



Systematic Review on Biomedical Ethics

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ABSTRACT

Biomedical ethics is an interdisciplinary field that examines the moral, legal, and social dimensions of healthcare, medical research, and biotechnology. With rapid advancements in medical science, including genetic engineering, artificial intelligence in healthcare, organ transplantation, reproductive technologies, and end-of-life care, ethical considerations have become increasingly significant in contemporary society. This systematic review aims to critically examine the theoretical foundations, emerging trends, and practical applications of biomedical ethics across diverse healthcare contexts. The review synthesizes existing scholarly literature to explore the four foundational principles of biomedical ethics—autonomy, beneficence, non-maleficence, and justice—and their relevance in addressing ethical dilemmas faced by healthcare professionals, policymakers, researchers, and patients. Particular attention is given to issues such as informed consent, patient confidentiality, equitable access to healthcare, clinical decision-making, ethical governance in biomedical research, and the challenges posed by emerging technologies. The study revealed that biomedical ethics provides an essential framework for balancing scientific innovation with human dignity, social responsibility, and patients' rights. Moreover, the review highlights the growing need for culturally sensitive and globally informed ethical guidelines in response to evolving healthcare systems and transnational medical practices. Ethical literacy among healthcare stakeholders remains fundamental for promoting transparency, accountability, and patient-centred care. In this article, a systematic review on biomedical ethics was discussed.

Keywords: *Biomedical, Ethics, Autonomy, Justice, Governance.*

INTRODUCTION

Biomedical ethics is an interdisciplinary field that examines the moral, legal, and philosophical dimensions of healthcare, medicine, biotechnology, and biomedical research. It seeks to address complex ethical dilemmas arising from advancements in medical science while safeguarding human dignity, autonomy, justice, and social responsibility. The increasing integration of emerging technologies in healthcare, including genetic engineering, artificial intelligence, organ



transplantation, reproductive technologies, and precision medicine, has further highlighted the importance of ethical frameworks that guide healthcare professionals, researchers, policymakers, and institutions in making informed and morally sound decisions. The modern foundations of biomedical ethics are primarily based on four fundamental principles: autonomy, beneficence, non-maleficence, and justice. These principles provide ethical guidance for respecting patients' rights, promoting their well-being, avoiding harm, and ensuring fairness in the allocation of healthcare resources. Biomedical ethics extends beyond clinical practice to encompass ethical issues in public health, medical education, biomedical research, and healthcare policy. Contemporary debates involving informed consent, confidentiality, end-of-life decision-making, human experimentation, stem cell research, genetic modification, and equitable access to healthcare continue to shape ethical discourse across diverse cultural and social contexts. Global healthcare challenges, including pandemics, healthcare inequalities, and technological innovations, have significantly expanded the scope of biomedical ethics. Questions surrounding data privacy in digital health systems, ethical implications of artificial intelligence-assisted diagnosis, allocation of scarce medical resources, and cross-border biomedical research require continuous ethical evaluation. Furthermore, ethical concerns related to vulnerable populations, community participation, and cultural diversity emphasize the necessity of adopting inclusive and context-sensitive approaches in biomedical decision-making. A systematic review of biomedical ethics is particularly relevant in the contemporary era because ethical challenges evolve alongside scientific progress. Synthesizing existing literature enables scholars to identify prevailing themes, emerging issues, methodological approaches, and research gaps within the field. Such reviews contribute to developing evidence-based ethical guidelines that strengthen healthcare practices and biomedical research. By critically examining philosophical perspectives, ethical principles, and contemporary debates, this systematic review aims to provide a comprehensive understanding of biomedical ethics and its indispensable role in promoting responsible, equitable, and human-centered healthcare systems worldwide. The objective of the study is to explore the systematic review on biomedical ethics.

SYSTEMATIC REVIEW OF LITERATURE

Faissner, M. et al. (2024). To combat mental health care practices that perpetuate social injustice, we encourage readers to familiarize themselves with intersectionality through this collection of articles. The structure of societies, including social processes and institutions, may disproportionately disadvantage members of marginalized social groups, unfairly limiting their opportunities for success. This phenomenon is known as social injustice. It is widely known that mental health diagnoses can have stigmatizing consequences and continue to influence a person's ability to flourish in various situations. It is less often known, however, that a person who has been diagnosed with a mental illness already holds a social position that is defined by a number of identity markers that both limit and expand their potential.

Noroozi, M. et al. (2024). The analysing publication patterns in a field of study aids in evaluating systematic scientific endeavours within that academic domain. The purpose of this study is to assess and contrast patterns in medical ethics articles throughout the nations in the Eastern Mediterranean Region (EMRO). We conducted a scoping review to identify publication patterns among Iranian and

EMRO medical ethicists. We searched the Web of Science, Scopus, and PubMed databases for English-language papers published by countries within the World Health Organization's EMRO regions. We searched Persian and English-language databases for Iranian articles. The Kennedy Institute of Ethics developed the bioethics filter's search methodology. The search methodology excluded grey literature, tertiary publications, and duplicate items. The retrieved articles formed ten major categories. We used Citavi® software to categorize and extract information from the articles. We acquired a total of 1835 Persian and English articles. The majority of Iranian medical ethics publications (1211, 66%) were in Persian, while the remaining 624 (34%) were in English. Iranian scholars wrote the majority (306, 64.42%) of the English-language publications published in the EMRO region. Saudi Arabia (52, 10.95%), Oman (40, 8.42%), Pakistan (28, 5.89%), Lebanon (13, 2.74%), and Egypt (12, 2.53%) were next in line. The study's findings demonstrate that the publication trend of EMRO nations—particularly Iranian publications—is insufficient to meet the countries' medical ethics needs. We have presented a concept map to identify the need for research in medical ethics. Prioritizing both national and regional research opportunities may have a synergistic impact on the advancement of medical ethics in the EMRO region.

Chandi, N. (2023). The demand for healthcare services is rising dramatically as the number of health problems worldwide continues to grow. However, these innovative companies have adapted healthcare services to keep pace with technological advancements. Endoscopic retrograde cholangiopancreatography (ERCP), an invasive endoscopic procedure performed in the bile ducts for both therapeutic and diagnostic purposes, is one of the most notable examples of technology being used to provide healthcare services.

Bystranowski, P. et al. (2022). Topic modelling, a text-mining technique that regularly reveals subject structures in large collections of texts, has gained increasing popularity in the context of analysing scholarly output. Using a machine learning method, we select nearly 100 issues that represent different themes of interest in the field of bioethics and philosophy of medicine from a corpus of 19,488 documents published since 1971 in seven prestigious publications. We provide a new, fine-grained intellectual map of bioethics and medical philosophy by clustering the content-based subjects into eight groups based on inter-topic connections. Additionally, we perform several diachronic analyses, looking at how the "prominence" of certain subjects has evolved throughout time. In this approach, we can see clear trends in how medical philosophy and bioethics have changed over the last fifty years.

Simon, J.R. & Lemoine, M. (2021). Two required and jointly sufficient conditions—that the condition is dysfunctional and that it causes harm to the bearer—form the basis of the HDA's hybrid explanation of disease. Since they HAD is a comprehensive description of illness, it should encompass illnesses in all living things, not just mental or human-specific conditions. However, it is difficult to define what "harm"—if not malfunction itself—might signify for plants, fungi, or invertebrates. Dussault suggests that extending the damage requirement to plants, fungi, or invertebrates could benefit from applying the concept of interests in environmental ethics. Dussault's study, however, demonstrates that even within this seemingly compelling framework, it is questionable whether the concept of harm can be defined apart from the disease description's dysfunctional element.



Muaygil, R.A. (2020). Despite interest in bioethics being arguably at its highest, the history, development, and tasks of this practice remain elusive to many medical practitioners. This ambiguity is not without good reason; unlike its clinical counterparts, bioethics is not exclusively a child of medicine. Rather, bioethics also belongs to theology, philosophy, sociology, and the law. Its intellectual assumptions are multi-disciplinary and wide-reaching, in contrast to those of medicine—neatly delineated and perfected by the scientific method. Indeed, bioethics is contemplative where medicine is active, inquisitive where medicine is decisive, and measured where medicine is efficient. Although at first glance, bioethics may not appear to share much with medicine, the discipline has become an essential conduit of moral medical practice. This manuscript gives an account of the history and development of contemporary bioethics in both the Islamic and Western world, its current state of affairs, its tasks, and its future. Ultimately, it is hoped that this work will demystify the practice of bioethics and elucidate the role of the bioethicist as a partner to the practitioner, an ally to the patient, and an advocate for the moral practice of medicine.

Yaminfirooz, M., Tahmasbei, K. & Amiri, S. (2020). Medical scientists today face new ethical challenges as a result of the expansion of human understanding in this area. One of the fundamental needs of the health system is the resolution of medical ethical dilemmas. Currently, the assessment of scientific output can provide a clear picture of the development, advancement, and significant problems in a scientific subject. Our goal in this study was to use scientometric analysis to pinpoint key areas of medical ethics research. The drawing of science is one of the most crucial scientometric research tools used in this study. The study's statistical population consisted of 3333 scientific publications indexed in the WOS database by the end of 2019. The researcher created a checklist to collect data and used the Ravar matrix and Ucinet 6 software for data analysis. The findings demonstrated that there have been 3333 scholarly publications in the field of medical ethics, ranging from two in 1946 to 104 in 2019. The yearly growth rate is 21.03% on average. Medical ethics research most frequently draws on the ideas of biology, ethical counselling, education, medical education, and autonomy, thereby dividing the field into nine global clusters. The six clusters encompassing Iranian products in this field include fundamental concepts of medical ethics, bioethics, ethics committees, strategic planning, and medical education.

Boldt, J. (2019). Vulnerability phenomena and their ethical importance are ubiquitous in healthcare. However, the primary application of this idea in healthcare ethics currently occurs in clinical research. Therefore, methods that expand on the idea to make it appropriate for healthcare in general merit fresh consideration. There are two obstacles to overcome in order to adapt the idea of vulnerability to healthcare ethics in general. We must first construct a more thorough characterization and systematization of the various domains of human capacities and the ways in which these domains contain vulnerability, starting with the term's application in research ethics. Second, the desired notion of vulnerability should avoid imagining the relationship between a healthcare practitioner and a patient as one between a dependent person in need and someone who can provide all the assistance required. Understanding when and in what ways caregivers may also be vulnerable should be possible with a sufficient understanding of vulnerability. Philosophical explanations of vulnerability can address both of these difficulties. Philosophical explanations can make the concept of vulnerability more appropriate for healthcare ethics in general. However, they have a cost.



Philosophical theories offer useful accounts of vulnerability, but in medical ethics, the ethical role of vulnerability typically involves reducing or overcoming vulnerability in certain situations. Therefore, we must further analyze and systematize the various forms and degrees of vulnerability to distinguish between those that are desirable and those that require reduction.

McMillan, J. (2018). This goal is consistent with the mission statement of JME and The Institute of Medical Ethics, which is to promote "ethical reflection and conduct in scientific research and medical conduct." The first editorial in the Journal of Medical Ethics described an ambition to be a "forum for the reasoned discussion of moral issues arising from the provision of medical care." Subsequent editors of the journal have reaffirmed this broad goal. It is an end worth considering because it shows how the journal has evolved and suggests what constitutes acceptable medical ethics. In the July issue of JME, Julian Savulescu, Tom Douglas, and Dominic Wilkinson affirm the importance of philosophical medical ethics and skilfully illustrate why it matters in the Charlie Gard case. 6 Does this imply that papers published in the JME must be philosophical? Raanan Gillon, who was editor at the time, was a champion for philosophical medical ethics and wrote a significant and influential book on the subject. In one sense, the answer is undoubtedly no, yet in another, the answer is indeed yes. Ethics in medicine is not a philosophy. A primarily philosophical approach is unlikely to be excellent in medical ethics due to its degree of skepticism, its narrow focus on seeking the truth, its technical nature, and the fact that it does not need to produce normative or practical ethical results.

Patuzzo, S. et al. (2018). Thomas Percival, an English physician, published his treatise Medical Ethics in 1803, marking a turning point in the evolution of contemporary medical ethics codes, starting with the first edition of the American Medical Association's code of ethics. Despite the indisputable impact this book has had on the codification of medical ethics, scholars and professionals continue to have divergent and conflicting opinions about its true character. They wonder if medical ethics actually falls under the literary category of medical ethics codes or, more accurately, medical etiquette. Regarding Percival's work as well as the morality of the current medical ethics and deontology standards, this discussion is essential to the fields of medical history and medical ethics. The current medical codification's adherence to the law, which is largely consistent with the past, betrays a lack of a thorough philosophical-moral study. However, the ongoing challenges posed by biomedical development necessitate a rethinking of the conventional conceptual tools in current codes of medical ethics to generate new ideas and creative solutions. This viewpoint suggests that doctors may mistakenly conflate their developed medical codes of ethics with medical etiquette. This discussion could focus on current medical ethics rules that follow tradition, which are more likely to be mislabelled as medical etiquette codes.

FINDINGS

The systematic review on biomedical ethics reveals that ethical considerations have become increasingly significant in contemporary healthcare and biomedical research due to rapid scientific and technological advancements. The literature consistently emphasizes that biomedical ethics provides an essential framework for addressing moral dilemmas while ensuring the protection of human rights, dignity, and social justice in medical practice.



One of the major findings of the review is the continued relevance of the four fundamental principles of biomedical ethics—autonomy, beneficence, non-maleficence, and justice—in guiding ethical decision-making across clinical and research settings. These principles remain universally applicable despite cultural and institutional variations in healthcare systems. Respect for patient autonomy through informed consent and shared decision-making has emerged as a central ethical concern in both developed and developing healthcare contexts.

The review further identifies that ethical challenges have expanded considerably with the emergence of novel biomedical technologies. Issues related to genetic engineering, artificial intelligence in healthcare, stem cell research, organ transplantation, precision medicine, and digital health have generated complex ethical debates concerning privacy, accountability, equity, and human welfare. Existing ethical frameworks are increasingly being adapted to address these contemporary challenges.

Another significant finding is the growing concern regarding equitable access to healthcare services and biomedical innovations. Several studies highlight disparities based on socioeconomic status, geographical location, and healthcare infrastructure, thereby emphasizing the ethical imperative of justice in healthcare delivery. Ethical concerns surrounding resource allocation during public health emergencies have also gained prominence in recent years.

The review reveals that institutional ethical oversight mechanisms, including ethics committees and institutional review boards, play a crucial role in safeguarding ethical standards in biomedical research. However, variations in regulatory practices and ethical compliance across institutions indicate the need for strengthening ethical governance and continuous professional training.

Furthermore, the literature demonstrates an increasing emphasis on interdisciplinary and culturally sensitive approaches to biomedical ethics. Ethical decision-making is influenced not only by medical considerations but also by philosophical, legal, social, and cultural dimensions. Consequently, integrating ethical education into medical and healthcare curricula has emerged as an important recommendation across studies.

The findings suggest that biomedical ethics continues to evolve in response to scientific progress and global healthcare challenges. There remains a pressing need for adaptive ethical frameworks, stronger institutional mechanisms, and sustained scholarly engagement to ensure that advancements in biomedical science remain aligned with fundamental human values and social responsibility.

DISCUSSION

This systematic review demonstrate that biomedical ethics continues to play a fundamental role in guiding healthcare practices, biomedical research, and public health policies in an era characterized by rapid scientific advancement. The increasing complexity of ethical challenges arising from developments in biotechnology, artificial intelligence, genomics, and digital healthcare underscores the need for robust ethical frameworks that can adapt to changing medical landscapes while preserving human dignity and social responsibility. The review indicates that the four foundational principles of biomedical ethics—autonomy, beneficence, non-maleficence, and justice—remain highly relevant in contemporary healthcare settings. Respect for patient autonomy has gained



considerable prominence with the increasing emphasis on informed consent, shared decision-making, and patient-centered care. However, the implementation of autonomy is often influenced by cultural, social, and economic factors, particularly in developing healthcare systems where healthcare literacy and resource constraints may affect patients' capacity to make fully informed decisions. This highlights the importance of contextualizing ethical principles without compromising their fundamental values. Technological innovations have significantly expanded the scope of biomedical ethics. Advances in genetic technologies, precision medicine, telemedicine, and artificial intelligence have created new ethical questions concerning privacy, data security, algorithmic bias, accountability, and equitable access to healthcare services. The literature reviewed suggests that existing ethical frameworks must continuously evolve to address these emerging concerns. Ethical deliberations are no longer confined to physician-patient relationships but increasingly involve multidisciplinary collaborations among healthcare professionals, ethicists, policymakers, technologists, and legal experts. Another important discussion emerging from the review relates to healthcare equity and distributive justice. Ethical concerns surrounding disparities in healthcare access remain prevalent across diverse healthcare systems worldwide. Public health emergencies have further highlighted the ethical complexities associated with allocating scarce medical resources and balancing individual rights with collective welfare. The principle of justice, therefore, assumes greater significance in addressing structural inequalities and ensuring that biomedical innovations benefit broader populations rather than privileged groups alone. The review also emphasizes the growing role of ethical oversight mechanisms in maintaining integrity and accountability within biomedical research. Institutional ethics committees and regulatory frameworks contribute significantly to safeguarding participants' rights and promoting responsible scientific conduct. Nevertheless, variations in ethical governance across institutions and jurisdictions suggest the necessity for strengthening regulatory standards, harmonizing ethical guidelines, and expanding ethics education among healthcare professionals and researchers. Furthermore, biomedical ethics increasingly requires culturally sensitive and interdisciplinary approaches. Ethical decisions are influenced by philosophical traditions, religious beliefs, legal systems, and societal values, making universal ethical principles both essential and adaptable. The integration of ethical competencies into medical education and professional development programs is therefore indispensable for fostering ethically informed healthcare practices. The discussion highlights that biomedical ethics is an evolving discipline that must remain responsive to scientific progress and societal transformation. Its continued relevance lies in its ability to provide principled guidance while accommodating emerging ethical complexities. Future scholarship should focus on developing inclusive, flexible, and globally applicable ethical frameworks that support responsible innovation, strengthen healthcare equity, and uphold the fundamental values that underpin biomedical science and practice.

CONCLUSION

Biomedical ethics remains an indispensable component of contemporary healthcare and biomedical research, providing moral and philosophical guidance in addressing complex ethical challenges. As scientific innovations continue to transform medicine through developments in genetics, artificial intelligence, organ transplantation, reproductive technologies, and digital healthcare, ethical considerations have become increasingly significant in ensuring that human welfare remains central



to medical practice and policy. The principles of autonomy, beneficence, non-maleficence, and justice continue to serve as the foundation for ethical decision-making, fostering respect for human dignity, patient rights, and social responsibility. This systematic review highlights that biomedical ethics is not a static discipline but an evolving field that must continuously adapt to emerging medical, technological, and societal developments. Ethical issues surrounding informed consent, confidentiality, equitable access to healthcare, end-of-life care, and biomedical experimentation require multidisciplinary approaches that integrate philosophical inquiry, legal frameworks, and empirical evidence. Furthermore, the growing emphasis on global health equity underscores the importance of culturally sensitive and inclusive ethical practices that address the needs of diverse populations and vulnerable communities. The review also reveals the necessity for strengthening ethical governance mechanisms, institutional oversight, and ethics education among healthcare professionals and researchers. Continuous dialogue among stakeholders is essential to balance scientific advancement with moral accountability and public trust. Future research should focus on emerging ethical concerns associated with artificial intelligence, precision medicine, genomic technologies, and global public health challenges while exploring context-specific ethical frameworks applicable across different healthcare settings. In conclusion, biomedical ethics serves as a critical bridge between scientific progress and human values. Its continued development is fundamental to promoting responsible innovation, protecting individual rights, and advancing equitable healthcare systems. By fostering ethical awareness and evidence-based policymaking, biomedical ethics contributes significantly to building compassionate, just, and sustainable healthcare practices for present and future generations.

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