A Review on Disadvantages of Artificial Intelligence in the Pharmacy Field

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ABSTRACT:

Pharmacy is being transformed by the use of Artificial Intelligence (AI) through automation, data analytics and predictive modeling. However, its use poses ethical, technical and operational issues. This review addresses the varieties of drawbacks of AI in the pharmacy field, such as data privacy breaches, algorithm bias, legal ambiguity, cost, and work dislocation. It also points to losing human empathy in attending to patients telling the necessity of the balanced integration. The analysis finds that the responsible governance, explainable models of AI, and continuous learning are essential in reducing the risk.

Keywords: Artificial Intelligence, Pharmacy Practice, Data Privacy, Ethical Challenges, Algorithmic Bias, Regulation, Workforce, Healthcare Technology.

INTRODUCTION

Artificial Intelligence (AI) has revolutionized the pharmaceutical sciences improving drug discovery, dosage schedule, and assisted with the management of patients. Nonetheless, any technological revolution has its own disadvantages. The dependence of AI on the data focuses on algorithms, introduces ethical, fairness, security, and deterioration of the essence of the pharmacist as a healthcare communicator (Reddy et al., 2023).

However, despite all the excitement, the downsides of the use of AI in the field of pharmacy are no marginal matter they are rather technical, economical, ethical, and even clinical. This review will combine the recent research and knowledge on these issues in 2021-2025, to enable pharmacy professionals and policymakers to critically evaluate such challenges.

2. Data-Related Challenges

2.1. Statistics Quality and Presentation

Drug designs or dispensing AI models are based on large databases. Nevertheless, there is usually incomplete or biased information in pharmacy databases, which results in low levels of generalizability (Patel et al., 2025). The problem of inconsistent EHR systems and low interoperability between hospitals to some extent enhances the errors further (Ali et al., 2024).

2.2. Privacy and Security Issues

The use of AI-based pharmacy systems to breach data that contains sensitive information about the patients can result in misuse of confidential information. Information that is stored on the cloud and shared across the borders reveals the weak points in data protection regulations like the GDPR provision and the DPDP Act 2023 of India (Saxena et al., 2024).

2.3. Consent and Ownership

Patients do not know that their health information is being trained into AI. Ethical standards are compromised by absence of explicit consent or anonymization (BMC Med Ethics, 2024).

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3. Technological and Algorithms Limitations.

3.1. Algorithmic Bias

The biases of healthcare systems are represented in the training datasets. In transparency, AI tools can provide wrongful outcomes when it comes to predicting the drug-response behaviour in some instances when some groups are poorly represented in pharmacogenomic datasets (Chowdhury et al., 2024).

3.2. Lack of Explainability

Deep learning algorithms are usually black box. Pharmacists will not be aware of the underlying reason behind AI prescribing a dose or identifying a drug interaction, which acts as a barrier to accountability (Kumar et al., 2024).

3.3. Poor External Validation

The validation of many AI models is only on controlled research. In practical pharmacy settings, the accuracy can be frequently affected by variability in the demographics and treatment patterns of patients (Li et al., 2023).

4. Ethical and Legal Issues

4.1. Liability and Accountability.

There are no legal provisions on AI errors in pharmacy. The fault can be known to be more on developers, pharmacists, or the software vendor (Sharma et al., 2024).

4.2. Patient Autonomy

Autonomy of patients is one of the aspects that can be undermined by automated decision-making, where AI-driven systems will propose changes therapies without speaking to a specific pharmacist (BMC Med Ethics, 2024).

4.3. Inequality in Access

The tools designed by AI are mostly trained within high-resource environments, creating healthcare disparities in the urban and rural pharmacies (Ijaz et al., 2023).

5. Barriers in Economy and Infrastructure.

5.1. Expensive on-Initial and Maintenance costs.

AI deployment would need high-performance computing systems, cyberspace security frameworks, and personnel either none experienced by many community pharmacies (George et al., 2024).

5.2. Infrastructural Gaps

The rural parts of India have an unstable power supply and limited internet connectivity, limiting AI implementation (Singh et al., 2024).

5.3. Relying on Proprietary Platforms.

The dependence of commercial AI vendors may lead to a dependency in the long run and reduce flexibility among hospitals or pharmacies (Wei et al., 2023).

6. Workforce and Social effects.

6.1. Job Displacement

The clerical pharmacy job is under threat if it is automated especially in dispensing and billing. There is, however, a possibility of the shift to introduce the data-oriented pharmacy employment demand (Reddy et al., 2023).

6.2. Training Deficiencies

Majority of pharmacy training does not have AI training. The interpretation of the AI outputs might create issues with the appropriate decision-making because professionals might not be able to interpret its results (Vijayan et al., 2022).

6.3. Loss of Human Touch

AI does not have empathy, moral reasoning, and communication, which are the main features of pharmacist-patient interaction. Personalized care can be undermined by being over-reliant (BMC Med Ethics, 2024).

7. Operational and Clinical Restrictions.

7.1. Problems Workflow Integration.

The current pharmacy information systems do not usually support the modern AI software, which leads to the emergence of data silos (Abdul et al., 2024).

7.2. Systemic Risks and Reliability.

Large-scale medication errors may arise as a result of hardware or algorithm failures. Unless there is a strong human oversight, such errors might go undetected (Clinicsmart, 2025).

7.3. Lack of Standardization

There are no universal regulatory standards to use when it comes to the validation metrics and risk assessment of AI-based applications in pharmacy (Nature Digital Medicine, 2023).

8. Discussion

The drawbacks of AI are interdependent and multidimensional. The most important danger is blind faith in systems without knowing their rationale or constraints. Pharmacists need to be the decision makers. The integration of AI ethically requires transparency, fairness, and constant monitoring. The future of AI in pharmacy should be guided by such a concept as the human-in-the-loop issue- the AI may help but it should not replace a professional opinion.

9. Recommendations

Establish regulatory recommendations that can apply to the use of AI in India pharmacy practice.

Introduce AI ethics committees into hospitals to track the fairness of the algorithms.

Add AI literacy courses in pharmacy programs.

Patient consent and data use transparency.

Foster open AI to avoid reliance on corporations.

Create nationwide data archives of secured model development.

Fairly fund rural pharmacy AI facilities.

Explainability standards in clinical applications and pre-implementation.

Check the performance after the deployment within the frame of the pharmacovigilance data.

Strengthen human-artificial intelligence, but not substitution.

10. CONCLUSION

The benefits of AI in improving efficiency and accuracy in pharmacy are obvious, yet the drawbacks, such as the vulnerability of data, algorithm bias, and ethical issues and the high cost, are considerable. Adoption is further complicated by the insufficiency of legal understanding and human compassion. Stakeholders may enforce responsible governance, transparency, and pharmacist leadership to make AI an empowerment mechanism rather than a displacement mechanism.

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