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Editorial

[Translated article] Ethical aspects of AI in hospital pharmacy

Aspectos éticos de la inteligencia artificial (IA) en farmacia hospitalaria

Over the last three decades, we have transitioned from an almost entirely analogue world to a highly digitalised one. The concept of the Anthropocene—a proposed geological epoch reflecting humanity's significant impact on the planet—alongside profound demographic and social shifts in a globalised world, and the emergence of what has been defined as a digital paradigm, may help us to understand the impact of artificial intelligence (AI) on hospital pharmacy (HP).

In this historical evolution, HP, like the rest of society, is undergoing a process of digitalisation—understood as a socio-technical process whereby digital technologies have been incorporated into previously existing processes and tasks. The aim is to improve efficiency and add value for professionals and users alike, substantially reshaping workflows and, above all, providing healthcare professionals with more quality time and space to deliver more direct care to patients. This process should pave the way for digital transformation (DT), which is a more advanced stage that we should actively pursue.[1]

Digital transformation is a disruptive process that requires strategic coordination to successfully integrate technologies and introduce new processes. Achieving DT necessitates both multidisciplinary and interdisciplinary collaboration. This involves new stakeholders, shifts in the rules of engagement, new delivery models, and novel services. It also requires the dismantling of communication and information barriers within HP itself, as well as between HP and the other agents it must engage with.

Indeed, DT is driven by technologies of great potential and complexity; however, its success fundamentally depends on human involvement, as its ultimate goal is to improve people's lives.[2]

As American cardiologist Eric Topol points out in his book *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*, AI offers us the opportunity to improve patient care by alleviating the workload of hospital staff, including those in HP. Therefore, this inherent and inescapable interdependence makes it essential to consider the ethical aspects of DT and, by extension, the practical application of AI in HP.[3]

Ethics refers to the set of moral principles that govern people's behaviour in all areas of life. In general, ethics seeks to determine the ideal behaviour of individuals. Given that its focus is on human behaviour, does it make sense for machines to adhere to ethical principles? There is a broad consensus that, in order to minimise the risks associated with this technology, its development must put human beings at the centre and be reliable, to which end it must respect fundamental rights, be technically consistent, and have an ethical purpose.[2]

The necessary link between ethics and technology is not new; bioethics emerged in the mid-20th century in response to technological and scientific developments impacting all aspects of life. Now more than ever, bioethics must regain its importance in a healthcare ecosystem where poorly managed or implemented AI could threaten its traditional principles of autonomy, beneficence, non-maleficence, and justice. We must not allow the use of AI to exempt us from reasoned deliberation, as this is necessary in order to establish the ethical criteria that guide decisions affecting people's lives.[2]

Hospital pharmacy services should be aware of the direct ethical challenges posed by AI in the healthcare sector. These challenges include the following aspects: transparency, privacy, and data security; consistency; accuracy and representativeness of the information generated by AI; the need for explainability and the corresponding co-responsibility; and guaranteeing values such as equity, accessibility, and non-discrimination, while avoiding potential biases.[4] These aspects are essential to ensure that decisions supported by AI are correct, fair, and transparent.

In AI, explainability refers to the ability to provide clear and understandable explanations of how and why certain decisions have been made or specific results produced. In other words, it is the process by which the inner workings of AI algorithms are made transparent, enabling users—particularly those without advanced technical training—to understand the reasoning behind the predictions and recommendations produced by these systems. Explainability in AI is a key priority for ensuring fair and ethical applications in healthcare. AI-driven clinical decision support systems for HP must be transparent, consistent, and accessible, such that pharmacists can understand the process and reasoning behind the systems' suggestions and gain confidence in their use. The opacity of these systems can cause serious problems and lead us to make wrong decisions, thereby putting patient safety at risk. It is also important to establish who is responsible for AI-based decisions and to define how the developers or owners of these technologies can be held accountable.[5]

Regarding fairness and accessibility, several studies have highlighted the potentially biased nature of AI systems, particularly in relation to specific socio-demographic groups. This is a major ethical problem, as these biases can lead to unequal treatment, a failure to deliver personalised healthcare, and disparities in health outcomes. One of the main causes of bias in AI models is the dataset used to train them, which may reflect historical inequalities in healthcare. Algorithms that disproportionately affect minority groups or perpetuate stereotypes can contribute to systemic discrimination in healthcare, perpetuating injustices and errors in treatment. The inappropriate or uninformed use of AI in HP could cause significant problems in the equitable distribution of pharmaceutical care resources. This is why, in the absence of

appropriate measures, AI is likely to exacerbate existing inequalities in our professional activity.[5] The ethical issues and concerns raised by AI in HP will sometimes be specifically related to the reduced professional oversight of certain machine learning processes, such as deep learning. Artificial intelligence can make autonomous decisions, which can be problematic when those decisions affect people's health and lives. Thus, it is important to set limits on AI in any field, including HP, and to ensure that human oversight is always maintained. The fact that the European Union's AI Act came into force in August 2024 demonstrates the relevance of this point. This law is specifically designed to ensure that AI developed and used within the EU is reliable and protects the fundamental rights of individuals, including the professionals who use it.[6]

Furthermore, it is crucial that healthcare professionals receive training on how to use AI-powered tools in a way that enhances, rather than weakens, their ability to connect with patients, understand their unique needs and concerns, and provide compassionate, personalised care. Patients have the right to know when and how AI systems are used in their care, and to understand the potential implications and limitations of this technology. Therefore, the development and implementation of comprehensive regulatory frameworks will serve to ensure the safe, ethical, and equitable integration of AI-driven technologies in the healthcare sector.

Hospital pharmacy is a particularly sensitive profession because its *raison d'être* is to improve people's health—and, by extension, that of society as a whole—always within a sustainable framework. While it is true that the clinical misuse of AI (or any other technology) must be avoided, it is also crucial to provide all possible solutions for improving the management of limited resources.

The application of AI in HP must be guided by the same values that underpin the evaluation of any other technology, governed under public accountability, and analysed in the same way as any other technology in the healthcare field. The value of a technology such as AI in HP depends on its usefulness, its contribution to improving aspects relevant to the profession, and achieving its objectives, while incorporating all appropriate cost-utility analyses. In my opinion, conducting this analysis in a rigorous and transparent manner is an essential ethical commitment for HP, as it is in any other area of human activity or healthcare—especially in the public sector. Hospital pharmacists must never lose sight of the fact that ethics is simply the rational attempt to discover how to live and coexist better, including how to do so with technology.

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