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Article

The challenges of patient autonomy in the face of the use of artificial intelligence in health

Os desafios da autonomia do paciente frente ao uso da inteligência artificial na saúde

Los retos de la autonomía del paciente ante el uso de la inteligencia artificial en salud

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Abstract

Objective: to conduct a critical analysis of how the integration of artificial intelligence in healthcare can impact patient autonomy, addressing issues such as algorithmic paternalism, ethical data governance, and the need for effective regulation. **Methodology:** A critical-narrative, qualitative review was conducted, structured in six stages: (1) formulation of the question; (2) search and selection; (3) data extraction; (4) critical analysis; (5) interpretation/discussion; and (6) integrated presentation of findings. The searches were conducted between March 2024 and October 2025 on a set of websites relevant to the topics of health, bioethics, and governance in artificial intelligence. The descriptors were extracted from *Descritores em Ciências da Saúde* and Medical Subject Headings, in Portuguese and English, combining them with the support of the Boolean operators "AND" and "OR." **Results:** it was evident that artificial intelligence offers relevant advances. However, risks to the principle of patient autonomy were identified, especially when there is low transparency of algorithms or a lack of human supervision. It was also observed that algorithmic paternalism can limit the active participation of patients in clinical decisions, reinforcing the need for ethical guidelines and effective regulations to ensure safe and individual-centered use. **Conclusion:** it is essential that the application of artificial intelligence preserves patient autonomy. The implementation of ethical guidelines, continuous human supervision, and system explainability are essential to ensure that technology reinforces, rather than limits, individual control.
Keywords: Patient Autonomy; Ethics; Artificial Intelligence; Governance; Decision Making.

Resumo

Objetivo: realizar análise crítica sobre como a integração da inteligência artificial na saúde pode impactar a autonomia do paciente, abordando questões como o paternalismo algorítmico, a governança ética dos dados e a necessidade de uma regulamentação eficaz. **Metodologia:** realizou-

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se uma revisão crítico-narrativa, qualitativa, estruturada em seis etapas: (1) formulação da pergunta; (2) busca e seleção; (3) extração de dados; (4) análise crítica; (5) interpretação/discussão; e (6) apresentação integrada dos achados. As buscas foram conduzidas entre março de 2024 e outubro de 2025 em um conjunto de sítios eletrônicos relevantes para os temas de saúde, bioética e governança em inteligência artificial. Os descritores foram extraídos dos Descritores em Ciências da Saúde e do *Medical Subject Headings*, em português e inglês, havendo combinação entre eles com o apoio dos operadores booleanos "*AND*" e "*OR*". **Resultados:** ficou evidenciado que a inteligência artificial oferece avanços relevantes. Contudo, identificaram-se riscos ao princípio da autonomia do paciente, sobretudo quando há baixa transparência dos algoritmos ou ausência de supervisão humana. Observou-se, ainda, que o paternalismo algorítmico pode limitar a participação ativa do paciente nas decisões clínicas, reforçando a necessidade de diretrizes éticas e regulamentações eficazes para garantir o uso seguro e centrado no indivíduo. **Conclusão:** é imprescindível que a aplicação da inteligência artificial preserve a autonomia dos pacientes. A implementação de diretrizes éticas, a supervisão humana contínua e a explicabilidade dos sistemas são essenciais para garantir que a tecnologia reforce, em vez de limitar, o controle dos indivíduos.
Palavras-chave: Autonomia do Paciente; Ética; Inteligência Artificial; Governança; Tomada de Decisões.

Resumen

Objetivo: realizar un análisis crítico sobre cómo la integración de la inteligencia artificial en la salud puede impactar la autonomía del paciente, abordando cuestiones como el paternalismo algorítmico, la gobernanza ética de los datos y la necesidad de una regulación eficaz. **Metodología:** se llevó a cabo una revisión crítico-narrativa cualitativa, estructurada en seis etapas: (1) formulación de la pregunta de investigación; (2) búsqueda y selección; (3) extracción de datos; (4) análisis crítico; (5) interpretación/discusión; y (6) presentación integrada de los hallazgos. Las búsquedas se realizaron entre marzo de 2024 y octubre de 2025 en un conjunto de sitios electrónicos relevantes para los temas de salud, bioética y gobernanza de la inteligencia artificial. Los descriptores se extrajeron de los *Descritores em Ciências da Saúde y del Medical Subject Headings*, en portugués e inglés, y se combinaron mediante los operadores booleanos "*AND*" y "*OR*". **Resultados:** se evidenció que la inteligencia artificial ofrece avances significativos. No obstante, se identificaron riesgos para el principio de autonomía del paciente, especialmente cuando existe baja transparencia en los algoritmos o ausencia de supervisión humana. También se observó que el paternalismo algorítmico puede limitar la participación activa del paciente en las decisiones clínicas, lo que refuerza la necesidad de directrices éticas y regulaciones eficaces para garantizar un uso seguro y centrado en la persona. **Conclusión:** es imprescindible que la aplicación de la inteligencia artificial preserve la autonomía de los pacientes. La implementación de directrices éticas, la supervisión humana continua y la explicabilidad de los sistemas son esenciales para garantizar que la tecnología refuerce, en lugar de limitar, el control de los individuos.
Palabras clave: Autonomía del paciente; Ética; Inteligencia artificial; Gobernancia; Toma de decisiones.

Introduction

The rise of artificial intelligence (AI) in medicine represents one of the most profound transformations in healthcare, promising everything from more accurate diagnoses to advanced treatments. Through algorithms capable of analyzing large volumes of data in a short time, AI has become an essential tool in several clinical areas. However, this evolution raises important ethical dilemmas, especially when it comes to patient autonomy, a fundamental principle of bioethics that ensures the individual's right to make informed decisions about their own care.

The World Health Organization (WHO)[1] emphasizes that the development of AI for health should be guided by ethical principles, which include promoting patient autonomy, transparency, and well-being. This is especially relevant in a scenario where the growing use of intelligent technologies in clinical practice can lead to the phenomenon known as "algorithmic paternalism"[2] where automated decisions begin to interfere with or even replace human judgment. This type of paternalism threatens patients' ability to maintain control over their own healthcare choices, limiting the independence and decision-making power that characterize autonomy.

Another critical issue concerns privacy and informed consent. The handling of personal data by AI systems requires a robust approach to ethical governance, as it involves sensitive information that can affect the safety and dignity of patients. The European Union (EU) General Data Protection Regulation (GDPR)[3] highlights the need for transparency and explicit patient consent, involving essential elements to ensure that the use of AI does not compromise user privacy and trust.

Alanzi *et al.*[4] demonstrate that, although AI can provide data that potentially improves patients' understanding of their health conditions, it also raises concerns about the technology overlapping with human judgment and patients' decision-making abilities.

The ethical challenges related to the use of AI are broad and require that technological innovations be accompanied by careful human supervision so that AI-based decision support systems function as complementary tools and not as substitutes for clinical judgment and patient preferences.

Thus, this article proposes a critical analysis of how the integration of AI in healthcare can impact patient autonomy, addressing issues such as algorithmic paternalism, ethical data governance, and the need for effective regulation.

Methodology

This study was developed from a critical and narrative review using a qualitative approach, based on the ethical guidelines of the World Health Organization[1] and relevant scientific literature. The process followed a methodological path structured in six stages: 1) definition of the central research question; 2) search and careful selection of publications in the main academic databases; 3) data extraction; 4) critical analysis of the content of the included studies; interpretation; 5) discussion of the findings; and, finally, 6) organization and presentation of the review in an integrated and analytical manner, focusing on the impacts of artificial intelligence on patient autonomy.

The guiding question of this study was formulated as follows: "How does the incorporation of artificial intelligence into healthcare practice impact patient autonomy, considering bioethical principles and regulatory frameworks on data governance, transparency, and human supervision?", guiding the critical analysis and selection of the reviewed literature.

The searches were conducted between March 2024 and October 2025 on a set of websites relevant to the topics of health, bioethics, and governance in artificial intelligence (Figure 1). The descriptors were extracted from the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH), in Portuguese and English, including: Patient Autonomy; Ethics; Artificial Intelligence; Algorithmic Paternalism; AI Governance. The combination was performed using the Boolean operators "AND" and "OR," integrating synonyms to broaden the sensitivity of the search[5].

The criteria for including articles in the references were: articles in Portuguese, English, and Spanish; publications no more than ten years old; works that addressed the use of artificial intelligence in healthcare and its impact on patient autonomy.

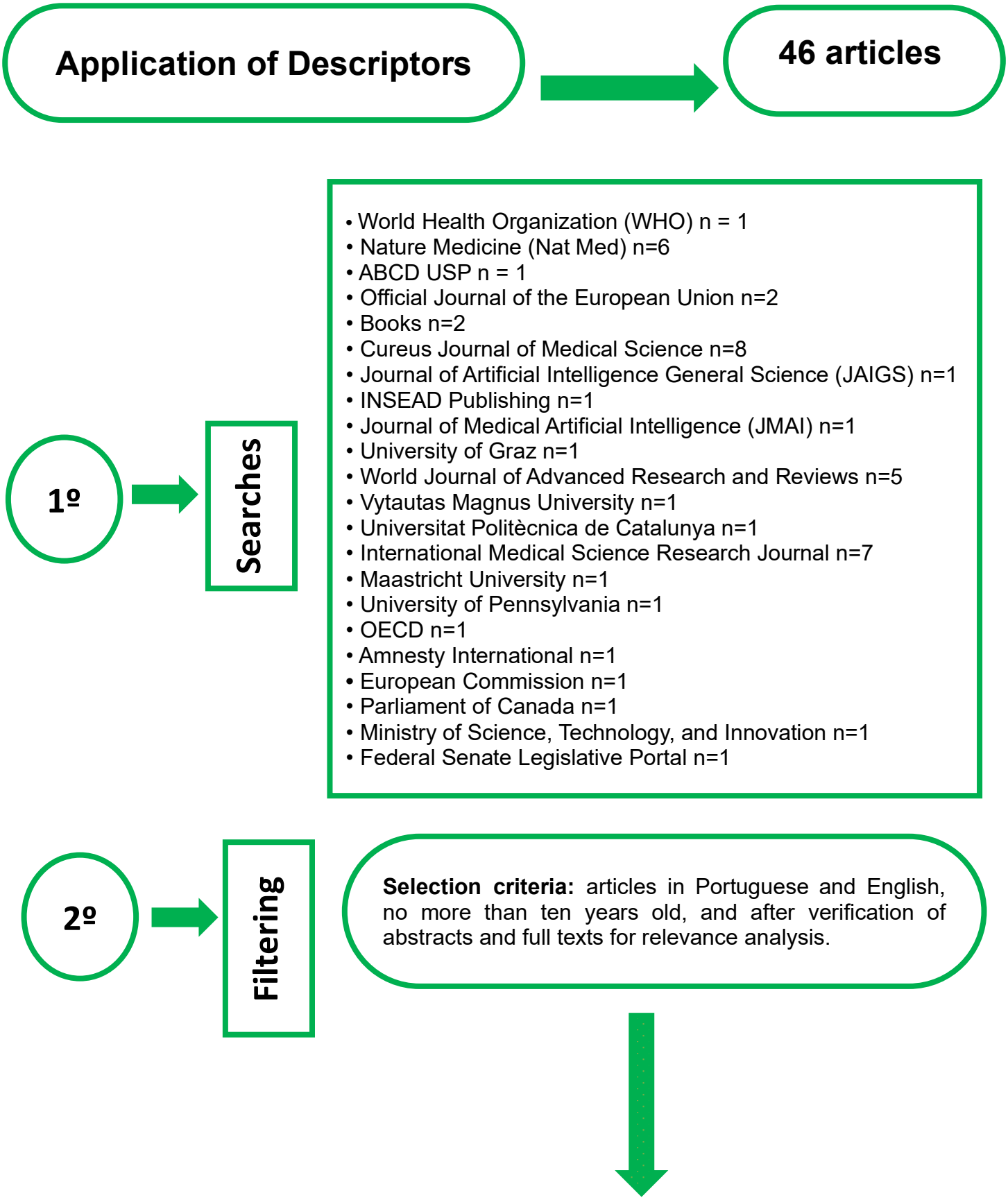
Exclusions were based on: duplicate articles; abstracts without full text; and works not directly related to the central theme or that dealt with AI outside the context of healthcare.

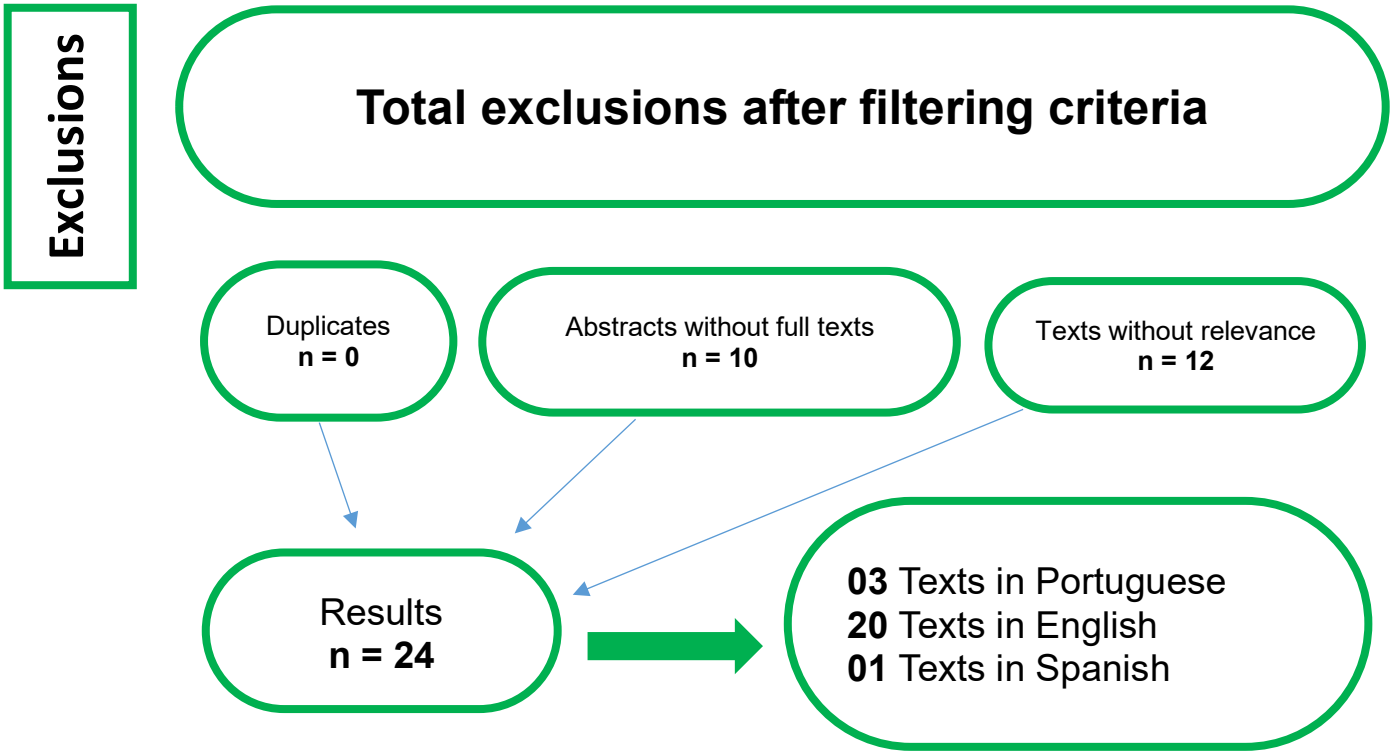
The screening was carried out in three stages: (i) reading of titles; (ii) reading of abstracts; and (iii) reading of full texts to confirm relevance. Disagreements were resolved by consensus among the researchers in order to reduce selection bias[5].

In the end, 46 articles were identified in the databases consulted. After applying the filters, 22 articles were discarded because they did not meet the inclusion criteria, resulting in 24 articles selected for qualitative analysis, considering scientific articles and relevant legislation for this metric.

The analysis was conducted through thematic content examination, categorizing the findings into: 1) Regulatory policies and guidelines; 2) Studies on patient trust in AI; 3) Ethical challenges related to algorithmic paternalism; 4) Dangers of algorithmic paternalism and its direct implications for autonomy; 5) Algorithmic paternalism in practice; 6) Governance and data security strategies in health; 7) Significant advances in artificial intelligence in health; 8) Exploration of public policies and legal initiatives; 9) Brazilian public policies and legal initiatives.

Figure 1. Presentation of the steps followed in the selection process and definition of the eligibility of the included studies





3º → Final sample

- World Health Organization (WHO) n = 1
- Nature Medicine (Nat Med) n = 1
- ABCD USP n = 1
- Official Journal of the European Union n = 2
- Books n = 2
- Cureus Journal of Medical Science n = 1
- Journal of Artificial Intelligence General Science (JAIGS) n = 1
- INSEAD Publishing n = 1
- Journal of Medical Artificial Intelligence (JMAI) n = 1
- University of Graz n = 1
- World Journal of Advanced Research and Reviews n = 1
- Vytautas Magnus University n = 1
- Polytechnic University of Catalonia n = 1
- International Medical Science Research Journal n = 1
- Maastricht University n = 1
- University of Pennsylvania n = 1
- OECD n = 1
- Amnesty International n = 1
- European Commission n = 1
- Parliament of Canada n = 1
- Ministry of Science, Technology, and Innovation n = 1
- Legislative Portal of the Federal Senate n = 1

Source: own elaboration.

As this is a bibliographic study, there was no need to submit it to the Research Ethics Committee (CEP), in accordance with Resolution Nº. 510/2016 of the National Health Council (CNS).

Results and Discussion

The analysis of the 24 articles (Table 1) revealed that artificial intelligence (AI) in healthcare has significant impacts in different dimensions: (i) optimization of diagnostic interpretation for healthcare professionals, especially in imaging exams, increasing clinical accuracy; (ii) improvement of workflow in healthcare institutions, reducing the occurrence of errors and optimizing response time; and (iii) contribution to the training and updating of professionals by integrating AI as a clinical decision support tool.

Table 1. Characteristics of the articles selected in the search

	Titles	Authors	Country/ year of publication	Country/ region as subject	Journal	Objective
1	Ethics and governance of artificial intelligence for health[1]	World Health Organization (WHO)	Switzerland, 2021	Global level	WHO	To guide the ethical and safe use of artificial intelligence in health, promoting autonomy, transparency, accountability, and equity.
2	Patient wisdom should be incorporated into health AI to avoid algorithmic paternalism[2]	McCradden MD, Kirsch RE	USA, 2023	Global level	Nature Medicine (Nat Med)	Define and discuss the concept of algorithmic paternalism, highlighting the importance of not replacing human clinical judgment
3	Regulation (EU) 2016/679 of the European Parliament and of the Council (GDPR)[3]	European Parliament	EU, 2016	European Union	Official Journal of the European Union (OJEU)	Establish a regulatory framework for the protection of personal data and the free movement of such information within the European Union, ensuring the fundamental

						rights and privacy of individuals.
4	Artificial intelligence and patient autonomy in obesity treatment decisions: an empirical study of challenges[4]	Alanzi T, Alhajri A, Almulhim S, et al.	China, 2023	Global level	Cureus Journal of Medical Science	Explore factors associated with artificial intelligence and patient autonomy in the decision-making process, identifying ethical, trust, and privacy challenges that impact the patient-professional-AI relationship.
5	Research methodology: investigation, argumentation, and writing techniques[5]	Lamy Marcelo	Brazil, 2020	Brazil	Matrioska Publishing House	Support for the development of scientific research methodology.
6	Artificial intelligence and the doctor-patient relationship: expanding the paradigm of shared decision-making[6]	Lorenzini G, Elger BS, Arbelaez Ossa L, Shaw DM	Switzerland, 2023	Global level	ABCD USP	To assess how artificial intelligence influences the doctor-patient relationship, highlighting its effects on shared decision-making and the risks of paternalistic practices.
7	AI in healthcare: revolutionizing patient care with predictive analytics and decision support systems[7]	Ramírez JGC	India, 2024	Global level	Journal of Artificial Intelligence General Science (JAIGS)	Analyze how AI, through predictive analytics and decision support, improves diagnoses, personalizes treatments, and addresses ethical

						challenges in healthcare.
8	Babylon Health (A): impact of artificial intelligence in healthcare - equal or unequal disruption?[8]	Stabile M, Aggarwal R, Carrick AM	France, 2023	Global level	INSEAD Publishing	Analyze the trajectory of Babylon Health, evaluating the use of artificial intelligence to offer digital health services, its positive and negative impacts on equity in access to healthcare.
9	Factors influencing trust in medical artificial intelligence for healthcare professionals: a narrative review[9]	Tucci V, Saary J, Doyle TE	Canada, 2022	Global level	Journal of Medical Artificial Intelligence (JMAI)	Identify factors that influence healthcare professionals' trust in medical AI, such as explainability, transparency, and usability, to support its safe use in clinical decisions.
10	Autonomy revisited: On the tension between autonomy and care in healthcare[10]	Schaupp Walter	Austria, 2022	Global level	University of Graz	Critically review the concept of patient autonomy in healthcare, proposing an integrated approach between autonomy and care, considering graduated, relational, assisted, and authenticity dimensions, to better guide clinical and ethical practice.

11	The role of AI and mobile apps in patient-centric healthcare delivery[11]	Oyeniyi Johnson	United Kingdom, 2024	Global level	World Journal of Advanced Research and Reviews (WJARR)	Explore how AI and mobile apps enhance patient-centric care by promoting personalization, engagement, and remote monitoring.
12	Role of ruler or intruder? Patient's right to autonomy in the age of innovation and technologies[12]	Žaliauskaitė Milda	Lithuania, 2021	Global level	Vytautas Magnus University	Analyze the patient's right to autonomy in the face of technological innovations, proposing the adaptation of legal instruments such as informed consent and advance directives.
13	Artificial intelligence in medicine: ethical and deontological aspects and the impact on the doctor-patient relationship[13]	Esquerda Montse, Pifarré-Esquerda Francesc	Spain, 2024	Global level	Universitat Politècnica de Catalunya	Analyze the ethical and deontological aspects of AI in medicine and its impact on the doctor-patient relationship, focusing on safety, privacy, and humanization of care.
14	Artificial Intelligence in Health: A Review of Ethical Dilemmas and Practical Applications[14]	Anyanwu Evangel Chinyere, Okongwu Chiamaka Chinaemelum, Olorunsogo Tolulope O, et al.	United States, Nigeria, and United Kingdom, 2024	Global level	International Medical Science Research Journal (IMSRJ)	Review ethical dilemmas and practical applications of AI in healthcare, addressing privacy, transparency, biases, and their impact on diagnosis, treatment, and personalization of care.

15	Fundamentals of Clinical Data Science[15]	Kubben Pieter, Dumontier Michel, Dekker Andre	Netherlands, 2019	Global level	Maastricht University	Introduce concepts and applications of clinical data science, showing how data and AI support healthcare diagnostics, decisions, and processes.
16	Adapting to Artificial Intelligence: Radiologists and Pathologists as Information Specialists[16]	Jha Saurabh, Topol Eric J	United States, 2016	Global level	University of Pennsylvania and Scripps Research Institute	A provocative view that, rather than being replaced by artificial intelligence systems, radiologists and pathologists should evolve into the role of "information specialists," collaborating with AI to interpret medical data and improve patient care.
17	Conversational Agents on Smartphones and the Web - chapter from the book Digital Therapeutics for Mental Health and Addiction[17]	Bickmore Timothy W, O'Leary Teresa	United States, 2022	Global level	Publisher Elsevier	Explore the potential of conversational agents (chatbots) on smartphones and the web to deliver automated and scalable interventions in mental health and addiction, highlighting their applicability in screening, education, referral, and treatment.

18	Recommendation of the Council on Artificial Intelligence[18]	Organization for Economic Cooperation and Development (OECD)	France, 2024	Global level	OECD	Promote the responsible use of AI, ensuring systems that are reliable, transparent, secure, and aligned with human rights, democracy, and sustainability.
19	The Toronto Declaration: Protecting the Right to Equality and Non-Discrimination in Machine Learning Systems[19]	Amnesty International and Access Now	Canada, 2018	Canada	Amnesty International and Access Now	Protect the right to equality and non-discrimination in AI systems by promoting transparency, accountability, and redress mechanisms.
20	Ethical Guidelines for Trustworthy AI[20]	High-Level Expert Group on Artificial Intelligence	Belgium, 2019	European Union	European Commission	Ensuring trustworthy, legal, ethical, and robust AI, with a focus on autonomy, transparency, privacy, accountability, and sustainability.
21	Regulation (EU) 2024/1689 of the European Parliament and of the Council – European Union Artificial Intelligence Regulation[21]	European Parliament and Council of the European Union	European Union, 2024	European Union	Official Journal of the European Union	Harmonize rules for safe, reliable, and human-centered AI, protecting fundamental rights and promoting innovation in the European Union.
22	Bill C-27 – Digital Charter Implementation Act, 2022[22]	House of Commons of Canada	Canada, 2022	Canada	Parliament of Canada.	Modernize Canadian legislation, regulating personal data protection and high-impact AI systems, with a focus on security,

						transparency, and risk mitigation.
23	Brazilian Artificial Intelligence Strategy (EBIA)[23]	Ministry of Science, Technology, and Innovations (MCTI)	Brazil, 2021	Brazil	Ministry of Science, Technology, and Innovations (MCTI)	To guide the ethical development of AI in Brazil, promoting innovation, governance, training, and social welfare.
24	Bill No. 2,338, of 2023 - Regulatory Framework for Artificial Intelligence in Brazil[24]	Pacheco Rodrigo	Brazil, 2023	Brazil	Senate Legislative Portal.	Regulate the use of AI in Brazil, guaranteeing fundamental rights, security, transparency, and stimulating innovation.

Source: own elaboration.

With regard to the temporal analysis and geographical location of publications, it was found that the years with the highest volume of publications on the subject are 2024 (n=6); 2023 (n=5), 2022 (n=4). In terms of geographical location, there is spatial variety, with articles located in the American (n=9), European (n=12), Asian (n=2), and African (n=1) continents, suggesting a global discussion of the topic.

Alanzi *et al.*[4] point out that even with the presence and advancement of artificial intelligence in the medical context, especially in diagnostics and clinical decision support, one cannot give up the human skills that are essential for healthcare[4] . AI can provide extremely accurate analyses, interpret imaging tests, or suggest courses of action based on large volumes of data, but it cannot replace fundamental aspects of medical practice, such as physical examination, patient guidance, and the preservation of the doctor-patient relationship This concern is reinforced when there is excessive dependence on automated systems, potentially leading to cascading errors when incorrect data is processed, in addition to the possibility of exposure of sensitive information, with relevant ethical and legal implications[6] .

Regulatory policies and guidelines

The integration of AI into the healthcare system represents a significant ethical dilemma, especially regarding privacy and the patient's right to their personal data. To address the ethical challenges posed by the introduction of AI in healthcare, comprehensive governance is essential, as recommended by the WHO[1].

The WHO[1] emphasizes the need for regulations that prioritize data protection and patient privacy, mitigating risks related to the inappropriate use of these technologies. Thus, AI systems must be designed and applied with transparency, explainability, and accountability, ensuring that users understand how their information is processed and by whom.

In addition, the WHO[1] suggests that frameworks such as the European Union's General Data Protection Regulation (GDPR) serve as a model, setting strict limits on the collection and use of sensitive data, ensuring, where applicable, the explicit consent of the user.

> i) From a human rights perspective, an individual should always control their personal data. Individuals' rights to their own data are grounded in concepts that are related but distinct from ownership, including control, agency, privacy, autonomy, and human dignity. Control can include various approaches to individual consent [...] as well as collective mechanisms to ensure that data is used appropriately by third parties [...]. Data protection laws are rights-based approaches that include standards for regulating data processing activities that protect the rights of individuals and establish obligations for data controllers and processors, both private and public, and also include sanctions and remedies for actions that violate statutory rights. Data protection laws may also provide for exceptions for non-commercial uses by third parties. More than 100 countries have adopted data protection laws.[6]

Such guidelines are essential to promote a relationship of trust and respect for the autonomy of individuals within the context of technological innovations. Ramírez[7] highlights the importance of robust regulatory frameworks for the responsible use of AI in healthcare, considering the protection of patient data privacy as a fundamental pillar. It should be noted that the introduction of AI systems without appropriate regulation can intensify ethical problems, such as algorithmic biases and the risk of automated decisions replacing human judgment.

The implementation of clear guidelines and oversight mechanisms is essential to ensure that AI technologies do not compromise patient autonomy but, on the contrary, support evidence-based decision-making and respect privacy[7]. This approach is in line with WHO guidelines, which call for ethical governance to mitigate risks associated with patient autonomy[4].

Furthermore, according to Ramírez[7], robust privacy policies with explicit patient consent not only protect the individual but also promote a more transparent relationship between patients and AI providers[3] .

Studies on patient trust in AI

Patient trust in AI is essential for the safe and effective adoption of this technology in healthcare. Likewise, transparency allows clinical users to make safe decisions when considering a recommendation issued by an AI system. It also supports improved trust, as transparent systems display their reasoning processes. In this way, healthcare professionals can apply their own decision-making processes to develop differential diagnoses and complement the conclusions of AI, since they are able to understand the methodological process employed by the system, as discussed by Tucci, Saary, and Doyle[9].

This scenario highlights the need for strategies that promote transparency and direct patient engagement in the process. To build this trust, it is also crucial to offer transparency and clarity regarding the use of personal data.

3 Launched in 2013, Babylon Health is a UK-based digital health service provider that combines Artificial Intelligence (AI) and machine learning technology to provide customers with personalized health assessments, treatment advice, and face-to-face consultations with healthcare professionals—through an app and a website. Despite its potential to improve access to quality healthcare, Babylon Health has highlighted issues of inequality in the healthcare system, especially in England, where it was first launched. At its core is the question of whether AI-based services can be a solution to the issue of health inequality or penalize people who do not have access to the internet/IT skills or have learning challenges, as analyzed by Stabile, Aggarwal, and Carrick[8].

The WHO[1] emphasizes that patients should be informed about who will have access to their information and for what purposes, thereby strengthening the relationship of trust. This approach, called “trust through transparency,” seeks to ensure that AI systems are used in an ethical and understandable manner, allowing patients to assess both the benefits and limitations of AI in the clinical context.

The WHO[1] underlines the importance of directly involving patients and establishing clear communication about the role of AI in medical decision-making. This engagement is essential to dispel fears and foster more informed and conscious adherence to AI-mediated treatments.

Transparent communication and active patient involvement help to consolidate a relationship based on respect and autonomy, in which patients feel like active participants in their own healthcare journeys[6].

Building trust in AI among patients and healthcare professionals is a complex process, permeated by ethical and privacy issues. Alanzi *et al.*[4] note that while doctors and nutritionists tend to trust AI system recommendations more, patients demonstrate more cautious trust, often due to concerns about data security and algorithm transparency.

This disparity in perceptions exposes a central challenge: the need for AI systems to be clear and transparent in their decisions in order to truly empower patients.

To build trust in AI, it is essential that patients understand how this technology operates and feel that their data is protected and used ethically[8].

This understanding not only promotes a relationship of trust, but also ensures that AI functions as a tool that strengthens patient autonomy in their healthcare, rather than replacing their decision-making capacity.

Patient trust in AI systems depends heavily on transparent communication about the role of this technology in the clinical decision-making process.

Lorenzini *et al.*[6] emphasize that, in order to preserve patient autonomy, it is essential that physicians clearly explain how AI contributes to diagnosis and present the available therapeutic alternatives. This practice reduces mistrust of AI and encourages active and informed participation, allowing patients to understand the impact of technology on their health choices.

By involving the patient in understanding AI processes, the physician strengthens the relationship of trust and ensures that the use of AI is a transparent complement to patient-centered care. In this way, AI becomes an ally in promoting medical care that respects autonomy and supports conscious decision-making[9].

Building patient trust in AI technologies requires that autonomy be treated in a "graduated" and "assisted" manner, as Schaupp argues[10]. Genuine autonomy cannot simply be granted; it requires active support that provides patients with the information they need to make informed decisions that are compatible with their values.

By providing this communicational clarity, healthcare professionals help create an environment where patients feel empowered and confident to participate in decisions about their own care.

Patient autonomy is understood in a relational and assisted way, meaning it does not mean total independence, but rather autonomy exercised with the support of professionals and technology. This type of autonomy considers the need for assistance, recognizing that in order to make truly informed decisions consistent with their values, patients often depend on information and guidance from reliable sources, such as healthcare professionals and AI systems[10].

The integration of AI and mobile applications into patient-centered healthcare plays a significant role in building user confidence in new health technologies. In this context, Oyeniyi[11] points out that by providing patients with digital tools that enable continuous monitoring and active management of their conditions, AI contributes to a more transparent and empowering care experience.

Žaliauskaitė[12], in turn, reinforces the importance of ensuring that patients maintain control over their information and decisions when using AI technologies in healthcare. For trust in AI to be truly established, it is essential that patients clearly understand how these technologies impact the medical decision-making process.

It should be noted that transparency and effective communication are essential for patients to feel that their autonomy is preserved, even in an AI-mediated environment[12].

These technologies, such as health apps and virtual assistants, not only facilitate access to information and medical support, but also increase patient autonomy and sense of control over their own care. This direct engagement promotes a relationship of trust, in which patients feel more secure and involved with the use of AI in their healthcare journey.

Ethical challenges related to algorithmic paternalism

The introduction of AI-facilitated clinical decision support systems is reshaping the doctor-patient relationship, forming a triad in which artificial intelligence becomes a third element in decision-making. This transformation, while innovative, raises significant ethical questions, particularly regarding the risk of "algorithmic paternalism"[2].

In this scenario, automated decisions could override human judgment, impacting the autonomy of professionals and patients themselves.

The WHO[1] warns of the risks of indiscriminate use of AI in clinical contexts, which could lead to the replacement of human decisions by the "opinion" of algorithms, accentuating biases and discriminating against patients[4].

To avoid this scenario, the WHO[1] recommends human intervention in critical decisions, ensuring that AI acts as an auxiliary tool and not as a substitute for doctor-patient decisions.

This caution is essential to protect patients' right to actively participate in their healthcare choices, maintaining respect for autonomy and avoiding paternalistic practices.

Lorenzini *et al*.[6] assert that the presence of AI in healthcare poses the risk of establishing a "double paternalism," in which both the autonomy of physicians and patients is compromised. They further argue that by becoming intermediaries for decisions proposed by AI, physicians could lose the ability to fully exercise their clinical judgment, serving only as transmitters of algorithmic recommendations.

This model of double subordination prevents healthcare professionals from acting autonomously and, at the same time, reduces the possibility of patients actively participating in choices about their treatments. The lack of transparency and explainability in AI processes exacerbates this problem, creating a "third element" in the doctor-patient relationship that, instead of supporting decision-making, directs choices without due consideration of patients' individual values and preferences, reinforcing algorithmic condescension[8].

Alanzi *et al*.[4] reinforce this concern, especially in the treatment of conditions such as obesity, where AI can be perceived as an "authority" that defines "what is best," compromising patient autonomy.

In addition, Ramírez[7] points out the ethical complexities in the extensive use of health data in AI systems, warning of the need to protect patient privacy. As AI relies on large volumes of data to support diagnoses and treatments, it is essential to implement robust data protection mechanisms, ensuring respect for privacy.

Patient autonomy is intrinsically linked to control over their data and the right to decide on access to and use of their information, which is essential for trust in the healthcare system[7].

Another ethical challenge lies in the so-called algorithmic "black box," in which AI predictions become difficult to interpret or justify. Esquerda et al.[13] explain that the complexity of machine learning models, such as neural networks, makes it difficult to understand the underlying motivations (behind the scenes) for the recommendations made by AI.

Similarly, Anyanwu *et al.*[14] point out that the inherent opacity[4] of many AI models ("black box") intensifies this challenge, as it makes it difficult for patients and healthcare professionals to understand automated decisions. The practice of auditing processes and algorithmic transparency is therefore essential to ensure that AI functions as a support tool and not as a substitute for human judgment, preserving the independence and trust of those ivolved[14].

The phenomenon of "algorithmic paternalism" can lead doctors and patients to accept AI decisions without question, which poses a significant risk to autonomy. To mitigate this risk, it is recommended to prioritize the transparency and explainability of AI systems, ensuring that they act as support tools and not as substitutes for healthcare professionals[14].

The integration of AI in healthcare, therefore, requires a careful balance between innovation and ethics, with a focus on preserving patient autonomy and professional responsibility. In this context, Schaupp[10] presents a critical view of traditional "individualistic autonomy", "advocating the concept" of "relational autonomy" in healthcare.

Schaupp[10] argues that for autonomy to be truly genuine, it is necessary to consider the patient's relational context, where decisions are made in dialogue with professionals and family members, rather than in isolation.

This perspective is especially relevant in the use of AI, as it reinforces that systems should act as supports for patient autonomy, rather than replacing human interaction or personalized communication.

The practice of relational autonomy helps prevent the risk of algorithmic paternalism, preventing patients' choices from being directed by AI in an imperceptible and dominant manner. In this way, AI can be integrated into healthcare in a way that strengthens patient independence[4].

Dangers of algorithmic paternalism and its direct implications for autonomy

Algorithmic paternalism is a concept that has become increasingly relevant in the debate on the ethics of artificial intelligence. It refers to the ability of algorithms to influence, manipulate, or even make decisions for humans, often without them being fully aware of it.

4 Opacity refers to the difficulty or inability to understand how algorithms arrive at certain decisions or recommendations. Often, AI models, especially those based on complex techniques such as deep neural networks, operate like a "black box": their internal operations are difficult to interpret or explain, even for experts. This means that both patients and healthcare professionals cannot clearly see how the system arrived at a specific conclusion, which can lead to insecurity and lack of confidence[13].

This interference can be seen as a form of digital paternalism, where algorithms, rather than parents or governments, take on the role of "guardians" of choices and behaviors Žaliauskaitė[12].

However, this transformation brings complex ethical challenges, as patient autonomy, previously widely exercised, is now constantly strained by this phenomenon.

In this scenario, AI, by offering automatic and sometimes opaque recommendations, can replace human judgment, which compromises patients' ability to choose their own treatment.

Thus, it is imperative that the use of AI in healthcare be accompanied by mechanisms that guarantee patients' control over their healthcare decisions, ensuring that this technology functions as a support and not as a substitute for human judgment. Žaliauskaitė[12] highlights the main implications for autonomy: a) manipulation of preferences: through mechanisms such as filter bubbles and content personalization, algorithms may only present information that confirms pre-existing beliefs, limiting the patient's exposure to different perspectives and hindering the formation of critical opinions; b) limiting patient choices: by presenting preselected and targeted options, algorithms can restrict the patient's ability to explore new possibilities and make autonomous decisions; and finally; c) influencing behavior: algorithms can be used to persuade people to take certain actions, such as making purchases, voting for a specific candidate, or adopting certain habits.

Algorithmic paternalism in practice

Social media algorithms determine which *posts* users can access, influencing opinions and social relationships. In addition, search results are influenced by algorithms that take into account search history and other factors, shaping the way the world is understood. Algorithms recommend products based on purchase history and data from other users, influencing consumer decisions, and virtual assistants can make autonomous decisions, such as scheduling appointments or making purchases, limiting users' autonomy.

Examples of algorithmic paternalism in healthcare include automated treatment recommendations that ignore patient preferences: in clinical decision support systems, AI algorithms often suggest treatments based on population data and statistics, but may not take into account individual patient preferences. For example, a system may recommend invasive treatments or specific medications without considering the patient's personal aversions or cultural aspects. This can restrict autonomy, as the patient is inclined to accept a "machine" recommendation, which appears to be infallible, even when it does not align with their personal preferences, according to an analysis by Kubben *et al.*[15].

As an example, remote monitoring that imposes actions based on average standards: health monitoring devices, such as those for diabetes or blood pressure control, may automatically suggest changes in diet or medication dosage. These systems are based on typical responses but do not consider individual variations. In this sense, Kubben, Dumontier, and Dekker[15] note that patients may end up following a more rigid and generic regimen, believing it to be the most appropriate for their health, without questioning whether it is the best approach for their specific case.

Furthermore, automated diagnostic tools that influence clinical decisions: diagnostic algorithms used in radiology for tumor detection can offer recommendations that lead healthcare professionals to adopt a specific course of action, even if they have a different opinion. These systems are often treated as a "second opinion," but can easily become the primary opinion.

In a study on the use of AI in radiology, Jha and Topol[16] discuss how this paternalism occurs when doctors feel pressured to follow the system's recommendations, fearing that disregarding them could be interpreted as error or negligence.

Another example would be mental health apps with standardized responses: chatbots and AI apps for mental health, such as Woebot and Wysa, can provide emotional support based on pre-programmed responses, but without considering the user's individual emotional and psychological context.

As a result, patients may feel unattended or without real support. Bickmore et al.[17] point out that these apps often encourage users to follow generic advice, reducing their ability to express doubts or seek humanized support.

Given the increasingly pervasive presence of algorithms in society, critical reflection on the impacts of algorithmic paternalism is urgently needed. By shaping social perceptions, influencing decisions, and limiting choices, algorithms challenge individual autonomy.

Governance and data security strategies in healthcare

Health data governance and security are essential pillars for the ethical implementation of AI. According to WHO guidelines, it is essential that AI systems guarantee the sovereignty and privacy of patient data, promoting individual autonomy over their own information.

In this regard, the WHO's[1] highlights the importance of broad consent structures, which ensure that data is only used with proper authorization, and federated governance models, which allow data to remain under the control of the institutions that hold it, but with authorized access for analysis and safe use.

> ii) Several non-profit institutions that have deposited health data in centralized biobanks practice informed consent principles for sharing such data, which ensures that the person providing the data understands the consent at the time of enrollment. Any industry partners are disclosed at the time of consent, and prospective and explicit consent is given for future secondary use of the data for research. These standards do not prevent secondary use of health data, except when, for example, commercial actors that were not included in the initial consent seek to use the data or when commercial actors could otherwise gain access because they subsidize activities of nonprofit entities that have access to the data. Even with additional standards in place, at a biobank operated by the University of Michigan, USA, access to data was denied by a review committee for only 6 of 70 projects proposed over 2 years, and only because of inadequate initial consent.[4]

In addition, the concept of data cooperatives, where communities and patients exercise collective control over the use of their information, is suggested as a way to balance privacy with ethical data sharing for the sake of advances in health. These strategies are crucial for strengthening public trust and protecting the integrity of sensitive information in the digital health environment, according to the WHO·Data[4] security and confidentiality are fundamental pillars for the application of AI in healthcare, especially considering access to large volumes of sensitive patient information.

As noted by Esquerda *et al.*[13] , the use of AI requires the explicit consent of patients for the collection and processing of their health data, an indispensable measure to protect privacy and ensure that this information is handled securely. In addition, it is essential to adopt anonymization practices and establish strict access control systems that protect data from misuse and increase patient

confidence in the digital healthcare environment. These precautions not only ensure the integrity of the information, but also consolidate a foundation of trust that is indispensable for the acceptance of AI technologies in healthcare[13].

> iii) The European Union has promoted an innovative law on AI, known as the Artificial Intelligence Act, which includes references to the collection and processing of health data, with consent as its essence. Patients must be aware of and explicitly consent to the use of their health data. In addition, strategies for access control, anonymization, and safeguarding of patient data are necessary to ethically protect the use of patient data. Health data will also be regulated by another draft, for which there is already a proposed regulation on the European Health Data Space (EHDS). This project aims to create health data (primary use) in all Member States for both primary and secondary uses, such as research and innovation, promoting interoperability. These practices are crucial for data governance that not only meets security requirements but also strengthens patient autonomy by ensuring that their data is treated with the highest level of integrity.[13]

Data privacy protection is a central issue in the use of AI in healthcare, especially in sensitive areas such as obesity treatment. Alanzi *et al.*[4] highlight that ensuring patient autonomy requires transparency and strict security measures in the use of personal data, so that patients can trust that their information is protected and used ethically.

The adoption of robust data protection policies and regular audits of AI systems are essential to mitigate risks and ensure that technology is an ally in patient-centered care, preserving autonomy and the confidentiality of sensitive information[6].

Anyanwu *et al.*[14] emphasize the importance of implementing transparent policies and robust security measures that protect sensitive patient information. They stress that the use of AI for diagnostics and other applications must be balanced with the preservation of data confidentiality, ensuring that technological advances do not compromise individuals' privacy. To this end, it is necessary to adopt rigorous data governance practices that involve informed consent, promoting a secure environment for the use of AI in healthcare[14].

> iv) As AI technologies become an integral part of medical decision-making, the principle of informed consent takes center stage. Patients have the right to understand how AI will be used in their healthcare and the potential impact on their treatment. Transparency in AI algorithms, their decision-making processes, and potential limitations must be effectively communicated to promote trust and ensure that patients can make informed decisions about their care[14].

These actions not only promote a relationship of trust with patients, but also ensure that AI acts as an ethical support, respecting the right to privacy and autonomy of individuals in the healthcare environment.

Significant advances in artificial intelligence in healthcare

The use of AI and mobile applications in healthcare has led to significant advances in areas such as remote monitoring and telemedicine, providing tangible improvements in access and continuous patient follow-up. As exemplified by Oyeniyi[11] these technologies allow healthcare professionals to remotely monitor vital signs, treatment adherence, and other clinical indicators in real time, facilitating rapid interventions and optimizing the management of chronic conditions.

The evolution of e-Health applications has witnessed the integration of wearable devices and sensor technologies, enabling real-time health data collection, remote monitoring, and personalized health insights. By connecting wearable devices such as smartwatches and fitness trackers to mobile applications, users can track vital signs, receive timely alerts, and monitor health trends seamlessly. The integration of sensor technologies has revolutionized health monitoring capabilities, empowering patients to monitor chronic conditions, detect early warning signs, and adapt their lifestyle choices to improve overall health outcomes.

The growth of e-Health applications has extended to remote patient monitoring and telemedicine platforms, facilitating virtual consultations, remote health assessments, and digital health interventions. With the emergence of telehealth services, patients can access medical care from the comfort of their homes, consult with healthcare providers via videoconferencing, and receive virtual follow-up visits for ongoing health management. The expansion into remote patient monitoring and telemedicine has increased access to care, improved care coordination, and enabled continuous monitoring of patient health status, especially in remote or underserved locations[11].

This is a practical case to illustrate the direct impact of AI on clinical practice, demonstrating how remote monitoring and telemedicine enhance the quality of care, promote accessibility, and contribute to more personalized and proactive care, according to Oyeniyi[11].

Exploration of public policies and legal initiatives

The WHO document[1] on ethics and governance of AI in health provides a solid basis for discussing patient autonomy. The WHO[6] emphasizes that the use of AI must protect human autonomy, preventing decisions from being automatically delegated to machines without proper human supervision. To this end, AI systems need to be transparent and explainable, enabling patients and healthcare professionals to understand the decision-making process and maintain control over healthcare choices[6].

The recommendations of the Organization for Economic Cooperation and Development (OECD) on AI are guidelines, not mandatory regulations. The main objective is to promote AI that respects fundamental rights, such as autonomy, transparency, and accountability. Thus, the OECD suggests that AI systems be designed to allow for human oversight and ensuring that technology complements, rather than replaces, individuals' decision-making capacity under the OECD terms[18].

The Toronto Declaration[19], published in 2018 by Amnesty International and Access Now, highlights the importance of protecting the rights to equality and non-discrimination in the use of AI and machine learning systems. This declaration emphasizes the need to ensure that these systems respect human rights and avoid discriminatory practices, whether intentional or accidental. Among the recommendations is the requirement for transparency and accountability for both governments and the private sector, ensuring that automated decisions are understandable and contestable by affected individuals and groups. This approach aims to ensure that AI functions as a complement to, rather than a substitute for, human decision-making[20].

The "Ethical Guidelines for Trustworthy AI," an initiative of the European Commission, were developed to address the challenges and opportunities of AI in an ethical and responsible manner. In 2018, the Commission created the High-Level Expert Group on Artificial Intelligence (GPAN-AI), composed of experts from various fields, including academia, industry, and rights organizations. In April 2019, the GPAN-AI published the "Ethical Guidelines for Trustworthy AI," proposing three

fundamental principles: a) legitimacy and human rights, ensuring that AI respects the dignity and rights of individuals; b) technical robustness and safety, ensuring that systems are reliable; and c) responsible governance, which includes transparency and accountability.

These guidelines, although not mandatory, served as the basis for the European Union's Artificial Intelligence Regulation (AI Act) of 2021, which established a legal framework for the use of AI inspired by the principles of GPAN-IA. The 2019 Guidelines, therefore, set a pioneering standard that will influence AI regulation in many European countries[20].

The European Union's Artificial Intelligence Regulation, published in 2024, provides strict guidelines for the development and use of AI, with the aim of protecting fundamental rights and promoting a human-centered approach. In the context of health, the regulation highlights the importance of preserving the autonomy of individuals, requiring transparency and traceability in the decisions of AI systems.

These measures seek to ensure that technology assists patients without compromising their choices, avoiding manipulative practices that could restrict freedom of decision. European regulation thus establishes a framework for public policies that reconcile the advancement of AI with respect for user autonomy, especially in sensitive areas such as healthcare[21].

Bill C-27, known as the Canada Digital Charter Implementation Act, reinforces the importance of privacy and individual autonomy in the use of AI. This legislation requires AI systems to operate transparently and provide for measures to mitigate the risks of bias and harm, especially in high-impact applications. With this, Canada reaffirms its commitment to international human rights standards, promoting the use of AI that respects individual autonomy and inspires public confidence in digital environments[22] .

Brazilian public policies and legal initiatives

The Brazilian Artificial Intelligence Strategy (EBIA)[23] document published by the Brazilian Ministry of Science, Technology, and Innovations highlights the importance of developing AI in an ethical and responsible manner, with a focus on preserving the autonomy and fundamental rights of individuals. The EBIA organizes its guidelines into nine thematic areas that guide the development of AI in the country , including governance, ethical use, professional training, public safety, and research. With regard to autonomy, the strategy emphasizes that AI systems must respect human values and include safeguards to ensure human oversight, especially in high-impact areas such as health and public safety[23]. In addition, EBIA proposes the use of impact reports and transparency mechanisms, allowing automated decisions to be audited and understood, ensuring that citizens' autonomy is preserved in the face of AI expansion[23].

Similarly, Bill No. 2338/2023[24] of the Federal Senate aims to establish a comprehensive regulatory framework for the use of AI in Brazil, focusing on the protection of fundamental rights and respect for individual autonomy. The proposal includes measures to ensure transparency, explainability, and human oversight, especially in high-impact applications.

Among the principles of the bill, self-determination and the right to contest stand out, ensuring people the right to understand and question automated decisions that directly affect their rights and interests. In this way, the legislation aims to protect citizens' autonomy by requiring AI systems to operate in an understandable and auditable manner, as well as establishing the right to human review in significant decisions, reinforcing trust and control over the use of technology[24].

Final Considerations

This study highlights the importance of an ethical and careful approach to the application of AI in healthcare, especially with regard to preserving patient autonomy.

AI offers numerous benefits, such as faster diagnoses and accuracy in data analysis, which can improve medical care. However, the presence of automated systems in clinical decision-making raises ethical concerns, such as the risk of "algorithmic paternalism," where human judgment is potentially replaced or dominantly influenced by algorithms. This interference can compromise the patient's active participation in their own treatment and their ability to make informed choices.

In order to ensure that AI functions as a tool that complements, rather than replaces, patient autonomy, it is essential that there be continuous human oversight and the implementation of clear guidelines for the responsible use of technology. In addition, privacy protection and respect for informed consent become indispensable in a scenario where data collection and processing are central to the functionality of these systems.

Governance policies that promote transparency and accountability are essential for patients to feel safe when using these technologies, maintaining control over their own information and healthcare choices. The use of AI in healthcare can be a powerful ally in improving medical care, as long as it is applied in a way that respects and strengthens patient autonomy. Trust in technology depends on an ethical approach that includes both the explainability of algorithms and the right of patients to question and participate in automated decisions.

Therefore, this article reinforces the need for robust governance practices and regulations that balance technological innovation with the protection of individual rights, promoting a healthcare environment that values and respects the dignity and autonomy of patients in a context mediated by artificial intelligence.

Conflict of interest

The authors declare that there is no conflict of interest.

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Authors' contributions

De Malta KC contributed to the conception/design of the article, analysis and interpretation of data, and writing of the article. Lamy M contributed to the critical review, writing of the article, and approval of the final version of the article.

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