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Islamic Bioethics from the Perspective of Islamic Religious Education toward the Development of Modern Science

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Abstract

The rapid development of modern science and technology, particularly in the fields of medicine, biotechnology, and health, has brought significant changes to human life. Innovations such as genetic engineering, cloning, in vitro fertilization (IVF), organ transplantation, and vaccine development have provided major benefits for improving human health and quality of life. However, these advancements also raise ethical, moral, and religious concerns that require comprehensive analysis, especially from the perspective of Islamic bioethics. This study aims to analyze the role of Islamic bioethics and Islamic Religious Education in responding to the challenges of modern scientific development. This research employs a qualitative approach through library research by examining books, scientific journals, fatwas, and relevant academic literature related to Islamic bioethics, maqashid sharia, and modern science ethics. The findings indicate that Islam fundamentally supports scientific and technological advancement as long as it aligns with moral values and the objectives of Islamic law (maqashid sharia). Islamic bioethics serves as an ethical framework in assessing modern biomedical technologies by emphasizing the protection of religion, life, intellect, lineage, and property. Furthermore, Islamic Religious Education plays a strategic role in developing ethical awareness, critical thinking, and spiritual responsibility among students in facing technological advancement. Therefore, the integration of Islamic bioethics into Islamic Religious Education is essential to create a generation that is intellectually competent, morally responsible, and spiritually grounded in responding to modern scientific challenges.

Keywords: Islamic Bioethics, Islamic Religius Education, Modern Science, Maqashid Sharia, Medicala Technology.

Abstrak

Perkembangan ilmu pengetahuan dan teknologi modern, khususnya dalam bidang kesehatan, bioteknologi, dan kedokteran, telah membawa perubahan besar dalam kehidupan manusia. Berbagai inovasi seperti rekayasa genetika, kloning, bayi tabung (*In Vitro Fertilization*/*IVF*), transplantasi organ, serta pengembangan vaksin modern memberikan manfaat besar dalam meningkatkan kualitas kesehatan dan kehidupan manusia. Akan tetapi, perkembangan tersebut juga menimbulkan berbagai persoalan etika, moral, dan keagamaan yang memerlukan kajian mendalam, terutama dalam perspektif bioetika Islam. Penelitian ini bertujuan untuk menganalisis peran bioetika Islam dan Pendidikan Agama Islam dalam merespons perkembangan sains modern. Penelitian ini menggunakan pendekatan kualitatif melalui metode penelitian kepustakaan (*library research*) dengan mengkaji berbagai buku, jurnal ilmiah, fatwa, dan literatur yang berkaitan dengan bioetika Islam, maqashid syariah, dan etika sains modern. Hasil penelitian menunjukkan bahwa Islam pada dasarnya mendukung perkembangan ilmu pengetahuan dan teknologi selama tetap berada dalam koridor nilai moral dan tujuan syariat (maqashid syariah). Bioetika Islam berfungsi sebagai landasan etis dalam menilai perkembangan teknologi biomedis modern dengan menekankan perlindungan terhadap agama, jiwa, akal, keturunan, dan harta. Selain itu, Pendidikan Agama Islam memiliki peran strategis dalam membangun kesadaran etis, kemampuan berpikir kritis, serta tanggung jawab spiritual peserta didik dalam menghadapi perkembangan teknologi modern. Dengan demikian, integrasi bioetika Islam dalam Pendidikan Agama Islam menjadi penting untuk membentuk generasi yang unggul secara intelektual, bertanggung jawab secara moral, dan memiliki kesadaran spiritual dalam menghadapi tantangan perkembangan sains modern.

Kata Kunci: Bioetika Islam, Pendidikan Agama Islam, Sains Modern, Maqashid Syariah, Teknologi Medis

A. Introduction

The development of modern science and technology has brought significant changes to human life, particularly in the fields of health, biology, and medicine. Various innovations such as genetic engineering, cloning, in vitro fertilization (IVF), organ transplantation, and the production of modern vaccines serve as evidence of scientific progress that helps humanity overcome various life challenges.[1] These advancements have had enormously positive impacts, especially in improving healthcare quality, extending life expectancy, and providing solutions to diseases and reproductive disorders that were previously difficult to treat. However, on the other hand, the development of modern science has also given rise to various ethical, moral, and religious issues that require in-depth study, particularly from an Islamic perspective.

The advancement of biomedical technology in modern society is no longer viewed merely as a scientific matter, but also as an issue related to human values, ethics, and moral responsibility. Genetic engineering, for example, not only offers opportunities to cure hereditary diseases, but also raises questions regarding the limits of human intervention in the creation of Allah SWT. Likewise, practices such

[1] Ridwan Abdullah Putra et al., "Infertilitas, Teknologi Reproduksi Berbantu, Dan Penggunaan Kecerdasan Buatan: Suatu Tinjauan Etika Kedokteran," *Jurnal Etika Kedokteran Indonesia* (Bandung) 9, no. 1 (2025).

as human cloning, sperm and ovum donation, surrogate motherhood, and embryo manipulation have generated prolonged debates concerning lineage clarity, human dignity, and the boundaries of what is permissible under Islamic law. This condition demonstrates that scientific progress requires a strong ethical foundation so that technological development is not solely oriented toward practical benefits, but also preserves humanitarian and spiritual values.

Islam as a universal religion, places great importance on the development of knowledge and science. Throughout the history of Islamic civilization, scientific advancement developed alongside religious values that positioned humans as khalifah (vicegerents) on earth.[2] Islam does not reject scientific progress; rather, it encourages its followers to think critically, conduct research, and develop knowledge for the benefit of humanity. Nevertheless, Islam also provides moral boundaries to ensure that scientific knowledge is not misused and remains within the framework of maqashid al-shariah, namely the preservation of religion (hifz al-din), life (hifz al-nafs), intellect (hifz al-'aql), lineage (hifz al-nasl), and property (hifz al-mal). Therefore, the study of Islamic bioethics becomes highly important as an effort to evaluate and direct the development of modern science in accordance with Islamic principles.

From the perspective of Islamic Religious Education (Pendidikan Agama Islam/PAI), the discussion of bioethics is highly relevant to the needs of contemporary society. Islamic Religious Education functions not only as a medium for transferring religious knowledge, but also as a means of shaping character, morality, and students' critical thinking skills in addressing the challenges of modern life. Through the approach of Islamic bioethics, students can understand that technological development cannot be separated from moral responsibility and spiritual values. Thus, religious education is expected to produce a generation that excels not only in mastering science and technology, but also in possessing ethical and religious awareness in utilizing scientific advancements.

In addition, public health issues such as vaccination have become an important part of modern Islamic bioethical studies.[3] Debates concerning the halal status of vaccines, the use of certain substances in pharmaceutical production, and public health policies demonstrate the need for a comprehensive understanding that integrates medical science with Islamic law. In certain situations, Islamic scholars apply the approaches of maqashid al-shariah and the principle of necessity (darurah) in determining legal rulings that prioritize the protection of human life.[4] This indicates that Islam possesses flexibility in addressing modern issues as long as it remains oriented toward the welfare of humanity.

Amid the complexity of modern bioethical issues, the roles of Islamic scholars and scientists are crucial in formulating religious rulings and perspectives that are relevant to contemporary developments. Religious scholars require scientific explanations from healthcare professionals, physicians, and scientists so that the legal decisions produced are not merely normative, but also

[2] M. Arief Sanjani Natsir et al., "Peran Pendidikan dalam Membentuk Peradaban Islam di Era Sains dan Teknologi: Tinjauan Sosial Budaya," *At-Tadbir: Jurnal Manajemen Pendidikan Islam* (Nusa Tenggara Barat) 3, no. 2 (2023), https://doi.org/10.51700/attadbir.v3i2.864.

[3] Achmad Kholiq and Neni Supriani, *Fiqh Kesehatan & Kedokteran Modern* (Penerbit KBM Indonesia, n.d.).

[4] Lisnawati et al., "Menimbang Skala Prioritas dalam Kaidah Fikih: Antara Darurat dan Kebutuhan," *Hidayah: Cendekia Pendidikan Islam dan Hukum Syariah* (Demak) 2, no. 2 (2025).

contextual and applicable. Conversely, scientists also need ethical guidance and religious values so that technological advancement does not lose its humanitarian orientation. This collaboration between religion and science serves as one of the primary foundations in the development of contemporary Islamic bioethics. Based on the explanation above, the study entitled *"Islamic Bioethics from the Perspective of Islamic Religious Education: Evaluating the Development of Modern Science"* is important to develop. This study is expected to provide a comprehensive understanding of the relationship between Islamic teachings, ethics, and the development of modern science, while also contributing to the advancement of Islamic Religious Education that is responsive to contemporary challenges.

B. Literature Review

1. Islamic Bioethics

Bioethics is a relatively new academic discipline that emerged as a response to the rapid advancement of life sciences and modern medicine. The concept was first introduced in the 1970s, although discussions concerning the ethics of life have been part of human civilization for thousands of years. Van Rensselaer Potter defined bioethics as a combination of biological knowledge and human value systems aimed at building a bridge between science and the humanities for the safety, sustainability, and betterment of human civilization.[5] Another definition cited by Ben Mepham describes bioethics as "the study of the moral and social implications of techniques resulting from advances in biological sciences".[6]

Bioethics is an interdisciplinary approach based on the analysis of scientific, biological, and medical data to evaluate the legitimacy of human intervention in life.[7] The scope of bioethics is not limited to traditional medical ethics, but also extends to various other fields. In medical bioethics, discussions include the relationship between doctors and patients, public health ethics, and research ethics involving human subjects. In addition, there is animal bioethics, which concerns the use of experimental animals and genetic engineering in animals, as well as agricultural bioethics, which discusses genetically modified crops and food products, nutrigenetics, and nutrigenomics. The rapid development of bioethics has also encouraged the establishment of various institutions responsible for regulating research boundaries and technological developments in accordance with ethical principles.

The fundamental principles of bioethics, particularly within the contexts of medicine and scientific research, consist of four major pillars:

a) Autonomy: This principle is based on the belief that every individual is capable of logical thinking and making independent decisions. In professional

[5] Jozić T, "Bioetika-Umijeće Opstanka: Van Rensselaer POTTER, Bioetika. Most Prema Budućnosti, S Engleskog Prevela Ines Radinović, Medicinski Fakultet u Rijeci/Katedra Za Društvene Znanosti, Hrvatsko Društvo Za Kliničku Bioetiku, Hrvatsko Bioetičko Društvo, Međunarodno Udruženje Za Kliničku Bioetiku, Rijeka," *Medicinski Fakultet u Rijeci/Katedra Za Društvene Znanosti* (Kroasia), 2007.

[6] Ali Nuraliah, "Urgensi Bioetika Dalam Perkembangan Biologi Modern Menurut Perspektif Islam," *Jurnal Binomial* 2, no. 1 (2019).

[7] Dian Pardede et al., "Etika Biomedis dalam Perspektif Kemanusiaan dan Keagamaan: Analisis Multidisipliner Terhadap Dilema Moral Modern," *Journal of Humanities and Education Studies* (Aceh) 1, no. 1 (2025).

practice, autonomy means respecting the rights of clients or patients to make decisions regarding their own treatment and healthcare.

b) Beneficence: This principle refers to the obligation to do good. It requires the prevention of wrongdoing or harm, the elimination of evil, and the promotion of goodness for oneself and others. In the medical context, every action should aim to improve the patient's health and ensure beneficial outcomes. At times, this principle may conflict with the principle of autonomy.[8]

c) Non-maleficence: This principle emphasizes the obligation not to cause physical or psychological harm to patients or clients. Physicians and researchers must minimize the risks of side effects or negative consequences arising from medical procedures or scientific experimentation.[9] If the risks outweigh the benefits, such actions should be avoided.

d) Justice: The principle of justice requires equal and fair treatment for all individuals without discrimination based on race, gender, socioeconomic status, or other factors. Justice also involves ensuring equal access to healthcare services for everyone. The implementation of these principles is not always straightforward, as conflicts often arise among them, requiring careful consideration and prioritization. This reflects the complexity of bioethical decision-making, where fundamental ethical principles may sometimes contradict one another.

2. Ethics of Modern Science

The ethics of modern science is a field of study that examines the relationship between scientific and technological advancement and humanity's moral responsibility in its application. The progress of modern science has produced extraordinary innovations in healthcare, biology, information technology, and genetic engineering, all of which have brought significant benefits to human life.[10]

However, alongside these benefits, scientific advancement has also introduced complex issues such as genetic manipulation, human cloning, in vitro fertilization, and the use of artificial intelligence in medicine. Therefore, the ethics of modern science seeks to ensure that scientific progress remains oriented toward humanitarian values, justice, and social responsibility.[11]

In the history of modern scientific development, science has often been viewed as neutral and value-free. This perspective emerged particularly during the era of positivism, which emphasized rationality and empiricism as the primary sources of scientific truth. Auguste Comte, for example, argued that scientific knowledge should be built upon objective facts without interference from religious or moral values. Nevertheless, technological developments have demonstrated that science can never be entirely neutral, as every scientific discovery inevitably carries social, political, economic, and moral consequences for human life.[12]

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[10] L. Beauchamp et al., *Principle of Biomedical Ethics*, 4th ed. (Oxford University Press, 1994).

[11] Hans Jonas, *The Imperative of Responsibility* (University of Chicago Press, 1984).

[12] Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (Farrar, Straus and Giroux, 2002).

Historical events such as the use of atomic bombs during World War II, unethical medical experiments on humans, and the misuse of biological technology illustrate that science without ethics can become a threat to humanity. Hans Jonas, in his theory *The Imperative of Responsibility*, emphasized that modern technological development creates enormous power capable of influencing the future of humanity. Therefore, humans must possess moral responsibility regarding the long-term impacts of technological advancement. Jonas stressed that scientific progress must be accompanied by ethical awareness in order to avoid damaging human life and the environment.

In the field of modern bioethics, one of the most influential theories is the Four Principles of Bioethics proposed by Tom L. Beauchamp and James F. Childress in the book *Principles of Biomedical Ethics*. They formulated four fundamental principles that serve as the foundation of modern medical ethics:

a) *Autonomy* (respect for individual autonomy)
b) *Beneficence* (providing benefit),
c) *Non-maleficence* (avoiding harm),
d) *Justice* (fairness and equality).

The principle of autonomy emphasizes the right of individuals to make decisions concerning their own bodies and health. In modern medical practice, patients have the right to accept or refuse medical treatment after receiving adequate information. This principle developed alongside growing awareness of human rights and resistance to authoritarian medical practices.

The principle of beneficence requires medical professionals and scientists to act for the welfare of humanity. Medical technology should aim to improve quality of life, cure diseases, and support public well-being. Meanwhile, the principle of non-maleficence stresses the prohibition against causing harm, in accordance with the classical medical principle *primum non nocere* ("first, do no harm"). The principle of justice, on the other hand, concerns equal access to healthcare services and technology. In the modern era, ethical issues emerge when advanced healthcare technologies are accessible only to certain groups due to economic inequality. Disparities in access to vaccines, organ transplantation, and reproductive technologies represent major ethical challenges in modern science.

These modern ethical principles are closely related to Islamic values, although Islam provides a broader spiritual dimension. Islam views scientific knowledge as a trust (amanah) from Allah SWT that must be used for the benefit of humanity. Consequently, science is evaluated not only based on material benefit, but also on moral values, spirituality, and responsibility before God. Ziauddin Sardar explains that science in Islam is ethical and holistic, rather than merely a tool for technological production. According to him, modern civilization often experiences crises because it separates scientific knowledge from moral and religious values. As a result, technology develops rapidly but does not always promote justice and humanity. In this context, Islamic ethics functions as a moral control mechanism to ensure balance between material progress and spiritual values.

Furthermore, Francis Fukuyama in his book *Our Posthuman Future* warns about the dangers of excessive biotechnological development, particularly human genetic engineering. He argues that biological manipulation may alter human nature and create new forms of social inequality. These concerns are also

consistent with the perspective of Islamic bioethics, which rejects forms of human manipulation that may damage human dignity, lineage, and the balance of life.[13]

In the educational context, the theory of modern scientific ethics is important to integrate into Islamic Religious Education so that students not only understand the technical aspects of technological advancement, but are also able to evaluate its moral implications. An educational system that focuses solely on scientific mastery without ethical formation risks producing generations that are intellectually advanced but morally weak. Therefore, Islamic education must foster awareness that knowledge is a means of worship and social responsibility, rather than merely a tool for exploitation or domination. Thus, the theory of modern scientific ethics serves as an important foundation for understanding the relationship between technological advancement and moral values. Within the study of Islamic bioethics, this theory is used to evaluate the extent to which modern scientific developments align with the principles of public welfare (*maslahah*), justice, responsibility, and respect for human dignity. The integration of modern ethical theories with Islamic values is expected to produce a more humane, just, and welfare-oriented approach to science and technology

C. Method

This study employs a library research method using a qualitative and descriptive approach. Library research is a method of inquiry conducted by collecting, reviewing, and analyzing data and information obtained from various written sources, including books, scholarly journals, religious fatwas, official documents, conference proceedings, and previous studies related to Islamic bioethics and the development of modern science. This approach was chosen because the study focuses on conceptual, theoretical, and normative analyses concerning Islamic ethical perspectives on contemporary scientific advancements. The qualitative approach is utilized to explore and interpret the values, principles, and ethical foundations of Islamic bioethics in responding to the rapid progress of modern science and technology. Meanwhile, the descriptive method aims to systematically describe the concepts, issues, and challenges associated with bioethical discussions within the framework of Islamic Religious Education. Through this method, the study seeks to present a comprehensive understanding of how Islamic teachings provide ethical guidance in addressing scientific developments, particularly in fields such as biotechnology, genetic engineering, cloning, organ transplantation, artificial intelligence, and medical innovation.

Data collection techniques in this study involve documentation and literature review processes by examining authoritative academic and religious sources relevant to the research topic. The collected data are then analyzed using content analysis techniques, which involve identifying, classifying, interpreting, and synthesizing information based on themes related to Islamic bioethics and modern scientific development. To ensure the validity and credibility of the data, the study prioritizes reputable and relevant sources from both Islamic scholarship and contemporary scientific literature.

Through this library research approach, the study is expected to provide a deeper theoretical understanding of Islamic bioethics and contribute to the

[13] Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution*.

development of Islamic Religious Education discourse in responding to ethical challenges emerging from modern scientific advancement.

D. Result and Discussion

Islamic Bioethics as an Ethical Foundation in the Development of Modern Science

The development of modern science and technology has brought significant changes to human life, particularly in the fields of healthcare, biology, and medicine. Such progress can be seen through the emergence of various innovations, including genetic engineering, organ transplantation, in vitro fertilization (IVF), artificial intelligence in the medical field, and the development of modern vaccines that help humanity overcome diseases and improve quality of life. These developments demonstrate that modern science has made substantial contributions to human welfare. However, alongside these benefits, technological advancement has also introduced increasingly complex ethical issues. Genetic manipulation, human cloning, the exploitation of the human body for experimental purposes, and the commercialization of healthcare technology have become controversial issues that provoke moral and religious debates within modern society. Therefore, scientific advancement cannot be separated from the need for an ethical foundation capable of guiding technology to remain aligned with humanitarian values and public welfare.[14]

In this context, bioethics emerges as a discipline that examines the relationship between developments in biology and medicine and moral values as well as human social responsibility. Bioethics does not merely question whether a technology can be implemented, but also whether it should be implemented from a moral perspective. In other words, bioethics functions as an ethical control over scientific advancement so that technology does not develop without direction or disregard for human values. The presence of bioethics in the modern world has become increasingly important because technological development often progresses far more rapidly than humanity's ability to establish moral and legal regulations governing it. This situation has resulted in various issues that are not only scientific in nature but also concern human identity, the right to life, social justice, and responsibility for the future of humanity.[15]

Amid these developments, Islam, as a universal religion, offers a distinctive perspective regarding the relationship between science and ethics. Fundamentally, Islam does not reject the advancement of modern science; rather, it strongly encourages humanity to think critically, conduct research, and develop knowledge. Many verses of the Qur'an command human beings to use reason, observe the universe, and reflect upon the phenomena of life. This demonstrates that the pursuit of knowledge is considered an act of worship and a form of human responsibility as khalifah (vicegerents) on earth. Nevertheless, Islam emphasizes that scientific knowledge must progress alongside moral and spiritual values in order to prevent destruction and harm. Thus, scientific advancement in Islam is evaluated not solely based on technological success, but also on its benefits, justice, and impact on human life.

[14] Abdulaziz Sachedina, *Islamic Biomedical Ethics: Principles and Application* (Oxford University Press, 2009).

[15] Mohammed Ali Al-Bar, *Contemporary Bioethics: Islamic Perspective* (Springer, 2015).

Islamic bioethics therefore emerges as an approach that integrates religious teachings with the advancement of modern science. Islamic bioethics seeks to employ the Qur'an, Hadith, maqashid al-shariah, and Islamic legal principles (qawa'id fiqhiyyah) as foundations for evaluating various contemporary biomedical issues. From the Islamic perspective, human beings possess noble dignity; therefore, the human body must not be treated merely as an object of experimentation or an economic commodity. Consequently, all forms of technological development must preserve human dignity (*karamah al-insan*), public welfare (*maslahah*), and the balance of life. This principle distinguishes Islamic bioethics from secular ethical approaches, which often focus primarily on practical benefits and individual freedom.[16]

One of the most important foundations of Islamic bioethics is the concept of *maqashid al-shariah*, namely the primary objectives of Islamic law intended to preserve human welfare. *Maqashid al-shariah* includes the protection of religion (*hifz al-din*), life (*hifz al-nafs*), intellect (*hifz al-'aql*), lineage (*hifz al-nasl*), and property (*hifz al-mal*). Within the context of modern scientific development, these principles serve as guidelines in determining whether a particular technology can be accepted or rejected in Islam. For instance, the use of vaccines is considered part of preserving life because it aims to protect people from dangerous diseases. Likewise, modern medical treatments capable of saving lives are viewed as efforts to realize public welfare. However, Islam also establishes limitations on technologies that may damage human dignity or create social disorder, such as reproductive human cloning or sperm donation that may disrupt lineage and family structure.

Islamic bioethics also emphasizes the importance of balancing benefits and harms. In Islamic legal maxims, it is stated that preventing harm should take precedence over obtaining benefit (*dar'u al-mafasid muqaddam 'ala jalb al-masalih*). This principle is highly relevant in responding to modern technological developments that often promise great benefits while simultaneously carrying significant moral and social risks. Genetic engineering, for example, may help cure hereditary diseases, but it may also create opportunities for human manipulation driven by economic or political interests. Therefore, Islam maintains that scientific advancement must be supervised by ethical values so that it does not exceed the boundaries of humanity.

Technological advancement is also frequently confronted with issues concerning individual freedom and social responsibility. The principles of modern bioethics—autonomy, beneficence, non-maleficence, and justice—serve as important foundations in medicine and scientific research. However, Islam views human freedom as not entirely absolute because it remains bound by responsibility toward Allah SWT and the interests of society as a whole. Consequently, Islamic bioethics considers not only individual rights, but also the social, moral, and spiritual impacts of technology.

Within the educational sphere, the development of modern bioethics presents a major challenge for Islamic Religious Education (Pendidikan Agama Islam/PAI). Islamic Religious Education should not merely teach rituals and acts of worship, but must also provide ethical understanding regarding scientific and technological advancement. Students need to be equipped with critical thinking

[16] Beauchamp et al., *Principle of Biomedical Ethics*.

skills so that they are able to respond wisely and responsibly to modern scientific developments. The integration of bioethics into Islamic Religious Education is therefore essential to ensure that younger generations are not only technologically competent but also possess moral and spiritual awareness in applying scientific knowledge. Through this approach, Islamic Religious Education can function as a medium for internalizing ethical values within the context of modern scientific development. Religious education should no longer be understood solely as the transfer of normative knowledge, but also as a process of character formation and the cultivation of social responsibility. Thus, students are expected to understand that scientific knowledge is a trust (*amanah*) that must be utilized for the welfare of humanity, rather than for exploitation, destruction, or purposes that contradict human values.[17]

Based on the discussion above, it can be understood that Islamic bioethics plays a highly significant role as an ethical foundation in addressing the development of modern science. Islamic bioethics does not aim to hinder scientific progress, but rather to direct technological advancement so that it remains within moral, humanitarian, and spiritual boundaries. The integration of religion and science is therefore essential in building a modern civilization that is not only technologically advanced, but also civilized, ethical, and oriented toward the comprehensive welfare of humanity.

Genetic Engineering, Cloning, and Reproductive Bioethics from an Islamic Perspective

The development of modern biomedical technology has brought major changes, particularly in the fields of healthcare and human reproduction. Advances in genetics have enabled humans to perform various forms of intervention in biological systems that were previously considered impossible. Genetic engineering, cloning, in vitro fertilization (IVF), sperm donation, ovum donation, and surrogate motherhood are examples of modern scientific developments that offer new hope in the medical world. These technologies can assist in treating hereditary diseases, overcoming infertility, and improving human health. However, alongside these benefits, various moral, ethical, and religious issues have also emerged, requiring in-depth analysis, especially from an Islamic perspective. These issues are not only related to medical aspects, but also concern human dignity, lineage clarity, reproductive rights, and the limits of human intervention in the creation of Allah SWT.[18]

From the Islamic perspective, science and technology are fundamentally viewed as part of the blessings granted by Allah SWT, which may be utilized for the welfare of humanity. Islam does not reject the advancement of modern science as long as its application aims at goodness and does not create greater harm. This principle is consistent with the Islamic legal maxim stating that the original ruling of all matters is permissibility unless there is evidence prohibiting them. Therefore, the development of medical technologies such as genetic engineering and reproductive technologies is not automatically considered forbidden (*haram*), but must instead be evaluated based on its objectives, benefits, and impacts on human life.[19]

[17] Ziauddin Sardar, *Islamic Futures: The Shape of Ideas to Come* (Mansell Publishing, 1985).

[18] Sachedina, *Islamic Biomedical Ethics: Principles and Application*.

[19] Yusuf al-Qaradawi, *Al-Halal Wa al-Haram Fi al-Islam* (Dal al-Shuruq, 1994).

Genetic engineering refers to technology used to modify the genes of living organisms for specific purposes, such as correcting genetic disorders, increasing resistance to diseases, or developing new medical therapies. In healthcare, genetic engineering provides major benefits because it can assist in treating hereditary diseases that were previously difficult to cure. This technology also opens opportunities for the development of gene therapy capable of repairing damaged human DNA. From an Islamic perspective, the use of genetic engineering for medical treatment and life-saving purposes is generally permissible because it aligns with the principle of preserving life (*hifz al-nafs*) within *maqashid al-shariah*.

Nevertheless, Islam also establishes ethical boundaries regarding the use of genetic technology. Genetic manipulation carried out solely for commercial interests, human exploitation, or the creation of "superior humans" is considered contrary to the principles of justice and balance in Islam. Concerns regarding the misuse of genetic engineering arise because such technology has the potential to alter human biological identity and create new forms of social inequality. In this context, Islamic bioethics emphasizes that humans should not use scientific knowledge excessively to the point of surpassing the limits of humanity and disrupting the order of life established by Allah SWT.

Another issue that receives significant attention in Islamic bioethics is human cloning. Cloning is the process of creating a new organism with a genetic composition identical to its original source. In the medical field, cloning is generally divided into two main forms: therapeutic cloning and reproductive cloning. Therapeutic cloning is conducted for medical research and the development of treatments for certain diseases, whereas reproductive cloning aims to create a new human individual who is genetically identical to another person. Most contemporary Muslim scholars reject reproductive human cloning because it is considered contrary to the natural order (*fitrah*) of human creation and may disrupt the system of lineage (*nasab*) in Islam.

The rejection of reproductive cloning is based on several moral and social considerations. First, human cloning may eliminate the clarity of family relationships and lineage, which Islam strongly protects through the concept of *hifz al-nasl* (preservation of lineage). Second, cloning practices are feared to degrade human dignity because humans may be treated as laboratory objects that can be artificially produced according to specific desires. Third, human cloning may create psychological and social problems whose consequences cannot yet be fully predicted. For these reasons, many international Islamic fatwa institutions, such as International Islamic Fiqh Academy (*Majma' al-Fiqh al-Islami*), have declared reproductive human cloning prohibited.[20]

In addition to genetic engineering and cloning, the development of modern reproductive technology has also become an important topic within Islamic bioethics. One of the most widely known reproductive technologies is in vitro fertilization (IVF), commonly known as the "test-tube baby" procedure. This technology involves fertilizing sperm and ovum outside the human body, after which the resulting embryo is implanted into the mother's uterus. IVF technology provides significant hope for married couples experiencing infertility or

[20] "Qarar Fi Al-Istinsakh al-Basyari (Keputusan Tentang Kloning Manusia)," paper presented at Organisasi Konferensi Islam, 1997.

reproductive disorders. From the Islamic perspective, IVF is permissible as long as both the sperm and ovum originate from a legally married husband and wife, and the process occurs within the duration of the marriage.[21]

The permissibility of IVF in Islam is based on its primary objective of helping married couples obtain offspring without violating Islamic principles. This technology is viewed as part of human effort (*ikhtiar*) to achieve one of the main objectives of marriage in Islam, namely having children. However, Islam imposes strict limitations regarding the involvement of third parties in the reproductive process. The use of sperm or ovum donors is considered prohibited because it may mix lineages and create ambiguity in family relationships. In Islam, lineage clarity holds a highly important position because it relates to inheritance rights, guardianship, and family identity.

The prohibition of sperm and ovum donation is also related to preserving human dignity and maintaining social stability. If reproductive donation were freely permitted, issues concerning a child's biological identity, parental rights, and potential future social conflicts would likely emerge. Therefore, the principle of *hifz al-nasl* within *maqashid al-shariah* serves as the primary foundation for rejecting reproductive practices involving third parties. The same principle also applies to surrogate motherhood, which is considered capable of creating ambiguity regarding maternal status and family relationships.[22]

On the other hand, the advancement of modern reproductive technology demonstrates that bioethical issues cannot be resolved solely through medical approaches. Dialogue between religious scholars, scientists, physicians, and genetic experts is necessary so that emerging healthcare issues can be understood comprehensively. Religious scholars play an important role in providing moral and legal guidance based on the Qur'an, Hadith, and *maqashid al-shariah*, while scientists provide technical explanations concerning the benefits and risks of developing technologies. Collaboration between religion and science is therefore essential to ensure that technological advancement remains within humanitarian boundaries and does not lose its moral orientation.[23]

Within the context of Islamic Religious Education (Pendidikan Agama Islam/PAI), discussions concerning genetic engineering, cloning, and reproductive bioethics are highly relevant to the needs of modern society. Islamic Religious Education is not limited to teaching ritual worship, but must also provide ethical understanding regarding scientific and technological advancement. Students should be equipped with critical thinking skills so that they understand that scientific progress must always be accompanied by moral and spiritual responsibility. Through this approach, Islamic education can produce a generation that is not only intellectually capable, but also ethically conscious in utilizing modern technology for the welfare of humanity.

Islamic Religious Education and the Analysis of *Maqashid al-Shariah*: Responding to the Development of Modern Medical Technology

The development of modern science and technology has brought significant changes to human life, including in the fields of education, healthcare,

[21] Gamal Serour, "Islam and Assisted Reproductive Technologies," *Middle East Fertility Society Journal* 13, no. 3 (2008).

[22] Wahbah Zuhaili, *Ushul Al-Fiqh al-Islami* (Dar al-Fikr, 1986).

[23] Tariq Ramadan, *Radical Reform: Islamic Ethics and Liberation* (Oxford University Press, 2009).

and social life. Advances in medical technology such as genetic engineering, organ transplantation, in vitro fertilization (IVF), and the development of modern vaccines demonstrate that humanity has achieved remarkable scientific progress. These technologies provide numerous benefits in improving quality of life, treating diseases, and extending life expectancy. However, such developments have also generated various ethical, moral, and religious issues that require serious examination, particularly from an Islamic perspective. These issues are increasingly important because modern technology does not only involve technical and scientific aspects, but also touches upon human values, moral responsibility, and the limits of human intervention in life.

In this regard, Islamic Religious Education (Pendidikan Agama Islam/PAI) plays a highly strategic role in developing ethical awareness within society concerning modern technological advancements. Islamic Religious Education is not merely intended to convey normative religious knowledge, but also to shape the character, morality, and mindset of students so that they are capable of facing contemporary challenges wisely. In today's era, students live in an environment dominated by rapidly developing digital technology and scientific advancement. Therefore, Islamic Religious Education is required to provide contextual understanding regarding various modern issues, including bioethics and medical technology.

So far, the teaching of Islamic Religious Education has often focused more on rituals and worship, while discussions concerning the ethics of science and technological development remain relatively limited. In fact, modern technological advancement has introduced new issues that require more relevant and applicable religious approaches. Students need to be equipped with critical thinking skills so that they not only understand technology from a practical perspective, but are also capable of evaluating its moral, social, and humanitarian impacts. In this context, the integration of Islamic bioethics into Islamic Religious Education becomes highly important as an effort to build a generation that is not only intellectually excellent, but also possesses spiritual awareness and social responsibility.[24]

Fundamentally, Islam strongly supports the development of science and technology. Many verses of the Qur'an encourage human beings to think, conduct research, and utilize knowledge for the welfare of life. Throughout the history of Islamic civilization, scientific advancement developed alongside the strengthening of moral and spiritual values. Classical Muslim scholars such as Ibn Sina, Al-Razi, and Al-Farabi did not separate scientific knowledge from ethics and religion. This demonstrates that, from the Islamic perspective, knowledge is not merely a tool for controlling nature, but also a means of drawing closer to Allah SWT and realizing the welfare of humanity.[25]

However, the development of modern science in the contemporary era often progresses without sufficient moral control. Rapid technological advancement has led to various ethical issues such as the exploitation of the human body, the commercialization of healthcare, genetic manipulation, and unequal access to modern healthcare services. Under such conditions, Islamic

[24] Muhaimin, *Paradigma Pendidikan Islam* (Remaja Rosdakarya, 2012).

[25] Seyyed Hossein Nasr, *Islam and the Plight of Modern Man* (BC International Group, 2001).

Religious Education has the responsibility to introduce ethical values so that technological development does not lose its humanitarian orientation. Religious education must instill awareness that scientific knowledge is a trust (*amanah*) that must be used responsibly and must not damage human dignity or the balance of life.

One of the most relevant approaches in responding to modern medical technology is the theory of *maqashid al-shariah*. *Maqashid al-shariah* refers to the primary objectives behind the establishment of Islamic law for the purpose of realizing human welfare. According to Al-Shatibi, the objectives of Islamic law include the protection of religion (*hifz al-din*), life (*hifz al-nafs*), intellect (*hifz al-'aql*), lineage (*hifz al-nasl*), and property (*hifz al-mal*). These principles serve as important foundations in evaluating whether modern medical technologies are consistent with Islamic values or whether they potentially create harm for humanity.[26]

In the context of modern healthcare technology, the principle of *hifz al-nafs* (protection of life) serves as one of the primary foundations in Islam. The development of vaccines, modern medical treatments, organ transplantation, and medical technologies intended to save human lives are viewed as efforts to preserve life, which are highly encouraged in Islam. Therefore, Islam fundamentally supports the advancement of medical technology as long as it aims to achieve public welfare and does not contradict the principles of Islamic law. This demonstrates that Islam is not a religion that rejects modernity, but rather one that establishes moral boundaries to ensure that technological advancement remains aligned with humanitarian values.

In addition to preserving life, *maqashid al-shariah* also emphasizes the importance of preserving lineage (*hifz al-nasl*). This principle is highly relevant in discussions concerning modern reproductive technologies such as IVF, sperm donation, ovum donation, and genetic engineering. Islam permits reproductive technology as long as it does not compromise lineage clarity and continues to preserve family dignity. Therefore, reproductive practices involving third parties are generally rejected because they may mix lineages and create social problems in the future. In this context, *maqashid al-shariah* functions as an ethical framework for determining the permissible limits of human intervention in reproductive systems.

The *maqashid al-shariah* approach also provides flexibility for Islamic law in responding to continuously evolving technologies. Many modern bioethical issues are not explicitly discussed in classical fiqh literature because such technologies did not exist in earlier periods. Therefore, contemporary Muslim scholars employ the *maqashid al-shariah* approach to understand the fundamental objectives of Islamic law so that Islamic jurisprudence remains capable of addressing contemporary issues without losing its essential values. This approach demonstrates that Islam possesses a dynamic and adaptive nature toward scientific and technological advancement.

In practice, the analysis of *maqashid al-shariah* regarding modern medical technology cannot be conducted unilaterally. Cooperation among religious scholars, scientists, physicians, and academics is necessary so that bioethical issues can be understood comprehensively. Religious scholars provide normative

[26] Al-Syatibi, *Al-Muwafaqat Fi Ushul al-Syari'ah*, vol. 2 (Dar al-Kutub al-'Ilmiyyah, n.d.).

foundations based on the Qur'an, Hadith, and Islamic legal principles, while scientists explain the technical aspects, benefits, and risks of developing technologies. This multidisciplinary collaboration is extremely important because modern technological advancement often carries complex consequences affecting various aspects of human life.

Within the educational sphere, integrating *maqashid al-shariah* and Islamic bioethics into Islamic Religious Education can serve as a solution for addressing the moral challenges faced by modern generations. Students should not merely understand the concepts of halal and haram textually, but should also comprehend the objectives and wisdom behind Islamic law. Through this approach, religious learning becomes more contextual and relevant to contemporary developments. Students are expected to understand that Islam does not oppose technological advancement; rather, it directs technology to be used for human welfare and the preservation of life's balance.

The integration of bioethics into Islamic Religious Education can also foster a culture of critical and reflective thinking among students. Younger generations need to be trained to evaluate technological advancement wisely, rather than merely following the flow of modernity without moral consideration. Religious education capable of engaging in dialogue with scientific development will produce Muslim generations who are not hostile toward scientific progress, while still maintaining their moral and spiritual identity. Thus, Islamic Religious Education can function as an ethical foundation in facing the increasingly complex challenges posed by modern medical technology.

Based on the discussion above, it can be understood that Islamic Religious Education and *maqashid al-shariah* have a very close relationship in responding to the development of modern medical technology. Religious education functions to shape the moral and spiritual awareness of students, while *maqashid al-shariah* serves as an ethical framework for evaluating the benefits and impacts of technological advancement. The integration of both is essential in building a modern society that is not only advanced in science and technology, but also possesses moral responsibility, social justice, and a strong humanitarian orientation. In this way, the development of modern science can progress harmoniously with Islamic values in order to realize the comprehensive welfare of humanity.

Conclusion

Based on the discussion presented above, it can be understood that the development of modern science in the fields of healthcare, biology, and medical technology has made significant contributions to improving the quality of human life. Various innovations such as genetic engineering, cloning, in vitro fertilization (IVF), organ transplantation, and the development of modern vaccines demonstrate that scientific knowledge has progressed rapidly and has enabled humanity to overcome numerous life challenges. Nevertheless, these developments have also generated various ethical, moral, and religious issues that cannot be resolved solely through scientific approaches. Issues concerning genetic manipulation, lineage clarity, exploitation of the human body, and unequal access to healthcare technology indicate that scientific advancement requires a strong moral foundation in order to remain oriented toward humanitarian values and the common good. In this context, Islamic bioethics emerges as an approach capable of integrating scientific advancement with the values of Islamic law. Fundamentally, Islam does not reject scientific and technological progress; rather, it encourages humanity to think critically, conduct research, and develop knowledge for the welfare of life. However, Islam also establishes ethical boundaries to ensure that technological advancement does not exceed moral and spiritual values. The principles of *maqashid al-shariah*, such as the protection of life (*hifz al-nafs*), intellect (*hifz al-'aql*), lineage (*hifz al-nasl*), religion (*hifz al-din*), and property (*hifz al-mal*), serve as important foundations in evaluating the development of modern medical technology. Through this approach, technologies intended to preserve and save human life may be accepted, while technologies that potentially damage human dignity or create social harm should be limited or rejected.

This study also demonstrates that the development of modern reproductive technologies such as IVF, sperm donation, ovum donation, and human cloning requires serious attention from the perspective of Islamic bioethics. Islam permits the use of reproductive technology as long as it preserves lineage clarity, family dignity, and does not involve third parties that may create ambiguity in familial relationships. Thus, Islamic bioethics functions not only as a legal framework for determining permissibility, but also as a means of protecting human dignity and maintaining social stability within modern society. Furthermore, Islamic Religious Education (Pendidikan Agama Islam/PAI) plays a highly strategic role in responding to the development of modern science. Islamic Religious Education should not merely focus on rituals and acts of worship, but must also cultivate ethical awareness, moral values, and critical thinking skills among students in addressing technological advancement. The integration of Islamic bioethics and *maqashid al-shariah* into Islamic Religious Education is essential so that younger generations understand that scientific knowledge is a trust (*amanah*) that must be utilized responsibly for the welfare of humanity. Through this approach, Islamic education can produce generations who are not only excellent in science and technology, but who also possess strong spiritual awareness and social responsibility.

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