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Review Article

Meaning and Conception of Bioethics and its Realm

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ABSTRACT

Background and Aim: The present era witnesses new biomedical technologies that have brought about philosophical, moral, religious and social challenges. More questions, challenges and uncertainties in biotechnology have made applied ethics, as a part of its ethics and philosophy, investigate the issue and find relevant appropriate solutions based on ethical principles and theories.
Materials and Methods: The current study aimed at casting light on bioethics and its scope using primary and authentic sources on bioethics and seeking the related keywords in these sources.
Ethical Considerations: The principles of research ethics have been observed in studies and citing the primary texts and sources.
Findings: Providing an all-inclusive definition of bioethics and its place in different disciplines of ethics, this short discussion tackles the area, realm, and significance of the issues in bioethics. Technologies such as assisted reproductive, in vitro fertilization (IVF), human and animal cloning, obtaining stem cells and using them, euthanasia, and manufacture of human organs and their transplantation are the most challenging matters for which within bioethics, the fundamental answers and strategies against the questions and challenges of their emergence are elaborated.
Conclusion: Bioethics is a new area of interest in applied normative ethics which, as an interdisciplinary, examines systematically the moral challenges coming from biological science and medical innovations and organizes the must-to-dos in this connection. The realm of bioethics comprises the distinction of consequences of applying modern biomedical technologies against the ethical principles and standards within human life. The aforesaid technologies and advancements that make up issues in bioethics are grouped in four categories:
- Life preserver technologies at the beginning of life and during it;
- Life lasting technologies to promote the life quality;
- Reproductive and esp. cloning technologies;
- Technologies associated with genetic engineering and gene therapy.

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Introduction

In the wake of the improvement and prevalence of new technologies in biomedical areas and its persistent continuity in the early years of the third millennium, the 21st century is called undoubtedly the biotechnology era (1). Rapid and significant advancements in biotechnology have provided a different and changing representation of the future life which is full of philosophical and moral ambiguities and possible risks to human life and his/her identity. Given the above-said picture, some believe that although several modern biotechnologies such as cloning and genetic manipulation may settle forever the old unsolved problem of the influence of "heredity or environment" in human behavior, these scientific and biomedical breakthroughs pave the way for human attempts to reach a biological Hiroshima that

can threaten the future of human life as well as the biosphere (2).

Manipulation in the areas which have been monopolized already by superhuman strength is considered today an intervention in creation that would face inevitably serious and deep questions. Production of transgenic plant and animal species and releasing them in nature, IVF infants via assisted reproductive technology, human and animal cloning, discovery and use of stem cells, euthanasia, Chimera, manufacture of human organs and their transplantation are included in issues in biotechnology which are positioned against ethics and the relevant areas and set forth serious questions and challenges.

As an example, although embryo health or genetic defect diagnosis in the early weeks of pregnancy is highly valuable using modern biomedical technologies, it has had unintended consequences such as the possibility of killing defective and deformed embryos or those with different characteristics from what the parents desire. The possibility of extended life for patients with much spending has caused ethical questions on euthanasia. Also, identifying and mapping the human genome has disclosed genetic information of individuals' problematic in such a way that it sets somehow the stage for discrimination and injustice regarding resource allocation, service benefit, or exploiting the abilities of people.

Following the realization of the first cloning in 1997 by Ian Wilmot, an Irish embryologist, and the birth of Dolly, the cloned sheep, free from the contribution of any fertility and sexual reproduction, many questions, and ambiguities on the possibility of human cloning via Somatic Nuclear Transfer Technique were proposed. Does success in human cloning pave the way for men of wealth and power to dominate the future of human beings to achieve their predetermined plans and as a result, humiliate and exploit people which would be against human dignity and identity (3)? Is human cloning to the advantage of human beings or their disadvantage? Does this measure cause risks including reduced genetic diversity of living species and living organisms?

The above-said issues and the related matters are questions that, within ethical dos and don'ts and the relationship between ethics and new biotechnologies, have established a new discipline of applied ethics which is called bioethics.

Ethical Considerations

The principles of research ethics have been observed as much as possible in studies and citing the primary texts and references to the sources have been taken completely into consideration.

Materials and Methods

The current study aimed at investigating and casting light on bioethics and its associated important issues using authentic sources on bioethics, the related keywords in the databases in ethics and rights, and the former studies on applied normative ethics. In this connection, the papers, books, and internet sources, especially those available to the author of this research in his three sabbatical courses in Max Planck Institute of Germany in 2007, 2011, and 2016, have played a significant role in supporting and making the literature of this study rich.

Findings

Providing an all-inclusive definition of bioethics and its place in different disciplines of ethics, this short discussion tackles the area, realm, and significance of the issues in bioethics. Accordingly, first, the conception of bioethics is identified which is followed later by an elaboration of its realm.

1. Meaning and Conception of Bioethics

A. Bioethics within Applied Ethics

More questions, challenges, and uncertainties in biotechnology have made applied ethics, as a part of its ethics and philosophy, investigate the issue and find relevant appropriate solutions based on ethical principles and theories. Numerous studies of scholars in different scientific and philosophical majors have set the stage for the emergence of bioethics, as a new discipline, within the familiar area of applied ethics to provide fundamental answers and strategies to the questions arising from modern biomedical technologies.

Explorations and investigations of experts in various disciplines in this connection have made the range of the area of bioethics deeper and wider than in the past. The significance and extent of the different dimensions of bioethical issues and their influence upon human life caused, in the short duration of emergence, prosperity, and development of this area, the scholars of different scientific, philosophical and religious fields to seek the relevant unrevealed aspects. In other words, bioethics is known as an intersection of various sciences such as biology, genetics, medicine, ethics, and its philosophy, theology, philosophy, metaphysics, politics, sociology, jurisprudence,

law, and religious research and interests. As a discipline under applied normative ethics, bioethics improves the relationship between modern biotechnologies and human behavior systems and organizes must-to-dos in this connection. Therefore, conducting a conceptual study of ethics and various ethical researches at first sounds essential.

Ethics and morality are synonymous and identical in meaning. The term «ethics» comes from the Greek word “ethikos” which is derived from the “ethos” taken to mean character and behavior. The term “morality” is taken from the Latin root of “mores”, and means "behavior, norm or habit" (4). Many authors in ethics, thus, believe that the two above-said words are synonymous and do not have a deep semantic difference.

On the other side, some linguists and scholars of ethics maintain that these two words are deeply different. In ethics, morality refers to a set of moral virtues and vices and their individual and social consequences and their role in organizing or causing turmoil in society, as the wise and ethical mentors have pointed out in their works in the past. Meanwhile, in the same area, ethics refers to the nature, origin, and characteristics of moral judgments without defending any judgment, value, or norm, and hence, it is called problem or philosophy of ethics(5). Some other experts believe that ethics makes attempt to define and identify that a behavior is good or bad, right or wrong, or is a vice or a virtue within a certain specific profession. It is also introduced to systems of values and habits which are realized in the life of a particular group of people. For example, in medicine, the Hippocratic Oath is known as a set of instructions and behavioral principles with which doctors comply in their daily professional activities. These instructions and principles are referred to as ethics (6).

Irrespective of the distinction that some scholars maintain between the abovementioned words, the words have been used synonymously in the literature of most of the works in ethics and philosophy of ethics. For example, as ethics refers to ethical philosophy, several reputable Western authors have presented their discussions under the phrase “philosophy of morality”. On the other hand, many Western philosophers have used “morality” and “ethics” to the same extent in their works when it comes to ethical virtues and characteristics of individuals. Also, the normative ethics is used under this phrase and treats various types of good and bad behaviors and the way of determining virtues and vices in human conduct, and this has made up the main tradition of moral thinking since Socrates (7). Finally, although some authors differentiate lexically the words of “morality” and “ethics” and this is valuable, the current study, like those who see the aforesaid words the same, has used these words in a general sense of ethics which includes ethics and its philosophy. It is also worth noting that the Persian literature and the Iranian and Islamic philosophy do not put an etymological difference between the abovesaid words.

Ethics and its philosophy, which deal respectively with the study of ethical actions and issues, and investigation of ethical fundamentals, principles, and theories, comprise at least three areas of research of which recognition of each contributes to a deeper identification of bioethics and its position and associated matters (8).

Meta-ethics is a part of the philosophy of ethics that analyzes the basic ethical concepts such as “good”, “bad”, “wrong”, “right”, “obligation”, and “responsibility”.

Descriptive ethics is the scientific study of ethics to achieve empirical knowledge of morals. In this area, ethical standpoints and their description and historical, psychological, and sociological origins are elaborated.

Normative ethics tackles the de facto moral approaches to external matters. The matter of investigating what actions are right and defendable and what is wrong and unacceptable is examined in this level of ethics.

Normative ethics is divided itself into two categories of general normative ethics and applied normative ethics.

General normative ethics is considered as a moral framework and system to provide a general response to the question of “what actions are basically right and what are wrong ethically?” The classical ethical theories are proposed here as well.

Applied normative ethics deals with specific moral problems which are proposed and investigated in a certain realm. Accordingly, the notion refers to using general and critical ethical theories on moral specific issues especially those coming from the emergence and development of new technologies to evaluate the practical moral decisions with the purpose of encountering the above-said matters (9).

Bioethics is a new area of study that investigates, as an interdisciplinary, systematically the moral challenges arising from adopting innovations of biological and medical sciences. Since the coinage

of this concept and its usage dates back to no more than four decades ago, many discussions still continue to exist on defining and using the concept. Therefore, prior to getting down to defining bioethics, it seems wise to review the background literature of the appearance of this term in the area of applied normative ethics.

B. Literature Review of Bioethics

The Recombinant word “bioethics” composed of two Greek roots “bio” means “life and existence” and “ethike” means "morality", was used for the first time in 1970 by Rensselaer Potter, an American cancer researcher, with the meaning of “science of survival”. The concept was used for interdisciplinary knowledge that aimed at preserving the biosphere of Earth and as a result, human survival and promotion of human life quality. According to Potter, bioethics is a discipline that combines biology with knowledge of human values system in order to bridge the gap between experimental sciences and humanities to contribute to the human being for survival, continuity, and universal promotion (10).

The present study has taken bioethics in line with the environmental and evolutionary concept of survival and continuity of human living on this biosphere and the relevant moral concerns, and the concept, thus, covers a wide area in this connection. Shortly after Potter, the term of bioethics was used by Andre Hellegers, a Danish physiologist who worked in Washington. With the collaboration and contribution of a number of researchers in biology, he founded the Institute of Human Reproduction and Bioethics at Georgetown University. He and his colleagues used the term of bioethics in a limited area in medical ethics and the ethics of biomedical research. In this meaning, bioethics found its place soon in ethical and biomedical studies so that the “Encyclopedia of Bioethics” was published; a reference of which the editor, Warren Reich, maintained that it was supposed first to be the encyclopedia of medical ethics. It should be noted of course hare that in a conference titled “Birth of Bioethics” on September 23 of 1992 in Washington, Warren Reich ascribed coinage of the term of bioethics to Andre Hellegers (11).

Bioethics, in terms of being ascribed to specific knowledge, does not have old literature and dates back to the late 1960s and early 1970s. However, some issues, moral criteria, and those matters which comprise today the basis of discussions on bioethics root in the codes of medical ethics prior to the 1960s and had been considered in the past a part of the science of medical ethics. A majority of regulations, standards, and principles in contemporary bioethics have been sprung from Nuremberg Code. These codes were regulated by the lawyers affiliated to the Allies during the trial of German war criminals on the tests doctors conducted on the prisoners in Nazi camps (11).

Also, earlier than the 1970s, the moral challenges in treatment and medical studies were settled via the primary ethical principles from the Hippocratic Oath. The ethical principles of the aforesaid Oath dating back more than 2000 years still shed light on the path of medical treatments and are considered as basics of medical ethics. Nonetheless, some believe that emergence of bioethics and its independence stem from the nonobservance of ruling propositions in classical medical ethics within the realm of new issues of biotechnologies (12). As a result, over time and with the quick and ceaseless development of new biomedical technologies in the late 20th century and at the beginning of the third millennium, bioethics and its associated issues have been separated from medical ethics and recognized as an independent discipline in universities and scientific entities.

The evolution of bioethics as an international event over the recent decades has brought about important achievements. Establishment of bioethics discipline in the world's most reputable universities, founding academic associations and research institutes on applied ethics and medicine, the emergence of a new profession for ethics scholars in 1990s and afterward in order to solve ethical dilemmas within the interaction between doctors, patients, and new biological sciences, providing a set of diverse ethical discussions on biomedical technology such as publishing encyclopedia of bioethics in 1978 and its later editions, and finally, formulation and approval of numerous regional and international documents in bioethics by international entities are indicatives of a prompt development of this knowledge among the diverse human scientific productions.

In Iran, the knowledge of bioethics has found its place as well in scientific circles and intellectuals of the related areas. Holding numerous conferences, seminars, and forums in recent years approve the issue. The first international congress on bioethics in April of 2005 was held in Tehran at a high scientific level with the attendance of the Iranian then president, the Secretary-General of the UN Educational, Scientific and Cultural Organization

(UNESCO), and many scholars and leading experts in this connection, resulting in the issuance of Tehran declaration of bioethics. Also, Tehran's second international congress on bioethics was held in 2010 in a similar way. Multiple courses of bioethics fellowship have been held successfully as well since 2007 in the research center for ethics and medical law at the same university.

C. Terminology of Bioethics

There have been some differences in opinions in the translation of "bioethics" into the Persian language. Two Persian equivalents, generally, have been proposed and used by the scholars of this area as follows.

a. Some believe that "medical ethics" is still the best Persian equivalent and maintain that many of the issues in medical ethics and bioethics overlap. Therefore, there is no need to coin a new term. These put that the relationship between medical ethics and bioethics goes to absolute general and specific areas and these two are so indifferent that no new term is needed to coin and it is wise to use still the same traditional term of medical ethics (13). The aforesaid experts defend their opinion by saying that in many western books, bioethics is used as the same as medical ethics, and these works present the issues of medical ethics as well.

However, the above said scholars did not explain that why the word "bioethics" was coined as a new area of knowledge if it is of the same meaning as medical ethics. This is whilst a new reference book titled "Encyclopedia of Bioethics" was prepared and published for the first time in 1979 with the succeeding second and third editions in 1988 and 2005.

II. Most of Persian translators prefers to use "bioethics" in discussions of philosophy of ethics. This term has effectively secured a good position in the contemporary academic environments and is a well-known concept. The term is consistent literally with its Latin equivalent, i.e. "ethics" which means "morality" and "bio" which is "living" which collectively comprises "bioethics".

D. Definition of Bioethics

Different views have been expressed in defining bioethics. The extent or limitation of the concept here stems from different attitudes of theorists in this area on determining its realm. Since bioethics is a discipline under applied normative ethics, the elaboration of the concept of bioethics is closely associated with the realm where moral challenges and the relevant issues are investigated. Depending upon the views on the realm of "living" and its surrounding matters, the general, particular or specific impressions come up to the concept of bioethics. Given the development of bioethics as a new area of knowledge and also different considerations on the concept, the intellectuals in this area use one of the following definitions based on their own belief and attitude. I. Bioethics in its general and broad sense refers to wide moral challenges that spring generally from biology and are, directly or indirectly, associated with human prosperity and survival.[14] Accordingly, the concept of bioethics covers here the area to the extent it is concerned with the preservation of the biosphere, human survival, and promotion of human life quality. As a result, a broad concept of bioethics is developed which encompasses all the biological areas surrounding the human being and the related moral concerns.

Rensselaer Potter, who is referred by some to as the inventor of the word "bioethics" in the late 1960s, adopted this approach (10). He used bioethics in a general meaning of "the science of survival" and as a "discipline which combines biology and the knowledge of human ethical values system".

In this broad sense of bioethics, the environment-associated ethics and ethics of treatment with animals together with issues including medical ethics and new biotechnology-associated ethics make up different areas of bioethics. Accordingly, no independent and specific major named bioethics does exist; it is, however, a set of areas in ethical problems which spring from biological and medical technologies as well as the human interaction with animals and the environment.

b. In a more limited sense, bioethics is synonymous with medical ethics and refers generally to all intricate political, social, moral, and even economic every now and then that are associated with medical issues (14). In line with this approach, although the moral matters related to the environment and ethics of treatment with animals seem irrelevant to bioethics, the ethical challenges of new biotechnologies are included in bioethics as much as they are concerned with medical science. Also, some issues such as the relationship between doctor and patient, method of fair and equal allocation of health care facilities, informed consent of human participants to medical surveys, abortion, euthanasia, physician-assisted suicide (PAS), surrogate motherhood and womb leasing, assisted reproduction, genetic engineering, and ethics in

medical researches are known as the main areas of bioethics in this approach. Andre Hellegers, a primary inventor of the term "bioethics" in 1970, took such an approach to this concept and used the word only for medical ethics and ethics in biomedical researches.

III. In a more limited sense, bioethics refers to the investigation of those complicated moral and normative challenges that have emerged on account of quick advancements in new biotechnologies and biomedical knowledge.[14] This approach tackles the evaluation of the interaction method of consequences of adopting these technologies with moral standards in human life. These biological advancements and innovations that hold the realm of issues in bioethics are grouped into four categories as follows.

- Life preserver technologies at the beginning and end of life;
- Life lasting technologies to promote the life quality;
- Reproductive and esp. cloning technologies;
- Technologies associated with genetic engineering, gene therapy, and the human genome.

Each one of the above items is associated with only a particular area of the specific concept of bioethics that is elaborated in the paragraphs to come.

Ethically speaking, the main problem and challenge are that when, how, and with what solutions these technologies could be used? Are the actual or possible consequences of these innovations in human life against moral principles and standards? Benefitting from the accepted ethical standards and principles, bioethics makes attempts to provide an appropriate and logical response to intricate concerns and ambiguities in this new era.

The core of the selected definition for bioethics sees it as a knowledge that deals with the ethical challenges coming from new biotechnologies; technologies such as human cloning and stem cells, manipulations, and genetic engineering. According to this definition of bioethics, which has been implied implicitly in some international documents such as universal declaration on bioethics and human rights, the special matters of medical ethics such as ruling moral issues in the doctor-patient relationship, and fair allocation of health care facilities among patients are considered matters beyond the realm of bioethics. Other fields like ethics of treatment with animals, and ethics of environment are certainly out of the realm of bioethics in this approach.

2. Realm of Bioethics

Conducting any critical study of legal and ethical dimensions of biotechnologies entails the identification of the realm of the relevant issues and obtain a full command over them. Therefore, the extent of the issues related to bioethics and its borders need to be determined.

I. Abortion

Abortion has been one of the most challenging matters of bioethics and has been discussed much within religious-philosophical and legal-ethical arguments. The recent medical breakthroughs have facilitated the diagnosis of incurable diseases and embryo defects during pregnancy. This has made abortion permission problematic more than in the past because awareness of parents and the doctor of the defects of the embryo and its relevance after birth material and spiritual expenses for family and the society could support the idea of abortion. This child, on the other side, is going to bear much pain and distress during his/her life up to death. Is abortion able to prevent later unbearable suffering? Or abortion itself is the imposition of pain and torment upon an alive human being who experiences the first moments of life.

One of the main challenges to abortion is "investigation of legal and ethical conditions of an embryo" (15). Determination of commencement of respectable life of a fetus and his/her being known as a man/woman is the starting difference point between critics in for and against stands. Does considering a fetus as a human being and his/her enjoyment of human rights produce a serious barrier against the issuance of abortion permission? On the contrary, is the non-recognition of rights for an embryo and his/her ethical situation humiliates it to a sole alive but waste organ-like appendix? In this event, the abortion would be ethically condemnable only at the level of an appendectomy operation.

II. Genetic Manipulation and Gene-related Technologies

In the wake of the discovery of the structure of physical and genetic map of the human genome within a plan named "Human Genome Project" as an international research project, the complete human DNA nucleotide sequence was determined providing a comprehensive source of data on structure and function of DNA (16).

The plan of human genome set, which was started in 1988 by the United States and other countries, developed a study on DNA with the aim of

achieving three main objectives of finding the succession chain of nucleotide sequence on chromosomes; second, mapping of the exact place of genes on DNA strands; and third, identify the genes causing diseases, and developing genetic therapies. The project was gone ahead with the ultimate goal of recognition of the emergence time of each human gene and its function in order to identify genetic diseases and, hence, achieving a new generation of genetic treatment. The project was finally completed in January of 2000 when the scientists disclosed they found the accurate sequencing of the human genome that provides a detailed map of coordinates of human life (16).

Identification of defective genes as origins of diseases lead the scholars to a new treatment method called “gene therapy”. Gene therapy is the manipulation of the genetic structure of an alive organism with the aim of repairing a mutated or defective gene and replacing it with a better and modified one or even inserting a completely new gene into the cells of the body (17). The main objective of genetic engineering and data gathering on defective genes is to develop a diagnosis and treatment process. Accordingly, all attempts are made to provide an optimist horizon for such diseases by change, replacement, or manipulation of the defective genes of the patient. Achieving this technology paves a new way for physicians in the treatment of incurable diseases such as Parkinson's, Alzheimer and schizophrenia (18). Still, irrespective of increased human capabilities in genetic technologies and developing treatment goals, new concerns are found as well. Acquiring genetic data of an embryo prior to evolution makes it possible to manipulate its genetic features based on the desires of parents or a third party. Also, there is the possibility of an intended abortion based on genetic data is another likely aftermath of gene-related technologies. Having access to the genetic ID of individuals increases the probability of genetic discrimination in certain cases such as recruitment in organizations or refrain from insurance companies from having personnel included in insurance coverage.

The creation of new biological species like Chimera using the Germ Line engineering is another realizable outcome of such a technology. Making attempts to use the technology of genetic enhancement in order to give birth to seemingly perfect children free from incurable diseases may result in the omission of genetic diversity from human life. This possibility has been placed at the back of scholars’ minds that the biosphere’s balance and ruling order are based on the genetic diversity of alive organisms and the elimination of this factor would cause human beings and other alive creatures high-cost risks.

III. Biomedical Experiments on Human Subjects

No biomedical advancement is made without much experiment on nature and human beings. The growth of biological sciences especially knowledge of genetics and the ability to treat diseases entails only by conducting various scientific researches and tests on a human being. Approval and confirmation of suggested hypotheses related to biotechnologies are in need of carrying out experiments which must be conducted directly either on a human being or separated parts of his/her body. The results of the aforesaid tests could be obviously highly useful for all human beings and may set the stage for the growth and development of biological sciences towards prevention from or treatment of diseases. However, there is also the risk of putting adverse and permanent impacts of tests on the body and soul of human subjects.

Among the declarations on ethics of research in biomedical studies are the Declaration of Helsinki and the Nuremberg Code which seek to find and provide circumstances within which the medical experiments and researches on human beings are acceptable ethically. The most important shared requirement of inclusion in all of these declarations is to ensure the right of “informed consent” for all research participants during the experiment. Informed consent based on the principle of "autonomy" is a ruling standard in bioethics. It goes without saying that the development of biological sciences and exploration of new solutions to improve diseases cannot be considered per se permission of conducting tests on human beings.

On the other hand, is the sole consent of the research participant sufficient for carrying out experiments on a human being? There are some high-risk researches which the subject under study may not be fully aware of the related adverse aftermaths. The necessity of providing the voluntary subjects with the consequences of biomedical experiments is a fundamental requirement to make the test acceptable in terms of ethics. A number of questions may arise in this connection such as “who could be used to study in such experiments?”; “Is using prisoners sentenced to death or the patients with mental disorder acceptable for the studies of probable high risks?”; “Is using people in financial

needs in biomedical experiments considered a kind of exploitation?"; "To what extent does the principle of justice, as one of the principles of bioethics, go openly against the above-said matters?" Providing an answer to the questions set forth in this area and assessment of standards of fair conduct within the realm of bioethics and their compliance with the principles of justice holds a major part of bioethics discussions.

IV. Brain Death and Transplantation

Along with the recent developments, the concept of death has been subject to change. The possibility of death case in the past maybe was a natural death as a result of illness or accident. However, many medical professionals have recognized brain death. Consequently, the phenomenon of death has changed along with advancements in science and life quality and is today a cause of many theoretical and practical differences.

Today, some countries accept brain death as a certain death case under which it could be possible to get down to the corpse of a patient with brain death and transplant his/her organs to another alive patient. This gets back to a more basic issue to answer the question that what is a standard as a death indicative? What is basically the core of an individual of which the elimination implies s/he is dead? Although many medical professionals and regulatory regimes have recognized brain death as certainly actual death, some still do not accept it as an actual death situation. Accordingly, it sounds essential that the phenomenon of death and its associated concept from biological, philosophical, religious, and legal perspectives are defined comprehensively within bioethics in order to be able to talk about permission or non-allowance of measurements based on recognition of brain death (19).

V. Euthanasia

Lack of sufficiently available health care services in the past caused many victims of diseases in such a way that people died easily at home after a short resistance against known or unknown diseases. Today, however, along with recent medical developments, new advancements are witnessed in the diagnosis and treatment of diseases that have made it difficult to face death compared with the past. At present, death cases occur mostly in hospitals or entities like nursing houses and it happens just after carrying out a variety of medical tricks and procedures to help the patient live longer. As a result, the life expectancy of patients has been boosted and patients expect their doctors to help them experience a longer living via medical measures.

Moreover, many diseases such as tuberculosis, smallpox, malaria, measles, and poliomyelitis which were known fatal in the past are curable or controllable today. Notwithstanding, new diseases with increasing fatalities have been emerged due to deep changes in lifestyle and daily diet of people. Also, incurable diseases which are caused by genetic defects or mutations hold the current concerns of specialists. Providing health care services to the patients of the aforesaid new diseases, which usually cause the patient much pain and distress, is very expensive. On the other side, the increased life expectancy has led to a constant rise in aging-related diseases, and therefore, taking care of an aged patient has become a serious concern for his/her dependents as well as other social elements within the society.[20]

Pain, distress and high expense of life continuity of incurable patients and elderly people despaired of recovery encourage to put an end to the life of these people. Medical science has contributed to the thought of "how and where to die" and suggested different ways of reaching an easy, painless, and inexpensive death for the abovesaid patients. In line with this, the concept of euthanasia has been proposed and discussed in bioethics. The questions here are "Is this measure an unethical behavior?" "Is this justifiable to help another person to die in order to get rid of much pain, distress, and expense?" On the other hand, to what extent we are allowed ethically to help a patient to live longer while there is no hope of treatment and recovery?" "Is it acceptable to put an end to the life of a patient with no hope of survival to help another to stay alive?" "Are dimensions of various euthanasia different from one another? (21)"

V. Human Cloning

Irrespective of causing serious developments in biological science, the emergence of cloning technology has brought about rays of hope and fear in human life and bioethics. Many questions and ambiguities are set forth following the realization of cloning animals such as sheep, mouse and other mammals, and boosted possibility of human cloning in the near future. Many objections and sensitivities from different scientific, political and religious entities have been come up in this connection. Numerous philosophers and scholars of ethics and

religion have protested against human cloning stressing its unethical dimensions. Policymakers of many countries have also emphasized the ban and prevention of applying this technology. Many attempts have been made as well over the recent years in the prohibition and recognition of human cloning as a crime in international communities particularly in the UN General Assembly. It goes without saying that human cloning is a universal serious challenge and controversial dispute facing contemporary human beings that are deeply associated with human nature, personality, and value.

In general meaning, cloning is the asexual reproduction of an alive organism. The new alive organism is genetically identical to the same one of which the stem cell is derived. In a cloning process, the nucleus of a somatic cell is extracted from a human being and is replaced after the complete evacuation of the female egg cell nucleus. Then, the new cell (Zygote) is stimulated through a certain electricity flow leading to the commencement of cell division. On the heels of reaching a certain number of cells, five days normally, the created embryo is transferred to the uterus to experience the rest of prenatal growth stages (22).

Human cloning, depending upon its purpose, is divided into two types; first, reproductive cloning with the aim of the creation of a child identical to the original. Second, research or therapeutic cloning is conducted with the purpose of taking embryo stem cells to produce human cells and tissues for treatment or transplantation.

Serious criticisms are raised on using the terms of reproductive cloning and therapeutic cloning. In both, basically, an identical embryo is generated given the difference that in the first type, the stages of embryonic development continue until birth, while in the latter, the life of the cloned embryo comes to an end in order to use undifferentiated embryonic cells. However, there are various ambiguities in the aforesaid types of cloning. For example, the uncertainty of the physical and mental health of the cloned child, an unclear parental relationship, and the possibility of his/her abuse for inhumane purposes are included in the ambiguities that have preoccupied the intellectuals and scholars (23). In therapeutic cloning, given the embryo destruction after extraction of his/her stem cells, this question arises that this created embryo, which is subject to hurt, could not be called a human being (23,24)? To answer this question, actually, the long-lasting challenge between the pros and cons of abortion and the relevant proposed theories need to be investigated.

VI. Stem Cells

Stem cell technology, which has been developed over the recent three decades, is another challenge facing the realm of bioethics. In biology, stem cells are those undifferentiated cells that hold actively the data on all tissues and organs of a multicellular organism. These cells are capable of giving rise to indefinitely more cells of the same type and differentiate into diverse types of cells and tissues. Stem cells also possess high storage and renewable power (25).

That is why the aforesaid cells could be considered an appropriate means of repair and replacement of defective, diseased, or lost tissues in the body. Stem cells have a specific position in tissue engineering and regenerative medicine and theoretically are indicatives of the ways to treat debilitating and degenerative diseases such as spinal cord lesions, Alzheimer's, diabetes, osteoporosis, multiple sclerosis, and heart failures (26). From among the other applications of stem cells is having access to valuable information on the initial stages of human development and the possibility of test the medical medicine on these cells instead of human trials (27). Depending on the preparation source, stem cells are divided into two categories as follow:

1. Embryonic stem cells: are potentially pluripotent cells that could be isolated and extracted from the inner cell mass of a human embryo within the blastocyst stage (transmitting cells). The embryo blastocyst has 30 to 150 cells with a life duration of 4 to 7 days. A blastocyst is made up of two types of cells; the inner cell mass that will produce a human organism in the future and the outer layer (trophectoderm) which will create placenta in the future. The inner cell mass (ICM) has the ability to create all three embryonic generate layers (endoderm, mesoderm, and ectoderm); however, it loses the ability of replacement and growth in the uterus without trophectoderm. Stem cells are derived from ICM which mostly come currently from IVF-carrying extra embryos.

2. Adult stem cells: are those stem cells in every type of tissue which repair and maintain it via a constant generation of the cell type of the same tissue and are called “tissue cells”. These exist in certain adult tissues and are able only to generate the cells of the same tissue (28).

What has triggered a major moral challenge among different types of stem cells is the generation and usage of embryo stem cells. Opposition to embryo stem cells lies in the fact that a human fetus is killed in this process. At present, the human embryonic stem cells (HES), at the pre-replacement stage, are isolated and cultured. Obtaining stem cells from the blastocyst entails the human embryo to eliminate. In the next stage, the end of growth and reproduction of the isolated stem cells may be considered as killing a human being. Those who oppose the study and usage of stem cells know it against human dignity and believe it is the humiliation of a human being down to an object as the adverse aftermath of the action (29).

Conclusions

Bioethics is a new area of study that, as an interdisciplinary subject field, investigates systematically the ethical challenges of using biomedical technologies. As a discipline under applied normative ethics, bioethics tackles improvement of the relationship between modern biotechnologies and human behavior systems and organizes must-to-dos in this connection based on ethical principles and theories.

The realm of bioethics encompasses the study and evaluation of the interaction method of consequences of adopting the biomedical technologies in human life with moral standards. These technologies and advancements that hold the realm of basics in bioethics are grouped into four categories as follows.

- Life preserver technologies at the beginning and during the life;
- Life lasting technologies to promote the life quality;
- Reproductive and esp. cloning technologies;
- Technologies associated with genetic engineering, gene therapy, and the human genome.

To sum up, through using the accepted ethical theories and standards, the science of bioethics aims at providing a logical and appropriate response to the concerns and intricate ambiguities arising from the adoption of the aforesaid technologies.

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Conflict of Interest Statement

The author declares that they have no conflicts of interest.

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