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Ethics of AI in nursing care: A doctrinal analysis of governance and societal implications in Bangladesh

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ABSTRACT

The integration of artificial intelligence (AI) into nursing care presents significant opportunities for enhancing efficiency, predictive accuracy, and clinical decision-making. However, these technological advancements also raise profound ethical, professional, and societal challenges, particularly in contexts where regulatory frameworks and institutional support are underdeveloped. This study employs a doctrinal methodology to critically examine the governance, ethical obligations, and professional implications of AI-mediated nursing care in Bangladesh. By analyzing international guidelines, national policies, and professional codes of conduct, the study identifies gaps in accountability, professional autonomy, relational care, and social equity. Findings indicate that nurses may experience moral tension and constrained decision-making when navigating algorithmic recommendations, while current governance mechanisms inadequately address data privacy, fairness, and contextual equity. Furthermore, the study highlights the risk that AI systems, if uncritically implemented, could exacerbate existing healthcare disparities and undermine the humanistic and relational foundations of nursing. By integrating global ethical principles with local socio-cultural realities, the study provides novel insights into context-sensitive governance, professional preparation, and ethical oversight for AI in nursing. The findings offer actionable guidance for policymakers, healthcare institutions, and educators to ensure AI adoption aligns with both professional values and societal equity.

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1. Introduction

In recent years, artificial intelligence (AI) has emerged as a transformative force in healthcare, reshaping how care is delivered, monitored, and evaluated. From algorithmic triage systems and predictive analytics to clinical decision-support tools and automated documentation (Sony et al., 2025a, 2025b, 2025c), AI-driven technologies are increasingly embedded in everyday nursing practice (Alzghaibi, 2025). These developments are often presented as solutions to persistent healthcare challenges, particularly in contexts marked by workforce shortages and rising demand for services (Alzghaibi, 2025). While such technologies offer clear potential to improve efficiency and diagnostic accuracy (Mollah et al., 2024), their integration into nursing care raises deeper ethical questions that extend beyond technical performance.

Nursing is not only a clinical practice but also a moral and relational one, grounded in empathy, trust, and professional judgment (Alzghaibi, 2025; Park et al., 2025). The increasing reliance on AI systems challenges these foundations by introducing algorithmic reasoning into decision-making processes traditionally guided by human discretion (Chen et al., 2025). Scholars in digital ethics and the philosophy of technology argue that AI systems are not neutral tools but socio-technical constructs that embed values, biases, and institutional priorities within their design and deployment (Hanna et al., 2025; Park et al., 2025). In the context of nursing, this raises important concerns about how responsibility is assigned when clinical decisions are influenced—or shaped—by algorithmic outputs (Wei et al., 2025). As a result, accountability may become blurred, with responsibility distributed across nurses, healthcare institutions, and opaque technological systems (Groeneveld et al., 2025).

At its core, this transformation presents a philosophical problem concerning the nature of moral agency in AI-mediated care. Nursing practice has long assumed that nurses act as accountable moral agents, capable of exercising judgment in complex and context-sensitive situations (Joarder et al., 2021). However, when AI systems generate recommendations or guide decisions, responsibility no longer resides solely with the individual practitioner (Alzghaibi, 2025). Instead, it becomes dispersed across multiple actors and systems. This study conceptualizes this shift as a diffusion of responsibility, referring to a condition in which accountability is redistributed and partially obscured among human actors, institutional structures, and algorithmic processes. The concern is not simply that responsibility is reduced, but that its boundaries become unclear, raising questions about who is ultimately answerable for patient outcomes.

Global governance frameworks have begun to address these concerns by promoting principles such as transparency, fairness, accountability, and human oversight (Bean et al., 2025; van Norren, 2023). However, these frameworks often remain aspirational and lack effective implementation mechanisms, particularly in low- and middle-income countries where regulatory infrastructures are still evolving. Moreover, they are largely shaped by perspectives from high-income contexts and may not adequately reflect the socio-economic realities, institutional constraints, and professional dynamics present in the Global South (Bean et al., 2025; Sony et al., 2025a, 2025b, 2025c). As a result, a significant gap emerges between global ethical principles and local governance practices.

This gap is especially visible in Bangladesh, where digital health initiatives have expanded rapidly in recent years (Alam et al., 2025; Rahman et al., 2022). The adoption of AI-supported systems in diagnostics, telehealth, and health data management is gradually reshaping healthcare delivery (Bhuiyan et al., 2025). In practice, nurses may interact with decision-support systems that prioritize patients, flag clinical risks, or recommend interventions based on predictive models. While these tools can enhance efficiency, they also introduce new ethical tensions. For instance, when an algorithm suggests a course of action that conflicts with a nurse's clinical judgment, it becomes unclear whether the nurse should defer to the system or exercise independent

discretion. Such situations highlight the complex interplay between technological authority and professional responsibility.

At the same time, the nursing profession in Bangladesh operates within structural constraints, including workforce shortages, hierarchical clinical cultures, and evolving professional recognition (Joarder et al., 2021). These conditions shape how technologies are adopted and used in practice, often limiting the capacity of nurses to question or override algorithmic recommendations. Despite these realities, existing regulatory and policy frameworks in Bangladesh remain fragmented and largely silent on the ethical implications of AI in nursing care (Ramadan et al., 2024). Current policies tend to prioritize technological adoption and system efficiency while offering limited guidance on issues such as accountability, professional autonomy, and relational care. This regulatory gap places nurses in ethically precarious positions, where they are expected to rely on AI systems without clear frameworks to guide their responsibilities or protect their professional judgment. In response to these challenges, this study critically examines the ethical, professional, and societal implications of artificial intelligence in nursing care in Bangladesh, with particular attention to governance frameworks, professional autonomy, and relational care. To achieve this objective, the study addresses the following questions:

1. How is ethical responsibility configured in AI-divern nursing care?
2. What governance mechanisms regulate AI use in nursing practice in Bangladesh?
3. How does AI reshape societal values such as equity, trust, and human dignity in care?

The central rationale of this inquiry is that the integration of AI into nursing care is not merely a technical or administrative development but a transformation with profound ethical and societal implications. Without context-sensitive governance frameworks and adequate institutional support, AI risks creating ambiguity in responsibility, constraining nurses' moral agency, and weakening the relational foundations of care. By situating Bangladesh as a critical analytical lens, this study highlights how globally articulated ethical principles require reinterpretation within specific socio-cultural and institutional contexts. The Nursing educational upgradation and inclusion of AI uses in both diplomas, basic and post basic curriculum. The entry criteria in nursing education keeping up with the world should be upgraded. In doing so, it seeks to contribute a more grounded and humanistic understanding of AI ethics in nursing, particularly within the Global South.

2. Theoretical framework

This study adopts an interdisciplinary theoretical framework that brings together care ethics, moral agency, and relational autonomy to examine the ethical dimensions of AI in nursing practice. Care ethics serves as the primary lens (Gilligan, 2011), positioning nursing as a fundamentally relational practice grounded in attentiveness, responsibility, and responsiveness rather than abstract rule-based decision-making. Within this framework, moral agency is used to explore how nurses exercise ethical judgment in contexts where AI systems increasingly shape clinical decisions. Rather than assuming that technology simply constrains professional autonomy, this approach recognizes that AI can reconfigure how responsibility is understood and enacted in practice. Relational autonomy further extends this analysis by emphasizing that nurses' decision-making capacities are not purely individual but are shaped by institutional hierarchies, professional norms, and technological infrastructures.

In addition, the study incorporates a social justice perspective to critically assess how AI integration may reinforce or challenge existing inequalities in healthcare systems (Roy et al., 2022). This is particularly relevant in the Bangladeshi context, where disparities in access, digital literacy, and institutional capacity influence how technologies are deployed and experienced. By combining these theoretical perspectives,

the study moves beyond technocratic evaluations of AI and instead examines how ethical responsibility, professional identity, and equitable care are negotiated within specific socio-institutional settings. This integrated framework enables a context-sensitive analysis of governance gaps and highlights the need for ethical approaches that align technological innovation with the humanistic foundations of nursing practice.

3. Mapping ethical, governance, and societal discourses on AI in nursing care

The expanding body of scholarship (e.g., [Chen et al. \(2025\)](#); [Groeneveld et al. \(2025\)](#); [Wei et al. \(2025\)](#)) on AI in healthcare reflects an era marked by rapid technological innovation and an enduring faith in digital solutions to systemic health challenges. Much of this literature situates AI within a paradigm of optimization, emphasizing improvements in diagnostic accuracy, predictive capacity, and administrative efficiency ([Alzghaibi, 2025](#); [Groeneveld et al., 2025](#)). Within nursing scholarship, AI is frequently framed as an assistive mechanism designed to alleviate documentation burdens, streamline workflows, and enhance clinical decision-making ([Alruwaili et al., 2025](#)). While these narratives underscore tangible operational benefits, they often advance a technologically deterministic view that sidelines the ethical, relational, and societal dimensions of nursing care ([Alruwaili et al., 2025](#)). As a result, AI is commonly portrayed as an external enhancement to practice rather than as an intervention ([Michalowski et al., 2026](#)) that fundamentally reshapes caregiving relations, professional identities, and moral responsibilities.

Critical perspectives emerging from ethics, science and technology studies ([Sony et al., 2025a, 2025b, 2025c](#)), and the philosophy of care contest this instrumentalist framing by emphasizing that AI systems are neither neutral nor value-free ([Michalowski et al., 2026](#)). Rather, algorithms encode assumptions, priorities, and power relations that reflect the social and institutional contexts in which they are designed and deployed ([Sony et al., 2025a, 2025b, 2025c](#)). In healthcare, these embedded values become ethically salient when algorithmic outputs influence clinical judgments, patient prioritization, and risk assessment ([Alam et al., 2025](#)). For nurses, whose professional practice is deeply rooted in ethical reasoning, empathy, and contextual judgment, the increasing reliance on AI introduces tensions between human discretion and machine rationality ([Alruwaili et al., 2025](#); [Alzghaibi, 2025](#); [Ramadan et al., 2024](#)). The literature highlights concern that algorithm-assisted decision-making may constrain nurses' moral agency ([Ramadan et al., 2024](#)), particularly when institutional policies prioritize compliance with technological systems over professional judgment ([Groeneveld et al., 2025](#)).

Alongside ethical inquiry, governance-oriented scholarship has sought to articulate normative frameworks for responsible AI in healthcare ([Liang, 2026](#)). International guidelines advanced by organizations such as the WHO and UNESCO emphasize principles of transparency, accountability, fairness, and human oversight as foundational to ethical AI deployment ([Bean et al., 2025](#); [van Norren, 2023](#)). While these frameworks contribute significantly to global normative discourse, scholars argue that they remain largely aspirational and insufficiently operationalized within national regulatory regimes or clinical settings ([Bean et al., 2025](#); [van Norren, 2023](#)). Moreover, governance debates often privilege macro-level concerns—such as innovation policy, data governance, and system efficiency ([Tyagi et al., 2024](#))—while neglecting the micro-ethical realities of frontline care. Nurses, despite their central role in mediating patient interactions with digital systems ([Michalowski et al., 2026](#)), remain marginal figures in policy discussions on AI governance.

Moreover, the relational and humanistic dimensions of nursing have been increasingly foregrounded in sociological and nursing ethics literature responding to the digitization of healthcare. Studies examining electronic health records, telehealth platforms, and clinical decision-support tools suggest ([Groeneveld et al., 2025](#); [Joarder et al.,](#)

[2021](#)) that technology reshapes communication practices, redistributes emotional labor, and alters trust dynamics between nurses and patients ([Alruwaili et al., 2025](#); [Ramadan et al., 2024](#)). AI intensifies these transformations by introducing predictive and prescriptive elements into care encounters ([Ramadan et al., 2024](#)). Patients may come to perceive algorithmic recommendations as objective or authoritative, while nurses are tasked with interpreting, translating, and sometimes contesting these outputs ([Wei et al., 2025](#)). The literature reflects an ongoing ambivalence: while AI may enhance informational capacity, it risks attenuating the embodied, empathetic, and narrative aspects of care that are foundational to nursing ethics.

Despite these critical insights, a significant proportion of existing scholarship (e.g., [Chen et al. \(2025\)](#); [Groeneveld et al. \(2025\)](#)) remains geographically and culturally situated within high-income countries. Studies from North America and Europe often presume the existence of robust regulatory institutions, stable digital infrastructures, and established professional protections for nurses ([Leslie et al., 2023](#)). In contrast, scholars examining digital health in low- and middle-income countries highlight structural vulnerabilities, including weak governance mechanisms, limited data protection regimes, and pronounced socio-economic inequalities ([Alam et al., 2025](#); [Rahman et al., 2022](#)). In such settings, AI technologies are frequently introduced as cost-effective solutions to resource scarcity ([Hasan & Sony, 2022](#)), yet their ethical implications receive comparatively limited scrutiny ([Bean et al., 2025](#); [van Norren, 2023](#)). This asymmetry in the literature raises concerns that global ethical frameworks may inadequately capture the lived realities of nurses and patients in the Global South.

Further, within South Asian contexts, and Bangladesh in particular, academic engagement with digital health has largely focused on telemedicine, mobile health interventions, and health information systems aimed at expanding access and improving service delivery ([Alam et al., 2025](#); [Bhuiyan et al., 2025](#)). These studies often highlight innovation, scalability, and public-private partnerships, framing technology as a developmental imperative ([Alam et al., 2025](#); [Bhuiyan et al., 2025](#)). Ethical considerations—when addressed—tend to be confined to data privacy, consent, and infrastructural readiness, rather than broader questions of professional ethics, moral agency, and societal impact ([Bean et al., 2025](#); [Lund et al., 2025](#)). Notably, there is a paucity of scholarship examining how AI-mediated technologies intersect with nursing practice, despite nurses' pivotal role in operationalizing digital health initiatives and sustaining patient care at the frontline.

Furthermore, doctrinal analyses of AI governance in Bangladesh's healthcare sector remain underdeveloped. Existing legal and policy instruments addressing digital technologies are fragmented ([Bean et al., 2025](#)) and primarily oriented toward information and communication technologies more broadly ([Hasan & Sony, 2022](#); [Lund et al., 2025](#)), rather than AI-specific applications in care. This regulatory lacuna leaves critical ethical questions unresolved: Who bears responsibility when AI-informed decisions result in harm? How are nurses expected to reconcile professional accountability with algorithmic authority? And to what extent do current governance structures protect patients and healthcare workers from societal risks such as exclusion, bias, and loss of human dignity in care? The absence of clear normative guidance amplifies ethical uncertainty and places nurses in precarious professional and moral positions.

Taken collectively, the literature reveals a persistent disjunction between the rapid adoption of AI in healthcare and the slower development of ethically grounded, context-sensitive governance frameworks, particularly in relation to nursing care in the Global South. While global ethical principles offer valuable starting points, they require critical reinterpretation through local socio-cultural, institutional, and professional lenses. This gap underscores the necessity of a doctrinal approach that systematically interrogates ethical norms, governance arrangements, and societal values shaping AI use in nursing care. By situating Bangladesh within this broader scholarly and normative landscape, the present study seeks to contribute a critical, humanistic

perspective that foregrounds nursing ethics and societal responsibility in the ongoing digital transformation of care.

4. Methodology

Following Sony et al. (2025a, 2025b, 2025c), This study employs a doctrinal and interpretive approach to address the research questions outlined in the Introduction, particularly those concerning how ethical responsibility is defined, what governance mechanisms regulate AI in nursing, and how these technologies reshape professional autonomy and relational care in Bangladesh. The methodological orientation is designed to examine normative structures rather than empirical behavior, allowing the study to interrogate how legal and policy frameworks construct, distribute, or obscure responsibility within AI-mediated healthcare environments.

A doctrinal method is appropriate for this inquiry because it enables a systematic examination of authoritative texts—laws, policies, ethical codes, and institutional guidelines—to identify internal inconsistencies, regulatory absences, and conceptual ambiguities. The study treats these documents as the primary units of analysis, not as neutral descriptions but as normative instruments that shape professional conduct and institutional accountability. In this sense, the method aligns with the study's central concern: the emergence of a “diffusion of responsibility,” understood here as a condition in which accountability becomes fragmented across human actors, technological systems, and institutional frameworks without clear mechanisms for attribution or resolution.

The analytical corpus was constructed through a structured and transparent selection process. Three categories of documents were included: (i) international normative frameworks relevant to AI and healthcare governance; (ii) national legal and policy instruments from Bangladesh addressing digital health, data governance, and healthcare regulation; and (iii) professional standards and ethical guidelines governing nursing practice. Documents were identified through systematic searches of publicly accessible sources, including government portals, institutional repositories, and international organization databases. The search process was guided by clearly defined keywords such as “digital health governance,” “AI in healthcare,” “nursing ethics,” “professional accountability,” and “health data regulation.”

To ensure relevance and consistency, the study applied explicit inclusion and exclusion criteria. Included documents were those published between 2010 and 2025, formally issued by recognized authorities, and directly related to healthcare governance, professional standards, or data regulation. Documents lacking institutional authority, those unrelated to healthcare practice, or those without clear ethical or regulatory implications were excluded. This approach ensured that the final corpus reflects the contemporary governance landscape while remaining analytically focused.

The interpretive analysis proceeded through a structured, multi-stage process. First, all selected documents were read in full to establish contextual understanding and to categorize them according to their primary regulatory focus. Second, relevant sections were coded thematically, guided by key ethical domains such as accountability, autonomy, privacy, equity, and relational care. These domains were not treated as isolated categories but as interconnected dimensions through which governance frameworks articulate professional responsibility.

Third, the coded material was examined through an interpretive lens informed by care ethics, theories of moral agency, and principles of social justice. Rather than imposing these frameworks mechanically, the analysis used them to interrogate how responsibility is constructed within the texts. For example, provisions related to clinical decision-making were analyzed to determine whether they assign clear responsibility to healthcare professionals or defer accountability to technological systems. Similarly, data governance policies were examined to assess whether they support or constrain relational forms of care that are central to nursing practice.

A key analytical step involved identifying “normative gaps,” defined

as discrepancies between established ethical expectations and the regulatory provisions found within the corpus. These gaps were identified through comparative reading across international and national frameworks, highlighting areas where local policies fail to translate broader ethical principles into operational guidance. This process allowed the study to move beyond descriptive analysis and develop a critical account of how governance structures shape professional responsibility in practice.

To enhance transparency, the study maintains a clear audit trail by documenting the selection criteria, sources, and analytical procedures. All documents are cited using standardized academic conventions, including institutional authorship and publication details, enabling other researchers to trace and reassess the same materials. While doctrinal research does not aim for statistical replicability, this level of documentation supports analytical reproducibility by making the interpretive process visible and open to scrutiny. Given the centrality of textual analysis, the study also incorporates selected verbatim excerpts from key policy documents where necessary to illustrate how specific clauses inform the interpretation. These excerpts are used sparingly but strategically to strengthen the evidentiary basis of the analysis and to demonstrate the link between textual provisions and the study's conclusions.

To further improve clarity and accessibility, the study is supported by structured tables that summarize the analytical corpus and map the relationships between global ethical principles and national regulatory frameworks. Table 1 provides a structured overview of the analytical corpus, demonstrating the multi-layered nature of the study's doctrinal foundation. By bringing together international normative frameworks (e.g., WHO and UNESCO), national policy instruments from Bangladesh, and professional nursing standards (BNMC and ICN), the table illustrates how the analysis draws on interconnected governance levels. This composition reflects the study's effort to move beyond isolated policy review and instead situate AI-related ethical concerns within a broader regulatory ecosystem. The table also highlights the thematic diversity of the sources—ranging from data governance and digital health strategy to professional ethics—thereby establishing the scope and rigor of the document selection process.

Finally, ethical considerations were addressed in accordance with standard academic practice. As the study relies exclusively on publicly available documents and does not involve human participants or sensitive data, formal ethical approval was not required. However, the research adheres to principles of academic integrity, accurate representation of source materials, and responsible interpretation of policy texts.

5. Ethical and governance tensions in AI-mediated nursing care: evidence from the literature

A robust body of literature underscores that the integration of artificial intelligence into nursing practice raises profound ethical and governance concerns that extend far beyond technical performance. Systematic reviews of nursing and healthcare AI research consistently identify patient autonomy, data privacy, algorithmic bias, accountability, and the nurse–patient relationship as the dominant ethical domains warranting scrutiny. For example, a recent systematic synthesis of studies on AI in nursing practice found that concerns related to patient autonomy (67 %), privacy (61 %), accountability (49 %), equity and bias (42 %), and strains on relational care regularly recur across research contexts (Bodur et al., 2025). Notably, the opacity of AI systems was shown to hinder informed consent and shared decision-making, especially when algorithmic logic is not transparent to either clinician or patient.

Closely intersecting with autonomy is the ethical challenge of accountability in AI-supported decision-making. Reviews of ethics and regulatory literature highlight that existing governance frameworks often fail to delineate who should be held responsible when AI

Table 1
Summary of analytical corpus.

Document Title	Issuing Authority	Year	Category	Core Ethical/Governance Theme
Ethics and Governance of Artificial Intelligence for Health	World Health Organization (WHO)	2021	International	AI ethics, accountability, transparency, human oversight
Global Strategy on Digital Health 2020–2025	World Health Organization (WHO)	2020	International	Digital health governance, equity, system strengthening
Recommendation on the Ethics of Artificial Intelligence	UNESCO	2021	International	Human rights, fairness, accountability, AI governance
Guidance on Artificial Intelligence and Data Protection	World Health Organization (WHO)	2021	International	Data governance, privacy, ethical AI deployment
Digital Bangladesh Vision 2021	Government of Bangladesh	2009 (policy trajectory to 2021)	National	Digital transformation, ICT integration, service modernization
National Health Policy 2011	Ministry of Health and Family Welfare (MoHFW)	2011	National	Healthcare governance, service delivery, regulatory oversight
Digital Health Strategy of Bangladesh	Directorate General of Health Services (DGHS)	2020	National	Digital health systems, interoperability, service efficiency
National Artificial Intelligence Policy (Draft 2026–2030)	Government of Bangladesh	Draft (2026)	National	AI governance, innovation, accountability, transparency (high-level principles)
Data Protection Framework/Data Protection Act (Drafts)	Government of Bangladesh	2018–2023 (drafts)	National	Data privacy, data security, regulatory oversight
Information and Communication Technology Act/Digital Security Act	Government of Bangladesh	2006/2018	National	Cyber governance, digital regulation, accountability
Code of Ethics for Nurses	Bangladesh Nursing and Midwifery Council (BNMC)	Latest available	Professional	Professional ethics, patient care, accountability
Standards for Nursing Practice	Bangladesh Nursing and Midwifery Council (BNMC)	Latest available	Professional	Clinical standards, professional conduct, role expectations
The ICN Code of Ethics for Nurses	International Council of Nurses (ICN)	2021	Professional	Moral agency, relational care, ethical responsibility

(Author Produces, 2026)

influences clinical choices (Chen et al., 2025; Ramadan et al., 2024; Wei et al., 2025). This problem is particularly acute in nursing, as nurses may be expected to act on algorithmic recommendations without clear legal or professional guidance on liability for adverse outcomes (Mohammed et al., 2025). In turn, this ambiguity amplifies moral distress among nurses (Mohammed et al., 2025), who simultaneously occupy roles as both caregivers and implementers of technologies about which they have limited control or understanding.

Data privacy and security emerge as another recurring ethical domain. AI systems in healthcare rely on large quantities of sensitive personal data, including health histories and real-time monitoring outputs. Scholars have noted that unregulated or poorly governed data flows can compromise patient confidentiality unless robust ethical safeguards are in place (Alnawafleh et al., 2025; Zhong et al., 2025). Nurses, occupying a frontline position in data collection and interpretation (Zhong et al., 2025), are ethically obligated to protect privacy but often lack adequate legal and institutional support to do so effectively (Alnawafleh et al., 2025).

The literature also documents widespread concern about algorithmic bias and equity, with scholars demonstrating that AI systems trained on non-representative data can inadvertently perpetuate existing disparities in care delivery (Zhong et al., 2025). Bias may stem from skewed training datasets or inadequate representation of diverse population groups (Alnawafleh et al., 2025), leading to unequal predictive accuracy or treatment recommendations for historically marginalized patients (Badawy et al., 2025). Although much of this research spans broader healthcare contexts, its implications for nursing are salient given nurses' ethical commitment to equitable care.

Empirical qualitative studies further validate these concerns from the perspective of practitioners themselves. For instance, clinical nurses interviewed across different healthcare systems expressed ethical and psychological worries related to AI use (Alruwaili et al., 2025), including fears of professional redundancy (Bodur et al., 2025), emotional disconnection from patients (Ramadan et al., 2024), erosion of clinical judgment (Chen et al., 2025), and loss of therapeutic presence in care (Almagharbeh et al., 2025). These studies draw attention to nurses' lived experiences of AI implementation, revealing that technology can sometimes undermine rather than support the relational and

humanistic dimensions of nursing — core ethical commitments of the profession.

Additional qualitative research focusing on nurses' views about privacy and ethics confirms that providers perceive AI adoption as an ethical crossroads. Nurses articulated multiple thematic concerns, including the complexity of ethical decision-making in AI contexts (Arcadi, 2025), threats to privacy and confidentiality, tensions between innovation and ethical practice (Alnawafleh et al., 2025), and the challenge of preserving compassionate, patient-centered care in the face of automation (Almagharbeh et al., 2025; Badawy et al., 2025). These firsthand accounts reinforce the position that ethical dilemmas are not abstract but embedded in everyday clinical practice and communication.

Furthermore, cross-disciplinary review articles on AI ethics in healthcare emphasize that the ethical challenges faced in nursing reflect deeper structural and governance issues. Scholar like Nasir et al. (2025) argue that AI's integration into clinical practice requires balancing innovation with safeguards for trust, autonomy, justice, and fairness. Without policies that explicitly address these ethical domains — including accountability, consent, privacy, and equity — safety concerns and inequitable outcomes can proliferate.

Importantly, recent literature also highlights the need for ethical and educational preparedness among nursing professionals. Studies indicate a gap in nurses' understanding of AI systems and a limited sense of preparedness to engage with ethical challenges inherent in algorithmic decision-making (Arcadi, 2025; Badawy et al., 2025). This gap points to a broader governance issue: ethical integration of AI cannot be achieved without investing in nursing education that foregrounds digital literacy, ethical reasoning, and critical engagement with technology.

In addition to clinical and ethical impacts, scholarly work has drawn attention to societal implications, such as the risk of reinforcing health disparities and undermining patient trust. For example, broader healthcare AI research has documented how bias in widely used systems — including commercial chatbots (Kwak et al., 2022)— can propagate racial or demographic disparities (Sony et al., 2025a, 2025b, 2025c), underscoring the importance of fairness assessments and inclusive model development. Collectively, this evidence demonstrates that ethical and governance tensions in AI-mediated nursing care is not only

well-documented across multiple research designs but are also deeply experiential and systemic in nature. Ethical concerns span individual autonomy, relational care, privacy, equity, and professional responsibility, and they coalesce into a pattern of critical gaps in both policy and practice. This confluence of issues casts into sharp relief the necessity of governance frameworks that are not only technologically informed but deeply rooted in nursing's humanistic and ethical commitments.

6. Key insights from the doctrinal analysis

The doctrinal examination of ethical, legal, and policy texts, combined with international guidelines and professional standards, reveals a complex and often fragmented landscape for AI integration in nursing care in Bangladesh. One of the most striking insights is the diffusion of moral responsibility inherent in AI-assisted decision-making (Sony et al., 2025). Nurses, who are traditionally the final arbiters of patient care, increasingly rely on algorithmic recommendations that may carry implicit authority (Joarder et al., 2021). This shift creates ambiguity about accountability when clinical decisions lead to adverse outcomes (Almagharbeh et al., 2025). International frameworks, such as those provided by the WHO and UNESCO (Table 2), emphasize the necessity of human oversight and ethical responsibility (Bean et al., 2025). Yet, the translation of these principles into actionable national policies in Bangladesh remains limited. Consequently, nurses may find themselves ethically accountable for decisions while possessing insufficient authority to challenge or override AI outputs, a concern supported by recent qualitative studies highlighting nurses' anxiety about responsibility in AI-mediated care.

However, the expanded matrix (Table 2) provides a more sophisticated and policy-grounded picture of Bangladesh's emerging AI governance landscape, particularly by incorporating the Draft National AI Policy (2026–2030) alongside existing sectoral instruments. A clear pattern emerges: while the draft policy introduces normative alignment with global principles—such as accountability, transparency, and inclusion—it remains largely aspirational and high-level, without translating these commitments into operational or clinically actionable mechanisms. For instance, across domains such as accountability, human oversight, and data governance, the policy signals intent but does not define role-based liability, decision hierarchies, or clinical consent procedures, which are essential for frontline nursing practice. This reinforces the study's central argument that regulatory evolution in Bangladesh is occurring at the level of policy rhetoric rather than institutional specification, thereby sustaining the “regulatory silence” previously identified rather than resolving it.

At a deeper analytical level, Table 2 reveals a systematic misalignment between technocratic governance and relational-professional ethics. The National AI Policy strengthens digital governance narratives—data protection, transparency, and innovation—but remains largely disconnected from nursing-specific ethical domains, particularly relational care and moral agency. Notably, the absence of any reference to nurse–patient relationships or care ethics within the AI policy highlights a critical blind spot: AI governance is being constructed as a technical and administrative issue rather than a socio-professional one. This gap is further compounded by weak attention to implementation inequalities, where commitments to equity are not supported by enforceable strategies addressing rural–urban disparities or institutional capacity gaps. Overall, the table demonstrates that while Bangladesh is moving toward global AI governance convergence, the current framework risks producing a form of “formal compliance without practical coherence,” where ethical principles are acknowledged but remain insufficiently embedded in the lived realities of healthcare delivery.

Another critical insight concerns the impact of AI on professional autonomy and relational care. Doctrinal analysis suggests that the authority of algorithms can inadvertently constrain nurses' judgment,

Table 2
Matrix of governance gaps.

Global Ethical Principle	International Reference	National Regulatory Instrument (Bangladesh)	Identified Gap
Accountability in AI-assisted decision-making	WHO (2021); UNESCO (2021)	Digital Health Strategy (2020); Health Policy (2011); National AI Policy (Draft 2026–2030)	While the AI Policy introduces high-level accountability principles, it does not specify clinical liability frameworks or role-based accountability for nurses in AI-mediated decision-making
Data privacy and patient consent	WHO (2021); UNESCO (2021)	Draft Data Protection Framework; Digital Security Act (2018); National AI Policy (Draft)	Emphasis on data governance exists, but no operational guidance for clinical consent, secondary data use, or AI training datasets in healthcare contexts
Human oversight and professional autonomy	WHO (2021)	Health Policy (2011); BNMC Standards; National AI Policy (Draft)	The policy endorses human oversight in principle but lacks clear articulation of decision hierarchy between clinicians and AI systems in practice
Equity and access in digital health	WHO (2020); UNESCO (2021)	Digital Bangladesh Vision; Digital Health Strategy (2020); National AI Policy (Draft)	Strong rhetorical commitment to inclusion, but no enforceable mechanisms addressing rural–urban disparities or digital capacity gaps in healthcare delivery
Transparency and explainability of AI systems	UNESCO (2021); WHO (2021)	ICT Act/Digital Security Act; National AI Policy (Draft)	The policy promotes transparency but does not mandate explainability standards for clinical AI tools used by healthcare professionals
Protection of relational care in nursing	ICN Code of Ethics (2021)	BNMC Code of Ethics; (Not addressed in AI Policy)	The AI Policy is technically oriented, with no recognition of relational care, empathy, or nurse–patient interaction as ethical domains affected by AI
Responsibility and moral agency of healthcare professionals	ICN Code (2021); UNESCO (2021)	BNMC Standards; Health Policy (2011); National AI Policy (Draft)	Responsibility remains diffused across institutions, developers, and practitioners, with no framework to preserve or operationalize nurses' moral agency
Social justice and inclusion	UNESCO (2021); WHO (2020)	National Digital Policies; National AI Policy (Draft)	Although equity is framed as a policy goal, there is limited attention to structural inequalities in algorithmic bias, dataset

(continued on next page)

Table 2 (continued)

Global Ethical Principle	International Reference	National Regulatory Instrument (Bangladesh)	Identified Gap
			representation, or healthcare marginalization

(Author Produces, 2026)

particularly in hierarchical healthcare environments where clinical decision-making is already structured around physician oversight. Studies of telehealth and digital nursing practices illustrate that algorithmic interventions can alter communication patterns, reduce face-to-face interactions, and challenge the empathetic engagement that lies at the core of nursing ethics (Alam et al., 2025). In Bangladesh, where nurses often work under significant structural constraints (Joarder et al., 2021), these dynamics may heighten the tension between efficiency-driven technological protocols and the moral imperative to provide compassionate, patient-centered care.

The review further highlights the fragmented nature of ethical and legal governance. While global guidelines articulate principles of transparency, fairness, and accountability, Bangladeshi regulations addressing AI-specific applications in healthcare are sparse and largely generalized under broader digital health policies (Almagharbeh et al., 2025). For instance, data privacy regulations exist but often fail to consider the nuanced responsibilities of nurses as intermediaries who collect, interpret, and manage patient information within AI systems (Almagharbeh et al., 2025). This regulatory lacuna not only exposes nurses to ethical and legal vulnerabilities but also risks undermining patient trust, a cornerstone of effective care.

Equally significant are the societal implications of AI adoption, particularly in contexts marked by socio-economic disparities. Algorithms trained on non-representative datasets can inadvertently reproduce inequities, disadvantaging marginalized populations and challenging nursing's ethical commitment to social justice (Sony et al., 2025a, 2025b, 2025c; van Norren, 2023). In Bangladesh, where access to healthcare remains uneven (Mahzebin & Sony, 2026; Rahman et al., 2022), uncritical implementation of AI technologies could exacerbate disparities rather than mitigate them. The analysis underscores the need for governance mechanisms that explicitly address fairness, inclusivity, and the protection of vulnerable populations, ensuring that AI serves not only operational goals but also the broader ethical mission of nursing.

Finally, the analysis underscores that the effectiveness of emerging governance instruments, including the National AI Policy (2026–2030, Draft), remains contingent on institutional preparedness and professional capacity. While the policy articulates broad commitments to accountability, transparency, and inclusion, it does not translate these principles into operational guidance for clinical settings, particularly in relation to nursing practice. This gap reinforces the need for targeted investment in digital literacy, ethical reasoning, and context-specific training for healthcare professionals. Without such capacity-building, high-level regulatory frameworks risk remaining aspirational, offering limited practical support for navigating the ethical complexities of AI-mediated care (Badawy et al., 2025). In this sense, the challenge is not solely regulatory absence but the lack of institutional mechanisms that enable ethical principles to be enacted in everyday clinical decision-making.

In sum, the doctrinal analysis reveals a layered governance landscape in which global ethical standards, national policy ambitions, and professional codes remain only partially aligned. Even with the introduction of the National AI Policy, critical gaps persist in clarifying accountability, safeguarding professional autonomy, and addressing structural inequities in healthcare delivery. These findings suggest that the current framework places healthcare professionals within an

ethically uncertain environment, where responsibilities are insufficiently specified and support mechanisms remain underdeveloped. Addressing these challenges requires not only formal policy development but also context-sensitive implementation strategies that integrate ethical governance with institutional capacity, thereby aligning AI adoption with the relational and humanistic foundations of nursing practice.

7. Discussion

This paper argues that the integration of artificial intelligence in nursing care in Bangladesh fundamentally reconfigures how responsibility, professional autonomy, authenticity, and relational care are understood and governed. Drawing on a doctrinal analysis of international ethical frameworks and national regulatory instruments, the study shows that the core issue is not simply the adoption of new technologies, but the emergence of a normative gap in which existing legal and ethical structures fail to adequately account for AI-mediated decision-making. While AI systems are often presented as tools that enhance efficiency and clinical accuracy, this analysis suggests that their incorporation into nursing practice raises unresolved questions about accountability and moral agency within complex institutional settings.

In contrast to a large body of literature that prioritizes technological performance and operational gains (Almagharbeh et al., 2025; Alruwaili et al., 2025; Badawy et al., 2025), this study shifts attention to the ethical and professional dimensions of care. Existing studies (e.g., Alnawafleh et al. (2025); Badawy et al. (2025); Kwak et al. (2022); Mohammed et al. (2025)) demonstrate the benefits of AI-assisted diagnostics, predictive analytics, and telehealth systems. However, they tend to underemphasize how these technologies reshape the relational dynamics between nurses and patients. This analysis suggests that when algorithmic outputs begin to influence or guide clinical judgment, responsibility is not simply transferred but becomes reconfigured across human and technological actors. Without clear regulatory articulation, this redistribution of responsibility creates ambiguity in professional accountability and challenges the ability of nurses to exercise independent ethical judgment, particularly in hierarchical healthcare environments such as those in Bangladesh.

The findings further indicate that Bangladesh's existing governance structures remain fragmented and insufficiently aligned with global AI ethics principles (Bean et al., 2025). Although international frameworks promote values such as transparency, fairness, and human oversight, their translation into national policy remains limited and often generalized. This study demonstrates that the absence of AI-specific provisions within Bangladeshi health and data governance frameworks produces a regulatory lacuna, where nurses operate without clear guidance on liability, consent, or decision-making authority in AI-supported care. Rather than attributing this solely to technological lag, the analysis suggests that these gaps reflect broader structural constraints, including limited institutional capacity, uneven digital literacy, and entrenched professional hierarchies. In this sense, the Bangladeshi case illustrates how global ethical aspirations encounter context-specific limitations, reinforcing the need for locally grounded interpretations of AI governance (Bean et al., 2025; van Norren, 2023).

Another key contribution of this study lies in its focus on the societal and distributive implications of AI integration. While prior research often frames AI as a neutral tool for improving healthcare outcomes (Wei et al., 2025), this analysis highlights that algorithmic systems can reproduce or intensify existing inequalities if they are not carefully governed. In the context of Bangladesh, where disparities in healthcare access and infrastructure persist, the deployment of AI without context-sensitive safeguards risks marginalizing already vulnerable populations (Sony et al., 2025). The study therefore positions AI adoption as an inherently ethical and political process, one that must be evaluated not only in terms of efficiency but also in relation to equity, fairness, and the preservation of human-centered care.

At the same time, it is essential to distinguish between the doctrinal insights derived from the analysis of Bangladeshi regulatory texts and the broader theoretical concerns reflected in global scholarship. This study does not present empirical evidence of nurses' lived experiences; rather, it demonstrates that the existing regulatory architecture—including the Draft National AI Policy (2026–2030)—remains largely normative and aspirational, lacking the operational specificity required to address ethical tensions in clinical practice. While the AI policy introduces high-level commitments to accountability, transparency, and human oversight, it does not articulate role-based liability, clinical decision hierarchies, or safeguards for professional autonomy and relational care. Consequently, the analysis shows that the structure and content of current policies not only leave key governance questions unresolved but also reproduce a form of regulatory ambiguity in which accountability is diffused and ethical responsibilities in AI-mediated nursing practice remain insufficiently defined.

Taken together, the analysis underscores that the governance challenge in Bangladesh is not only a matter of regulatory absence but also of institutional preparedness. Addressing this gap requires more than the introduction of new policies; it calls for context-sensitive approaches that account for local healthcare hierarchies, resource constraints, and educational capacities. This includes developing clearer guidelines on professional liability in AI-assisted care, strengthening institutional support for ethical decision-making, and integrating digital literacy and moral reasoning into nursing education. By situating these recommendations within the specific socio-institutional context of Bangladesh, the study offers a grounded contribution to ongoing debates on AI ethics, while also providing a framework that may inform similar discussions across other Global South settings.

8. Policy implications

The findings suggest that this study can directly inform the development and refinement of Bangladesh's Draft National AI Policy (2026–2030) by translating its high-level ethical commitments into context-specific, operational guidance for healthcare practice. In particular, the analysis identifies the need for the policy to move beyond general principles of accountability and transparency by introducing role-based liability frameworks, clearly defining how responsibility is distributed among nurses, healthcare institutions, and AI developers in clinical decision-making. The study also highlights the importance of embedding explicit provisions on professional autonomy and human oversight, ensuring that AI systems function as supportive tools rather than authoritative substitutes in nursing care. Furthermore, it provides a basis for incorporating relational care and nursing ethics into the policy—domains currently absent but critical for safeguarding patient-provider interactions in AI-mediated environments.

Besides, collaboration with technology providers, policymakers, and stakeholders is essential to overcome infrastructure challenges in nursing education in Bangladesh. In addition, the study offers practical direction for making the National AI Policy more context-sensitive and implementable within Bangladesh's healthcare system. It underscores the need for regulatory provisions that address hierarchical clinical structures, resource limitations, and uneven digital capacity, particularly across rural–urban settings. This includes developing enforceable standards on clinical data governance, informed consent in AI use, and mechanisms to detect and mitigate algorithmic bias. Urgent curricular reforms in academic and clinical settings are needed to prepare nurses for a technology-integrated healthcare system. Investing in digital literacy for educators and students will bridge the digital divide and support effective AI use, while effective policy implementation must also be accompanied by institutional preparedness, including investment in nursing education, digital literacy, and ethical training. Establishing clear ethical guidelines and providing ongoing training for educators will ensure responsible AI implementation. Pilot projects can help assess AI's impact on learning outcomes. By grounding global AI ethics

principles in the realities of Bangladeshi healthcare, this study provides an evidence-based framework that can help policymakers transform the National AI Policy from a largely aspirational document into a clinically actionable and ethically robust governance instrument. By addressing these challenges, AI can enhance the quality and accessibility of nursing education, preparing nurses for evolving healthcare needs.

9. Limitations

This study is limited by its doctrinal design and reliance on publicly available policy, legal, and ethical documents, which may not fully represent the complete regulatory landscape in Bangladesh. Some relevant institutional or unpublished materials may not have been accessible, and translation of Bengali-language documents may also affect interpretive shade. As a non-empirical study, it does not capture the lived experiences of nurses or patients, nor does it examine how policies are implemented in practice. The broad treatment of AI also does not distinguish between different technological applications, which may carry distinct ethical implications. Additionally, the findings may vary across different healthcare settings within Bangladesh, particularly between urban and rural contexts. Despite these constraints, the study offers a systematic basis for identifying governance gaps and guiding future empirical and policy-oriented research.

10. Conclusion

The study concludes that the integration of AI into nursing in Bangladesh exposes a significant gap between emerging clinical technologies and existing ethical and regulatory frameworks. While national policies provide broad guidance on digital health and data governance, they do not adequately address AI-specific issues such as accountability, professional autonomy, and relational care. This creates a situation of normative uncertainty in which responsibility is diffused and insufficiently defined within clinical practice. The analysis shows that these challenges are shaped by institutional and contextual factors rather than technology alone, highlighting the need for context-sensitive governance. Strengthening regulatory clarity, institutional preparedness, and nursing education is essential to ensure that AI supports rather than undermines ethical care, professional agency, and equity in the Bangladeshi healthcare system.

Data availability statement

The dataset will be made available on reasonable request from the corresponding author.

CRediT authorship contribution statement

Banga Kamal Basu: Writing – original draft, Resources, Conceptualization. **Md Shabab Ashfaq Sani:** Writing – original draft, Formal analysis. **Masnoon Salehin:** Writing – original draft, Resources, Project administration, Investigation. **Mohammad Bin Amin:** Writing – original draft, Visualization. **Mir Mohammad Azad:** Writing – original draft, Software, Data curation. **M M Abdullah Al Mamun Sony:** Writing – review & editing, Supervision, Methodology. **Zoltán Bács:** Writing – review & editing, Validation.

Informed consent and patient details

Not applicable.

Ethical approval

Not applicable.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used *Grammarly* in order to improve the Academic English since the Authors are not native speaker. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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