

Algorithmic Governance and Bioethical Stewardship: Artificial Intelligence, Quality of Life and Clinical Decision-Making in Public Health Systems

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Abstract

This paper explores the intersection between governance, bioethics, and quality of life through the implementation of artificial intelligence (AI) in healthcare decision-making. Using a mixed-methods approach combining quantitative survey data from 600 healthcare professionals in Mexico and 40 semi-structured interviews, the study examines how algorithmic governance affects ethical reasoning, patient autonomy, and perceptions of life quality. Results reveal a paradox: while AI-based systems improve efficiency and diagnostic accuracy, they also generate ethical uncertainty and governance gaps. The findings suggest that AI bioethical governance requires not only regulatory frameworks but also cultural adaptation within clinical institutions. Recommendations for policy, training, and institutional governance models are presented.

Keywords: Governance, Bioethics, Artificial Intelligence, Quality of Life, Healthcare Systems, Ethical Decision-Making.

Introduction

The rapid integration of artificial intelligence (AI) in medicine has transformed governance models in healthcare systems, reconfiguring bioethical boundaries and redefining the meaning of quality of life [1]. From triage algorithms in emergency care to predictive analytics for chronic disease management, decision-making processes once guided by human reasoning are increasingly mediated by algorithmic logic [2]. This shift demands a bioethical reflection on autonomy, justice, and beneficence in digital health governance [3].

AI-based governance implies that clinical and administrative actions are not only supervised but also generated by computational systems [4]. Governance in this context transcends hierarchical structures and evolves into a distributed decision-making model,

where ethical accountability becomes opaque [5]. Quality of life, traditionally a subjective measure of well-being, is now quantified through algorithmic indicators, often divorced from individual lived experience [6].

Recent literature highlights that AI implementation in health governance offers dual potential: improved efficiency and ethical risk [7]. Studies in OECD countries indicate that while algorithmic governance enhances diagnostic speed, it also risks reinforcing social biases embedded in data [8]. In Latin America, where governance structures are often fragmented, the challenge is even greater [9]. Public health systems in Mexico, for example, face the tension between technological modernization and the preservation of ethical integrity in clinical practice.

This study examines how governance mechanisms adapt to AI-driven bioethical challenges, using the Mexican healthcare system as a reference. It explores whether algorithmic governance contributes to or undermines the quality of life of both patients and professionals. By linking governance theory with empirical data, this research provides a nuanced understanding of digital bioethics in practice [10].

Method

This research employed a mixed-methods design to capture both the quantitative dynamics and qualitative meanings of AI governance in healthcare.

Participants and Sampling

A total of 600 healthcare professionals (physicians, nurses, and administrators) were surveyed between January and June 2024 in six major public hospitals in Mexico City. The sample was stratified by occupation and institution to ensure representativeness. In addition, 40 semi-structured interviews were conducted with informants identified as key decision-makers or early adopters of AI technologies.

Instruments

The quantitative instrument was a Likert-scale questionnaire consisting of 45 items across four dimensions:

- 1. Perceived Ethical Governance (e.g., Transparency, Accountability)
- 2. AI Trust and Competence
- 3. Quality of Life Perception at Work
- 4. Patient-Centered Ethical Orientation

The instrument obtained a Cronbach’s $\alpha = 0.91$, indicating high internal consistency.

The qualitative component involved a semi-structured interview guide exploring themes such as ethical dilemmas in AI implementation, perceptions of algorithmic fairness, and professional autonomy.

Procedure

Data were collected with institutional approval and informed consent. Quantitative data were analyzed using SPSS v.27, employing descriptive and inferential statistics (ANOVA, regression). Qualitative interviews were transcribed and analyzed through hermeneutic coding using NVivo 12, identifying key ethical and governance themes.

Ethical Considerations

The study adhered to the Declaration of Helsinki and Mexican national research ethics standards. Participation was voluntary and anonymous, and ethical approval was granted by the Universidad de la Salud’s Institutional Review Board (Code 2024-UNISA-EGOV-112).

Results

Table 1: Descriptive Statistics of Main Variables (n = 600).

Variable	Mean	SD	Min	Max
Perceived Ethical Governance	3.72	0.81	1	5
AI Trust and Competence	3.58	0.77	1	5
Quality of Life at Work	3.41	0.69	1	5
Patient-Centered Ethical Orientation	3.89	0.74	1	5

Table 2: Regression Analysis: Predictors of Quality of Life at Work.

Predictor	β	t	p
Perceived Ethical Governance	0.42	6.88	< .001
AI Trust and Competence	0.27	5.12	< .001
Patient-Centered Orientation	0.18	3.46	.002
$R^2 = 0.53, F(3,596) = 72.18, p < .001$			

Interpretation: Ethical governance perception and AI competence significantly predict quality of life, explaining 53% of variance.

Extracts from Informants

“Algorithms are efficient, but they do not see patients — they see data,” stated a senior physician (Informant 12, age 54).

A Nurse Expressed Ambivalence: “AI helps me monitor patients faster, but it feels like someone else decides for me” (Informant 27, age 32).

An administrator added, “Ethical responsibility becomes diffuse when decisions are shared with algorithms” (Informant 9, age 45).

Discussion

The findings confirm that governance and bioethics intersect dynamically in AI-mediated healthcare environments. Perceived

ethical governance strongly correlates with quality of life, suggesting that professionals value transparency and human oversight more than pure technological precision (Morley et al., 2020). The relationship between AI trust and quality of life also indicates that digital literacy and ethical assurance are essential for maintaining morale and professional identity [3].

Qualitative data reveal a tension between efficiency and ethical autonomy. This echoes Floridi’s notion of “distributed moral agency,” where decisions are shared between human and non-human actors [1]. In this distributed governance, accountability becomes both collective and ambiguous. Informants reported that algorithmic recommendations, though technically sound, sometimes conflicted with experiential judgment or patient-specific contexts. This aligns with Jobin, who argue that bioethical

governance must incorporate procedural transparency rather than mere compliance [7].

Furthermore, the study demonstrates that AI governance can improve organizational trust only when embedded in ethical frameworks that prioritize patient welfare over algorithmic optimization. The regression model supports the idea that ethical governance moderates the impact of AI adoption on professionals' perceived well-being, consistent with global findings in digital ethics research [5,8].

From a governance perspective, these results underscore the need for adaptive regulation — not only legal oversight but also participatory mechanisms that include clinicians and patients in decision-making processes. Without such structures, AI systems risk reproducing asymmetries of power, particularly in public institutions where accountability is already diffuse [9]. The bioethical imperative is thus not to resist AI but to humanize its governance.

Conclusion

Algorithmic governance in healthcare represents a paradigm shift that challenges traditional notions of bioethics and quality of life. While AI improves operational efficiency and diagnostic reliability, it simultaneously introduces moral and institutional ambiguities. The results of this study demonstrate that ethical governance, when perceived as transparent and accountable, significantly enhances the professional quality of life and ethical alignment in clinical practice.

Future governance models should balance technological optimization with moral deliberation, ensuring that AI serves as an ethical companion rather than a dehumanizing authority. Education, participatory regulation, and continuous ethical evaluation are essential to sustain the integrity of healthcare systems in the era of artificial intelligence.

Ethical Declarations

All procedures followed the ethical standards of the institutional and national research committees. Informed consent was obtained from all participants.

Use of Artificial Intelligence

AI tools were used exclusively for linguistic editing and formatting consistency under human supervision. Analytical interpretation and data synthesis were conducted manually by the research team.

Author Contributions

Cruz García Lirios (40%): Conceptualization, Data Analysis, Writing.

Nadya Elizabeth Vásquez Segura (15%): Field Coordination.

Sonia Sujell Vélez Báez (10%): Qualitative Analysis.

Héctor Daniel Molina Ruíz (10%): Quantitative Modeling.

Wilfrido Isidro Aldana Balderas (10%): Validation.

Felipe de Jesús Vilchis Mora (10%): Literature Review.

Reyna Amador Velázquez (5%): Data Curation.

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