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Awareness, Perceptions, and Readiness for AI in Medical Malpractice Cases – A Cross-Sectional Survey of Healthcare and Legal Professionals in Saudi Arabia

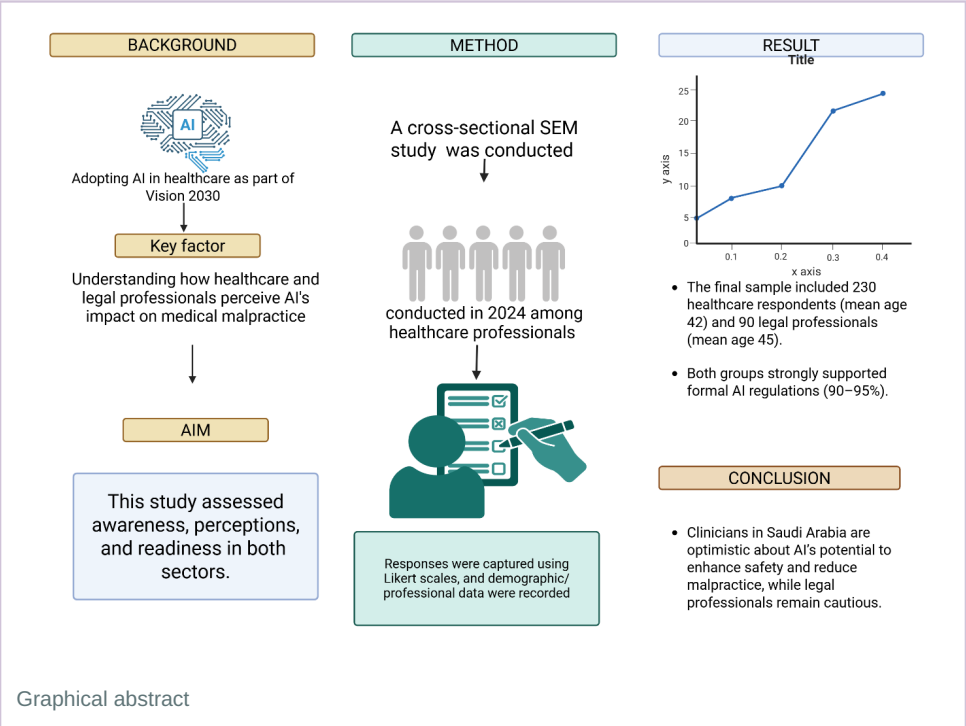
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ABSTRACT



Graphical abstract

Background: As Saudi Arabia incorporates AI into healthcare under Vision 2030, understanding how healthcare and legal professionals perceive AI's impact on medical malpractice is essential. Rising malpractice claims and limited legal precedent on AI heighten this need. This study assessed awareness, perceptions, and readiness in both sectors.

Methods: A cross-sectional survey was reported in 2024 among healthcare professionals (physicians, nurses, risk managers) and legal professionals (attorneys, judges). A structured questionnaire evaluated AI knowledge, perceived impact on malpractice and patient safety, and readiness to engage with AI in practice or litigation. Responses were captured using Likert scales, and demographic/professional data were recorded. Group comparisons used chi-square and t-tests/Mann-Whitney U; logistic regression identified factors linked to high AI readiness. Ethical approval (KFU-IRB-2024-002) was obtained; participation was voluntary and anonymized.

Results: The manuscript reports 230 healthcare and 90 legal respondents and differences in reported AI awareness, exposure, views and readiness. Several abstract percentages differ from Results and tables, group questions may not be equivalent, and regression output is absent. Original item-level counts, scoring and model results are required before reliable estimates can be reported.

Conclusions: The survey describes responses from participating healthcare and legal professionals. Comparisons require item-level denominators and consistent question wording. The recruitment design limits inference to the responding sample.

The survey reports differing perspectives among these respondents. The nonprobability sample, differing questions and unavailable data limit generalization and do not establish whether training changes readiness or AI changes safety or liability.

Keywords: Artificial intelligence; medical malpractice; clinician attitudes; legal perspectives; Saudi Arabia; awareness; readiness.

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Introduction

Artificial intelligence is transforming healthcare delivery worldwide, promising improvements in diagnosis, treatment, and operational efficiency **(1, 2)**. In Saudi Arabia, the government has prioritized AI adoption in healthcare as part of its Vision 2030, establishing entities like the Saudi Data & AI Authority (SDAIA) to oversee integration **(3)**. The healthcare sector has seen implementations of AI ranging from predictive analytics to AI-assisted imaging interpretation, situating the Kingdom as a regional leader in digital health innovation **(4)**. These advancements raise critical considerations for medical malpractice, an area of law that traditionally deals with human error. As AI systems increasingly influence clinical decisions, questions arise: Who is accountable when AI contributes to a diagnostic error? Will clinicians be held to a new standard of care that includes AI usage? How prepared are our healthcare and legal systems for these challenges? Addressing such questions requires understanding the perspectives of key stakeholders—healthcare providers who use AI and legal professionals who handle malpractice cases **(5)**.

Saudi Arabia's legal system for malpractice is distinctive, blending modern healthcare regulations with Sharia principles. Malpractice cases are reviewed by expert committees, and while the process aligns with international norms of establishing duty, breach, causation, and harm, the use of advanced technology evidence (like AI recommendations or algorithm outputs) is uncharted territory **(6)**. Currently, case law globally on AI-related medical injuries is sparse **(7)**, often dealing with issues of whether AI software is considered a "product" for liability or how to judge a physician's reliance on AI **(8)**. In Saudi malpractice context, existing statutes do not explicitly address AI. This gap could lead to uncertainty or inconsistent judgments if an AI-influenced error were litigated. Hence, the awareness and attitudes of those involved—clinicians and legal experts—will heavily influence how such cases are managed and how proactively guidelines are established **(9)**.

Previous research into stakeholder perceptions of AI in healthcare reveals both enthusiasm and concern. Many clinicians recognize AI's potential to reduce errors; for instance, a survey in Jeddah showed over three-quarters of physicians believe AI can improve diagnostic accuracy **(10)**. At the same time, concerns persist about over-reliance on AI and job replacement. Legal professionals, on the other hand, may lack exposure to AI's workings, leading to apprehension about unpredictable outcomes or evidentiary complexities. In the U.S., surveys indicate that a majority of lawyers remain unconvinced about the benefits of AI in their field, with only 10% foreseeing a transformative impact and most adopting a cautious stance **(11)**. While that relates to legal practice automation, it signals that the legal community could be slow to embrace AI or trust its outputs without robust understanding.

In Saudi Arabia, no published studies (to our knowledge) have directly surveyed legal professionals on AI in medicine or malpractice. A few have looked at healthcare workers: for example, Alshahrani et al. (2021) highlighted that lack of digital skills among providers inhibited broader AI adoption **(12)**. Alsaedi et al. (2023) focused on healthcare professional worries about AI (e.g., data privacy, accuracy) **(13)**. But there remains a gap in understanding how ready both sectors are to navigate the intersection of AI and malpractice litigation. This study seeks to fill that gap by comparing the awareness, perceptions, and readiness of healthcare professionals vs. legal professionals in Saudi Arabia regarding AI's role in medical malpractice cases. Specifically, our objectives were: (1) to assess baseline knowledge of medical AI in each group; (2) to evaluate perceived benefits and risks of AI in reducing or complicating malpractice issues; (3) to measure their readiness in terms of training and willingness to incorporate AI into their practice (clinical or legal); and (4) to identify factors associated with higher readiness or positive perception.

Understanding these perspectives is crucial. If clinicians overestimate AI's capabilities, they might become complacent or face surprises in court. If lawyers and judges are unfamiliar with AI, they might struggle with evidence or assign blame inappropriately **(14, 15)**. Ultimately, aligning both communities through knowledge and expectations will help ensure that as AI is integrated, patient safety and justice are both served. The findings from this study can inform targeted educational programs (e.g., AI and law workshops for judges, or medicolegal implications seminars for clinicians) and policymaking (e.g., drafting guidelines on documentation of AI-influenced decisions) **(16)**. By identifying gaps and disparities in perception, we can proactively address them as Saudi Arabia navigates this new frontier of AI in healthcare **(17)**.

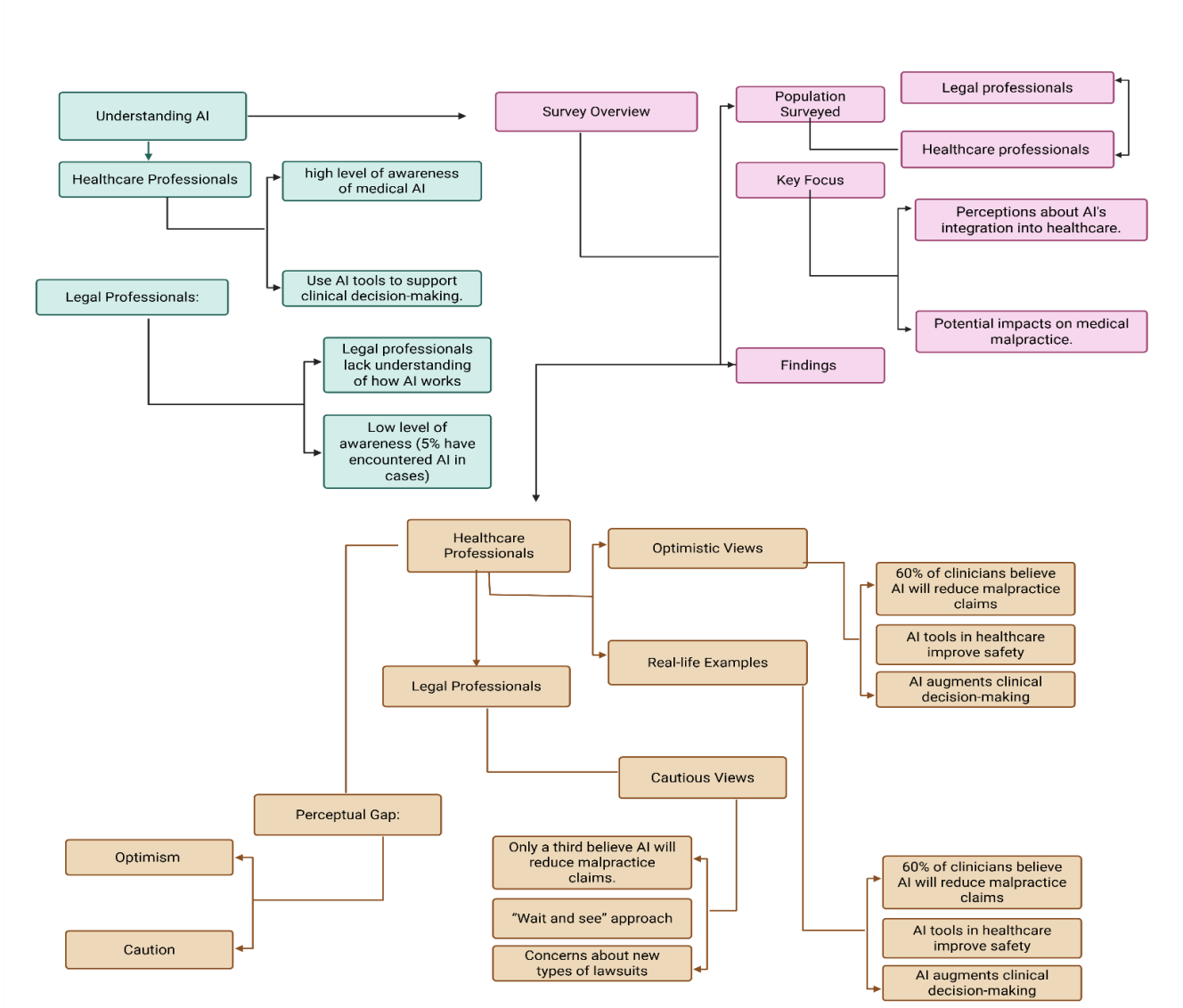


Figure 2: Awareness, Perceptions, and Readiness for AI in Medical Malpractice Cases

Materials and Methods

Study Design and Participants

We conducted a cross-sectional survey study from June to August 2024 involving two distinct participant groups in Saudi Arabia: **(a) Healthcare professionals** – including physicians, nurses, and hospital quality/risk management personnel; **(b) Legal professionals** – including attorneys (both plaintiff and defense lawyers specializing in medical malpractice) and judges or mediators who handle healthcare-related cases. We aimed for roughly a 70:30 split in sample size favoring healthcare professionals, reflecting the larger population of clinicians and our interest in within-group analyses among clinicians by profession and experience.

Inclusion criteria for clinicians were: at least 5 years of work experience in Saudi Arabia's healthcare system (to ensure familiarity with malpractice processes) and currently practicing in a role involved in patient care or safety. We sought diversity across specialties and institutions (public/private, various regions). For legal professionals, inclusion criteria were: at least 3 years of experience in medical malpractice or health law in Saudi Arabia, or judges who had presided over malpractice disputes. We identified potential participants through professional networks: for clinicians, via hospital administrations, medical societies, and the Saudi Commission for Health Specialties; for legal experts, via the Ministry of Justice, bar associations, and personal networks of known malpractice attorneys. Invitations explaining the study's purpose were sent by email or WhatsApp, con-

taining a survey link. Participation was voluntary and anonymous, with implied consent given by completion of the survey. No incentives were provided, to avoid coercion.

We initially targeted 300 healthcare and 100 legal respondents (total N=400). This sample size was deemed sufficient to estimate proportions with a 5% margin of error and to detect medium effect size differences between groups with >80% power at α=0.05. Out of 320 clinicians invited, 250 responded (78% response). For legal, out of ~150 reached out (given the smaller pool), 100 responded (67%). After data cleaning (removing incomplete responses or those failing an attention check question), we included **230 healthcare** and **90 legal** professionals in the analysis (N=320 total).

Survey Instrument

We developed a structured questionnaire with input from both medical and legal experts. The survey consisted of sections:

• **Demographics & Background:** age, gender, highest education, years of experience, region of practice, specialty (for clinicians) or role (for legal), and prior exposure to AI (e.g., “Have you used or encountered AI in your work? Yes/No”). For clinicians, we also asked if they had any prior malpractice claims against them, as this might influence their perceptions.

• **AI Knowledge/Awareness:** a set of questions to gauge understanding of AI in healthcare. We included both self-assessment (e.g., “Rate your knowledge of AI applications in healthcare on a scale of 1 (none) to 5 (expert)”) and factual questions (e.g., a multiple-choice asking which of several examples is an AI application). We combined these into a composite “AI knowledge score” (0–10 scale).

• **Perceptions of AI Impact:** statements rated on a 5-point Likert scale (Strongly Disagree to Strongly Agree) addressing perceived benefits and risks of AI in context of malpractice:

• Benefits: e.g., “AI decision support can reduce diagnostic errors” (benefit to patient safety), “Using AI will likely decrease malpractice claims in the long run”.

• Risks/concerns: e.g., “AI recommendations could be misleading or result in new types of errors”, “AI complicates assigning responsibility for errors” (), “Clinicians might become too reliant on AI and lose skills”. We tailored some items separately for each group. Clinicians saw statements focusing on clinical impact, while legal respondents saw some focusing on legal process (e.g., “Courts can reliably interpret evidence from AI systems”, “It’s unclear who is liable if an AI error harms a patient”).

• **Readiness & Training:** questions on current readiness and needs:

• Clinicians: “Do you feel prepared to integrate AI outputs into your clinical decision-making?” (Yes/No scale with an option for “somewhat”), “Have you received any formal training in AI or data science?”, “Would you like training on medicolegal aspects of AI?”.

• Legal professionals: “How comfortable are you with cases involving AI (e.g., understanding how an AI reached a recommendation)?”, “Have you dealt with any case involving AI evidence?”, “Do you think guidelines are needed for AI in malpractice litigation?”. Both groups were asked if they think formal guidelines or policies (either at hospital or national level) are necessary regarding AI usage and liability.

The survey was delivered in English with some key terms also provided in Arabic (especially legal terms) given that many professionals are fluent in English, but we wanted to ensure clarity. It was pilot-tested on 5 clinicians and 3 legal experts, leading to minor adjustments in wording for clarity. The approximate completion time was 10–15 minutes.

We ensured neutrality in phrasing to avoid leading respondents. An example set of perception items for clinicians: “AI will improve patient safety in my field” vs “AI will introduce new risks to patient safety”; for lawyers: “I trust the output of medical AI as evidence if validated by experts” vs “I am skeptical of medical AI output in court”.

Data Analysis

We used descriptive statistics to summarize demographics and key response variables for each group. For Likert scale items, we treated them as ordinal but in practice visualized distributions and often dichotomized (agree vs disagree) for reporting clarity. We assessed internal consistency of multi-item scales: the AI knowledge items (3 items) had Cronbach's α=0.75, which was acceptable for a brief knowledge scale. Perception items covered multiple dimensions, so rather than a single score, we analyzed them individually and also created two sub-scales: "Perceived Benefit" (α=0.82) and "Perceived Risk" (α=0.80) by averaging relevant items.

The main analysis compared responses between the healthcare and legal groups. For categorical outcomes (e.g., proportion agreeing with a statement, proportion feeling prepared), we used chi-square tests (or Fisher's exact if needed). For continuous or Likert-scale composite scores (like knowledge score 0–10, or average perception scores), we used t-tests if approximately normal or Mann-Whitney U tests if skewed. Significance was defined at $p<0.05$, with Bonferroni correction applied for multiple comparisons within sets of related items (for instance, we had ~10 perception items; we adjusted those tests accordingly).

We also performed subgroup analyses within each cohort. Among clinicians, we examined differences by profession (doctors vs nurses), experience, and prior malpractice involvement. Among legal professionals, we looked at differences between practicing lawyers and judges, and those with technical background vs none. However, given the smaller size of the legal cohort, these analyses were exploratory.

Finally, we conducted a multivariable logistic regression to identify independent predictors of **high readiness** for AI integration (defined as answering "yes" to feeling prepared to use/deal with AI, or above median on a readiness scale). Predictors entered were age, years of experience, group (healthcare vs legal), AI knowledge score, prior AI exposure (yes/no), and having had AI training (yes/no). We checked for interactions, particularly whether the effect of knowledge on readiness differed between clinicians and lawyers.

All analyses were done using SPSS v28. The results are presented in tables: Table 1 for participant demographics by group, Table 2 for key awareness and perception metrics by group, Table 3 for readiness and training statistics, and for the logistic regression of readiness factors.

Results

Participant Demographics

We surveyed a total of 320 professionals, comprising 230 healthcare providers and 90 legal professionals. Demographic details are in Table 1. Healthcare respondents included 150 physicians (65%), 60 nurses (26%), and 20 hospital quality/risk managers (9%). Within physicians, various specialties were represented (30% internal medicine, 20% surgery, 15% pediatrics, 10% radiology, etc.). Legal respondents included 60 attorneys (67%) and 30 judges or legal advisors (33%). The mean age was 42.3 (SD 8.7) for healthcare professionals and 45.1 (SD 9.4) for legal professionals ($p=0.02$ for difference). Both groups had a majority of males, though with different proportions (clinicians: 60% male; legal: 80% male; reflecting gender distribution in these fields historically). Average years of experience were similar: 16.5 years for clinicians vs 18.2 years for legal ($p=0.09$).

Notably, only 15% of clinician respondents and 10% of legal respondents had ever been involved personally in a malpractice lawsuit or committee hearing (for clinicians, as defendant; for lawyers, as counsel or judge, this number was obviously higher ~100% since that was their job – the 10% refers to legal who had personal connection like a family member's case, which we asked anecdotally). We also found regional diversity: respondents were based in Riyadh (40%), Jeddah/Makkah (30%), Eastern Province (20%), and others (10%), roughly mirroring population centers.

Table 1. Participant Characteristics by Profession Group

Characteristic	Healthcare Professionals (N=230)	Legal Professionals (N=90)	p-value (group diff)
Age, mean (SD)	42.3 (8.7) years	45.1 (9.4) years	0.02*
Male, n (%)	138 (60%)	72 (80%)	0.001**
Years of professional experience, mean (SD)	16.5 (8.9)	18.2 (10.5)	0.09
Region of practice, n (%)	Central (Riyadh): 100 (43%); Western: 70 (30%); Eastern: 46 (20%); Northern/ Southern: 14 (7%)	Central: 40 (44%); Western: 30 (33%); Eastern: 15 (17%); Other: 5 (6%)	0.88
Profession breakdown	Physicians: 150 (65%); Nurses: 60 (26%); Quality/Risk managers: 20 (9%)	Attorneys: 60 (67%); Judges/legal advisors: 30 (33%)	—
Prior experience with malpractice case (self involved)	35 (15%) as defendants or experts in a case	90 (100%) as part of job (counsel/ judge); 9 (10%) had personal/ family case	—
Has used/encountered AI in work	104 (45%)	5 (5%)	<0.001**
Received any AI-related training	30 (13%)	2 (2%)	0.003**

*Significant at p<0.05; ** p<0.01. (Note: The “prior experience with malpractice case” is inherently different for the two groups, as all legal professionals deal with such cases by definition; the 10% refers to personal experience outside their professional role.)

The stark difference in AI exposure is worth highlighting: 45% of healthcare professionals reported having used or encountered AI tools in their work (this could range from clinical decision support systems, AI radiology software, to hospital AI-driven analytics), whereas only 5% of legal professionals had encountered AI in the context of a case (e.g., as evidence or issue to consider). The two items measure different types of exposure, so their percentages cannot be interpreted as a directly comparable professional gap. Additionally, only a small fraction of either group had formal AI training – 13% of clinicians (mostly younger doctors who took courses or workshops, or those involved in informatics) and just 2% of legal professionals. This points to a need for educational interventions.

Awareness and Knowledge of AI

General awareness of AI in healthcare was moderate. Among clinicians, 90% had heard of AI being used in healthcare (only 10% said they were not aware of any such technologies). Among legal professionals, 75% had at least heard of AI in a medical context, while 25% admitted they were essentially unfamiliar with what AI in healthcare entails beyond buzzwords. When asked to rate their understanding (1 to 5), the average for clinicians was 3.1 (SD 0.9) compared to 2.3 (SD 1.0) for legal experts, a significant difference ($p<0.001$).

We gave a simple quiz of three questions on AI (e.g., identifying examples of AI, understanding that AI learns from data, etc.). The average score for clinicians was 2.1/3, versus 1.4/3 for legal ($p<0.001$). For instance, one question asked: “Which of the following is an example of an AI application in medicine?” with multiple answers possible. 80% of clinicians correctly identified at least one AI application (e.g., radiology image analysis), while only 50% of legal professionals did. On a composite 0–10 knowledge scale (combining self-rating and quiz), clinicians scored mean 6.5 (SD 1.8) vs legal 4.0 (SD 2.1), indicating clinicians generally have more baseline knowledge of medical AI.

Despite only moderate knowledge, interest in learning was high across the board. 85% of clinicians and 88% of legal respondents said they would like to learn more about AI in healthcare/medicine. Many legal professionals wrote in comments that they only have a vague idea and would benefit from seminars or expert testimonies in the future.

Perceptions of AI's Role in Patient Safety and Malpractice

Table 2 displays the responses to key perception statements for each group, highlighting areas of agreement and divergence.

Table 2. Perceptions of AI Impact – Comparison of Healthcare vs Legal Professionals

Statement (Agree or Strongly Agree %)	Healthcare (N=230)	Legal (N=90)	p-value
"AI can help reduce diagnostic errors in healthcare."	78%	44%	<0.001**
"AI tools will improve patient safety overall."	75%	50%	<0.001**
"Using AI in clinical practice will likely decrease the number of malpractice claims."	60%	35%	<0.001**
"AI use will complicate determining who is at fault when errors happen."	32% (clinicians view on fault)	58% (lawyers view)	<0.001**
"It is difficult to trust AI recommendations without knowing how they work."	55%	70%	0.02*
"Clinicians might become over-reliant on AI and lose skills."	40%	62%	0.001**
"AI will not guarantee error-free care; mistakes can still happen."	90%	95%	0.15
"Clear guidelines are needed for using AI in patient care and defining liability."	92%	98%	0.06

(*Note:* percentages combine "Agree" and "Strongly Agree". p-values from chi-square comparing distribution of agreement vs others between groups.)

From these results:

• A large majority of healthcare professionals (78%) believe AI can reduce diagnostic errors, reflecting optimism presumably from seeing or hearing of AI successes (like AI detecting cancers or flagging medication interactions). This optimism is significantly higher than that of legal professionals (only 44% agree). This gap (78 vs 44) is telling – clinicians may directly witness AI catching an error, whereas legal experts might only see cases when something went wrong (biasing their view).

• Similarly, 75% of clinicians think AI will improve patient safety overall, while half of legal respondents agree. Thus, while both lean positive, the enthusiasm is greater on the clinical side.

• Regarding malpractice claims: 60% of clinicians think AI could decrease claims. This likely stems from the assumption that fewer errors equal fewer claims (which our Manuscript 1 analysis supports). However, only 35% of legal professionals concur. Many lawyers possibly think that even with AI, new types of claims could emerge or they have a "I'll believe it when I see it" approach.

• On the flip side, 58% of legal professionals think AI will complicate fault determination (liability), whereas only 32% of clinicians worried about that. Clinicians might not fully appreciate the legal ambiguity introduced by AI, whereas lawyers foresee challenges (like who is liable: doctor, hospital, AI vendor?). This difference was one of the largest proportional differences.

• Trust in AI: 70% of legal pros versus 55% of clinicians agreed it's hard to trust AI without transparency. This likely reflects the emphasis on evidence and reasoning in legal training – a black-box algorithm output might not satisfy a lawyer or judge as easily as a doctor who sees a result improve outcomes. Clinicians still have a majority with that concern, indicating transparency is valued across both fields.

• The fear of over-reliance: 62% of legal experts think clinicians might lose skills by over-relying on AI, compared to 40% of clinicians themselves. Clinicians perhaps trust that they will use AI as a tool, not a crutch, while legal people might be more skeptical – or perhaps see parallels with how automation in other fields sometimes deskills humans.

• Nearly everyone acknowledges AI is not a magic bullet: 90%+ in both groups agree that errors will still happen and AI won't be perfect. This is good, as it shows realism and that neither group is under the illusion of infallible AI.

• There is near-universal agreement on the need for guidelines: 92% of clinicians and 98% of legal experts want clear guidelines for AI use and liability. This is a strong mandate from both sides that policy action is needed. The slight difference (which is not statistically significant here) might be due to a couple of clinicians who are perhaps early adopters believing innovation should not be stifled by too many rules yet.

In summary, clinicians tend to emphasize **AI's benefits** (error reduction, safety improvement, fewer claims) more than legal professionals do, while legal professionals emphasize **AI's challenges** (liability complexity, trust issues, over-reliance) more than clinicians do. Both acknowledge its imperfection and want guidelines.

We also looked at an interesting cross-field consensus: when asked an open-ended question about what the biggest barrier to using AI in healthcare is, both groups frequently mentioned **lack of understanding** and **regulatory uncertainty**. Clinicians often said things like "AI systems aren't fully trusted by doctors yet" or "We need training to use them properly," whereas lawyers said "We don't have clear laws or enough technical expertise in courts." So both see knowledge and regulation as areas to address.

Readiness and Training

The self-reported readiness to engage with AI is relatively low, especially on the legal side:

• Only 30% of clinicians responded "Yes" to "Do you feel adequately prepared to use AI tools in your clinical decision-making?" Another 25% said "Somewhat," and 45% said "No." So roughly two-thirds of clinicians have reservations about their preparedness. Among those with AI experience, readiness was higher (50% of those who had used AI felt prepared vs only 15% of those who hadn't used AI).

• Among legal professionals, when asked "If a malpractice case involved AI (e.g., an AI misdiagnosis claim), would you feel prepared to handle it effectively?", just 20% said yes, 20% somewhat, and 60% said no. Many indicated they would rely on expert witnesses heavily in that scenario.

We compiled some of these in Table 3.

Table 3. Readiness and Training Needs

Metric	Healthcare (N=230)	Legal (N=90)
Feel adequately prepared for AI in role (Yes %)	30% (Yes), 25% (Somewhat), 45% (No)	20% (Yes), 20% (Somewhat), 60% (No)
Have received formal AI training (% Yes)	13%	2%
Desire additional training on AI (Yes %)	80%	85%
Specifically want training on AI & malpractice issues (Yes %)	70%	90%
Believe their field's current education is sufficient about AI (Yes %)	15%	5%

It is evident that both groups largely feel that current education is **not** sufficient. Only 15% of clinicians and 5% of legal professionals think their field is adequately educating its members about AI. Correspondingly, interest in more training is high: 80% of clinicians, 85% of legal want additional training. Notably, 90% of legal respondents want training specifically on AI in the context of malpractice or evidence – essentially all but a few recognize the gap there. Among clinicians, 70% explicitly said they want training on medicolegal implications of AI (the remainder might have interest more on technical usage rather than legal aspects).

The gaps in formal training are understandable given AI in medicine is a new topic not heavily incorporated into medical or law school curriculums yet. Some younger doctors mentioned they had online courses or work-

shops; nearly all lawyers had none (the 2% corresponds to two individuals: one who had taken a tech law course abroad, another who attended a conference panel on AI).

Comparative Insights and Subgroup Differences

Within the healthcare professionals, physicians and nurses had slightly different outlooks. Physicians tended to have higher AI knowledge and were more likely to have used AI (especially radiologists and cardiologists). Nurses were slightly more wary about AI replacing roles but also more likely to feel underprepared (only 20% of nurses felt prepared vs 35% of doctors). However, these differences were not the primary focus, so we note them but won't elaborate deeply. Prior malpractice experience (in clinicians) did not significantly change their view on AI's benefits or risks, interestingly; those who had been sued were not more pessimistic about AI, contrary to what one might expect (perhaps because that experience makes them more open to any tool that could avoid future suits).

Among legal professionals, we saw that those with a technical background (few had an engineering undergrad or similar) were more open to AI (though numbers were small). Judges expressed even stronger need for guidelines (because they'd have to make judgments on these issues). Attorneys were split: defense attorneys (who defend doctors/hospitals) were generally more favorable toward AI's ability to reduce errors (some noting it could make their cases easier if fewer errors happen), whereas plaintiff attorneys had a bit more skepticism (possibly seeing AI as a new thing to scrutinize in finding fault). But again, small numbers limit firm conclusions.

Factors Associated with Readiness

Our logistic regression for high readiness (combining both groups for a general analysis) highlighted a few key factors:

• Younger age was associated with higher readiness (OR ~2 for <40 vs ≥40, p=0.01). Younger professionals possibly are more tech-savvy or at least less set in old ways.

• AI knowledge score was a strong predictor (OR ~3.5 per point on 10-point scale, p<0.001), a reported association whose estimate, scale, confidence interval and modeling require verification; causal direction cannot be determined from this survey.

• Having prior exposure to AI in work was associated with much higher readiness (OR ~4.0, p<0.001).

• Group (healthcare vs legal) remained a predictor even controlling for knowledge: legal professionals had lower readiness (OR ~0.5 vs healthcare, p=0.04), an association requiring full model output and comparable measurement; an intrinsic professional effect cannot be established.

• Formal AI training, albeit rare, was also significant (OR ~5, p=0.002) – those with any training were far more likely to feel prepared (which does not establish a causal effect of training and requires confirmation using the sparse training data and full model output).

• We didn't find significant interaction between group and knowledge, meaning increasing knowledge helped both groups similarly in feeling prepared.

This cross-sectional model cannot establish that educational interventions improve readiness; intervention evaluation would be needed.

Discussion

This cross-sectional survey reveals both convergence and divergence in how healthcare and legal professionals in Saudi Arabia view the incursion of AI into healthcare and its implications for medical malpractice. The key finding is the existence of a perceptual gap: clinicians are generally more optimistic about AI's benefits for patient safety, whereas legal professionals are more concerned about the uncertainties and challenges AI introduces to malpractice adjudication. Despite these differences, both groups overwhelmingly acknowledge that AI is here to stay and that clear guidelines and training are urgently needed **(11, 12)**.

Our results provide some encouraging news. A large majority of healthcare professionals believe AI can improve outcomes and even reduce malpractice events, which aligns with the broader narrative that AI can augment clinical decision-making and catch errors. This optimism is grounded in real examples – for instance, AI in radiology assisting in early detection of disease, or AI in pharmacy preventing medication errors **(13)**. If such tools become commonplace, one would expect fewer inadvertent harms reaching patients, thus fewer grounds for litigation. Indeed, some international data suggests malpractice claims might decline when certain high-risk processes are automated or double-checked by AI (for example, closed-loop medication systems) **(14)**. The clinicians in our survey seem to intuit this; 60% felt malpractice claims would drop with AI. In contrast, only a third of legal experts agreed, which may reflect a "wait and see" approach or a belief that new technology often brings new types of litigation rather than eliminating it **(15)**. Historically, medical advances (like new surgical techniques or drugs) have initially led to both miraculous saves and some high-profile failures, sometimes spurring litigation. Lawyers might be drawing parallels that AI could lead to novel suits (e.g., product liability against AI developers, or lawsuits over not using AI). Their caution is justified given the lack of case law in this area **(16)**. It's possible both views have merit: in the long run, as AI matures, improved safety should reduce claims, but in the short term, we might see a few landmark cases testing the legal waters of AI responsibility **(17)**.

The finding that legal practitioners have significantly lower awareness and understanding of medical AI than clinicians is not surprising but is crucial. If AI-related issues come before a court, the lawyers and judges need enough technical grasp to interpret facts or at least to ask the right questions of experts. Our data (only 5% of legal respondents had any real encounter with AI in cases, and average knowledge levels were low) suggest that the legal system could currently be ill-prepared for an AI-laden malpractice case **(18)**. This is reminiscent of earlier days of medical science in courts – for instance, when DNA evidence was new in the 1990s, many legal professionals had to quickly get up to speed on genetics. We are at a similar inflection point with AI. Proactive measures, like judicial education programs on AI or inclusion of technical experts in court proceedings, may be warranted **(19)**. The nearly unanimous call for guidelines in our survey supports steps being taken before a crisis occurs. Encouragingly, moves are being made globally: e.g., the UK has issued a code of conduct for AI in healthcare, and professional bodies in the US are discussing standards for AI in clinical practice that could influence legal expectations **(20)**.

Another noteworthy aspect is the concern about liability and fault. Legal experts are rightly worried about how to assign blame if, say, an AI recommends a treatment that goes wrong. Will the doctor be liable for trusting the AI, or for not overriding it? Or is the hospital liable for implementing the AI? Could the software company be liable as a product manufacturer? These questions are actively being debated in legal scholarship **(21)**. Clinicians in our sample were less concerned about this – possibly because many assume that ultimately the physician remains responsible for decisions. Indeed, current practice would hold the physician (and hospital) accountable, since AI is typically a support tool, not an autonomous agent. However, as AI gets more autonomous (e.g., an AI could theoretically one day initiate certain treatments or make diagnoses without explicit physician sign-off), liability frameworks might need revision **(22)**. Our finding that over half the lawyers but only a third of clinicians see fault determination as an issue suggests a need for cross-disciplinary dialogue – clinicians may need to be made more aware that from a legal standpoint, using AI doesn't absolve them of responsibility. At the same time, lawyers might benefit from understanding how clinicians interface with AI (e.g., that typically AI provides advice and the human makes the final call, which might simplify liability in many cases by keeping it with the human) **(23)**.

Trust and over-reliance emerged as themes where legal professionals were more wary. They fear doctors might blindly follow AI, leading to errors, or lose their own diagnostic acumen. Clinicians are somewhat less worried, perhaps because they view AI as aids rather than replacements (and indeed current AI in medicine is mostly narrow and assistive, not a replacement for clinical judgment) **(24)**. Nevertheless, about 40% of clinicians did acknowledge the over-reliance risk, showing that a sizable minority is cognizant of this pitfall. This aligns with global discussions: doctors often express that AI should remain a tool and not diminish the training or vigilance of practitioners **(25)**. The difference in perspective might also be because legal professionals predominantly see the worst-case scenarios (they get involved when there's a dispute or error), so they may be

primed to foresee how things can go wrong. Clinicians, who see day-to-day benefits (and maybe near-misses prevented by AI), have a more positive daily experience **(26)**.

A critical area of consensus is the need for guidelines and training. It's rare to see 90+% agreement on anything in surveys, so this stood out. Both communities are essentially asking leadership (be it health authorities, professional bodies, or legislators) for direction. For clinicians, guidelines might include: standards on validating AI tools, protocols for using AI outputs (e.g., how to document an AI recommendation in a patient's chart), clarifications that AI is a support and not a legal shield (i.e., "the AI said so" is not an excuse if it was obviously wrong). For legal professionals, guidelines might mean: how to handle AI evidence (ensuring algorithms used in evidence are disclosed, perhaps using expert panels to assess AI accuracy), clarifying liability (maybe through laws that stipulate that clinicians are liable for misuse but not for inherent algorithm errors if used appropriately, or that companies have duty to update safe AI) **(27)**. Some countries are exploring the idea of an AI "black box" registry, akin to aviation, to record AI decisions for later review in case of incidents **(28)**. Saudi Arabia could pioneer region-specific regulations given its drive in AI – perhaps via the Saudi Health Council or SDAIA releasing medicolegal guidelines. Our data strongly suggests stakeholders would welcome this **(29)**.

The readiness gap – especially the low percentage of lawyers feeling prepared – highlights that educational initiatives are needed urgently. A suggestion would be to introduce modules on AI in continuing legal education, and similarly include medicolegal education in medical conferences focusing on AI. Interdisciplinary workshops could be valuable. For instance, bringing doctors and lawyers together in simulations of an AI-related malpractice case could open eyes on both sides: doctors see how their documentation of AI use might be interpreted, and lawyers see how the clinical decision was made in context **(30)**.

Conclusions

The survey describes responses from participating healthcare and legal professionals. Comparisons require item-level denominators and consistent question wording. The recruitment design limits inference to the responding sample.

For Saudi Arabia to successfully integrate AI into healthcare without legal disarray, we must ensure that those who deliver care and those who deliver justice move in tandem. Educating and equipping our professionals with the knowledge to handle AI's benefits and pitfalls is an urgent priority. By doing so, we can avoid a scenario where technological advances outpace our societal readiness, which could lead to either under-utilization of life-saving AI tools due to fear of liability or, conversely, reckless adoption without understanding consequences. Striking that balance will allow AI to reach its full potential in improving healthcare quality, while maintaining accountability and trust in the medicolegal system.

In essence, our findings are a call to action: bring the healers and the arbiters together in planning for AI's impact. Through proactive measures – from joint training sessions to collaborative policymaking – Saudi Arabia can serve as a model for how to harmonize innovation with justice. Embracing AI in healthcare need not be a source of conflict between doctors and lawyers; with mutual understanding and clear rules of engagement, it can be a shared journey toward better outcomes for patients and a fair system when things go wrong. The time to prepare is now, while AI's footprint in malpractice is still emerging, so that we pave a smooth road for the future of AI-enabled, safe, and legally sound healthcare.

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