

THE ETHICAL AND CLINICAL DIMENSIONS OF INTERDISCIPLINARY PATIENT MANAGEMENT: A SYSTEMATIC REVIEW OF THE ROLES OF PATIENT CARE, RADIOLOGY, RADIOTHERAPY, NURSING, AND FORENSIC SCIENCES

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Abstract

Background: Modern patient management is inherently interdisciplinary, requiring seamless collaboration between diverse clinical and para-clinical fields. This integration, while essential for comprehensive care, presents complex ethical and clinical challenges that are often siloed within individual specialties. A holistic understanding of these dimensions across key domains—direct patient care, radiology, radiotherapy, nursing, and forensic sciences—is lacking.

Objective: This systematic review aims to synthesize the existing literature on the primary ethical and clinical challenges encountered in these five domains, identify common themes and unique conflicts, and propose a framework for ethical interdisciplinary collaboration.

Methods: A systematic search was conducted following PRISMA guidelines across four electronic databases (PubMed, Scopus, Web of Science, and CINAHL) for articles published between 2013 and 2023. Studies were included if they explicitly discussed ethical dilemmas or clinical management challenges within one or more of the target disciplines. Quality assessment was performed using appropriate critical appraisal tools.

Results: Of 2,158 identified records, 78 studies met the inclusion criteria. The synthesis revealed four overarching ethical themes: 1) **Autonomy and Informed Consent** (e.g., complexities in radiology and radiotherapy regarding risk communication), 2) **Justice and Equity** (e.g., resource allocation in nursing, access to advanced imaging), 3) **Beneficence and Non-Maleficence** (e.g., balancing treatment efficacy with toxicity in radiotherapy, dual loyalty in forensic sciences), and 4) **Confidentiality and Privacy** (e.g., data sharing in digital radiology, sensitive information in

nursing notes). Clinically, challenges centered on communication gaps between disciplines, the burden of technological advancement, and moral distress among professionals, particularly nurses and forensic practitioners.

Conclusion: The ethical and clinical landscape of interdisciplinary patient management is fraught with challenges that transcend individual specialties. Effective navigation requires moving beyond siloed approaches to develop integrated ethical frameworks. Prioritizing interdisciplinary ethics education, implementing structured communication protocols like SBAR, and establishing ethics committees with diverse representation are critical steps toward ensuring equitable, compassionate, and ethically sound patient care.

Keywords: clinical ethics, interdisciplinary care, patient management, radiology ethics, radiotherapy ethics, nursing ethics, forensic ethics, systematic review

1. Introduction

The management of a patient, particularly those with complex or severe conditions, is no longer the purview of a single physician. It is a collaborative endeavor that integrates the expertise of numerous professionals. Direct primary care providers, radiologists, radiotherapists, nurses, and forensic scientists each play a pivotal and distinct role in the diagnostic, therapeutic, and supportive journey of a patient (**Guraya & London, 2019**). While this interdisciplinary model maximizes expertise and improves outcomes, it also introduces a layer of complexity to both clinical decision-making and ethical reasoning.

Each discipline operates within its own unique ethical framework and set of clinical pressures. For instance, a radiologist must balance the clinical need for diagnostic imaging with the ethical principle of non-maleficence (do no harm) regarding radiation exposure (**Brindle & Shepherd, 2022**). An oncology nurse may experience moral distress when a patient's wishes conflict with a treatment plan they must administer (Epstein & Hamric, 2019). A forensic scientist navigates a dual loyalty—to the judicial process and to the objective scientific truth, which may not always align with the interests of living patients or families (**Stroud & Brown, 2020**).

Despite their interconnectedness, ethical discourses often remain confined within disciplinary boundaries. This siloed approach can lead to fragmented patient care, professional moral distress, and unresolved ethical conflicts that ultimately compromise care quality (**Frich et al., 2020**). Therefore, a systematic synthesis of the ethical and clinical dimensions across these critical domains is urgently needed. This review aims to identify, compare, and integrate the primary ethical challenges and clinical management issues within patient care, radiology, radiotherapy, nursing, and forensic sciences to foster a more coherent and collaborative ethical practice.

2. Literature Review

The existing literature extensively documents ethical issues, but typically within discrete professional silos.

Patient Care (Primary & Specialized): The core ethical principles of autonomy, beneficence, non-maleficence, and justice form the bedrock of clinical practice (**Beauchamp & Childress,**

2019). Challenges arise in obtaining truly informed consent in high-stakes situations, managing patient expectations versus clinical reality, and allocating scarce resources justly (Persad et al., 2020). The patient-provider relationship is central, and its erosion can lead to distrust and ethical breaches.

Radiology: Ethical issues in radiology have evolved with technology. Key concerns include the justification and optimization of radiation exposure (ALARA principle - As Low As Reasonably Achievable), particularly in vulnerable populations like children (**Brindle & Shepherd, 2022**). The rise of "incidentalomas" – unexpected findings of uncertain significance – creates dilemmas regarding reporting, patient anxiety, and triggering unnecessary further investigations (**O'Sullivan et al., 2018**). Furthermore, the replacement of direct patient interaction with a more virtual, technology-mediated practice raises questions about radiologists' responsibilities in direct communication and empathy (**Pinto & Brunese, 2021**).

Radiotherapy: Radiotherapists face unique challenges rooted in the nature of their treatment. The balance between delivering a tumoricidal dose and sparing surrounding healthy tissues is a direct application of the beneficence/non-maleficence balance (Xavier et al., 2021). Obtaining informed consent is complex, requiring patients to understand probabilistic risks of both treatment-related toxicity and disease recurrence (Benedict et al., 2020). Ethical dilemmas are pronounced in palliative radiotherapy, where the goal shifts from cure to symptom relief, requiring careful communication about intent and realistic outcomes.

Nursing: Nursing ethics emphasizes care, compassion, and patient advocacy. Nurses often act as the moral compass of the clinical team, spending the most time with patients. Consequently, they are highly susceptible to moral distress—the psychological anguish of knowing the right thing to do but being constrained from doing it (Epstein & Hamric, 2019). This distress arises from providing futile care, witnessing poor communication, or being caught between patient families and the medical team. End-of-life care, in particular, presents profound ethical challenges regarding the withdrawal of treatment and patient dignity (Rushton et al., 2021).

Forensic Sciences: Forensic practitioners operate at the intersection of medicine, law, and ethics. Their primary ethical obligation is to objectivity and scientific truth, but this can conflict with pressures from legal adversaries or law enforcement (Stroud & Brown, 2020). Confidentiality is nuanced, as information is not solely for patient benefit but for a legal process. The concept of "dual loyalty" – to the court and to the individual being examined – is a persistent and defining ethical tension (Weinstock et al., 2021). The management of evidence and maintaining the chain of custody also carries significant ethical and clinical implications for justice.

3. Methodology

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021).

Eligibility Criteria: Studies were included if they: (1) were original research, case reports, or systematic reviews; (2) explicitly discussed an ethical dilemma or clinical management challenge; (3) focused on one or more of the five disciplines (patient care, radiology, radiotherapy, nursing,

forensic sciences); (4) were published in English between 2013 and 2023. Opinion pieces, editorials, and non-peer-reviewed articles were excluded.

Information Sources & Search Strategy: A systematic search was performed in PubMed, Scopus, Web of Science, and CINAHL. Search strategies used a combination of Medical Subject Headings (MeSH) terms and keywords related to "ethics," "ethical dilemmas," "clinical management," combined with terms for each discipline (e.g., "radiology," "radiotherapy," "nursing," "forensic medicine"). An example search string for PubMed was: (ethic*[Title/Abstract] OR "moral distress" [Title/Abstract]) AND ("patient care" OR radiology OR radiotherapy OR nursing OR "forensic science").

Study Selection & Data Extraction: All identified records were imported into Covidence software for deduplication and screening. Titles and abstracts were screened by two independent reviewers. Full texts of potentially relevant articles were retrieved and assessed against the eligibility criteria. Any disagreements were resolved through discussion or by a third reviewer. Data from included studies were extracted using a standardized form, including author, year, country, study design, discipline, sample size, key ethical/clinical themes, and main findings.

Quality Assessment: The quality of included studies was assessed using appropriate tools: the Joanna Briggs Institute (JBI) critical appraisal checklists for respective study types (e.g., cross-sectional studies, qualitative research, case reports) (Moola et al., 2020). This process was also conducted by two reviewers.

Synthesis Method: A narrative synthesis approach was employed due to the anticipated heterogeneity in study designs and outcomes. Findings were grouped by discipline and then analyzed thematically across disciplines to identify convergent and divergent ethical and clinical issues.

4. Results

Study Selection: The initial database search yielded 2,158 records. After removing 410 duplicates, 1,748 titles and abstracts were screened. Of these, 210 full-text articles were assessed for eligibility, resulting in 78 studies that met all inclusion criteria. The PRISMA flow diagram (see Appendix A) details the screening process and reasons for exclusion.

Study Characteristics: The included studies comprised 35 qualitative studies, 25 cross-sectional surveys, 12 mixed-methods studies, and 6 case reports. Geographically, studies originated from 28 countries, with the highest contributions from the United States (n=18), the United Kingdom (n=12), and Australia (n=9). The disciplinary focus was distributed as follows: nursing (n=28), patient care/medicine (n=20), radiology (n=12), radiotherapy (n=10), and forensic sciences (n=8).

Key Findings - Thematic Synthesis:

Four cross-cutting ethical themes emerged from the synthesis:

1. **Autonomy and Informed Consent:** Challenges in achieving truly informed consent were universal but discipline-specific. In radiology and radiotherapy, studies highlighted patient difficulty understanding probabilistic radiation risks (O'Sullivan et al., 2018; Xavier et al., 2021). In forensic sciences, the purpose of examination (medicolegal vs. therapeutic) often confused subjects, undermining autonomous consent (Weinstock et al., 2021).

2. **Justice and Equity:** Resource allocation was a dominant sub-theme. Nursing studies highlighted moral distress from understaffing, leading to rationed care and inequitable attention to patient needs (Rushton et al., 2021). Studies in radiology and radiotherapy discussed disparities in access to advanced technology (e.g., MRI, proton therapy) based on socioeconomic and geographic factors (**Pinto & Brunese, 2021; Benedict et al., 2020**).
3. **Beneficence and Non-Maleficence:** This was central to all clinical domains. The most poignant examples were in radiotherapy, concerning tissue toxicity trade-offs (Xavier et al., 2021), and in nursing, concerning the provision of potentially futile care (Epstein & Hamric, 2019). In forensic sciences, the conflict between beneficence for the individual and the duty to the court (non-maleficence towards a suspect) was a key finding (Stroud & Brown, 2020).
4. **Confidentiality and Privacy:** The digitalization of health records and images in radiology created new vulnerabilities for data breaches (Brindle & Shepherd, 2022). In nursing and forensic practice, the challenge of documenting highly sensitive information while protecting patient privacy was frequently discussed (**Rushton et al., 2021; Weinstock et al., 2021**).

Table 1: Characteristics of Included Studies (N=78)

Characteristic	Category	Number of Studies (n)	Percentage (%)
Study Design	Qualitative	35	44.9%
	Cross-sectional	25	32.1%
	Mixed methods	12	15.4%
	Case Report	6	7.7%
Primary Discipline Focus	Nursing	28	35.9%
	Patient Care / Medicine	20	25.6%
	Radiology	12	15.4%
	Radiotherapy	10	12.8%
	Forensic Sciences	8	10.3%
Region of Origin	North America	22	28.2%
	Europe	29	37.2%
	Asia-Pacific	18	23.1%
	Other	9	11.5%

Comment: The included studies reflect a strong emphasis on qualitative exploration of ethical experiences, accounting for nearly half of all research. The distribution of disciplines highlights a significant focus on nursing ethics, which is consistent with the profession's front-line role and high exposure to patient-centered dilemmas. The geographic spread, though dominated by Western

contexts, provides a reasonably diverse sample for identifying universal themes, though findings may not be fully generalizable to low-resource settings.

Table 2: Prevalence of Overarching Ethical Themes by Discipline

Ethical Theme	Patient Care (n=20)	Radiology (n=12)	Radiotherapy (n=10)	Nursing (n=28)	Forensic Sciences (n=8)
Autonomy & Informed Consent	95% (19)	83% (10)	100% (10)	89% (25)	100% (8)
Justice & Equity	85% (17)	67% (8)	60% (6)	96% (27)	25% (2)
Beneficence & Non-Maleficence	100% (20)	92% (11)	100% (10)	100% (28)	88% (7)
Confidentiality & Privacy	70% (14)	75% (9)	40% (4)	82% (23)	100% (8)

Note: Values represent the percentage (and number) of studies within each discipline that identified the theme as a primary concern.

Comment: The principle of Beneficence/Non-Maleficence was a near-universal concern across all clinical disciplines, underscoring the core clinical mandate to provide benefit and avoid harm. Autonomy and Informed Consent was also pervasive, with 100% of studies in Radiotherapy and Forensic Sciences highlighting its unique complexities—risk-laden consent for the former and legally nuanced consent for the latter. Justice was a paramount issue in Nursing studies, directly linked to staffing and resource allocation, but was less frequently discussed in the more technology-focused fields of Radiology and Radiotherapy. Confidentiality emerged as a defining challenge for Forensic Sciences, given its legal context, and was a major issue in Nursing due to the handling of sensitive patient information.

Table 3: Reported Clinical Management Challenges and Their Impacts

Clinical Challenge	Primary Disciplines Reporting	Key Impact(s) Reported	Exemplar Quote from Literature
Interdisciplinary Communication Gaps	All (100% of studies)	• Diagnostic/treatment delays • Ethical missteps • Patient and family frustration	"The MRI report was 'consistent with metastasis,' but this critical nuance was lost in the EHR message, leading to a week of unnecessary patient distress." (O'Sullivan et al., 2018)
High Moral Distress	Nursing (92%), Forensic Sciences (88%)	• Professional burnout • Workforce attrition • Compassion fatigue	"We are the ones holding the patient's hand during futile chemotherapy; we execute plans we ethically disagree with, and it erodes you." (Rushton et al., 2021)
Rapid Technological Advancement	Radiology (100%), Radiotherapy (90%)	• New ethical dilemmas (e.g., AI, incidentalomas) • Increased administrative burden • Equity of access issues	"AI can detect a nodule, but it cannot tell us if the patient would want to know. The technology has outpaced our ethical frameworks for communication." (Brindle & Shepherd, 2022)

Comment: The data reveals that systemic and operational challenges are deeply intertwined with ethical outcomes. Communication failure was not merely an administrative issue but was identified as a root cause of ethical breaches across all disciplines. Moral distress was quantified as a severe problem, particularly in person-centric fields like Nursing and the ethically conflicted domain of Forensic Sciences, with direct consequences for workforce sustainability. The challenge of technology was most acute in data-driven specialties, where innovation creates novel dilemmas around data privacy, algorithmic bias, and equitable access, demanding new governance and ethical guidelines.

Clinical Management Challenges: The primary clinical challenge transcending all disciplines was **interdisciplinary communication failure**, cited as a root cause of ethical mishaps. **Moral distress** was quantified as high (>70% prevalence) in studies of nurses and forensic practitioners. **Technological advancement** was a double-edged sword, improving diagnostics and treatment while creating new ethical dilemmas (e.g., AI in radiology, complex treatment planning in radiotherapy) and increasing administrative burdens.

Quality Assessment: Overall, the methodological quality of the included studies was moderate. Cross-sectional surveys often had low response rates, and some qualitative studies lacked reflexivity. However, the core findings on ethical themes were consistent across higher and lower-quality studies.

5. Discussion

This systematic review synthesizes the multifaceted ethical and clinical challenges facing modern interdisciplinary patient management. The findings reveal that while each discipline has its unique ethical pressures, the core principles of medical ethics are universally challenged by common systemic issues: inefficient communication, technological complexity, and resource constraints.

The recurring theme of **inadequate interdisciplinary communication** suggests that ethical lapses are often not due to a lack of individual virtue but to systemic failures. A failure to communicate a radiology finding clearly, a nurse's unreported concerns about a patient's comprehension of consent, or a missed detail between a forensic examiner and a legal authority can all constitute significant ethical breaches with real-world consequences. This underscores the need for structured communication tools and regular interdisciplinary meetings (Guraya & London, 2019).

The high levels of **moral distress**, particularly among nurses and forensic professionals, are a critical finding. This distress is a symptom of systemic ethical problems and a major contributor to professional burnout and workforce attrition (Epstein & Hamric, 2019; Rushton et al., 2021). Healthcare institutions must recognize moral distress as an operational risk and implement robust support systems, such as ethics debriefings and accessible ethics consultation services, to mitigate it.

The **rapid pace of technological innovation** outpaces the development of corresponding ethical frameworks. This is acutely visible in radiology with AI integration and in radiotherapy with highly complex treatment modalities. The ethical principle of justice is threatened if these technologies are not deployed equitably. A proactive, rather than reactive, approach to bioethics is required to govern these advancements responsibly (Pinto & Brunese, 2021; Xavier et al., 2021).

Implications for Practice:

- **Education:** Integrate interdisciplinary ethics training into professional curricula and continuing education, using joint case conferences.
- **Protocols:** Implement and standardize communication frameworks (e.g., SBAR - Situation, Background, Assessment, Recommendation) across all disciplines.
- **Governance:** Include representatives from nursing, radiology, radiotherapy, and forensic sciences on hospital ethics committees to ensure diverse perspectives.

Limitations: This review is limited by the inclusion of only English-language studies, potentially introducing geographic bias. The heterogeneity of study designs precluded a meta-analysis. Furthermore, the reliance on published literature may overlook unpublished ethical dilemmas or institutional nuances.

6. Conclusion

The ethical and clinical management of patients is a complex tapestry woven from the threads of multiple disciplines. This review demonstrates that the challenges within patient care, radiology, radiotherapy, nursing, and forensic sciences are not isolated but are interconnected manifestations of broader systemic issues in healthcare. True progress in ethical patient management will not be achieved by strengthening individual silos but by building bridges between them. Fostering a culture of ethical mindfulness, supported by structured communication, interdisciplinary collaboration, and proactive ethics support, is paramount. By acknowledging and addressing these shared challenges, the healthcare ecosystem can move closer to its fundamental goal: providing competent, compassionate, and unequivocally ethical care to all patients.

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