low and students perceive that patients exhibit limited confidence in the system, students are more likely to believe that patients should place complete trust in physicians during consultations and that patients often fail to respect physicians' time. Effective implementation of AI in healthcare depends on cooperative interactions between patients and physicians, which in turn requires mutual trust and understanding [66]. Trust has been conceptualized as "an individual's calculated exposure to the risk of harm from the actions of an influential other" [31, 67], where harm refers to the potential physical or psychological damage arising from misjudged trust [31]. In the context of medical AI, this harm primarily affects patients and directly influences the physician-patient relationship [35, 68]. Consequently, trust impacts not only patient outcomes but also the reliability of AI, physicians' confidence in using it, its acceptability, and the likelihood of its future adoption.

International students' perspectives on AI and medical trust differ, likely because many come from Western or Northern European countries where shared decision-making is deeply embedded in medical practice. This model prevents extremes in the patient-physician dynamic: it avoids situations where the physician unilaterally dictates decisions or where the patient assumes complete control. Modern healthcare emphasizes a collaborative partnership between physician and patient, with ethical communication and patient autonomy playing key roles. Students from Western Europe are thus more familiar with systems that prioritize these principles. In contrast, remnants of a paternalistic approach remain in some post-communist or transitional countries [69, 70]. Although patient involvement in decision-making is increasing, vestiges of the old hierarchical model persist.

In this study, Slovak and Croatian students were more likely than international students to perceive patients as less respectful of physicians' time and to believe that patients should fully trust physicians' judgments. These attitudes may be partially explained by the continued influence of paternalism in the patient-physician relationship in these countries. Transitional nations such as Croatia and Slovakia exhibit specific cultural patterns in medical communication, including limited information sharing and a paternalistic orientation toward patients [71]. Systematic studies on these issues are scarce in Central and South-Eastern Europe [71]. However, Croatian researchers, following Slovak studies [72], have examined patient rights with a focus on physician-patient communication and the informed consent process [71]. Findings revealed that while informed consent procedures in selected Croatian hospitals were officially based on shared decision-making, paternalistic dynamics persisted. Given the similar cultural and political contexts, a comparable situation is likely in Slovakia, although recent research is lacking.

Historical examples of enduring medical paternalism in Slovakia, such as the involuntary sterilization of Roma women—initiated under communist Czechoslovakia and continuing into the 2000s—have fueled public debate and contributed to ongoing distrust in the national healthcare system among Roma communities. This legacy has affected vaccine uptake and underscores the need for improved communication practices and informed consent [73, 74].

When discrepancies arise between a physician's judgment and an AI system, our findings indicate that over half of the medical students believe patients should either seek a third (expert) opinion (49.4%) or trust the physician (42.1%). These results align with a German study [48], in which 82.5% of participants stated that the physician's decision should take precedence. Notably,

international students were more likely than Croatian and Slovak students to defer to AI rather than their own judgment, despite being enrolled in the same program as their Slovak peers. These findings provide novel insights into ongoing discussions [33–35] about the extent to which future physicians may place trust in medical AI.

In situations involving conflicting diagnoses, Croatian and Slovak students tended to favor patient reliance on the physician's opinion. Nearly 90% of students agreed that physicians must explain to patients how they reached their conclusions. Yet, only 53.6% felt confident that they could adequately explain AI technology to a patient. This discrepancy may create challenges in healthcare, as patients may not fully understand or accept AI-derived diagnostic conclusions when they conflict with a physician's assessment. Ensuring that future physicians can effectively use AI, interpret results accurately, understand associated risks, and communicate them clearly to patients will be crucial [75].

Strengths and Limitations

To our knowledge, this is the first study examining medical students' attitudes toward AI and trust in healthcare in Eastern Europe, specifically in Croatia and Slovakia. The research highlights differences in perceptions regarding trust and the patient-physician relationship. The primary limitation is the non-probabilistic, convenience-based sample, which limits the generalizability of the results. Logistical and technical constraints necessitated this sampling approach. It is also important to note that data collection occurred in late 2022 during the ongoing COVID-19 pandemic, which may have influenced students' attitudes toward healthcare. Additionally, international students completed the survey in English, which was not their first language, potentially leading to misinterpretation or misunderstanding of certain questions.

Conclusions

This study offers valuable insight into the attitudes of medical students from Croatia, Slovakia, and international programs regarding the future role of AI in healthcare, particularly concerning trust. The findings contribute to the ongoing discourse on whether future physicians can place trust in medical AI. Students overwhelmingly agree that trust between physicians and patients is essential, yet many believe that integrating digital technologies may negatively affect this relationship. Notably, international students' views differed from those of Croatian and Slovak students. Students from Croatia and Slovakia were more likely to anticipate reduced patient trust with the implementation of AI and expressed elements of a paternalistic approach. These students also reported higher confidence in their diagnostic accuracy and ability to explain AI processes compared to international students.

The study underscores the need to integrate AI-related education into medical curricula, with careful consideration of national and cultural factors that could hinder AI adoption if neglected. Enhancing AI explainability and fostering trust through targeted education will likely improve acceptance and strengthen the patient-physician relationship in the future.

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