A.I. Baksheev et al /J. Pharm. Sci. & Res. Vol. 10(4), 2018, 889-892

ISSN:0975-1459
Journal of Pharmaceutical Sciences and Research
www.jpsr.pharmainfo.in

Bioethical Principles and Mechanisms for Regulation of Biomedical Research

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Abstract

The article analyzes the bioethical principles and mechanisms of medical and biological research regulation. The main bioethical principles and rules for carrying out biomedical research are outlined; their characteristics are given. The functions and tasks of the ethics committee, as one of the main mechanisms of ethical and legal regulation of medical and biological research, are considered.

Key words: bioethics, bioethical principles and mechanisms, ethical committee, medical and biological research.

INTRODUCTION

Wide-scale introduction of evidence-based medicine standards into practice, development of new treatment methods, pharmaceuticals and substances with toxic properties require a thorough study of their safety and effectiveness in standardized medical and biological research conditions, which tend to turn into a global technology.

The cases when scientists put experiments on themselves, risking their health in the name of science, have disappeared. Today, carrying out biomedical research requires careful analysis of information obtained by standardized scientific methods using a large number of laboratory animals and involving a large number of people. Such studies in most cases tend to gain worldwide scale, for example, when customers are located in one country, and the research is conducted in scientific centres and with the participation of citizens of some other countries (usually less developed economically, that helps to save money on researchers' salary, materials and insurance of the research subjects).

Medico-biological researches, which are planned and carried out in different types of animals, as well as those that occur with the participation of people, are undoubtedly accompanied by risks to the health and well-being of the objects and subjects of the study. In both cases, there appear the problem of moral principles and principles of relevant scientific research works: humane attitude to experimental animals, guarantees of people's rights observance as subjects of the research such as their right to life, health, freedom of choice, dignity, etc.

Ethical requirements for the activity of a scientist dealing with a person as a research subject were primarily declared in 1946 and were allocated by the Nuremberg Code, which was the first to put forward the idea of the priority of the good and the interests of an individual over the interests of science and society. This document marked the beginning of bioethics and biochemistry birth, it also contributed to the development of international legal and legislative practice for the protection of human rights and humane treatment to experimental animals.

In the following years, a number of international documents were adopted; they reflected modern ethical and legal requirements for scientific activity: the Helsinki Declaration of the World Medical Association (the latest version of 2008), the Declaration on the Policy of Ensuring the Rights of Patients in Europe (1994), the Convention on the Protection of Rights and Human Dignity in Connection with the Application of the Achievements in the Field of Biology and Medicine (Council of Europe, 1996), the Cartagena Protocol on Biosafety (2000), the European Charter of Patients' Rights (2002), the Universal Declaration on Bioethics and Human Rights (UNESCO, 2005), etc. [1].

In the 1970-s, at the intersection of natural and human sciences, a new interdisciplinary direction of knowledge and practice began its formation. It was bioethics, aimed at solving complex ethical dilemmas of preserving the health and well-being of humans, as well as other living beings and the environment, especially in the context of intensive use of biomedical technologies.

In Europe, bioethics, as scientific direction and social movement, was formed in the 80-s of the XX century, when in many European countries national and academic bioethical centres began to appear, as well as bioethical seminars and conferences were held, and ethical and legal problems of biomedicine took an important place in the activities of influential international organizations which were represented in European capitals (UNO, WHO, UNESCO, etc.).

Today, bioethics is represented by a range of its branches: global bioethics, ethics of science, biomedical ethics, ethics of scientific (including biomedical) research, ecological bioethics, ethics of humane treatment of animals.

Bioethics, according to its founder, V.R. Potter, appeared due to the anxiety and critical concern of scientific and social progress, it is to unite human values and knowledge about biological facts: "If the states of the world want to find a" bridge to the future", they must understand that consolidation is obligatory to preserve the fragile tissues of living beings that do not belong to the human race, but support the existence of human society" [2].

At the same time in the United States along with such profound notions of bioethics as wisdom, aimed to save mankind and all living things from destruction, an alternative view on bioethics, as a purely applied ethic dealing with ethical problems of biomedical practice, began to develop. American scientists E.D. Pellegrino and D.S. Thomasma offer to treat bioethics exclusively as a new medical morality, while T. Beauchamp and J. Childress treat it as a biomedical ethic, which is based on four

principles: respect for the autonomy of an individual, "do no harm", "do good", justice [3; 4].

Nowadays, bioethical principles have a significant impact on the planning process, subject, object and methods of conducting scientific studies. It turns out that scientific objectivity and novelty are firmly connected with moral standards and standards of the researcher, the values that some scientific research institution and some other scientific community have and are based on in their activity. Therefore, it is very important to take into consideration these values and relevant ethical principles, their social verification, legislative backing and, finally, their implementation in research practice.

MATERIALS AND METHODS

The purpose of the present study is to prove bioethical principles of biomedical research.

In order to achieve this goal, an expert survey was conducted as a practical part of the study, in which teachers from theoretical department (philosophy and social sciences), clinical department (nursing and clinical nursing), as well as students from medical, pediatric and dental faculties, having pharmacy as speciality. All the respondents were from Krasnoyarsk State Medical University named after Professor VF. Voino-Yasenetsky, 227 people in total.

The questionnaire contained two questions, the answers to which should be given in details:

1. List the most significant, in your opinion, ethical principles and rules of the researcher activity in the field of biomedical research;

2. Describe the principles and rules you have mentioned.

The choice of fundamental principles and rules was carried out due to such criterion as the greatest number of mentions by various experts, but not less than 50% of their total number.

RESULTS

Experts mainly mentioned and gave detailed description of the following principles and rules of the researcher's activity in the field of medical and biological research: respect for autonomy and dignity of the subject of a research, "do no harm", "do good", justice, vulnerability, informed consent, confidentiality, non-interference in private life, etc.

Let us consider the characteristics of some of the mentioned principles and rules in details.

Principles of respect for autonomy and human dignity are considered by experts as the most important among other ethical principles of scientific research. They mean not only respect for the pragmatic ability of the research subject to make the right "reasonable choice", but also to create appropriate conditions for the embodiment of ideals and values, ideas about one's own health and well-being in research practice. These principles do not only indicate the duty of the researcher to provide complete information on the goals and methods, consequences and risks of the studied, but also to support and strengthen the ability to autonomous selections and responsible decisions, to protect those with limited autonomy (children, the elderly people, people with disabilities, people with mental disorders).

These principles, according to experts, are based on respect for a man as a person, as well as on the recognition of the will, the right and the ability to fulfil a decisive role in decision-making concerning physical, mental, corporeal and social well-being. It assumes moral right of the research subject to special feelings and inner spiritual states, which can guide him/her in life.

Experts consider *the rule of informed consent* as the continuation of the principles of respect for autonomy and personal dignity. It means that a patient, a client or any other subject gives the permission for any interference in his/her life voluntary and consciously, and this permission is based on understanding of the relevant information provided by a professional researcher. This corresponds with the regulations of the Constitution of the Russian Federation, according to which every citizen has the right for: life, health protection, a favourable environment, freedom and personal inviolability, inviolability of private life, protection of personal dignity, that a citizen has lifelong.

Informed consent is as an obligatory requirement for ensuring respectful attitude towards the studied as a human being, as well as minimizing the threat for his/her health, social and psychological well-being, moral values due to unfair or irresponsible actions of a researcher. From the point of view of a content, this rule assumes that a patient, a client or any other subject gives permission to interfere in his/her life for a scientific purpose voluntary and consciously, and this permission is based on understanding of the relevant information provided by a professional (doctor, scientist, social worker, lawyer, etc.).

The principle of "do no harm" means that "no one has the right to do harm to other people." In this regard, harm means any evil that can be done, prevented, or remedied – pain, suffering, injustice, loss of livelihood, disability, death of a person. Therefore, any supposed harm and risk to the one under study should not be a mean of achieving good goal or exceeding the expected benefit for the studied. The researcher should strive for less invasive methods of study and should minimize all possible risks. A planned biomedical research may have undesirable negative or side effects for the subject of the study, but the latter, in such case, should receive proper medical aid, and his/her participation in the study should be stopped.

The principle of "do good", according to experts, means that the health and well-being of the research subject should be protected in the best possible way during the study. This principle is provided for the actions that are considered to be a direct benefit for the one under the study, protects or enhances the quality of life and health, prevents and minimizes harm to the one under the study, eliminates undesirable negative phenomena.

The principle of justice, according to experts, indicates the need for an equal and respectful attitude to the autonomy and dignity of all the research subjects, despite their age, belonging to certain social strata, religion and nationality; same attitude, both to the sick and to healthy people – participants of the study; creation of equal opportunities for all the research subjects regarding their access to medical services, obtaining benefits or remedy caused during the study.

However, some of these principles, according to experts, should be extended to animals under study as well.

DISCUSSION

One of the key issues of modern bioethics is a humane attitude to non-anthropic forms of life, to other living beings, animals, including the laboratory ones. There are various approaches to the use of animals in modern biomedical research, among them is the requirement of total ban on the use of animals in experiments and the core idea that animals do not have mental faculties like human beings, so they do not realize pain and suffering. Animals rights are opposed to human rights, believing that there is a tough alternative: either humanity recognizes that animals have equal rights as humans, otherwise, attitude toward animals will not differ from the one toward inanimate nature.

Among a number of significant points of impossibility to refuse from the use of warm-blooded animals are:

the organism of a warm-blooded animal is the closest to the human body according to morpho-functional and metabolic indicators;

simultaneous use of different types of warm-blooded animals increases the probability of detecting the effect (in particular, when studying toxicity);

possibility to investigate numerous indicators of physiological state of the organism (hematologic, macro-microscopic, pharmacokinetic);

ability to use different schemes of method application or medicine introduction, changing the channel, duration, dose, exposure, if necessary;

high accuracy of the results when repeated injections of the test substance is given to animals;

possibility of long-term monitoring of treatment course [5].

The problem of carrying out experiments on animals from the ethical standpoint is still unsolved, as well as the definition of human right to carry out painful experiments, limits of pain, which require the use of painkillers. In accordance with bioethics, it is important to admit and use the "three R-s" principle while planning and conducting biomedical experiments:

refinement – humanization of attitude towards animals during the experiment;

reduction – decrease the number of animals used;

replacement - interchange of highly developed animals by those that are at a lower evolutionary level of development or by alternative methods [6].

As for the participation of people in biomedical research, now it becomes evident that moral understanding should be ahead of any scientific and cognitive activity, while ethical requirements should be provided in advance and be a part of the research project. In this connection, two main mechanisms for ethical regulation of scientific projects have been formed, they are: 1) the procedure for obtaining the informed consent of the tested; 2) ethical (bioethical) expertise of the project itself.

The Research Ethics Committee (REC), social institutions that must carry out bioethical expertise at the planning stage of scientific research are entrusted with monitoring of the observance of modern ethical and legal requirements for the scientific research in the vast majority of developed countries today [7; 8]. Committees / ethics and bioethics commissions are established at national, regional or local levels and are considered to be independent expert organizations.

Bioethical (ethical) expertise of scientific research contributes to the embodiment of bioethical values and principles in a scientific project (theory, methodology, practice). It is aimed at ensuring the protection of the rights of humans, animals and nature subjects that take part in a research, preserving their health and well-being, life and evolutionary development. Its objects are scientific projects, plans, designs, legislative acts, normative and legal guidelines, scientific and technical programs, as well as mechanisms and means, social, medical, biological, environmental and other conditions and peculiarities of their implementation, the process of implementing scientific projects itself, social practices – all that is related to the process of developing and implementing any dangerous technologies into practice. The subjects of bioethical expertise are mechanisms and means, ways and principles for the implementation of bioethical principles into the theory and practice of applying science and technology, ensuring the rights of humans, animals, nature subjects for life and development while creating and implementing technologies.

At the beginning of the study, REC experts analyze the content of the study in accordance with the protocol provided by a researcher, as well as informed consent forms of the ones under study. If necessary, a number of other documents are added, for example, the researcher's brochure, instructions (leaflets) of the preparation, samples of questionnaires, description of instruments, copies of important decisions of public or private institutions on the study, etc.

Ethical examination is carried out at the beginning of the research, during its implementation and at the end of it. They analyze if the research corresponds to the level of ethical and legal requirements completely and embodies modern bioethical principles. Unforeseen and undesirable phenomenon for the one under the study, which arise in the course of the study, are monitored.

The REC decision, in accordance with international requirements, can be as follows: 1) approval of the draft study, 2) approval after certain changes, 3) negative decision, 4) cancellation of any decision taken earlier. REC is a kind of intermediary between the researcher and the one under study, applicant, sponsor and other parties that are involved in the implementation of the research project. If planning, conducting or results of biomedical study do not correspond to current ethical and legal requirements, and the principles of bioethics and related regulations, in particular, REC has every reason not to approve the draft project or conducting the study suggested, as well as to offer the researcher to make all necessary changes to the study protocol.

The authority of ethics committees in the whole civilized world is high enough to influence strict adherence of bioethical principles in scientific research. However, in various countries, REC functions vary considerably. Thus, ethical committees in the USA have regulating and sanctioning functions, that is, they have the right to ban any research. In Sweden, France, Italy, ethical committees do not have such rights, and their decisions are consultative and deliberative [9].

In Russia, at federal level, ethical committee is established and functions under the sponsorship of Roszdravnadzor (Russian Federal Service for the Supervision of Public Health and Social Development). Its tasks are to conduct ethical examination of clinical trials of medicinal products in order to protect the ones under the study, to clarify ethical validity of such studies and to prepare the conclusions on their appropriateness. [10]

Another example is the Russian Bioethics Committee under the Russian Federation Commission for UNESCO. It was formed by the decision of the General Meeting of this Commission on April 25, 2007. Its tasks include the evaluation of ethical, legal, scientific and social problems related with the research projects and the used technologies, the subject of which is a person; participation in preparation and examination of legislative and regulatory acts of the Russian Federation in the field of bioethics; identification and analysis of new trends in the development of bioethical norms, international practice in this field, etc. [11].

Today Russian ethics committees have been established and are working with many medical, therapeutic and preventive, research and educational institutions. Their goal is not only primary bioethical examination of research protocols, but also constant monitoring of the studies that are already underway. According to the Order of the Ministry of Health of the Russian Federation No. 200-н from 01.04.2016 "On the Adoption of the Rules of Proper Clinical Practice," independent ethical committee established at the level of medical organization (local ethics committee), at regional level and functioning as an independent body ensures the protection of rights, safety and health care of the clinical study participants [12].

CONCLUSION

Mechanisms of bioethical control and regulation of biomedical researches are constantly being improved. Today they are even used in such studies that are conducted without interference in psycho-physical integrity of the studied, for

example, in cohort studies, when information data about the state of health, genetic, biochemical and other characteristics of certain population groups are studied. This also refers to cases of minimal risk – the study of human biological materials. The nature of the risk in these cases is different, but this does not exclude the possibility of injuring the one under study, for example, by disclosing confidential private information.

The main characteristic of modern scientist's outlook as a specialist in a certain field, is ethical and legal orientation: civil and individual for the consequences of the activities, understanding of the importance of introducing bioethical principles in scientific and cognitive activities, in the process of forming scientific assumptions and hypotheses, and planning the research.

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