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Contra Legem Dilemma in Anticipating Legal and Ethical Degradation in Assisted Reproductive Services: A Systematic Review

Edwin Darmawansyah*, Arif Firmansyah
Universitas Islam Bandung, Indonesia
Email: edwin.darmawansyah@gmail.com*, arif.firmansyah@unisba.ac.id

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Abstract

The rapid advancement of assisted reproductive technologies (ART) has outpaced legal and ethical frameworks across many jurisdictions, creating regulatory gray zones where practices operate without explicit legal authorization or in potential conflict with positive law (*contra legem*). This misalignment generates legal uncertainty, ethical dilemmas, and risks of normative degradation. This systematic review aims to synthesize the literature on *contra legem* practices in ART, examine the legal and ethical dilemmas they generate, and identify strategies to anticipate and prevent normative degradation. A systematic review following PRISMA guidelines was conducted using PubMed and Scopus for studies published between January 2015 and December 2025. The Population-Exposure-Outcome (PEO) framework guided the search strategy. Studies addressing ART practices from legal, ethical, or health policy perspectives and examining *contra legem* situations were included. Data were synthesized using qualitative, narrative thematic analysis. Twelve studies met the inclusion criteria, examining surrogacy, gamete donation, postmortem embryo transfer, and cross-border reproductive care across multiple jurisdictions. The findings reveal substantial regulatory fragmentation, with *contra legem* practices arising from regulatory gaps, legal uncertainty, and the absence of international harmonization. Key ethical concerns include the commercialization of reproduction, the exploitation of vulnerable women, the instrumentalization of embryos, and the weakening of bioethical principles. Cross-border reproductive care emerges as a significant driver of legal evasion. *Contra legem* practices in ART reflect structural misalignments between technological innovation and governance frameworks. Strengthening ART governance requires comprehensive, technology-sensitive legislation, specialized oversight mechanisms, and international regulatory coordination to ensure legally secure and ethically robust reproductive health services.

INTRODUCTION

The development of assisted reproductive technologies (ART) represents one of the most transformative advances in modern medicine (Cohen et al., 2025; Haider & Ghaffar, 2023; Mapari et al., 2024; Tenchov & Zhou, 2025). Since the introduction of in vitro fertilization (IVF), innovations such as intracytoplasmic sperm injection, gamete donation, embryo cryopreservation, preimplantation genetic testing, and gestational surrogacy have expanded reproductive possibilities for individuals and couples experiencing infertility (Salama et al., 2018; Raimondi et al., 2025; IFFS, 2022). Beyond their clinical impact, these technologies have profoundly reshaped conceptions of parenthood, family formation, and the moral status

of embryos, generating persistent tensions between rapid biotechnological innovation and the capacity of legal and ethical frameworks to regulate emerging practices (Raimondi et al., 2025; Purvis, 2015; IFFS, 2022).

Within this evolving landscape, a growing number of ART practices operate in what may be described as a *contra legem* context, namely, in the absence of explicit legal authorization, within regulatory gray zones, or in potential conflict with positive law (Martiana, 2024; Judiasih & Dajaan, 2017; Rina, 2025). Such situations arise in relation to third-party gamete donation, the management and secondary use of surplus embryos, surrogacy arrangements, postmortem embryo transfer, and cross-border reproductive care (Salama et al., 2018; Raimondi et al., 2025; Sari et al., 2024). Because clinical innovation often outpaces legislative reform, clinicians, patients, and institutions are frequently exposed to legal uncertainty, disputes over parentage and civil status, and heightened ethical vulnerability (Raimondi et al., 2025; Judiasih & Dajaan, 2017; Rina, 2025).

Regulatory fragmentation across jurisdictions has further intensified these challenges (Adedokun, 2024; Li, 2025; Lin, 2024; Magrelli et al., 2025; Xu, 2025). Divergent national approaches, ranging from highly restrictive to permissive regimes, have fueled the expansion of cross-border reproductive care, whereby patients seek services prohibited in their home countries (Salama et al., 2018; Ethics Committee of the American Society for Reproductive Medicine, 2016). In these transnational contexts, practices that are lawful in one jurisdiction may generate complex legal and ethical consequences when their effects are reintroduced into more restrictive legal systems (Salama et al., 2018; Ethics Committee of the American Society for Reproductive Medicine, 2016; Pennings et al., 2008). Regulatory asymmetries and the lack of international harmonization thus constitute a major driver of *contra legem* practices in ART (Salama et al., 2018; Pennings et al., 2008; IFFS, 2022).

In Indonesia, these dilemmas are compounded by the strong influence of religious norms, moral values, and an evolving national legal framework (Purvis, 2015; Rina, 2025). Several ART practices, including gamete donation, surrogacy, and the nonreproductive use of embryos, remain either strictly prohibited or insufficiently regulated, creating regulatory gray zones with significant implications for parentage, inheritance, and professional liability (Martiana, 2024; Judiasih & Dajaan, 2017; Putri & Latumahina, 2025). Although recent reforms in reproductive health regulation reflect increasing state engagement, important legal and ethical uncertainties remain unresolved (HHP Law Firm, 2025).

From a bioethical perspective, regulatory ambiguity in ART risks facilitating the commercialization of reproduction, the exploitation of women, conflicts of interest in gamete donation, and the reduction of embryos to mere biological commodities (Raimondi et al., 2025; Rina, 2025; Biana, 2025). When law lags practice, ethical standards may be weakened, undermining core principles of autonomy, justice, nonmaleficence, and human dignity (Raimondi et al., 2025; Ethics Committee of the American Society for Reproductive Medicine, 2016).

Despite extensive debate on ART, existing scholarship remains fragmented across disciplines and often focuses on isolated practices without adopting a broader *contra legem* perspective (Alves et al., 2017; Raimondi et al., 2025). Few studies have systematically synthesized how ART practices contribute to the degradation of legal and ethical norms across jurisdictions or examined the strategies proposed to mitigate these risks (Salama et al., 2018; Raimondi et al., 2025).

Accordingly, this systematic review aims to synthesize the literature on *contra legem* practices in assisted reproductive technologies, the legal and ethical dilemmas they generate, and the regulatory and ethical strategies proposed to anticipate and prevent normative degradation (Salama et al., 2018; Raimondi et al., 2025; IFFS, 2022). By integrating cross-

disciplinary and cross-jurisdictional evidence, this review seeks to contribute to the development of more coherent and ethically robust governance frameworks for ART.

The benefits of this study are both theoretical and practical. Theoretically, this research contributes to health law, bioethics, and reproductive governance by providing a comprehensive synthesis of *contra legem* practices in ART across multiple jurisdictions. It offers a novel conceptual framework integrating legal, ethical, and regulatory perspectives, enriching scholarly discourse on the relationship between technological innovation and normative frameworks. The study also identifies recurring patterns and structural gaps that can inform future theoretical developments in medical law, reproductive ethics, and comparative health policy. Practically, this review provides valuable insights for multiple stakeholders. For policymakers and legislators, the findings offer evidence-based guidance for developing comprehensive and technology-sensitive regulatory frameworks that address existing legal gaps and anticipate future challenges. For healthcare professionals, the study enhances awareness of legal and ethical boundaries, supporting more informed clinical decision-making in contexts of regulatory uncertainty. For judicial and legal practitioners, the synthesis clarifies legal complexities surrounding parentage, inheritance, and professional liability in ART cases, contributing to more consistent jurisprudence. For international organizations, the review underscores the urgent need for harmonized standards and cross-border cooperation to mitigate risks associated with reproductive travel and regulatory asymmetry. Ultimately, by identifying effective governance strategies, this study aims to support the development of ART services that are technologically advanced, legally secure, ethically robust, and respectful of human dignity across diverse cultural and legal contexts.

METHOD

This study was conducted as a systematic review examining *contra legem* practices in assisted reproductive technologies (ART) and their associated legal and ethical implications. The review was designed and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. A Population–Exposure–Outcome (PEO) framework was used to formulate the research question and guide the development of the search strategy, eligibility criteria, data extraction, and synthesis.

The Population component comprised healthcare services and medical institutions providing assisted reproductive technologies, including fertility clinics, hospitals, obstetrics and gynecology practices, and national or regional health regulatory systems. The Exposure component referred to *contra legem* practices or deviations from positive law, health regulations, and public policies in ART services, including unlawful surrogacy, illegal gamete donation, and embryo manipulation outside existing regulatory frameworks. The Outcome component included legal conflicts and dilemmas, ethical conflicts and violations of medical ethics, risks of degradation of legal and ethical norms, and reported preventive or anticipatory strategies. Based on this framework, the review addressed the following research question: how do *contra legem* practices in assisted reproductive technologies generate legal and ethical dilemmas and risks of normative degradation, and what preventive or anticipatory strategies are reported in the literature?.

The search strategy applied is electronic database. Electronic searches were conducted in PubMed and Scopus. Search terms were developed to represent each PEO component and combined using Boolean operators. Population-related terms included “assisted reproductive technology,” “assisted reproduction,” “in vitro fertilization,” “fertility clinic,” and “reproductive medicine services.” Exposure-related terms included “*contra legem*,” “legal non-compliance,” “illegal medical practice,” “regulatory violation,” and “unlawful medical practice.” Outcome-related terms included “legal dilemma,” “ethical dilemma,” “medical ethics,” “bioethics,” “legal degradation,” and “regulatory challenges.” Searches were restricted

to studies published between January 2015 and December 2025, written in English or Indonesian, and available in full text.

Studies were eligible for inclusion if they addressed assisted reproductive technologies or reproductive medicine services, incorporated legal, ethical, or health policy perspectives, and examined *contra legem* practices, regulatory non-compliance, or conflicts between clinical practice and legal norms. Eligible study designs included qualitative empirical studies, normative legal analyses, ethical or bioethical reviews, health policy or regulatory analyses, and academically analysed judicial decisions. Studies were excluded if they were purely clinical or biomedical without legal or ethical analysis, focused exclusively on pregnancy outcomes or laboratory techniques, consisted of editorials, brief commentaries, letters to the editor, or non-academic opinions, were not available in full text, or involved animal or laboratory research without legal or ethical context. The study selection process was documented using a PRISMA flow diagram.

From each eligible study, data were systematically extracted using a predefined extraction framework aligned with the analytical structure of the review. Extracted variables included bibliographic information (authors, year, and journal), the primary legal and ethical issues addressed in ART, the specific ART practices examined, the legal and regulatory frameworks analyzed, and the authors' positions regarding compliance with positive law, including explicit or implicit classification of practices as *contra legem*. Additional data included the main legal and ethical findings, reported ethical implications, and proposed regulatory, policy, or governance recommendations. Data extraction was performed by one reviewer and independently verified by a second reviewer to ensure accuracy and consistency.

Given the heterogeneity of study designs, jurisdictions, and analytical approaches, a qualitative narrative synthesis was conducted. Findings were organized thematically according to (i) categories of ART practices, (ii) types of legal frameworks and regulatory regimes analyzed, (iii) positions toward positive law and identification of *contra legem* practices, (iv) major legal and ethical dilemmas, (v) ethical implications, and (vi) recommended policy or regulatory directions. Cross-jurisdictional comparisons were performed to identify recurring patterns, regulatory gaps, and normative tensions across different legal systems.

RESULTS AND DISCUSSION

The systematic search and selection process resulted in the inclusion of 12 articles that met the predefined eligibility criteria and examined legal and ethical dimensions of assisted reproductive technologies (ART) in relation to *contra legem* practices. The included studies were published between 2015 and 2025 and were drawn from a range of disciplinary fields, including health law, bioethics, reproductive medicine, sociology, and Islamic family law. Most articles were normative legal analyses or ethical legal reviews, while several adopted comparative regulatory approaches across different jurisdictions.

The selected literature addressed a broad spectrum of ART practices, including surrogacy, in vitro fertilization, gamete donation, sperm banking, post-mortem embryo transfer, cross-border reproductive care, and the use of surplus embryos for stem cell research. Across the included studies, substantial variation was observed in national regulatory frameworks, institutional practices, and ethical interpretations. Recurrent issues included regulatory gaps and legal uncertainty surrounding parentage and lineage, divergent positions toward positive law, tensions between religious norms and reproductive autonomy, risks of commodification and exploitation, and challenges related to equitable access to ART services. An overview of the study selection process is presented in the PRISMA flow diagram (Fig. 1), and the main characteristics of the included studies are summarized in Table 1.

This systematic review provides a cross-jurisdictional synthesis of how *contra legem* practices in assisted reproductive technologies (ART) generate persistent legal and ethical

dilemmas and expose structural misalignments between law, ethics, and clinical innovation (Salama et al., 2018; Raimondi et al., 2025; Sari et al., 2024). Across the 12 included studies, recurrent patterns emerged in which technological developments and patient demand advanced more rapidly than the evolution of regulatory frameworks, creating regulatory grey zones in which clinicians, patients, and institutions operate under conditions of legal uncertainty (Salama et al., 2018; Martiana, 2024; Rina, 2025). These findings confirm that *contra legem* practices in ART are not isolated deviations from positive law, but rather manifestations of broader governance gaps and normative fragmentation (Raimondi et al., 2025; Sari et al., 2024).

A central finding of this review is the diversity of national regulatory responses to comparable ART practices (Alves et al., 2017; Sari et al., 2024; IFFS, 2022). The included literature documents wide variation in legal approaches to surrogacy, gamete donation, embryo use, and post-mortem reproduction, ranging from strict prohibition to permissive or partially regulated regimes (Alves et al., 2017; Raimondi et al., 2025; Rina, 2025). Such heterogeneity not only generates uncertainty within domestic legal systems but also drives the expansion of cross-border reproductive care (Salama et al., 2018; Ethics Committee of the American Society for Reproductive Medicine, 2016; Pennings et al., 2008). As several studies demonstrate, patients increasingly engage in reproductive travel to circumvent restrictive laws, a phenomenon that facilitates "law evasion" and complicates the legal status of children, parental rights, and professional accountability upon return to the home jurisdiction (Salama et al., 2018; Ethics Committee of the American Society for Reproductive Medicine, 2016). In this respect, *contra legem* practices in ART are closely linked to regulatory asymmetries and the absence of effective international harmonization (Salama et al., 2018; Pennings et al., 2008; IFFS, 2022).

The review further highlights that *contra legem* practices often arise not from deliberate disregard for the law but from structural ambiguities and regulatory lacunae (Raimondi et al., 2025; Rina, 2025; Sari et al., 2024). In multiple jurisdictions, the absence of specific legislation on emerging technologies---such as the secondary use of surplus embryos, post-mortem embryo transfer, and novel surrogacy arrangements---forces clinicians and patients to rely on self-regulation, professional guidelines, or informal practices (Raimondi et al., 2025; Rina, 2025). While such adaptive strategies may enable access to reproductive care, they simultaneously weaken legal certainty and blur the boundaries of professional responsibility (Judiasih & Dajaan, 2017; Ethics Committee of the American Society for Reproductive Medicine, 2016). Over time, these dynamics risk normalizing practices that remain formally prohibited or insufficiently regulated, thereby contributing to the gradual erosion of legal authority in the governance of ART (Raimondi et al., 2025; Rina, 2025).

The Indonesian context exemplifies many of these tensions (Purvis, 2015; Martiana, 2024; Rina, 2025). Several included studies demonstrate how restrictive norms grounded in religious and moral values coexist with rapidly advancing reproductive technologies and growing clinical demand (Purvis, 2015; Rina, 2025). Prohibitions on gamete donation and surrogacy, combined with regulatory ambiguity surrounding embryo use, generate significant uncertainty regarding lineage, parentage, inheritance rights, and professional liability (Martiana, 2024; Judiasih & Dajaan, 2017; Putri & Latumahina, 2025). Although recent reforms in reproductive health legislation signal increasing state engagement, the persistence of grey zones suggests that formal regulation has not yet fully adapted to the ethical and legal complexity of contemporary ART practice (HHP Law Firm, 2025). These findings underscore the need for clearer statutory guidance and institutional oversight mechanisms tailored to the specific risks associated with reproductive technologies (Martiana, 2024; Putri & Latumahina, 2025).

From a bioethical perspective, the review reveals consistent concerns regarding the degradation of core ethical principles in contexts characterized by legal ambiguity (Raimondi et al., 2025; Rina, 2025; Biana, 2025). Across jurisdictions, regulatory gaps facilitate the commercialization of reproduction, the exploitation of economically vulnerable women in surrogacy arrangements, conflicts of interest in gamete donation, and the instrumentalization of embryos as biological resources (Salama et al., 2018; Rina, 2025; Biana, 2025). Several studies emphasize that when law lags behind practice, ethical standards may be reinterpreted in minimal or pragmatic terms, weakening safeguards for autonomy, justice, non-maleficence, and human dignity (Judiasih & Dajaan, 2017; Rina, 2025). These patterns suggest that *contra legem* practices in ART pose not only legal risks but also systemic threats to the normative foundations of medical ethics (Raimondi et al., 2025; Rina, 2025; Biana, 2025).

Importantly, the included literature also offers convergent recommendations for strengthening ART governance (Raimondi et al., 2025; Martiana, 2024; Rina, 2025). Proposed strategies include the enactment of comprehensive and technology-sensitive national legislation, the establishment of specialized supervisory authorities and ethics committees, the development of transparent consent and documentation standards, and the harmonization of cross-border regulatory frameworks (Salama et al., 2018; Martiana, 2024; Putri & Latumahina, 2025; Pennings et al., 2008). Several authors further advocate inclusive and rights-based regulatory models capable of accommodating diverse family forms while maintaining robust protections against exploitation and commodification (Rina, 2025; Biana, 2025; IFFS, 2022). Together, these proposals point toward the necessity of integrated governance approaches that align legal regulation, professional standards, and ethical oversight (Raimondi et al., 2025; Rina, 2025).

This review has several limitations. First, the number of included studies was relatively small and concentrated primarily in legal and bioethical scholarship, limiting the generalizability of the findings (Raimondi et al., 2025; Sari et al., 2024). Second, the heterogeneity of study designs, jurisdictions, and analytical frameworks precluded quantitative synthesis and restricted the analysis to narrative thematic integration (Raimondi et al., 2025). Third, publication bias may have favored studies addressing controversial or high-profile practices, thereby underrepresenting routine regulatory compliance in ART services (Salama et al., 2018; Sari et al., 2024). Future research should expand empirical investigation into clinical decision-making in legally ambiguous contexts and assess the effectiveness of emerging regulatory models (Rina, 2025; IFFS, 2022).

Despite these limitations, this review contributes a novel integrative perspective by framing diverse ART practices within a unified *contra legem* analytical framework (Raimondi et al., 2025; Sari et al., 2024). By demonstrating how regulatory fragmentation, legal uncertainty, and ethical vulnerability intersect across jurisdictions, the findings underscore the urgency of developing coherent and anticipatory governance mechanisms (Salama et al., 2018; Rina, 2025; IFFS, 2022). Strengthening the alignment between law, ethics, and clinical innovation is essential to ensuring that ART services remain not only technologically advanced but also legally secure, ethically robust, and respectful of human dignity (Raimondi et al., 2025; Rina, 2025; Biana, 2025).

CONCLUSION

This systematic review demonstrates that *contra legem* practices in assisted reproductive technologies (ART) largely stem from persistent misalignments among rapid technological innovation, fragmented legal frameworks, and evolving ethical standards. Regulatory gray zones, cross-border reproductive care, and unresolved national restrictions generate significant legal uncertainty for clinicians, patients, and institutions, while heightening the risk of normative degradation through commercialization, exploitation, and the instrumentalization of

human reproductive material. By synthesizing cross-jurisdictional evidence, the review underscores the urgent need for coherent and anticipatory governance frameworks that integrate adaptive legislation, robust ethical oversight, and international coordination to ensure that ART services remain legally secure, ethically sound, and respectful of human dignity. Future research should focus on developing comparative, evidence-based regulatory models and evaluating the effectiveness of international harmonization mechanisms in addressing *contra legem* challenges across diverse legal and cultural contexts.

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