Analysis of Hospital Civil Liability in Cases Involving Multiple Causes of Damage in Intelligent Treatment Processes: A Review of Judicial Practices in the United States and England

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Abstract

Background and Objective: Healthcare centers serve as the foundation for implementing artificial intelligence (AI) in medicine. Currently, in advanced countries including the UK, the US, and other European nations, this process is being integrated into hospitals and healthcare facilities through software and intelligent robots. While AI has the potential to overcome existing barriers in hospital management, it may also introduce new challenges. Important questions arise regarding medical liability within AI-based healthcare systems, including: How should healthcare providers, AI system developers, or hospitals be held responsible for adverse outcomes related to AI-driven recommendations or decisions? Who the physician or the hospital would be liable if a patient is harmed due to AI applications? These legal issues must be thoroughly discussed and examined before deploying such technologies.

Materials and Methods: This descriptive-analytical study involved a review and documentation of contemporary Persian and English sources for use in this article.

Results: According to the theory of vicarious liability, indirect and secondary liability can be attributed to the employer (hospital) for the wrongful acts of an employee (medical staff). Conversely, healthcare providers using AI-based medical devices should be held responsible for any damages caused by these automated systems during their use. Under this theory, liability should be distributed among hospitals and other relevant parties for damages caused by AI to ensure full compensation for the patient.

Conclusions: European laws propose principles related to "Vicarious Liability," whereby an employer-such as a hospital-is held responsible for the actions of its employees, including doctors, as well as "Product Liability." Hospitals may be liable for providing appropriate intelligent care systems. However, product liability law offers limited assistance in addressing these concerns because it is challenging to categorize a faulty AI system as a product defect or design flaw. Although courts are generally reluctant to extend product liability to developers of medical software-since such software is regarded as a support tool for final medical decision-making-judicial practices in Europe, including in the UK and the US, remain ambiguous and inconsistent, thereby exacerbating the existing uncertainty.

Keywords: Artificial Intelligence; Liability, Legal; Clinical Decision-Making; Hospitals

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Introduction

Around the world, "smart hospitals" are increasingly integrating artificial intelligence (AI) technology into their internal networks to enhance patient care. These smart hospitals utilize automation and intelligent systems to manage patient information and treatment processes with precision. By analyzing data, they enable more informed decision-making and improve overall hospital performance. Healthcare centers serve as the primary platforms for implementing AI in medicine and possess the best capacity for risk control and management. However, the application of this technology also carries potential risks; therefore, establishing frameworks and ensuring security require thorough discussion and examination of legal challenges, including liability issues. As AI becomes more deeply integrated into healthcare, there is a growing need for clear regulatory frameworks and standards to guarantee the safety, effectiveness, and accountability of these systems. The absence of robust regulatory oversight could increase liability risks for both healthcare providers and AI developers.

Identified challenges include discrimination and bias, data privacy, consent for data use, and medical liability. This analysis highlights the need for careful consideration when implementing such technologies to ensure adequate protection for both healthcare professionals and patients. The purpose of this study is to identify and discuss the legal challenges associated with using AI in hospital management, referencing relevant legal cases from the United States and England.

1. Definitions

1.1) Artificial Intelligence

AI refers to the ability of computers to make decisions autonomously.[1] It is a branch of computer science that focuses on automating intelligent behavior.[2] Machine learning, a subset of AI, uses data-driven techniques to identify patterns and predict behaviors.[3] The fundamental principle of machine learning is a computer's ability to improve its performance through continuous analysis of its interactions and communications with the real environment. Machine learning focuses on programs that learn from experience over time, thereby enhancing decision-making and predictive accuracy.[4] Generally, AI is defined as computer technology designed to perform tasks as well as or better than humans. It employs complex algorithms and methods to enable machines to operate independently and make autonomous decisions. Machine learning[5] and deep learning[6] are fundamental components of AI.

In response to the question about the difference between machine learning and AI: AI refers to systems or machines that imitate human intelligence to perform tasks and can repeatedly improve themselves based on the information they collect. Machine learning, a subset of AI, uses algorithms to automatically learn insights and patterns, which it then uses for improved decision-making.

1.2) Medical Staff

It is important to note that, in this context, the term “medical staff” refers to personnel employed at a hospital who are part of the healthcare sector. According to Article 1 of the Administrative Procedures for Addressing Professional and Commercial Violations by Medical Professionals, relating to subordinate professions:

“Subordinate professions related to medical affairs, as outlined in Article 24 of the Law for the Formation of the Medical System Organization of the Islamic Republic of Iran, hereinafter referred to as the Law, include graduates with associate, bachelor's, and higher expert degrees working in fields such as clinical laboratories, medical technology, radiology, biophysics, radiotherapy, pharmacy, midwifery, operating rooms, intelligence, pharmacy, nutrition, disease control, family health, oral and dental health, public health, various rehabilitation disciplines, physiotherapy, audiometry, optometry, medical equipment, biomedical engineering, biophysics, biochemistry, social services, and basic medical sciences.”

Not all individuals working in hospitals are considered part of the medical staff, nor are all professions related to medical affairs classified as medical personnel. In other words, among those providing services to patients in hospitals, some are medical staff (such as doctors and nurses), while others are non-medical staff (such as security guards).

1.3) Robot

A robot is a machine built based on programmed algorithms and initial data, which can be in a fixed or movable format.[5] With its unique functioning, it possesses varying degrees of independence, ranging up to full autonomy. Due to technological advances, the production of highly autonomous robots in the robotics industry is increasing.

There is no single, universally accepted definition of a robot or robotics. Robots and robotic machines can be broadly examined based on five key features:

1. **Size**
2. **Mobility**
3. **Connectivity: the device's ability to receive and to transmit information.**
4. **Autonomy or independence: the ability to respond to external inputs and engage in physical actions independently.**
5. **Intelligence: the extent to which a device can receive, evaluate, utilize, and transfer information; learn from experience; and use this learning to shape future responses.[6]**

Robots are categorized into three performance levels: autonomous or weak robots, semi-autonomous or semi-independent robots, and fully autonomous or fully independent robots.[7]

The European Union's Legal Affairs Committee defines the independence of a robot as follows: "The ability to make decisions and execute them in the real world independently of external control or influence. Although this independence is purely technological in nature, its level depends on the complexity of the robot's interaction with its environment."[8]

This phrase is also used in the EU's 2012 technical standard, ISO 8373 EN, regarding "robots and robotic devices." Paragraph 2.28 of this standard defines an intelligent robot as:

"A robot capable of performing tasks by understanding and assessing its environment, interacting with external resources, and adapting its behavior."

This standard describes industrial robots equipped with visual sensors for object grasping and positioning, mobile robots with collision-avoidance capabilities, and stable robots capable of moving across uneven surfaces.

2. Applications, Advantages, and Risks of AI in Hospitals

2.1) Applications and Advantages

Some capabilities and features of a smart hospital include:

Online Appointment System: Patients can conveniently book their appointments through an online system without the need to be physically present at the hospital. This significantly reduces waiting times.

- **Patient Tracking System: Using smart technology, patients can easily access their electronic medical records, view treatment information, test results, and health recommendations.**
- **Smart Pharmacy System: Intelligent systems improve the medication dispensing process, reducing errors and increasing patient safety.**
- **Smart Diagnosis and Treatment System: Using modern technologies such as AI and machine learning, intelligent systems can assist doctors in diagnosing diseases and determining appropriate treatment plans.**
- **Smart Medical Equipment: Intelligent solutions enable medical devices, such as monitors and heart rate sensors, to automatically record data and present it to physicians.**

- **Smart Energy Management System: This system can reduce and optimize energy consumption in hospitals.**
- **Smart Parking System: Patients and visitors can easily manage parking and find available parking spaces**.
- **Smart Notification System:**

Hospitals can provide patients and visitors with near real-time access to data. The data generated by a smart hospital—fully integrated from sensors and other digital assets—enables better resource utilization, personalized care, faster decision-making, and cost reduction.

- **Enhanced Data Security:**

By employing advanced defensive strategies, the security of hospital data is increased, preventing system vulnerabilities and ensuring patient privacy. It is important to note that modern smart hospitals are built using the latest global industry standards and technologies, which generally ensures a high level of data security.

- **Provision of Higher-Quality Healthcare Services:**

Since automation equipment is utilized in digital hospitals, the quality of healthcare services can be considerably improved. The integration of smart hospitals with specialized clinics allows healthcare providers to comprehensively review patient experiences and outcomes, thereby enhancing efficiency, system connectivity, and overall performance—all of which positively impact the patient experience.

- **Reduction of Costs for Patients and Hospitals:**

One of the significant benefits of "hospital digitalization" is the reduction of hospital expenses. Using intelligent equipment decreases the need for human resources and efficiently manages energy consumption, both of which contribute to lowering hospital costs and, consequently, reducing patient expenses. The cost of building a smart hospital depends on its size, complexity, and the technologies used. While constructing a smart hospital can be expensive, the improved performance and improved service quality make it a worthwhile investment.

- **Early Diagnosis: AI systems can quickly analyze medical data, enabling the early detection of diseases at their initial stages.[9]**
- **Personalized Treatment Planning: Using patient data and AI algorithms, tailored treatment plans can be developed for each individual patient.**
- **Improved Efficiency: AI can more effectively process medical information, issue medication orders, and manage patient records.[9]**
- **Error Prevention: AI systems can identify and prevent human errors.**

Intensive Care Unit (ICU):

ICU patients are monitored multiple times throughout the day, with medical professionals analyzing their data to make treatment decisions. Currently, AI systems can perform this task and have the potential to assume responsibility for medical supervision. In the future, medical decisions in the ICU might be delegated entirely to computers, with medical staff consulting and comparing their assessments to AI-generated recommendations.

In fact, this technology, equipped with detailed patient information, can make effective treatment decisions. AI systems are enhanced by machine learning and reinforcement learning, enabling continuous growth and improvement. Additionally, AI can be highly valuable in training and education. Overall, AI development is progressing at an astonishing rate and is expected to have a significant impact on our future as humans.

Therefore, the appropriate use of AI can improve patient care and increase the effectiveness of healthcare systems. However, insufficient human oversight of these AI systems could lead to serious legal consequences. AI applications are not limited to diagnosis, monitoring, or direct patient care—areas that instinctively draw our attention. Moreover, the potential impact of AI on predictive maintenance, bed management, staff shift scheduling, and clinical decision support (CDS) systems is also important.

It is essential to distinguish between AI applications used for hospital management and those employed for clinical purposes.

- **The former involves implementing AI technologies to optimize administrative processes, enhance operational efficiency, and improve decision-making in non-clinical domains.**

The latter pertains to utilizing AI to support decision-making processes and optimize administrative tasks related to patient care and treatment.

2.2) Risks

Although the use of AI in hospitals and medical environments offers potential benefits, it also involves significant risks and challenges. As AI applications expand across industries such as education, technology, and healthcare, the potential harms that may arise should not be overlooked. Various concerns include:

- **Privacy Issues:**

The use of patients' medical data by AI systems can lead to privacy violations. These legal and ethical concerns must be addressed, especially in sensitive fields such as healthcare, where the introduction of AI raises specific privacy challenges. Applying AI to patient information or monitoring vital signs could have serious consequences and involves unique risks. In a hospital setting, protecting patient health and safety is paramount to ensuring effective treatment and optimal care delivery. To provide high-quality care, hospitals need to collect various types of patient data, which exposes them to numerous risks related to personal information that must be carefully safeguarded. Therefore hospitals and healthcare networks need to thoroughly assess AI-related risks, as this domain lies at the delicate intersection of innovation and complexity.

- **Lack of Transparency:**

The "black box" nature of many AI models prevents healthcare providers from fully understanding the rationale behind system outputs. This opacity can undermine trust and create challenges in defending medical decisions. Additionally, patients may find it difficult to understand how AI-based decisions are made, potentially impacting their ability to provide informed consent.

- **Data Errors and Inaccuracies:**

While AI implementation can help hospitals improve care flow and support doctors and staff in better monitoring vital signs, the risks associated with AI regarding patient data such as data breaches and inaccuracies can be catastrophic.[10] In some cases, AI algorithms may deliver incorrect diagnoses or treatments, which can be extremely dangerous for patients. Such errors can have irreparable consequences. For instance, if patient data entered into an AI system contains errors or if the system provides incorrect information such as false medication recommendations or incorrect dosages this can be fatal. Hospitals using AI systems may face medical liability claims due to alleged misdiagnoses, medication errors, or delays in diagnosis.

- **Data Quality and Bias:**

Another important issue pertains to data bias. The quality of the data used to train AI systems can significantly impact their performance and decision-making. Existing biases in training data may lead to biased or discriminatory outputs.[11] Healthcare providers may be held responsible if they fail to properly review the data and algorithms used by the AI systems they rely on.

- **Lack of Human Oversight:**

A deficiency in human supervision and control over AI systems increases the risk of unforeseen hazards. Legal claims may arise in cases where inadequate human oversight results in AI errors with catastrophic consequences for patients.

- **Responsibility and Accountability:**

When AI systems are used in clinical decision-making, determining responsibility and accountability for errors or adverse outcomes becomes difficult. The complex and opaque nature of AI algorithms makes it challenging to trace the sources of errors or inappropriate decisions.

3. Types of Civil Liability for Hospitals

The scope of hospitals' personal and direct civil liability, except in cases where a contractual relationship exists between the parties, is limited to issues related to defective medical equipment and failure to observe safety obligations and precautions. As a result, the hospital is not personally responsible for the errors of its medical staff unless those errors result from defective medical devices or breaches of safety obligations, taking into account the distinction between contractual and non-contractual categories.

- **In cases of contractual liability, if damage is caused to the patient due to the fault of doctors or other personnel, the hospital is responsible because the treatment and care contract is directly concluded between the patient and the hospital. Therefore, the hospital is obligated to provide appropriate medical services.[12]**

Furthermore, according to the principle of unity of criteria in Article 12 of the Civil Code, if damage is caused by hospital personnel or employed doctors while performing their duties or in connection with them, the hospital is liable.

- **Hospital liability can be non-contractual and extrajudicial; this may arise from acts, omissions, or violations of legal obligations. Examples include the invalidity of a treatment contract, the hospital's refusal to treat a patient in critical condition, or emergency treatment provided by the hospital these are considered cases of non-contractual liability.**

- **In cases of extracontractual liability, responsibility arises without any specific obligation or contract, and no direct legal relationship exists between the injured party and the wrongdoer. Such liability may result from negligence, intent, or a combination of both.**

- **Unlike contractual liability, extrajudicial liability is connected to public order, and waiving this liability through an agreement is prohibited. This type of liability does not arise from any contractual obligation, and there is no direct legal relationship between the victim and the perpetrator.**

- **Civil liability of hospitals may also originate from acts or omissions; in this context, liability is based on the breach of legal duties.**

3.1) Responsibility of Hospitals Concerning the Negligence of Their Employees

To establish the civil liability of hospitals as legal entities, the following arguments may be presented:

a. Article 11 of the Civil Liability Law holds the state, as a legal entity, responsible for negligence and misconduct in providing appropriate administrative systems and facilities. Therefore, a legal entity can be held liable under the scope of civil liability for hospitals toward patients and others.

b. According to Article 211 of the Commercial Law, a legal person, except in exceptional cases, has rights and obligations similar to those of a natural person.[13]

c. Articles 321 and 331 of the Civil Code, which address tort and causation, also apply to legal entities.

An examination of the civil liability of hospitals shows that, legally, a hospital can have two distinct types of civil liability:

1. Liability related to negligence and misconduct of hospital staff, making the hospital directly responsible to patients.

2. Liability related to providing an appropriate environment and physical infrastructure for treatment.

Regarding the civil liability of hospitals, two major theories have been discussed, both of which are rooted in common law:

- **Theory of Apparent Authority**
- **Theory of Vicarious Liability**

Both theories address the hospital’s civil liability toward patients in cases of medical negligence by doctors.

According to the Theory of Apparent Authority, if a legal entity explicitly or voluntarily grants someone the authority to act as its representative, it is presumed that the representative has the legal power and authority of the legal entity. Consequently, the legal entity is liable for any damages caused by its representative to third parties. In other words, if it is proven that a person appears to act as a representative of the legal person, the entity is fully responsible for any damages resulting from the agent's actions.

For example, in the case of Kash Sheyan v. Purt, the hospital was sued for negligence, with claims that a specialist cardiologist provided substandard treatment. The court applied this theory to justify the hospital's liability and held the hospital responsible.[14]

The benefit of applying this theory is that, to prove the civil liability of the hospital, it is not necessary to prove that the doctor or employee was explicitly at fault; it only needs to be shown that the doctor or employee was employed by the hospital. This theory is based on a doctrine known as the "Liability of the Master for the Servant."[14]

According to this doctrine, an employer is responsible for the actions or omissions of their workers or agents if these actions fall within the scope of their employment. Even if the misconduct or negligence is not directly attributable to the hospital, the hospital may still be liable for malpractice or damages caused by its staff or physicians, provided the acts are connected to their employment.

Court rulings based on common law have extensively incorporated this theory to justify the civil liability of hospitals. For example, in the case of Collins v. Hertfordshire,[20] prior to a surgical operation on the plaintiff's husband's jaw, the hospital's surgeon gave instructions via telephone to an assistant surgeon. These instructions were misunderstood, leading to improper treatment that caused the patient's death. The court ruled that the hospital was responsible for the negligence of its staff.

By carefully examining the nature and essence of vicarious liability, we understand that it essentially refers to liability arising from the actions of another. Currently, a hospital can be held indirectly responsible for the acts of medical specialists who are its employees. However, the issue of liability concerning independent specialists is more complex.

Although hospitals are generally not held responsible for the acts of independent contractors, many cases have ruled otherwise, citing various reasons. Additionally, there is a difference in how a hospital's civil liability is addressed in cases of criminal negligence versus civil negligence by doctors. Doctors are personally responsible for their criminal negligence, whereas in cases of civil negligence, the hospital may be held indirectly liable, as demonstrated in Indraprastha Medical Corp. Ltd. v. State NCT of Delhi.

The secondary liability of hospital authorities for the harmful acts of their representatives has long been a subject of debate in legal circles. Legal systems have adopted varying and sometimes conflicting positions regarding liability for a doctor's negligence in performing their duties.

Following this confusion, injured patients often suffer harm and are caught off guard by powerful companies that rarely accept responsibility for their actions.

The answer to this issue is by no means simple and depends on the nature of the negligent act, the professional relationship between the doctor and the employer (hospital), and other factors.

However, it should not be assumed that the hospital's liability for its staff and doctors is absolute. Plaintiffs are not need to prove negligence to claim damages; rather, they must demonstrate that the injury was caused by the defendant's misconduct.

3.2) Responsibility of Hospitals for the Negligence of Employee Doctors (Personnel)

Instances of medical negligence may include errors in diagnosis, negligence during pregnancy and childbirth, errors in prescribing or administering medications, surgical errors, and other professional duties. If a medical professional employed by the hospital is negligent in any of these areas, the hospital may be responsible alongside the doctor.

In certain cases and legal rulings, a distinction has been made between professional duties and administrative or ministerial duties. This indicates that the traditional control test used to determine an employer's liability for an employee's actions is not always decisive, especially in cases involving skilled or professional work. In the context of hospitals, this means they can be held responsible for the negligence of their professional staff, such as doctors, regardless of the extent of control exercised over their work.[15] The distinction between professional duties and administrative or managerial responsibilities in such cases is generally accepted.

In Darling v. Memorial Community Hospital of Charleston, the court observed that the traditional concept is that hospitals are not liable under the doctrine of respondeat superior for the negligence of their medical staff. However, the court acknowledged that this traditional concept has evolved. It ruled that a hospital can be held liable for the negligence of its professional medical staff, thereby rejecting the previous distinction between professional duties and managerial or administrative duties.

This represents a shift from the traditional rigid control test used to establish employer liability for employee actions, particularly in the context of skilled or professional work. The court emphasized that hospitals are obligated to supervise and ensure the competence of their medical staff, even if they do not have direct control over the specific professional tasks performed.

In summary, this case reflects a significant deviation from the traditional view and increases hospital liability for negligence committed by their professional medical staff, even when the hospital does not exercise direct control over their work.

The court stated that the traditional concept of respondeat superior, as applied to healthcare providers employed by hospitals, does not accurately reflect the realities of modern hospital operations. This reasoning provided a foundation for the ruling that the defendant hospital is responsible for supervising the care and treatment provided to the complainant not only by nurses but also by doctors.

In other words, the court held that modern hospitals should also be liable for supervising the quality of care provided by affiliated doctors. This responsibility extends beyond mere control over directly employed staff. The ruling indicates the court's progress in imposing greater accountability on hospitals for the performance of healthcare providers.

In Cassidy v. Ministry of Health, Lord Denning stated:[16]

"The hospital's responsibility for the professional negligence of individuals employed under a contract of service or a contract for services is a practical reality. The hospital is obligated to provide proper care, and although it may delegate this duty to individuals who are not its employees, it remains responsible if the task is performed inadequately by its representatives."

In other words, Lord Denning stated that a hospital can delegate the duty of providing appropriate treatment to its non-employee doctors and specialists; however, it remains liable if this duty is performed inadequately, even if those doctors are not officially employed by the hospital. This ruling indicates an expansion of hospitals' responsibility for the performance of healthcare providers under their supervision. Lord Denning explicitly expressed that hospitals could be vicariously liable for the negligence of doctors working under service contracts.

The cited cases and writings show that over time, the understanding of a hospital's vicarious liability has evolved. It was previously believed that, based on the control test, hospitals were not responsible because the "employer" (hospital) could not control how the work was performed. However, the control test has since been recognized as insufficient for assessing skilled or professional work for various reasons.

As articulated in the Cassidy case, the hospital has a duty to provide proper treatment because the patient enters into a contract with the hospital, not just with the doctor. The doctor is not regarded as the sole representative of the hospital; therefore, the patient places their trust in the hospital's authorities. It is this trust that imposes on the hospital the responsibility to ensure the patient's welfare.

3.3) The Responsibility of Organizations for the Actions of Independent Contractors

In general, an organization is not responsible for the negligence or misconduct of an independent contractor because it does not control the contractor's methods of work. However, there are exceptions in which the organization can be held vicariously liable for the acts of the independent contractor:

a. Exception to Non-Delegable Duty:

If an organization has a non-delegable duty to ensure that a task is properly performed, it can be held liable for the negligence of an independent contractor.

b. Exception for Inherently Dangerous Work:

If the work performed by the independent contractor is inherently dangerous, the organization may be held liable for failing to take reasonable precautions.

c. Exception to Apparent Authority:

If an organization presents an independent contractor as its agent or employee and creates the appearance of authority, it may be responsible for the contractor's negligence.

d. Exception to Approval:

If an organization explicitly or implicitly approves the negligent acts of an independent contractor, it can be held vicariously liable.

The fundamental reason is that an organization should not evade liability by employing independent contractors to perform activities integral to its business operations, for which it owes a duty of care to third parties. Over time, these exceptions have expanded, increasing the likelihood that organizations will be held liable for the actions of independent contractors.

In recent years, many hospitals have increasingly relied on independent contractors to provide hospital care. This trend is particularly evident among emergency room physicians, who are hired by hospital management and contracted to deliver emergency services.[17]

In general, an organization cannot be held responsible for the acts of an independent contractor, and this principle applies to organizations such as hospitals as well. However, there are exceptions to this general rule.

In Collins v. Herts County Council, Justice Hilbery stated that the vicarious liability of a hospital does not depend on whether the authority performed its duties under a service contract or a contract for services, but rather on whether the authority was engaged in providing part of the nursing, accommodation, and treatment obligations owed to patients.[18]

Furthermore, in Cassidy v. Ministry of Health, Lord Denning observed that because one of the services the hospital provided was the continuous presence of a resident surgeon, the hospital was responsible for the negligence of specialists employed under service contracts and contracts for services. The authority is obligated to provide proper care; although this duty can be delegated to individuals who are not employees, the hospital remains responsible if the task is performed inadequately by its representatives.

Lord Denning explicitly understood that the hospital authority is responsible for the actions of individuals under service contracts, including independent contractors. It is also noteworthy that hospital-independent contractors perform functions delegated to them by the hospital, making Lord Denning's ruling applicable to independent contractors as well.

In Cox v. Ministry of Justice[19], the court observed that a relationship other than employment specifically, a non-employee relationship can generally establish vicarious liability when harm is wrongfully caused by a person who performs part of the business and acts on its behalf, particularly when the wrongful act results from a risk created by the activities delegated to that person. Although the facts of this case are not directly related to the medical profession, this observation can be effectively applied to the current scenario.

A doctor working for a hospital, whether as an employee or an independent contractor, performs activities that are an integral part of the organization (i.e., the hospital) and serve its interests. Additionally, the wrongful act is a risk that the organization (the hospital) has created by delegating these activities to the individual (the doctor). Therefore, this case provides a strong argument supporting the hospital's vicarious liability for the acts of independent contractors.

The doctrine of apparent authority provides a strong basis for holding hospitals accountable for the actions of independent contractors within their premises.

When a hospital leads a patient to believe that a doctor is its employee, and the patient relies on this belief, the doctrine of apparent authority may enable the patient to claim damages from the hospital for medical negligence.

In Vivone v. Broadlawns Medical Centre[20], the court ruled that apparent authority allows a patient to seek compensation from the hospital for negligence committed by an independent doctor working within the hospital clinic. A similar ruling was made in Roessler v. Novak, which applied the doctrine of "agency by estoppel," a well-established principle in Maryland courts (USA).[21]

Another similar doctrine of apparent agency was applied in Malcolm v. Mount Vernon Hospital, resulting in a comparable judgment. Most notably, in Ginsberg v. Northwest Medical Center, the court ruled that a surgical consent form stating that the surgeon is an independent contractor rather than an employee does not prevent the patient from claiming damages from the hospital.[22]

However, this doctrine has not been accepted uniformly in all cases. Contradicting Ginsberg, in Fletcher v. South Peninsula Hospital[23], the court decided that the patient could not hold the hospital responsible for the acts of an independent contractor because the patient had signed a contractual agreement prior to surgery explicitly stating that the surgeon was an independent contractor.[24]

This doctrine aligns with a patient's reasonable defense, as patients are generally not expected to know whether their treating physician is an employee or an independent contractor. Apparent authority also has significant legal implications: plaintiffs' lawyers often view hospitals as "deep-pocket" targets and try to include them in legal claims.

3.4) Responsibility of the Hospital Regarding the Physical Structure

The hospital may be held accountable for providing an appropriate care system, and this responsibility cannot be delegated or assigned to others. For example, in the Bolkhanami case, a woman was hospitalized for childbirth.

She gave birth to twins, but the surgical operation was conducted a mile away from the delivery site, and it took the doctor more than an hour to arrive at the appropriate location.

As a result, the twins were born with severe brain injuries. The court ruled that the hospital authorities were responsible for failing to provide an appropriate monitoring system.[25]

Regarding the hospital's failure to provide necessary facilities, it should be noted that this omission does not constitute grounds for civil liability unless it causes harm or damage to the patient. However, if it is proven that the patient's injury resulted from the lack of facilities or from defective or substandard equipment, the hospital will undoubtedly be held responsible.

Under Iranian law, the possibility of vicarious liability for hospitals is not governed by a definitive general rule and remains uncertain. Instead, the legal relationship between the doctor and the hospital must be examined. If this relationship resembles that of an employer and employee (master-servant), the hospital, as the employer, is responsible for compensating damages caused to patients.

Although doctors may not adhere strictly to the hospital's directives in technical matters such as surgeries and may be independent regarding how they perform procedures, they remain subject to hospital policies in many administrative areas such as salary, working hours, and presence at the hospital. This justifies the hospital's vicarious responsibility.

Applying this theory allows plaintiffs to name doctors, the hospital, and staff as defendants in a civil liability suit. The inability to sue one defendant does not preclude pursuing the lawsuit against others.

In fact, the liability of healthcare centers, hospitals, and their staff toward patients resembles joint liability, similar to that found in commercial documents and trespass cases. Judicial decisions also reflect this understanding.

Moreover, the degree of responsibility should be determined based on the doctor's diligence, caution, and level of negligence.[26]

3.5) Responsibility of Hospitals in Obtaining Patient Consent

First, it is necessary to provide an introduction to the general issue of obtaining patient permission for treatment and surgical procedures. This will allow us to address the topic of patient consent specifically regarding the use of AI in treatment processes, such as robotic surgery.

Obtaining consent for surgery is an obvious requirement. Consent can be given either explicitly or implicitly. Explicit consent involves the patient explicitly stating their permission, whereas implicit consent occurs when the patient performs an action that indicates approval such as rolling up their sleeve for an injection. For consent to be valid and genuine, certain essential conditions must be met: a) It must be voluntary; b) It must be given by an authorized person; c) It must be informed; and d) It must be related to the procedure being performed.[27]

However, in emergency situations where delaying treatment to obtain consent would pose a risk, the physician is not obligated to seek the patient's permission. Accordingly, obtaining consent for surgery on a child without parental approval is not necessary in urgent situations. For example, in the Poloshk case[28], involving a five-year-old child, the court ruled that the hospital was not liable for performing surgery without parental consent, especially when there were concerns about the child's health and consent was obtained from the grandmother instead of the mother.

In Iranian law, patient permission is also recognized by legislation. Article 121, Clause c, of the Islamic Penal Code of 1332 (1953) states: "...Performing acts that are considered crimes by law is not a crime in the following cases: c) Any lawful surgical or medical procedure carried out with the consent of the individual, guardians, or legal representatives, and in accordance with technical, scientific, and regulatory standards. In urgent cases, obtaining consent is not necessary."

In our country, consent for surgical procedures is typically obtained by the husband on behalf of his wife. Some scholars distinguish between cases, arguing that if the wife is sane, of legal adult age, and unconscious, the husband may provide consent for her. However, if the wife is conscious, the husband's consent is only valid for procedures related to family goals and interests.

All the above concerns pertain to the traditional issues of obtaining permission before surgery and related matters. A new issue introduced with the advent of AI is the patient's consent regarding the use of AI in the treatment process, such as robots performing surgery.

There are important questions regarding consent and AI. For example, physicians use AI technologies to record conversations with patients, which can then quickly generate patient visit records. Healthcare authorities welcome such tools because they reduce documentation and administrative burdens on healthcare staff. However, as healthcare systems adopt these technologies, they must carefully consider issues of consent. Specifically, if physicians use these tools, is it necessary to obtain patient consent for this purpose?

In patient care, hospitals and other providers should consider obtaining patient consent when AI technology is used to support diagnoses. Consent requirements are likely to evolve, and we can expect the development of regulations that mandate disclosing the use of AI, along with its associated risks and benefits, such as the potential for generating fake images and inaccuracies in hospital data.[29] Additionally, providers need to establish protocols for actions to be taken if a patient refuses to consent to the use of AI tools in supporting diagnosis.

Regarding AI, the issue of consent is primarily discussed in two contexts. The first is informed consent, a fundamental principle in medical law that requires patients to have adequate information and understanding about their care before making decisions. Concerns about informed consent and individual autonomy arise when hospitals deploy AI systems that influence clinical decision-making. The second pertains to consent for the use of data for administrative purposes.

What is the role of informed consent when a doctor relies on an AI system's recommendation to provide care to a patient? The primary concern involves obtaining the patient's consent for collecting and using their data in medical research, AI model development, or AI system processing.

Overall, patients often lack sufficient information about the sources of data or computer-based decision-making tools that healthcare professionals use to make decisions. This lack of transparency undermines trust between patients and providers and raises concerns regarding obtaining patient consent for data use. Additionally, collecting data without individual consent for commercial or other purposes may violate patients' dignity and human rights.

In the era of big data, obtaining consent is increasingly challenging, particularly in today's profit-driven environment where companies prioritize the commercial use of data. Various consent models—such as broad (general), tiered, and dynamic (or semi-permanent)—have been employed to secure patient approval for the secondary use of their health data. However, none of these models satisfy the requirements for protecting meet individual rights.

The complexity increases with the integration of AI algorithms that function as "black boxes." These algorithms often operate opaquely due to machine learning techniques, making it difficult even impossible for both medical professionals and developers to fully understand their inner workings. This opacity makes explanation or disclosure challenging or unfeasible for affected individuals. In some cases, even if disclosure is possible, obtaining genuine consent may still be insufficient.[29] For example, individuals with limited access to healthcare systems may be unable to provide consent or may be denied healthcare access if they refuse.

Ultimately, these issues raise complex questions about the extent to which patients should be required to consent to data use, particularly for administrative purposes rather than clinical contexts. Nonetheless, as AI becomes more integrated into hospital systems, individuals directly or indirectly affected may expect greater control over how their data is used for these purposes.

In summary, obtaining patient consent for the use of their data in AI systems is a complex issue. While informed consent is crucial in clinical contexts, data used for administrative purposes should also involve patient participation. This approach helps maintain trust between patients and the healthcare system. Transparency about data usage and providing meaningful options to patients are also important. Ultimately, as AI integration increases, patients' expectations for control over their data will increase.

However, using this data raises privacy concerns regarding patients' personal information. The primary issue centers on who has the right to access medical data. AI systems require large amounts of sensitive personal data, and if this data falls into the wrong hands, significant harm could result. Additionally, it raises important questions about who holds ultimate authority over when, how, and to what extent the data are used and processed.

According to the European Commission's proposal, the processing of medical data must be lawful, transparent, and limited to specified purposes. Appropriate measures should be implemented to protect patients' privacy and data security. It is important to note that data protection laws preserve the rights of data subjects rather than confer ownership of the data. This means that certain uses or processing of data may not necessarily require patient consent. What is needed is to provide patients with clear opportunities to understand how and why their data are collected. Additionally, patients should have direct access to their data and be informed about privacy policies concerning the use, storage, and transfer of biometric data obtained through AI technology.

This issue is further connected to concepts of liability arising from informed consent, which necessitates examining appropriate methods for obtaining patient consent considering modern AI applications. A comprehensive review of informed consent cases suggests that claims related to informed consent resemble a form of medical negligence, as they emphasize patient autonomy.

Authors explain that, in defining the scope of informed consent, courts have largely agreed that physicians have a legal obligation to inform patients about essential information—such as risks, benefits, and options—regarding proposed treatments.[11]

The author describes three types of cases that may be related to medical AI:

1. **Provider Experience: For example, a scenario in which a doctor conceals their inexperience by failing to disclose the use of AI during the informed consent process.**

2. **Physician Substitutes: A scenario in which the patient may be unaware that AI or machine learning is involved in a specific aspect of their treatment.**

Financial Conflicts of Interest: A situation in which a physician conceals their financial interests related to the AI technology used in a patient's treatment.[29]

Legal experts recommend that the inclusion of a "black box" be mandatory in all robotic operations equipped with AI or used for medical diagnoses. Similar to an airplane's black box, this device would collect comprehensive evidence about how the operation or diagnosis was performed, which could be used in court. When the black box is accessed and scientists can determine what happened at critical decision points, it can play a crucial role in establishing causal links between the action and any resulting harm, as well as the degree of negligence or misconduct, if applicable. Even in the absence of a black box, electronic medical records significantly facilitate access to patient and procedural data, providing valuable information for liability claims.

While machine learning has the potential to improve medical practices, one concern is that introducing such technology could lead to the growth of "black box medicine" the use of opaque computational models in healthcare decision-making. These models are inherently non-transparent due to the amount and complexity of the data they process, rather than their design. Furthermore, machine learning techniques are often difficult to explain in human terms. The outputs of these models are frequently probabilistic and sometimes difficult to interpret. Black-box medicine raises complex issues related to informed consent. Intuitively, it is challenging to define what "being informed" means to be "informed" when the precise functioning of the system is not fully understood by anyone.

These challenges highlight the need to reconsider methods of obtaining informed consent in the era of advanced technologies, ensuring that patients are properly engaged in their decision-making processes. In the context of medical AI, treatment plans may be presented as definitive, without discussion of alternative options or their respective benefits and risks. This underscores the critical role of the physician in ensuring that patients receive sufficient information to make informed decisions.

4. Civil Liability of Hospitals in Judicial Practice

The principles governing damages laws in the medical field worldwide are primarily based on the famous English case Bolam v. Friern Hospital Management Committee,

which defines the "Bolam test." According to this test, a doctor is not liable if their actions conform to a standard of care accepted by a responsible body of medical professionals.

European laws also establish principles related to "vicarious liability," where an employer, such as a hospital, is responsible for the actions of its employees, including doctors, and "product liability." Physicians are obligated to exercise caution because, in cases where the use of AI results in damages, the physician remains responsible. This issue is further complicated by the fact that the standard of care is not fixed and may undergo relatively rapid changes in response to advanced technology. The complexity is further exacerbated by the scarcity of legal cases in this area, which contributes to significant uncertainty in the field.[30]

From the perspective of hospital management, several scenarios may give rise to legal liability. Here, we examine two cases drawn from judicial practice:

Damage to patients caused by staffing shortages during a busy night in the emergency department, resulting from the failure of an AI system to properly schedule staff shifts (from the hospital's liability perspective).

Failure of AI to accurately predict the maintenance needs of medical equipment used in patient care, eventually leading to equipment failure and patient harm (from the developer's liability perspective).

In both cases, the primary challenge is determining legal responsibility, which requires thorough review and interpretation of relevant laws. Healthcare centers, like physicians, are obligated to adhere to the standard of reasonable care toward patients. Usually, hospitals are responsible for ensuring sufficient staffing, the availability of functioning equipment, and proper training of staff in the use of such equipment.

Therefore, a hospital may be held liable if it fails to adequately equip the intensive care or emergency departments or if it negligently assigns tasks to staff at inappropriate times. For example, in Kozobinski v. Hospitals and Physicians, the failure to provide enough personnel to assist the physician during the postoperative period was considered a breach of the hospital's duty.[31] Similarly, in Levitte v. St. Taman Regional Hospital,[32] the hospital was found to have breached its obligation by not providing enough staff to help patients get out of bed.

Furthermore, institutional liability may also arise when a hospital fails to properly evaluate the quality of the products or equipment it provides. In Parker v. St. Vincent Hospital[31], although the hospital was not explicitly held responsible for implant design defects, the court acknowledged the hospital's potential duty to investigate the safety of implants or other medical devices.[34]

Although these cases are not directly related to the use of AI, the same principles can be applied to the field of AI. In the scenario described above, a healthcare facility might be held liable not only for staffing shortages but also for implementing and relying on an inefficient AI-based shift scheduling system that the hospital failed to adequately evaluate. However, proper validation of the implemented system may be impossible due to the inherent opacity of AI technologies. Additionally, this lack of transparency and ambiguous nature creates significant challenges in establishing causality, which in turn complicates the assessment of civil liability.

In this context, developers of AI algorithms may also be held responsible if a patient is harmed due to design or manufacturing defects or the absence of warnings about potential risks. However, product liability laws are less effective in addressing these concerns. One reason is that it is difficult to categorize a faulty AI system as a product defect or design flaw. While product defects typically entail strict liability, the nature and standards of claims related to design flaws remain unclear.

Furthermore, in some jurisdictions, for a patient to succeed in a product liability claim, they must demonstrate the existence of an alternative design that is feasible and cost-effective. Although courts have generally been reluctant to extend product liability to medical software developers—since such software is considered a support tool rather than the final decision-maker—their rulings remain inconsistent and unclear, thereby increasing uncertainty.

Current civil liability laws in European countries, the UK, and the US generate ambiguity regarding when liability may arise from the use of AI in hospitals. Addressing these legal ambiguities surrounding AI liability is essential to fully harness its benefits in healthcare and to facilitate its responsible integration into hospital management systems.

This legal uncertainty poses a significant challenge to the full utilization of AI's advantages in healthcare and its responsible incorporation into hospital administrative systems. Without clear legal frameworks and liability principles, healthcare providers and AI developers will remain hesitant to adopt and implement AI technologies due to the risks of legal claims and financial damages.

Therefore, resolving these legal uncertainties is crucial. It is necessary to establish standards, define documentation requirements, and allocate responsibilities among various stakeholders—including healthcare centers, AI developers, patients, and others—to ensure transparency and legal certainty for the safe and effective use of AI in medical settings.

Addressing this legal gap is a priority because it unlocks the transformative potential of AI in healthcare while ensuring appropriate accountability mechanisms are in place. Developing comprehensive responsibility frameworks is a key step toward the responsible integration of AI technologies into hospital systems and processes.

Hospitals are increasingly adopting AI technologies to enhance predictive maintenance, bed management, staff rotation planning, and CDS systems. Current approaches have limitations that can be overcome through the integration of AI, thereby improving patient care and overall operational efficiency. However, hospitals must remain aware of the legal risks associated with implementing AI. We have highlighted several legal issues related to discrimination and bias, data privacy, informed consent, and medical liability to clarify their interaction in this domain. While other issues warrant further examination, the aim here is to provide insight into the intersection of technological applications and key legal concerns. Based on this, more comprehensive extrajudicial analyses are expected to be conducted in other areas.[11]

The doctrine of vicarious liability assigns indirect and secondary responsibility to an employer for the misconduct of an employee, provided that such misconduct occurs within the scope of employment. Similarly, healthcare providers using AI-based medical devices should be held responsible for any damages caused by their autonomous systems during operation.[35]

The rationale behind this liability is that the costs resulting from any harm caused by AI should be distributed among hospitals or other relevant parties to ensure full compensation for the affected patient.

However, the application of this doctrine to AI and robotic technologies has faced criticism because it ignores the fact that AI-based systems, especially intelligent robots, lack legal personality or capacity and do not have independent financial status to compensate for damages they cause. Furthermore, establishing a clear connection between usage, environmental inputs, and changes in algorithms and approaches remains highly challenging. Autonomous robotic and medical systems do not operate under full human or corporate control, and their outputs are not necessarily entirely determined by the inputs they receive.

Legal experts have noted that evolving standards of care can add complexity to healthcare systems. Samuel Hodge, a law professor at Temple University, stated in a 2022 interview with Chief Healthcare Executive® that as AI becomes more accessible, related claims against hospitals are also likely to increase.

In a medical malpractice case, the standard of care is based on what an average physician in the relevant locality would do, Hodge explained. "With AI technology, the duty of care might be elevated to a higher standard and could become a national standard, since everyone will have access to the same equipment." If a doctor uses an AI tool in patient care and the patient experiences adverse effects, determining responsibility is not straightforward.

Acknowledging certain legal issues, Hodge notes that relevant factors may include questions such as: Was the physician reasonably diligent in reviewing and applying medical judgment during the case examination? Did the AI tool operate in accordance with the contractual terms of use? Were there any extraordinary circumstances? Was bias present?

If a provider fails to fulfill their professional duty of care, over-reliance on AI recommendations or delegating decision-making to an AI system without critical evaluation could lead to liability. To ensure the responsible use of AI in hospitals, several key strategies should be considered, including:

Monitoring and Regulatory Standards: Hospitals must maintain strong and continuous human oversight of AI systems to promptly identify and correct errors.

- **Enhancing Transparency and Explainability: AI processes and algorithms should be transparent and understandable to both physicians and patients, which increases trust.**
- **Continuous Monitoring: Hospitals should continuously monitor and evaluate the performance of AI systems to ensure their alignment with clinical requirements.**
- **Maintaining Professional Judgment and Decision-Making[11]: Healthcare providers, even when using AI systems to inform clinical decisions, are expected to apply their professional judgment and make decisions in the best interests of the patient.**
- **Development of Clear Responsibility and Accountability Frameworks: Medical liability is a significant issue covered under both criminal liability and tort law. Generally, to pursue legal action for damages, the injured person must prove negligence on the part of the defendant. This means demonstrating that the defendant failed to meet the standard of care, breached that duty, and caused injury as a result.**
- **Ensuring High-Quality Data and Addressing Algorithmic Biases**
- **Developing Robust Regulatory Guidelines and Standards**

Ultimately, as AI becomes increasingly integrated into healthcare, legal and ethical issues related to medical liability will continue to evolve, necessitating ongoing collaboration between healthcare providers and AI developers. Overall, strategies for the responsible implementation of AI in hospitals include rigorous oversight, transparency, and continuous monitoring.

Based on the information provided, the following are the most important actions that hospitals and healthcare systems should undertake regarding the use of AI:

- **Understanding new legal frameworks and regulations related to AI.**
- **Developing policies and procedures to ensure compliance with these new laws and regulations.**
- **Providing necessary training for staff to use AI tools and ensuring they remain up-to-date with relevant regulations.**
- **Monitoring AI tools to ensure compliance with regulations.**
- **Thoughtful planning regarding how and where AI will be implemented within the organization.**
- **Establish a specialized team to review legal and operational issues.**
- **Regularly reassessing the potential positive and negative impacts of AI.**

- **Developing strong governance policies for AI.**
- **Carefully overseeing AI-related activities**

The hope is that hospitals and healthcare systems will act proactively by developing robust policies and procedures and forming appropriate teams to manage the evolving legal and operational landscape of AI in patient care.

Conclusion

Careful consideration of the civil responsibility of hospitals indicates that, from a legal perspective, a hospital may have two distinct types of civil responsibility: (1) liability arising from the negligence or misconduct of hospital staff, which makes the hospital directly accountable to patients; and (2) liability related to providing a suitable treatment environment and physical infrastructure, including smart tools. The hospital may be liable for providing an appropriate smart care system, and this responsibility is non-delegable. The hospital has a duty to provide proper treatment to the patient because the contractual relationship exists between the patient and the hospital, not only with the physician. European laws also provide principles regarding "vicarious liability," under which an employer, such as a hospital, is responsible for the actions of its employees, including doctors, as well as "product liability." Physicians are obligated to exercise caution because, in cases where the use of AI leads to damages, the physician remains liable. The doctrine of vicarious liability attributes indirect and secondary liability to the employer for wrongful conduct by an employee, provided that such conduct occurred within the scope of employment. Similarly, healthcare providers using AI-based medical devices must be held responsible for any damages caused by their automated systems during use. According to this theory, responsibility involves distributing the costs resulting from any harm caused by AI among hospitals or other relevant parties to ensure full compensation for the patient. However, product liability law is less effective in addressing these concerns. One reason is that it is difficult to classify a malfunctioning AI system as a product defect or design flaw. While product defects generally entail absolute liability, the nature and standards related to claims of design flaws remain ambiguous. Moreover, in some jurisdictions, to succeed in a product liability claim, the injured party must demonstrate the existence of an alternative, feasible, and cost-effective design. Although courts have been reluctant to extend product liability to medical software developers, considering such software merely as a support tool for the physician's final decision, judicial procedures remain ambiguous and inconsistent, exacerbating this uncertainty.

Current civil liability laws in European countries, the UK, and the United States create ambiguity regarding when liability may arise from the use of AI in hospitals. Resolving these legal uncertainties about AI responsibility is essential to fully leveraging its benefits in healthcare and to facilitate its responsible integration into hospital management. This legal uncertainty poses a major challenge to the effective utilization of AI advantages in healthcare and their responsible incorporation into hospital administrative systems.

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