Dissertation

At

IIHMR, Delhi

On

**Impact of Artificial Intelligence (AI) in Healthcare- Ethical
Consideration – A Systematic Review**

by

Dr. Saloni Kastwar

PG/22/101

Under the guidance of

Dr. Ekta Saroha

PGDM (Hospital and Health Management)
2022-24

**International Institute of Health Management Research
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Certificate of Approval

The following dissertation titled **"Impact of Artificial Intelligence in Healthcare- Ethical Consideration- A Systematic Review"** at **"IIHMR, Delhi"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

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Mentor

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
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Name of the Organization in Which Dissertation Has Been Completed: IIHMR, Delhi

Area of Dissertation: Health IT

Attendance: 100%

Objectives achieved: Obtained knowledge & experience about AI in health system

Deliverables: Requirement management, User research

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Suggestions for Improvement: To enhance the knowledge & interest in public health.

Suggestions for Institute (course curriculum, industry interaction, placement, alumni):

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Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Saloni Kastwar,** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. He/ She is submitting this dissertation titled **"Impact of AI in Healthcare- Ethical Consideration- A systematic Review"** at **"IIHMR, Delhi"** in partial fulfillment of the requirements for the award of the **PGDM (Hospital & Health Management).**

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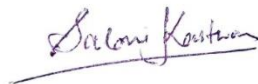
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Dr. Ekta Saroha
for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from **11th March 2024** to **10th June 2024**
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Dr. Saloni Kastwar

(PG/22/101)

TABLE OF CONTENT

<u>ACRONYMS / ABBREVIATIONS</u>

1. AI= Artificial Intelligence

2. ML= Machine Learning

3. DL= Deep Learning

4. IT= Information Technology

5. GDPR= General Data Protection Regulations

6. HIPAA= Health Information Portability and Accountability Act

7. XAI= Explainable Artificial Intelligence

8. MDP= Management Development Programme

9. NLP= Natural Language Processing

10. EMR= Electronic Medical Record

11. PRISMA= Preferred Reporting Items for Systematic Reviews and Meta-

    Analysis

12. NDHB= National Digital Health Blueprint

13. DISHA= Digital Information Security in Healthcare Act

14. MOHFW= Ministry of Health and Family Welfare

SECTION A

ABOUT THE ORGANIZATION

IIHMR DELHI

The International Institute of Health Management Research (IIHMR), New Delhi is allied to the 'Society for Indian Institute of Health Management Research' which was established in October 1984 under the Societies Registration Act-1958. IIHMR-Delhi was setup in 2008 in response to the growing needs of sustainable management and administration solutions critical to the optimal function of healthcare sector both in India and in the Asia-Pacific region.

It is a leading institute of higher learning that promotes and conducts research in health and hospital management; lends technical expertise to policy analysis and formulation; develops effective strategies and facilitates efficient implementation; enhances human and institutional capacity to build a competent and responsive healthcare sector. Our multi-dimensional approach to capacity building is not limited to academic programs but offers management development programs,

knowledge and skills-based training courses, seminars/webinars, workshops, and research studies. Our four core activities are:

1. Academic courses at master's and doctoral level in health and hospital management to meet the growing need of skilled healthcare professionals.
2. Research that has high relevance to health policies and programs at national and global level.
3. Continued education through management development programs and executive programs for working professionals to help them upgrade their knowledge and skills in response to the emerging needs of the industry.
4. Technical consultation to the national and state-level flagship programs to address the gaps in planning as well as implementation.

Over the years IIHMR-Delhi has emerged as an institute of repute both nationally and globally for producing socially conscious, skilled and vibrant top-class health care management professionals. Our graduates are well-matched for the ever-changing health care sector and evolving social milieu. The institute has progressed as a leader in research, teaching, training, community extension programmes and policy advocacy in the field of health care. IIHMR has carved out a niche for itself through its cutting-edge academic curriculum, infrastructure, accomplished multi-disciplinary faculty and research.

The Institute as an autonomous body of international stature has been developing leaders for several years to shape tomorrow's healthcare by equipping the students in the fields of health, hospital, and health information technology. The Institute's dynamic health care research programmes provide rigorous training in management, health systems, hospital administration, health care financing, economics, and information technology.

Commitment to Inclusive Excellence

As an institute, IIHMR-Delhi is committed to creating an environment of higher learning that can serve as the model for the kind of society it strives to build – one of equity, social justice and mutual support. We have also made a concerted effort to promote the ethos and philosophies amongst today's students and nurture them into growing as effective managers, to think both critically and ethically, to learn to cope with ethical dilemmas and apply systems-thinking approaches to serious and complex societal problems. Our internationally renowned faculty lead multidisciplinary health research in multifarious areas such as public health, health services, health economics, hospital management, social determinants of health, mental Health and other topics of global and national interest.

The IIHMR is invited by various governmental and civil society organizations to provide technical support for capacity building and policy research needs that culminates in developing innovative and equitable health care strategies and

provide advocacy support for health policy and planning. The institute also responds to global health threats, natural disasters, conflict and related humanitarian crisis. In addition to the master's and doctoral level programmes, IIHMR-D also offers several highly specialized and popular Management Development Programmes (MDP) to wide range of health professional in the country and overseas which largely addresses educational needs amongst in-service aspirants.

SECTION II

DISSERTATION REPORT

Impact of Artificial Intelligence (AI) in Healthcare - Ethical Consideration - A Systematic Review

ABSTRACT

Artificial intelligence (AI) is transforming the healthcare industry by enabling significant advances in diagnostics, treatment recommendations, tailored medication, and operational efficiencies. This systematic study investigates the moral concerns surrounding the integration of AI in healthcare, emphasizing major obstacles that must be addressed to guarantee responsible and fair implementation.

One of the most important issues is patient privacy and data security. AI systems require access to huge amounts of sensitive patient data, requesting strict measures that guarantee confidentiality and prevent data breaches. Regulatory frameworks like GDPR and HIPAA give guidance, but ongoing revisions are required to stay up with technology developments.

Bias and fairness in AI systems are serious ethical concerns. Training data that reflects prior biases might result in disproportionate treatment recommendations, especially for underrepresented populations. Creating solutions for bias identification and reduction is critical to promoting justice and equity in healthcare.

Transparency and accountability are also major problems. The "black box" nature of many AI algorithms makes it difficult to comprehend and verify AI-driven outcomes. Efforts to build explainable AI (XAI) are critical in allowing stakeholders to accept and evaluate AI suggestions. Clear accountability frameworks are required to determine blame when AI systems fail or generate unsatisfactory results.

Informed consent in the context of AI in healthcare creates new dynamics in patient-provider interaction. Patients must be well-informed about the use of AI in their treatment, including its advantages, hazards, and limits. Effective communication and educational programs are critical for improving patient knowledge and participation.

Access and inequality are key problems, since AI has the potential to aggravate existing gaps if these technologies are unevenly dispersed. Ensuring equal access to AI technologies is critical, especially in low-resource contexts. Policymakers and healthcare institutions must work together to bridge the digital gap and encourage inclusive AI deployment.

The evaluation emphasizes the necessity of strong regulatory and ethical norms for the development and deployment of AI in healthcare. These frameworks should address data use, algorithm development, clinical validation, and post-

market surveillance. International collaboration can assist to standardize standards

and maintain consistent ethical behaviors across boundaries.

INTRODUCTION

Artificial intelligence (AI) is the replication of human intellect in robots designed to think and learn like humans. These robots are capable of doing activities that traditionally require human intellect, such as speech recognition, decision-making, problem-solving, and natural language understanding.

Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), and Robotics are all key concepts in artificial intelligence.

AI has potential applications in healthcare, including illness diagnosis, personalized treatment planning, and medication development.

- In finance to detect fraud, manage risks, and automate trading.
- Automate tailored suggestions, inventory management, and customer service in retail.
- Education in providing personalized learning experiences, automates administrative tasks, and develops intelligent tutoring systems.
- And many more…

AI is a strong and revolutionary field of computer science that has the potential to radically revolutionize medical practice and healthcare delivery. Healthcare systems across the world have enormous hurdles in fulfilling the 'quadruple objective' for healthcare: increase population health, improve patient experience,

20

enhance caregiver experience, and lower growing healthcare costs. Furthermore, against the background of the global pandemic, healthcare systems are being challenged to 'perform' (provide effective, high-quality treatment) and 'transform' care at scale by integrating real-world data-driven insights directly into patient care [1].

AI is a fast-expanding discipline with the potential to revolutionize healthcare. AI refers to a wide variety of technologies that allow computers to accomplish activities that normally require human intellect, such as learning, reasoning, and problem-solving. AI in healthcare has already demonstrated potential for improving patient outcomes, lowering costs, and increasing efficiency. The fast breakthroughs in AI have created interesting potential for the healthcare business. AI technologies such as machine learning, natural language processing, and computer vision have transformed many aspects of healthcare delivery. These improvements have the potential to dramatically improve patient care, boost diagnoses, expedite administrative operations, and drive medical research and innovation [2].

The incorporation of AI into the health care system not only alters aspects such as the role of health care practitioners, but it also creates new opportunities to enhance patient safety outcomes and care quality [3]. AI has potential to assist clinicians in making better diagnoses [4] and has contributed to the fields of drug development [5], personalized medicine, and patient care monitoring [6].

AI in the healthcare system can help at both the "clinical" and "diagnostic" levels. AI is a powerful technology that may be used in the healthcare arena to show tiny patterns in data, which physicians can then analyze to find new clinical and health-related concerns [8]. However, the rapid adoption of AI in healthcare also raises several ethical concerns.

Health ethics is the study of moral concerns concerning healthcare, medicine, and human values. It entails thinking about values while prioritizing and justifying activities that may affect the health of patients, families, and communities. Health ethics encourages health practitioners, researchers, and politicians to consider values when prioritizing and justifying activities that may have an influence on the health and well-being of patients, families, or communities.

It is an interdisciplinary field that encompasses many different realms, including public health, health research, and clinical treatment. With competing interests and limited resources, a health ethics framework allows for a systematic study and resolution of conflicts using evidence-based general ethical concepts such as respect for human autonomy, beneficence, fairness, utility, and solidarity.

Ethical considerations are the guidelines and expectations that help determine the rightness or wrongness of conduct, particularly in situations when moral values are at issue. Ethical considerations in healthcare and artificial intelligence (AI)

cover a wide variety of topics aimed at preserving individual well-being and sustaining public confidence. These issues are crucial in directing the development, deployment, and use of AI technologies so that they benefit society without causing harm or increasing inequities.

Fig.1: Ethical principles in AI for Health.

Optimizing Data Quality: Artificial Intelligence is a data-driven technology, and as such, the data used to train and test the AI has a significant impact on the technology's results. This is especially crucial in the area of AI for health, as a skewed or insufficiently big dataset can lead to problems with discrimination, prejudice, and other problems. The biggest risk to data-driven technologies, such as AI for health, is data bias. The preexisting bias that develops in AI models when they make choices against a certain group of individuals is one of the main issues it brings up. This prejudice is mostly attributable to the human who was engaged in training the data, which taints the AI's judgment.

Accessibility, Equity, and Inclusiveness: The use of computers for development, as well as the use of AI technologies in healthcare, require a greater availability of infrastructure. The excessive dependence on technology may thus impede the wider implementation of promising solutions in areas where they are expected to make a bigger impact.

Safety and Risk Minimization: Before an AI-based system is widely used, it must be proven that it will work safely and reliably. The duty for guaranteeing participant safety falls on all parties participating in the development and implementation of AI technology. The highest emphasis must be given to the protection of patients' and participants' dignity, rights, safety, and well-being. The risk associated with implementing AI technology and methodologies in clinical research or patient care varies depending on the use case and subsequent deployment approach chosen.

Collaboration: Artificial intelligence for health is data-driven. A vast collection of well-curated datasets is required for any significant use of AI in health.

Autonomy: When AI technologies are employed in healthcare, there is a risk that the system may operate independently, undermining human autonomy. The use of AI technology in healthcare has the potential to shift decision-making duty to

computers. Humans should have full control over the AI-powered healthcare system and medical decision-making. Under no circumstances can AI technology be used to limit patient autonomy. Patients have the freedom to deny consent. There should be no coercion from the government, sponsors, researchers, healthcare professionals, or other stakeholders to use such AI technology. Overreliance on artificial intelligence systems for diagnosis and treatment may have a detrimental impact on the patient-clinician interaction and the patient's autonomy.

Data Privacy: Throughout the development and deployment process, AI-based technology should secure personal data. Maintaining the trust of all stakeholders, including the recipients of healthcare, in the safe and secure use of personal data is critical to the effective and widespread deployment of AI. Accountability and Liability: Accountability is defined as a person or organization's obligation to account for its operations, accept responsibility for their acts, and publish the outcomes in a transparent way. AI solutions intended for use in the health sector must be ready to be vetted by relevant authorities at any moment.

Trustworthiness: It is the most desirable characteristic of any diagnostic or prognostic tool employed in AI healthcare. Clinicians must develop trust in the tools they utilize, and the same is true for AI technology.

Validity: AI technology in healthcare must undergo thorough clinical and field validation before being used on patients/participants. These are required to assure safety and effectiveness. The divergence of AI-based algorithms may be compounded by disparities in the datasets used to train AI systems.

Non-Discrimination and Fairness rules: To avoid biases and mistakes in algorithms and maintain quality, certain rules should be observed.

AI applications in healthcare have literally transformed the medical field, including imaging and electronic medical records (EMR), laboratory diagnosis and treatment, augmenting physicians' intelligence, new drug discovery, preventive and precision medicine, biological extensive data analysis, speeding up processes, and data storage and access for health organizations. However, this branch of study confronts a number of ethical and legal issues. It should be highlighted that deploying AI presents a number of obstacles, including ethical quandaries, privacy and data protection, informed permission, social gaps, medical consultation, empathy, and compassion. As a result, before incorporating artificial intelligence into the healthcare system, practitioners and experts should address the four medical ethics principles, namely autonomy, beneficence, nonmaleficence, and justice in all aspects of health care [9].

The ethical difficulties that society faces as a result of AI include privacy and surveillance, bias or discrimination, and, perhaps, the philosophical challenge of human judgment. Concerns have been raised regarding modern digital

technologies providing a new source of inaccuracy and data breaches due to their widespread adoption. Mistakes in procedures or protocols in the healthcare industry might have disastrous effects for the patient who is the victim of the blunder. It is critical to remember that patients encounter physicians at the most vulnerable times in their life. Currently, no well-defined rules exist to handle the legal and ethical difficulties that may develop due to the usage of artificial intelligence in healthcare settings [10].

RESEARCH QUESTIONS

1. Identify the need for a systematic review on the ethical considerations for the impact of AI in healthcare.

2. What are the challenges and ethical considerations associated with AI in healthcare?

RESEARCH METHODOLOGY

This systematic review will follow the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Search Strategy:

Electronic databases such as PubMed and MEDLINE will be searched using a combination of keywords related to AI, healthcare, and ethics. Boolean operators (AND, OR) will be used to refine the search and identify relevant studies. Examples of search terms include:

- Artificial intelligence
- Machine learning
- Healthcare
- Medicine
- Ethics
- Privacy

Inclusion criteria:

- Studies published in English.

- Articles must focus on the ethical implications of AI in healthcare and address ethical challenges.

Exclusion criteria:

- Studies not focused on AI in healthcare or ethical considerations.

- Non-English language publications.

- Studies with inadequate methodology
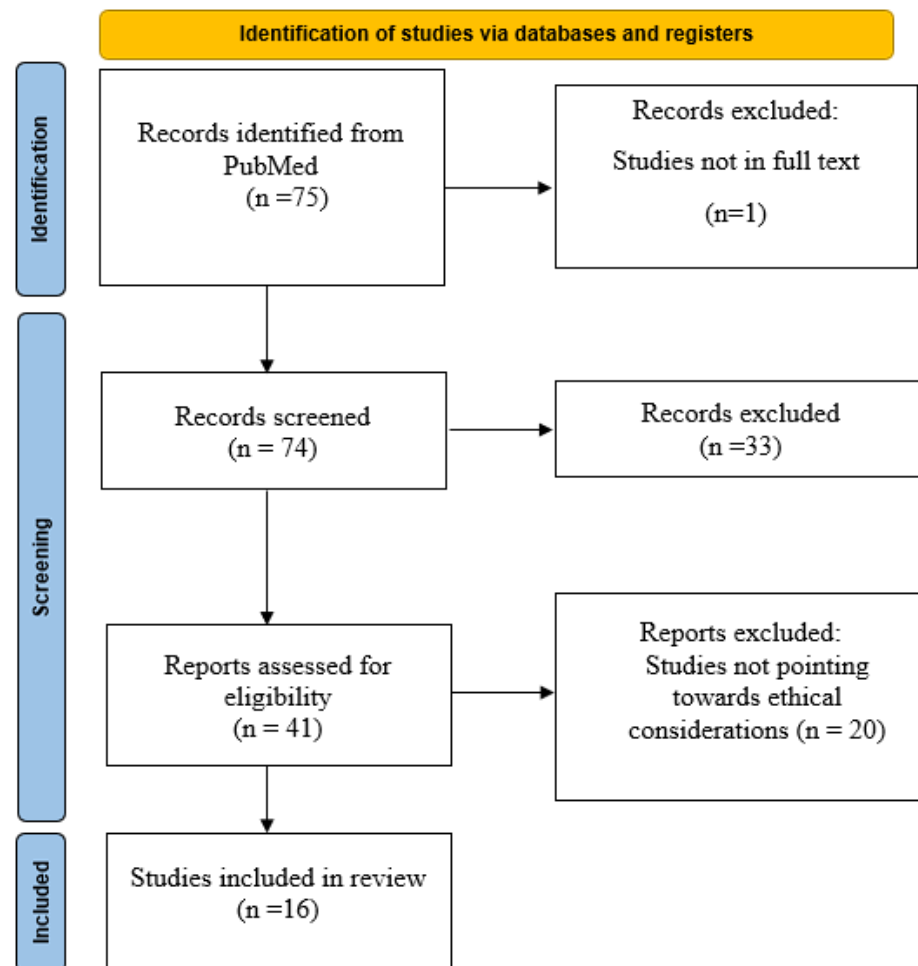
Time Frame: 3 Months

Data Extraction and Analysis

Data extraction will involve collecting information on study characteristics, identifying ethical challenges, and proposed solutions. A thematic analysis will be conducted to identify recurring ethical concerns and based on AI, machine learning, healthcare, medicine, ethics and privacy.

RESULTS

I have identified records from major databases like PubMed(n=75) records in total. After screening(n=75) records, (n=1) records were excluded because of not being in full text format. After screening, (n=74) articles were finalized to undergo screening, where (n=33) records were removed because of records not following the PRISMA methodology. Lastly (n=41) articles were eligible to be included, which undergone full-text screening and out of which (n=20) article was excluded because of irrelevancy towards the study.

Finally (n=16) Full text articles were included in this study.

The systematic study attempts to give a complete knowledge of how Artificial Intelligence (AI) in healthcare affects many areas of patient care. By combining current evidence, the review will shed light on how AI interventions affect patient care delivery. This complete understanding will help to advance research in the area while also informing stakeholders about the potential benefits and limitations of AI integration in healthcare settings.

The Indian government has worked to simplify AI technology in a variety of industries, including healthcare. The National Health Policy (2017) focuses on the integration of digital health and the creation of a National Digital Health Authority to use digital health technologies. The National Digital Health Blueprint (NDHB 2019) aims to create an electronic health record system that adheres to international standards, establish data ownership channels, and include ethical principles of data anonymization and de-identification.

The Digital Information Security in Healthcare Act (DISHA) 2018, proposed by the MOHFW, Government of India, is a step toward providing "electronic health data privacy, confidentiality, security, and standardization, as well as the establishment of National Data Health Authorities and Health Information Exchanges." The Act seeks to facilitate the "establishment of National and State eHealth Authorities and Health Information Exchanges to standardize and regulate the processes related to collection, storing, transmission and use of digital

health data; and to ensure reliability, data privacy, confidentiality and security of digital health data"

Before using AI technology, any biases must be recognized, detected, and extensively examined. Training data must not include any sampling bias. Such sampling bias may impair data quality and accuracy. Researchers must maintain data quality. Bias in the data set can have an impact on how AI technology works. If an AI technology is shown to be discriminatory or biased, it must be temporarily shut down. To mitigate data issues, comprehensive clinical validation is necessary before implementing AI-based technologies in healthcare. All developing technologies, including AI, must go through a well-established vetting procedure that applies to all aspects of scientific research and clinical treatment. AI developers and relevant authorities must ensure equitable sharing of AI technologies. Organizations should strive to give equitable opportunities and access to AI technologies for all user groups.

Collaboration could only be achieved by encouraging collaboration at the entry level. AI developers and relevant authorities must ensure equitable sharing of AI technologies. Organizations should ensure fair access to AI technologies for diverse user groups.

Algorithms, especially AI and ML, have the potential to advance science and research, improve medical care, and address global challenges such as the

environment and transportation. They can also drive smarter solutions to everyday problems.

It is critical to create an atmosphere that encourages innovation while also protecting users. Instead of rigorous disclosures, consumers would benefit from understanding the inputs that go into algorithm creation and how they contribute to the intended outcomes. At the same time, it is critical to raise public awareness of the purpose of algorithms and their appropriate creation and implementation. Similarly, consensus-driven best practices and self-regulatory bodies capable of developing flexible and nuanced regulatory approaches are the best ways to promote responsible and ethical development while preserving the potential of rapidly evolving AI technologies to solve major economic, social, and environmental challenges.

Bias in algorithms is a risk, although it should be noted that bias exists in many existing non-algorithmic processes, and well-designed algorithms have the potential to eliminate bias and make systems more equitable. Best practices for identifying and eliminating potential bias in AI include ensuring diversity in data sources, scrutinizing initial data sets and inputs to eliminate bias, continuously testing and encouraging feedback, supporting research on practical techniques for promoting fairness, and involving multi-stakeholder groups in feedback processes. Such procedures can be institutionalized through consensus-driven best practices developed by self-regulatory organizations, allowing for more flexible and nuanced approaches.

At the same time, it is critical to underline that AI technologies must be appropriately created and applied, particularly in the public sector. Improvements in cost and efficiency achieved by algorithmic decision-making must be weighed against the need to promote equity, accountability, and democratic engagement in the development and delivery of services, particularly those supplied by governments.

The numerous difficulties at hand with AI are complex in terms of both causes and consequences, and so will not be resolved by a single solution. As a result, a deeper knowledge of the cause or contributory elements is required to develop effective techniques for reducing or eliminating the negative results that algorithms can create.

It is also critical to be aware of the ways in which bias and injustice work in the world today, as statistics indicates. These data trusts might adopt a sectoral, multi-stakeholder, and self-governance approach within the scope of AI governance.

Though algorithms have long been employed, their technical sophistication and range of use across industries is growing. A flexible framework for determining the proper breadth and technical feasibility of various accountability mechanisms will assist to optimize the benefits algorithms provide while mitigating any downsides.

Create flexible principles to help self-regulatory activities in determining the most acceptable accountability method. Not all algorithms are created equal, and a self-regulatory monitoring structure may be easier or more successful to implement in certain circumstances than others.

Establish best practices for scrutinizing data sets used to train algorithms, ensuring:

- They are not incomplete, erroneous, biased, or over or under representative of populations.
- Data labels are correct or account for the level of individual data points, as well as 'metadata' regarding the dataset.
- Data sets are acceptable for the use case, with sensitive data utilized responsibly and in accordance with existing regulations and the concept of minimizing the use of personally identifiable information where possible

Given the wide diversity of decision-making processes, it is critical to understand that the context in which an algorithm is employed is critical to identifying the best practices that should be applied to it.

Because of their complexity, algorithms that exploit recent advances in machine learning might create distinct hurdles in terms of explainability.

AI/ML stakeholders can sponsor research to improve comprehension and explainability of algorithms.

Such research could cover a wide range of disciplines and output types, such as developing technical tools that automate explainability, reviewing automated decisions to look for harms or biases, and highlighting key ethical factors for regulators to consider when reviewing algorithms.

This might eventually lead to the identification of more complex best practices, or even seals and certificates, on which regulators and individuals can rely for openness and confidence.

AI may have a wide-ranging influence on society, which is why the government, in collaboration with other stakeholders, must play a critical role in ensuring favorable results. Horizontal laws on AI technologies would impede innovation, make it impossible for the law to adapt to technological advances, and ineffectively manage the use of AI in vital areas such as access to justice, which would need an outlook beyond what a general law could give. As a result, a sectoral approach to regulating AI would provide greater flexibility, more effective implementation, and focused approaches that may better manage certain areas than a generic rule.

Existing general legislation (such as the IT Act Rules) and sectoral regulations control technology deployments in a variety of industries, including health care,

transportation, and communications. Sectoral specialists are often most suited to analyzing context-specific uses, as well as the effect and outcomes of new technologies, although they may require assistance in developing AI competence. As AI evolves, the government may extend its technological knowledge and investigate new multi-stakeholder cooperation frameworks to mitigate concerns while maximizing AI's potential.

Instead of prescribing AI practices in the form of administrative requirements such as notice format and other codes of practice, including audit standards, the AI framework should define broad principles and guidelines/requirements and allow organizations to design their own programs in accordance with these principles, with the flexibility to adapt as technology continues to evolve at a rapid rate. The focus should be on defining realistic security procedures and improving internal governance systems in enterprises without creating unnecessary bureaucracy. Organizations should be permitted to self-regulate, but they must be held accountable for infractions. In the event of a breach or complaint, businesses should be responsible for demonstrating due diligence.

The Ministry of Electronics and Information Technology provided the following recommendations:

- Civil responsibility: AI systems may face civil responsibility in the long run because to their independent decision-making and knowledge acquisition. Considering this, stakeholders must consider whether to

recognize the AI system as a legal person. If legal personhood is granted, it should be supported by an insurance program or compensation fund to pay for any losses. If such systems are to have a worldwide footprint, these challenges must also be addressed in international forums.

- Holistic Approach: A committee of stakeholders should conduct a comprehensive investigation into all pertinent concerns. To give the technology a fair chance, a decision on allowing AI systems should be taken after taking into account both the rise and decrease in hazards associated with AI adoption.

- Reviewing Existing Laws: Review existing laws and legislation for potential modifications to support AI deployment in the area. It is preferable to amend current provisions in legislation rather than create new provisions. Excessive rules should be avoided since they may impede technological advancement.

- Prioritize industries: Laws should be reviewed in industries with high potential for early adoption. These might include transportation, healthcare, and finance. When the necessity arises, the experience obtained in these fields can be used to other domains.

- Regular review: This is not a one-time activity. The legislation should be revised on a regular basis, considering technological advancements and implementation experience.

- Conduct sector-by-sector study using Indian and international legislation and best practices to identify legal holes for AI-enabled systems, particularly in relation to the IT Act.

- Identify and address current restrictions to safe AI use.

- Funding to improve in-house IT competence for regulators in the most affected sectors.

- Establish an advisory council or point of contact (POC) to coordinate AI governance problems, with representation from research, industry, and civil society.

- Collaborate with governing entities worldwide to exchange and learn from experiences.

- Encourage industry sharing best practices and promoting rules of behavior.

- Provide ethics training for government-funded researchers.

<u>DISCUSSION</u>

I investigated the ethical issues surrounding the use of artificial intelligence (AI) in healthcare. The findings show AI's enormous potential to enhance diagnosis, customize treatments, and optimize healthcare delivery. However, the research reveals numerous significant ethical problems that need careful examination and mitigating techniques.

AI's transformational potential is obvious in a variety of disciplines, including diagnosis and treatment suggestions, customized medicine, and administrative efficiency. However, these developments raise substantial ethical concerns that must be addressed to guarantee equal, transparent, and responsible adoption.

One of the most common issues raised is prejudice and unfairness in AI systems. Biases in training data can provide biased results, worsening existing healthcare inequities. To address these biases, a multifaceted strategy is required, including the use of diverse and inclusive datasets, the use of fairness criteria throughout development, and continuing monitoring for bias creep.

Another major issue is a lack of transparency in AI decision-making processes, sometimes known as the "black box" problem. This opacity makes it difficult to grasp how AI comes to its judgments, raising questions about responsibility and

trust. There is a need for progress in explainable AI (XAI) to make these models more interpretable, promoting confidence and allowing human supervision.

The evaluation emphasizes the necessity of safeguarding patient privacy and data security. The massive volumes of personal data necessary to train and deploy AI systems necessitate strong data anonymization, safe storage, and ethical usage. Clear norms and laws are critical for protecting patient privacy and fostering confidence in AI-driven healthcare.

Furthermore, the possible influence of AI on the function of healthcare professionals warrants investigation. While AI can improve human skills, it should not replace human judgment or patient interaction. The goal should be to create a collaborative method in which AI aids healthcare practitioners with diagnosis, treatment planning, and decision-making.

CONCLUSION

AI will be utilized more and more in healthcare; thus, it must be held morally accountable. Data bias must be avoided by utilizing proper algorithms based on unbiased real-time data. Diverse and inclusive programming groups are required, as are regular audits of the algorithm, including its application in a system. While AI cannot totally replace clinical judgment, it can assist physicians in making more informed judgments. If there is a shortage of medical expertise in a setting with limited resources, AI might be used to undertake screening and evaluation. In contrast to human decision making, all AI decisions, including the quickest, are systematic since algorithms are involved.

As a result, even if behaviors have no legal ramifications (since effective legal frameworks have yet to be formed), they always result in accountability, not from the machine, but from the humans who constructed it and use it. While there are moral quandaries about the use of AI, it is likely to supplement, coexist with, or replace present systems, ushering in the artificial intelligence era of healthcare, and not adopting AI is potentially unscientific and immoral.

The incorporation of AI in healthcare raises several ethical concerns that must be carefully considered. This paper discusses the difficult problems and potential hazards connected with AI applications in healthcare.

Privacy arises as a significant worry, with data-driven healthcare depending on ML and deep learning systems to anticipate user behavior, needing a careful balance between data protection and access. Transparency and trust are critical for effective AI adoption, especially in high-stakes decision-making environments where a lack of transparency in AI's decision-making processes can engender skepticism and distrust. Creating frameworks and norms for transparent reporting and organized AI model assessment can help improve the trustworthiness and ethical usage of AI in medical applications. Responsibility attribution in AI is complicated and dynamic, necessitating a mix of human agency and AI skills, whereas transitioning from data ownership to data stewardship may provide responsible data management and privacy protection.

Addressing biases in AI algorithms and data collecting is critical to accomplishing equitable healthcare outcomes, since biases can influence AI predictions and worsen gaps in healthcare.

Collaboration between researchers, healthcare practitioners, policymakers, and technology experts are critical for overcoming ethical difficulties and promoting responsible AI usage in healthcare. By creating comprehensive rules, legal frameworks, and technical solutions that prioritize privacy, transparency, and justice, AI can transform healthcare delivery and enhance patient outcomes while adhering to ethical norms.

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