Ethical Dilemmas in the Use of Artificial Intelligence in Breast Cancer Diagnosis and Treatment
(Addressing Issues of Bias, Transferability, and Patient Trust in Breast Cancer AI)

Priscilla Auleader Napitupulu
Institut Teknologi Bandung

Article Info

ABSTRACT

Breast cancer care is becoming one of the main areas of development of artificial intelligence (AI), with applications including screening and diagnosis, risk calculation, disease progression, clinical decision support, management planning, and precision medicine. This paper will review the ethical, legal, and social implications of these developments, including the values embedded in algorithms, evaluation of results, issues of bias, data ownership, confidentiality, and consent, as well as legal, moral, and professional responsibilities. Additionally, we also need to consider the potential impact on patients, including trust in healthcare, as well as explaining the reasons why AI is being implemented quickly. Resolving this challenge requires the involvement of professionals, governments and regulators, health care providers, and patients, regarding the imposition of conditions on implementation, and preventive monitoring systems to ensure development does not move too quickly ahead of evaluation and discussion.

Corresponding Author:

Name: Priscilla Auleader Napitupulu
Institution Address: Jalan Ganesha No 10, Coblong, Bandung, 40132
e-mail: priscillanapitupuluu@gmail.com

1. INTRODUCTION

In the 1970s to 1980s, known as the 'Old AI era,' attention to breast cancer grew rapidly. Breast cancer is the subject of major study on a variety of issues, including differential diagnosis, assessment, prognosis, and management. However, breast cancer is a significant and growing public health problem affecting millions of women worldwide [2].

Over time, the use of artificial intelligence (AI) in breast cancer care has the potential to improve detection, diagnosis and treatment outcomes. However, with the development of this technology, ethical issues also arise that need to be addressed. One key issue is the potential for AI systems to perpetuate or exacerbate existing biases in healthcare, which could lead to disparities in care and undermine trust in healthcare providers.

In addition, the privacy and security of patient data is a serious problem. AI systems require access to large amounts of sensitive health information, and there is a risk that that data could be misused or compromised. Patients may also not fully

understand the implications of using AI in their care, raising questions about informed consent.

Another factor is the commercial nature of the healthcare AI market. Companies may prioritize profits over patient safety and ethical considerations. This suggests a need for greater regulation and oversight of AI systems in healthcare.

In this context, a logical consequence is that stakeholders, including governments, regulators, professional groups, healthcare providers, patients, and the public, must engage in thoughtful discussions to ensure that the development of AI in breast cancer care is aligned with social values and patient preferences. This is necessary to ensure that AI-powered breast cancer treatments are developed collaboratively and prioritize patient benefit as well as safety and ethical values.

2. LITERATURE REVIEW

2.1 Principles of Privacy Protection and Data Security

In the context of AI-powered breast cancer diagnosis, privacy protection is important to ensure that patient data is not misused or disclosed without permission. This requires a strong data governance framework that prioritizes patient privacy and confidentiality, as well as a consent process that ensures patients understand the implications of using AI in their care. The Health Insurance Portability and Accountability Act (HIPAA) sets strict rules for the collection, use, and disclosure of protected health information, while the European Union's GDPR sets strict rules for the collection, use, and disclosure of personal data [1].

2.2 Professional Code of Ethics

Professional codes of ethics provide a framework for healthcare professionals and organizations to ensure that the use of AI in breast cancer diagnosis is in line with ethical and legal standards. This includes data protection laws, such as the American Medical Association (AMA) which has developed ethical guidelines for the use of AI in healthcare, emphasizing the importance of transparency, accountability and patient-centered care. Existing research has begun to address aspects such as ethical principles and AI governance and human rights. Likewise, the International Council of Nurses (ICN) has developed ethical guidelines for the use of AI in nursing, which emphasize the importance of ethical decision making, patient safety, and professional responsibility [6].

2.3 Anti-Discrimination and Bias

One of its key principles is transparency, which refers to the need for AI systems to be open and explainable in their decision-making processes. This allows for greater accountability and oversight, as well as identification and mitigation of bias and discriminatory practices.

In addition to transparency and fairness, there is also a legal and regulatory framework that regulates the use of AI in healthcare and aims to prevent discrimination and bias. For example, GDPR in the European Union prohibits the use of personal data for discriminatory purposes [1].

3. METHODS

To address the ethical dilemmas surrounding the use of Artificial Intelligence (AI) in breast cancer diagnosis and treatment, a comprehensive approach is crucial. This method, informed by a review of the existing literature, encompasses several key steps.

Firstly, a thorough analysis of the ethical challenges and concerns associated with AI in breast cancer diagnosis will be conducted, drawing insights from previous research and case studies. This will provide a foundation for identifying the most pressing ethical issues in this context.

Secondly, the method involves a detailed examination of the principles and guidelines for ethical AI use, as outlined in existing literature. This will include ethical frameworks, standards, and best practices proposed by professional organizations, research institutions, and regulatory bodies.

Furthermore, the method includes an investigation into the practical implementation of AI technologies in breast cancer diagnosis and treatment. This examination will encompass the assessment of AI algorithms and systems, the processes involved, and the role of healthcare professionals in utilizing AI for patient care.

In addition, the method incorporates an exploration of patient perspectives, including their attitudes, concerns, and preferences regarding AI involvement in their diagnosis and treatment. Understanding the patient's viewpoint is essential for ethical decision-making and patient-centered care.

Finally, the method involves a comparative analysis of regulatory approaches and policies across different regions and healthcare systems. This comparative review will help identify variations and gaps in ethical regulations and their impact on AI integration in breast cancer care.

By employing this method, the paper aims to provide a comprehensive and well-informed assessment of the ethical dilemmas associated with AI in breast cancer diagnosis and treatment. This analysis, grounded in the existing literature, will contribute to a deeper understanding of the challenges and opportunities in this evolving field, ultimately guiding the development of ethical guidelines and best practices for AI utilization in breast cancer care.

4. RESULTS AND DISCUSSION

By taking a 'Rights' approach, below we will explain what ethical issues each stakeholder faces by emphasizing the importance of respecting individual rights, such as the right to privacy, the right to information, and the right to receive equal health care. In this context, a Rights approach can help identify and resolve emerging ethical conflicts related to the use of AI in breast cancer by considering individual rights and the values surrounding them [5].

4.1 Description of Ethics

The use of information technology (IT) in breast cancer diagnosis raises various ethical, IT professionalism and social issues that need to be analyzed. The influence of IT use involves individuals, organizations and society at large, and triggers ethical conflicts and violations of professionalism that have the potential to affect all stakeholders.

4.1.1 Potential bias in Artificial Intelligence systems

One of the main problems is the potential for bias in AI systems, which could increase existing disparities and discrimination. This is particularly relevant in breast cancer care, where there are significant differences in screening rates and outcomes between different populations.

Stakeholders such as researchers, health practitioners, and patient advocacy groups may have different views about the extent to which bias in AI systems is a significant ethical concern. Researchers may focus on developing AI technology that tends to be biased due to less representative training data, while patient advocacy groups may prioritize equality and accuracy of diagnosis for all population groups.

If the data used to train an AI algorithm only comes from a certain population, then the algorithm may not be able to recognize or predict health conditions in other populations with the same accuracy. This can lead to misdiagnosis or inappropriate treatment, especially in populations that are underrepresented in the training data. In addition, bias can also occur if AI algorithms are designed with certain assumptions or preferences, such as the assumption that all patients have equal access to health services or a preference to avoid higher costs.

4.1.2 Lack of transparency and explanation in AI systems used for breast cancer diagnosis

The lack of transparency and explanation in AI systems used for breast cancer diagnosis poses challenges to patient rights. Patients have the right to know how their diagnosis was made and to access

information about the accuracy and reliability of these AI systems.

Parties involved in AI development and healthcare providers may have different views on the extent to which transparency in AI systems needs to be increased. AI developers may be inclined to keep their algorithms secret to maintain commercial advantages, whereas healthcare providers may want more transparency to secure patient consent and address ethical questions.

4.1.3 Commercialization of Artificial Intelligence in Curing Breast Cancer

The issue of commercializing Artificial Intelligence (AI) in curing breast cancer includes utilizing AI technology for the diagnosis, treatment and management of this disease in a business or commercial environment. This raises a number of ethical, professionalism, and social issues, including patient privacy, transparency, commercial influence on medical decisions, and social impacts such as accessibility and cost of health services. These issues require attention in developing and implementing ethical, effective, and responsible AI solutions in the field of breast cancer care.

Conflicts regarding the commercialization of AI may arise between technology companies and the medical profession. Companies may pursue profits, while medical professionals may focus more on ethics and integrity in providing care. This can spark a debate about financial versus ethical priorities in the world of healthcare.

4.2 Mitigation Actions

In an effort to implement the solution "The use of AI technology in breast cancer diagnosis should first be tested in rigorous research setting before being implemented commercially or clinically," a number of risk mitigation measures can be implemented. First of all, cooperation between governments, regulators and health institutions needs to be built to establish a research environment that supports AI trials. This includes the development of clear research protocols with strict inclusion and exclusion criteria and robust measurement parameters.

Follow-up action involves collaborating with stakeholders, such as researchers, doctors, patients, and AI technology developers, so that all perspectives and needs are included in the research. Procurement of funds is important, and governments, foundations, and technology companies can be potential sources of funds.

AI technologies should be tested using appropriate clinical data, but in controlled research settings to minimize risks. The research results were then rigorously evaluated to ensure its efficacy, safety and benefits in breast cancer diagnosis.

Furthermore, based on research results, appropriate guidelines and regulations can be drafted to guide the use of AI technologies in clinical settings. Transparency and community support are also needed through the dissemination of research results to medical professionals, government and the public. Finally, safe clinical implementation can occur after rigorous research trials and guideline development to ensure maximum benefit and patient safety. With this approach, the risks associated with the use of AI technology in breast cancer diagnosis can be properly managed.

4.3 Consequence

The consequences of these steps will affect a number of parties involved. Governments will be faced with the task of allocating additional resources to support research and development of AI technologies. As regulators, they need to develop strict regulations and monitor compliance and safety in the use of this technology. Professional groups in the medical world will also play an active role, requiring time and resources to contribute to research and comply with established guidelines.

Healthcare providers will face training and adaptation challenges to integrate AI technology into the care services they provide. Meanwhile, patients and the public may have to be patient longer before they can access the latest AI technology. However, given these ramifications, this

action aims to ensure that the use of AI technology in breast cancer diagnosis can be closely monitored and verified before it is widely implemented. The top priority is to ensure maximum benefit and, equally important, patient safety in the use of this innovative technology.

5. CONCLUSION

In conclusion, the author argues that addressing the ethical issues arising from the use of AI in breast cancer diagnosis requires concrete steps. Firstly, IT professionals involved in the development and implementation of AI technology must prioritize patient data privacy and security as a core value throughout the process. Furthermore, efforts to mitigate bias in AI algorithms and ensure transparency in decision-making should be integral to technology development. Additionally, close collaboration among various stakeholders, including doctors, patients, government, and technology developers, will help ensure that the ethical and social values perceived as right by each party involved are accommodated in AI implementation. Governments and regulators must play a crucial role in establishing strict guidelines and monitoring compliance. With this comprehensive approach, we can ensure that the utilization of AI in breast cancer diagnosis is not only medically effective but also meets high ethical standards, builds patient trust, and maximizes benefits for society.

REFERENCES

[1] A. Čartolovni, A. Tomičić, and E. Lazić Mosler, "Ethical, legal, and social considerations of AI-based medical decision-support tools: A scoping review," *International Journal of Medical Informatics*, vol. 161, p. 104738, May 2022, doi: 10.1016/j.ijmedinf.2022.104738.

[2] S. Legg and M. Hutter, "A collection of definitions of intelligence," Frontiers in Artificial Intelligence and Applications, vol. 157, 2007.

[3] N. Houssami, G. Kirkpatrick-Jones, N. Noguchi, and C. I. Lee, "Artificial intelligence (AI) for the early detection of breast cancer: a scoping review to assess AI's potential in breast screening practice," Expert Rev Med Devices., vol. 16, 2019, doi: 10.1080/17434440.2019.1610387.

[4] Y. Jiang, C. Wang, and S. Zhou, "Artificial intelligence-based risk stratification, accurate diagnosis and treatment prediction in gynecologic oncology," Seminars in Cancer Biology, vol. 96, pp. 82–99, Nov. 2023, doi: 10.1016/j.semcancer.2023.09.005.

[5] "Culture and Ethics Resource Centre - Definitions - Bluestone Edge." https://www.bluestoneedge.com/culture-and-ethics-resource-centre/culture-and-ethics-resource-centre-definitions/ (accessed Oct. 26, 2023).

[6] T. K. Greaker, I. Aune, and S. K. Grudt, "Ethical challenges and reflection. Norwegian bachelor students' experiences during clinical placement in Sub-Saharan Africa," *International Journal of Africa Nursing Sciences*, vol. 19, p. 100633, Jan. 2023, doi: 10.1016/j.ijans.2023.100633.