

Autonomy and care in the logic of competing and solidarity relations in medicine

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Abstract. The interactions of the subjects of medicine are considered in the projection of two logics: solidary and competing relations. This approach develops the critique of the dominance of the concept of patient autonomy that comes with the bioethics represented in the ethics of care by K. Dörner, A. Moll and others. The conceptual forms of competition and solidarity are identified as oppositions to power and equality, autonomy and care, individualism and interdependence of subjects of medicine, anti-paternalism and paternalism, neglect and attentiveness, the legal and ethical meaning of informed consent, control and compliance, medical services and medical care.

In medicine, from point of view of bioethics, the solidary relations could be expressed in a paternalistic model. It is based on ethical connotations such as doctor's responsibility and mutual trust. Autonomy has a legal and economic predication. The ethics of care, traditional for the Russian cultural model, implies not so much the doctor's authorities over the patient, recognizing him as unequal in medical decisions, but in modern healthcare it can be combined with a voluntary expression of consent to medical interventions with the properly provided information.

Keywords: bioethics, doctor-patient relationship, paternalism, anti-paternalism, the principle of autonomy, ethics of care

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Автономия и забота в логике конкурирующих и солидарных отношений в медицине

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Аннотация. Взаимодействия субъектов медицины рассмотрены в проекции двух логик: солидарных и конкурирующих отношений. Этот подход развивает идеи критики засилья концепта автономии пациента, который приходит с биоэтикой, представленной в этике заботы К. Дёрнера, А. Мол и других. Выделены концептуальные формы конкуренции и солидарности в качестве оппозиций власти и равенства, автономии и заботы, индивидуализма и взаимозависимости субъектов медицины, антипатернализма и патернализма, пренебрежения и внимательности, юридического и этического смысла информированного согласия, контроля и комплаентности, медицинской услуги и медицинской помощи.

Солидарные отношения в медицине в биоэтической экспликации могут быть выражены в патерналистской модели. В ее основе лежат этические коннотации: ответственность врача и взаимное доверие. Автономия имеет юридическую и экономическую предикацию.

Ключевые слова: биоэтика, отношения врача и пациента, патернализм, антипатернализм, принцип автономии, этика заботы

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Introduction

A feature of medical activity is that historically it was regulated by clearly defined principles and rules, which together were called medical ethics. The norms of health care ethics were influenced by cultural, historical, and religious features [1]. In ancient times, these rules were spelt out in the Hippocratic Oath. At the turn

of the 18th and 19th centuries, in the era of the formation of European rationalistic medicine based on scientific methods, medical ethics became the subject of research and this has led to the first scientific works. Modern medical ethics is strongly influenced by bioethics, for which respect for autonomy is a central principle. The purpose of this article is to show that the principle

of autonomy corresponds to the logic of competing relationships in medicine and that solidarity relationships are based on trust. The study was conducted based on observations of the Russian practice of using informed consent, analysis of Russian legislation in the field of healthcare, and analysis of conflicts in Russian medical institutions. The vast majority of conflicts in medicine are associated with a violation of the norms of ethical communication and unfulfilled patient expectations. Although since the 90s, Russian legislation has guaranteed broad rights and protection of the rights of the patient, potential conflicts and dissatisfaction with medicine have only grown. It is possible that the model of autonomy, which was the basis for the new ethical and legal regulations of interactions in medicine, was not successfully implemented, because it largely contradicted the traditional paternalistic model, which is based on the deontology of care. The discourses about the issues are built with a cultural and historical analysis of philosophical and ethical ideas that formed the basis of various versions of medical ethics.

Discussion

The English doctor T. Percival creates medical ethics as a sort of estate - medical ethics and draws up the first ethical code. It is quite natural that this is happening in England, where the laws of reputation and systems of etiquette rules that prescribe standards of conduct in estate social structure conditions have traditionally been the determining regulators of social relations. The philosophical basis for this version of medical ethics was the ethics of utilitarianism, which established parity between own selfish interests and public benefits. In utilitarianism, in the writings of Jeremy Bentham, appears the deontology which is also an ethical doctrine, where the main concept is a duty as an important regulator of relations between individuals in society. Around the same time, Immanuel Kant created his complex philosophical and ethical system. He criticizes utilitarians for their selfish orientation in understanding the motives of human actions when their significance is determined by interest and is measured by the degree of its satisfaction that is utility. Utilitarians believed that people pursue their interests, competing for their implementation, striving to find the maximized utility that satisfies everyone. Therefore, the imperative in the logic of utilitarianism turns into an obligation to orient the actions of competing individuals towards the maximum degree of the common good. These obligations can be established every time, for example, they can be prescribed in the contract. In contrast to the utilitarians, Kant argues that duty is a categorical (unconditional) moral (rather than contractual, legal) imperative – an internal motivation that an individual has as a freely acting subject. The categorical im-

perative is the "moral law in me", the disinterested orientation of the will of a freely acting subject for the good, thanks to this desire in the soul of every person, a community of people is achieved, and society acquires unity and integrity. These obligations can be established every time, for example, they can be prescribed in the contract. In contrast to the utilitarians, Kant argues that duty is a categorical (unconditional) moral (rather than contractual, legal) imperative that is an internal motivation that an individual has as a freely acting subject. The categorical imperative is the "moral law in me", the impersonal orientation of the will of a freely acting subject for the good, thanks to this desire in the soul of every person, a community of people is achieved, and society acquires unity and integrity. Medical practice was the best way to pass down the altruistic nature of solidarity, and not competing social relations. They began to call medical ethics deontology, believing that the doctor is guided in his activities by the unconditional acceptance of professional imperative, the content of which was established as a universal basis by the Hippocratic Oath. In different countries over the time the Hippocratic oath has become a professional symbol for the medical community, it could have different modifications, supplemented by new principles, but always retained a set of basic principles formulated in antiquity: the obligation to remain faithful to the profession, "do no harm", respect for life, act for the benefit of the patient, maintain medical secrecy, etc.

From the second half of the 19th century and the beginning of the 20th century, medicine turns into a field of activity, which is handled by the state, where national health care systems are created, the doctor's imperative becomes part of the responsibility of large professional corporations. In this situation, the doctor should no longer be driven by a class obligation, which was expressed in how a representative of the medical guild behaves, but by a conscious moral necessity, an inner conviction that is duty. The more they wanted to emphasize the inclusion of a doctor in the system of corporate responsibility in the system of ethical regulation, the more medical ethics looked logical, which should be called and understood deontology. In pre-revolutionary Russia, the national medical ethos (professional culture) was formed in the bosom of European medicine based on the Christian cultural model and the high authority of Hippocratic norms in professional ministry. The meaning of the doctor's activity was interpreted not as a service, but namely as a service to professional duty and to the patient, which was also associated with the moral pretensions inherent in the Russian intelligentsia. Unlike service, where the unquestioning performance of duties comes first, and servicing is a voluntary and conscious moral choice

of your mission, understanding it as compassionate, sacrificial help, emotional attachment, and complicity [2]. The Russian medical tradition was embodied in the domination and consistent acceptance by doctors and patients of the paternalistic model, according to which the doctor assumes moral obligations concerning the patient, must take care of him in a paternal way, and the patient unconditionally trusts the doctor, revealing to him the intimate aspects of his life. In Soviet Russia, medical (physician's) ethics was declared a bourgeois relic, primarily in the matter of maintaining medical confidentiality. Little has been said about medical ethics, it existed in the form of learned norms for doctors who were educated in pre-revolutionary times and then passed them on as skills of professional communication with patients and colleagues to the next generations of medical professionals. In 1945, the outstanding Russian oncologist N.N. Petrov wrote an article on surgical deontology. The term "deontology" corresponded to the spirit of the imperative obligations, which was the essence of the moral code of the Soviet society, therefore, for a long time it firmly replaced the concept of "medical ethics". In our country, medical ethics is still most often called deontology. N.N. Petrov successively linked the ethos of pre-revolutionary medicine and Soviet medicine, finding a formula of deontology that did not contradict the basic and contemporary social attitudes, which were built on the responsibility and care of the doctor. And on the part of the patient, this formula was built on the acceptance of paternalistic medical leadership, which was quite consistent with cultural ideas about the sacred, paternal status of a person with medical education.

Bioethics emerged in the United States in the last third of the 20th century. Bioethics is an even more complex phenomenon, since it is formed in response to the need to comprehend the transformations taking place in medical and clinical practice, and in society as a whole, in connection with scientific and technological progress that changes the equipment of medicine, the organization of medical care, and the nature of relationships.

Bioethics has spread to all continents and has become a discipline in medical education. If deontological norms are formulated based on bioethical principles, in this form it is what is called clinical bioethics in the USA. But the ethical imperative also does not take into account the diversity of the moral life and the variations of moral choice. Doctors and medical staff can be extremely focused on fulfilling established professional requirements, and at the same time neglect deontology in the aspect of communication with patients, and refuse the emotional connection. This took place in Soviet medicine and still has a negative effect when a routine is established in medical institutions that is convenient for

professionals and significantly limits patients and their relatives. Moreover, the staff stops encroachments on the established order, considering it as a condition for the proper performance of their duties, even though following it may infringe on the dignity of patients and their relatives. An excellent illustration of the loss of the high meaning of deontology in such "routines" can be seen in the book by A. A. Starobinets "Look at him". In this book, the author, writer and journalist, conveyed the whole nightmare of encountering a callous system in an extremely vulnerable situation: she had to terminate a pregnancy at the late stages for fetal abnormality incompatible with life [3].

The principle of autonomy in bioethics. In the second half of the 60s, in the United States, along with the discussion of global threats, issues related to the activation of various human rights and anti-discrimination movements came to the agenda. Exposure of abuses in medical, clinical, psychiatric, and research practices contributed to the fact that, following movements against racial, gender, and other forms of social discrimination, movements arose for the rights of patients, for the legitimization of the right to abortion at the woman's choice, for the rights of patients in psychiatric institutions, the rights test subjects, etc. In European countries (it should be noted that in some countries there were significant differences in the traditions of providing medical care, in the relationship between the doctor and the patient and difference in the use of biomedical technologies), as well as in the former USSR, as well as in the regions of South and Southeast Asia, had an expression, referred to their cultural forms. In the United States, bioethics began to move towards the protection of the rights of patients and subjects in biomedical experiments, and some norms of medical ethics began to be replaced or rewritten in line with the legal discourse.

American bioethics at the same time has its own theoretical and regulative basis in the form of a classic set of principles and rules formulated by Georgetown University professors Beauchamp and Childress: the principle of autonomy, do no harm, beneficence and justice and related so-called procedural rules like the rule of the informed consent, privacy, confidentiality and truthfulness. In European bioethics, these principles were also broadcast, but the emphasis was placed on other formulations: the principles of respect for human dignity, the principle of integrity, the principle of voluntariness becomes synonymous with the principle of autonomy, and the rule that implements the principle of autonomy became informed consent (IC). For comparison, in the deontological model of medical ethics, the main principles are "do not harm", mercy and compassion, benefit and medical secrecy.

Comparison of the fundamental principles allows one to see the cultural specificity of bioethics. For Americans, with their tradition of case law, the principle of autonomy implies upholding patient rights and ethical regulation is combined with legal regulation. Russian bioethics, which came to us in the 1990s, in its form belonged to the American model, and in content to the European one, because from a cultural and semantic point of view, of course, it, first of all, demanded that the doctor take care of the patient and was guided by paternalism. But following the logic of institutional borrowing, which was situationally determined in the 1990s, the principle of autonomy began to play a leading role in the legal regulation of Russian healthcare.

The principle of autonomy affirms the patient's right to dispose of his body, and the right to decide on medical matters. Respect for the autonomy of the patient on the part of the doctor means ensuring the exercise of this right by the patient. If the patient refuses his own choice, the doctor must help him make a decision, especially in cases of interventions that involve an invasion of the bodily and mental organization of a person, which can change the patient's future life.

Violations of autonomy are diverse. For example, treatment in a psychiatric hospital may be coercive if the patient is sent there involuntarily. Another form of influence is manipulation when someone is forced to perform an action that the medical professional wants. In medical relationships, manipulation is common and often necessary to provide medical guidance to patients.

Paternalism and autonomy

Orientation towards the principle of autonomy changed the historical configuration of the doctor-patient relationship. There are anti-paternalist movements in medicine. Paternalism began to be considered one of the models of the doctor-patient relationship [4]. Paternalism was perceived as a historically outgoing form. Autonomy was more consistent with the collegial model, equal position and cooperation between the patient and the doctor.

However, paternalism is not comparable in its nature and significance to other models proposed by Veatch. Models should be viewed in a situational way. Paternalism is the basic model of the doctor-patient relationship, in which the doctor takes responsibility for his decisions and actions, and the patient relies on his qualifications and experience. It can be supplemented by collegiality, organized technically and supported by a contract. Paternalism is built on trust as the basis of interactions between doctor and patient.

Paternalism refers to the medical management of the patient, based on an objectively existing professional hierarchy. It will always be justified as long as there is a social division of labour. The patient's trust must not give rise to medical authoritarianism.

Paternalism is the basis for interaction between a doctor and a patient in all branches of medicine. Thus, the paternalistic principle played an extremely important role in the history of psychiatry [5]. It is no coincidence that an essential part of anti-paternalism in the United States, and then in European countries, was the anti-psychiatric movement, which led to the deinstitutionalization of psychiatry since human rights violations in this branch of medicine were egregious [6].

The discourse on the dominance of the patient's autonomy has led to noticeable transformations that have become alarming. Their main consequence is the separation of the doctor and the patient, the reduction of relations to treaty obligations and, as a result, their huge bureaucracy, the loss of trust, the emergence of various forms of patient care – the refusal of compliance (adherence to the prescribed treatment), the strengthening of self-treatment trends, one of the specific examples is anti-vaccination. The principle of individual autonomy appeals to the notion of a "self-made person", for which caring is associated exclusively with addiction, and worrying about it is a sign of weakness [7].

Patient autonomy in Russia

The principle of autonomy along with bioethics came to us from the USA in the 90s. Then in the new Russia, in the wake of the total denial of the Soviet past, including in the organization and regulation of social interactions in medicine, without proper sociocultural experience, new principles and norms were introduced, which often acquired a distorted deformed character.

An illustration of this is the practice of informed voluntary consent. Informed consent began to be introduced as not so much ethical as legal regulation. As a result, in addition to performing an important and necessary function that is ensuring the patient's right to express his will in medical matters (this right is enshrined in Article 20 of the Federal Law 323), the institution of the informed consent has received a hypertrophied, legalized and coercive meaning. Physicians consider informed consent (IC) as a cover in cases of litigation, the IC is associated with the bureaucratic, formal signing of papers, when the patient does not even get acquainted with the content. Based on the main idea of respect for autonomy in bioethics, the patient should be first informed, and then get consent. In Russian medical institutions, informed consent is often signed before any meeting with the doctor. The patient must sign several forms before being informed. If a patient does not do this, he may be denied medical care, except in emergency cases. This practice divides doctors and patients, undermines confidence, reduces the meaning of the IC to the function of protecting the doctor in case of litigation and other proceedings, but ultimately leads to an increase in lawsuits against doctors [8]. It turns out that the

admitting of the patient's autonomy in its legal rather than bioethical interpretation through the preventive implementation of informed consent served as one of the factors in the formation of an unhealthy atmosphere of confrontation between doctors and patients, when patients are ready in advance to record violations of their rights, proactively suspecting doctors of dishonest performance of their professional duties. A situation of expression of consent by adolescents is an example of the discrepancy between the legal and ethical approaches. Russian law establishes that from the age of 15 a teenager can independently express consent to medical intervention. However, if we take into account the cultural aspect, then in our society the family connection of parents and children at this age is still very high, excluding parents from making a decision. Therefore, from an ethical standpoint, it is important that the teenagers at least discuss it with their parents before making their decision.

Autonomy vs care

European bioethics and social relations in medicine were in another psychological and intellectual situation, which did not oblige us to deny our experience as "retarded", or "imperfect" and allowed us to look around and study what is suitable for the national health care model and what does not. These bioethics proceeded from understanding that continental medicine traditionally had differences from the Atlantic i.e. British and American. Over time, the positive role of the paternalistic relationship between doctor and patient began to be more often recalled in European clinics.

The German physician and philosopher of medicine K. Dörner openly argued with the principle of self-determination enshrined in the institution of informed consent. He fixed the conflict between the strategies of the patient's right in medical choice and care as intrinsic ethics of healing. The liberal principle of autonomy, formulated in the context of physicians' a priori suspicion of possible abuse of power over a patient, it can cause a doctor to feel ethical revenge: by shifting medical decisions onto the shoulders of patients, the doctor relieves himself of responsibility, while he can obtain consent from the patient for that intervention, that the doctor needs. K. Dörner believes that the approach based on obtaining informed consent, which developed as a result of self-criticism of medicine after the Nuremberg Tribunal of Nazi criminal doctors (although the topic of patient self-determination is historically older, it originated in Europe at the end of the 19th century), which ultimately led to the concept of bioethics, is distorted in the conditions of the market and the power of corporations. Competitive social relations penetrate medicine. The philosopher believes that, first of all, the ethics of care is in demand in modern medicine, where work with chroni-

cally ill patients predominates, involving long-term contact between the doctor and the patient. In this situation, it is the logic of good care, the logic of co-dependence of all subjects of medicine, that is most important, as well as the fact that the opposition of power and equality, arising from the legal meaning of autonomy, goes by the wayside in this case, and the opposition of mindfulness becomes the most significant for everyday medical practices. and neglect, i.e. moral and psychological reading of the doctor-patient relationship. Care is not contrary to choice, but is its prerequisite and environment. Care also becomes the basis for responsibility, which Dörner understands as the same care, perceived as a duty [8, p. 44].

In line with the ethics of care, the liberal understanding of autonomy is being corrected. The autonomous choice model must recognize that not all people are completely autonomous, that "autonomy only occurs after a long period of dependency, and that in many ways we remain dependent on others throughout our lives" [9], and that it also implies that those people cared for by others were able to make their judgments that "one of the goals of caring is to stop addiction" [9]. "Because people are sometimes autonomous, sometimes dependent, sometimes providing care for dependents, they are best described as interdependent. By thinking of humans as interdependent, we can understand both autonomous and involved elements of human life. In general, a society that takes care seriously will engage in the discussion of public life not from the concept of autonomous, equal and rational entities pursuing separate goals, but from the concept of interdependent entities, each of which needs care and provides care to different ways, and each of which has other interests and tasks outside the sphere of concern" [9]. A social philosopher from the Netherlands A. Mol wrote a book about the logic of care, which, became a response to the dominance of the concept of autonomy [10]. Mol questions the ideal of medical choice, which is almost forced upon the patient. The moral content of medical practice is opposed to the economic and legal logic of autonomous choice in a competitive environment, imputed to the patient by the modern healthcare system. A. Mol's methodology is aimed at finding "good care" that will contribute to effective healing, give a person a sense of support, and not an indifferent performance of professional functions.

Conclusion

In the situation of absolutization of the patient's autonomy, the moral meaning of relations as solidarity in medicine is replaced with competitive, antagonistic ones. The subjectivity of the patient and the doctor is determined not by personal value, but by their economically coloured and enshrined in law interest. Therefore, ethical regulation of relations in medicine is replaced by legal

regulation. This canvas fits well with the transition from medical care to medical service, i.e. The economic dimension of medicine is considered as defining, levelling the value-semantic content and, thus, destroying the moral and psychological foundations of the interaction between the doctor and the patient. In medical relations, there is the occurrence of contradiction between the solidary, collectivist, interdependent nature of interactions and the competitive, individualistic, autonomy-oriented nature. The reduction of medicine to a form of economic relations means a rejection of the meanings and norms of millennial medical ethics and deontology. Doctors are not ready for this, first of all, they are not satisfied with such an emasculation of the medical profession. This trend can be countered by variants of paternalism updated for the current situation. For example, the actions of doctors should be concretized in the optics of the ethics of care, which for centuries has been the moral expression of medical responsibility in Russian medicine. The ethics of care excludes neither the choice of the patient, nor his free will, nor mutual agreement with the doctor of medical decisions.

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REFERENCES

1. Veatch R.M. Hippocratic, religious, and secular ethics: The points of conflict. *Theoretical Medicine and Bioethics Philosophy of Medical Research and Practice*. 2012;33(1).
2. Siluyanova I. V. Selected. About calling a doctor. Moscow: Publishing house of Forma LLC, 2008. 256 p. (in Rus.).

3. Starobinets A.A. Look at him. Moscow, AST Publ., 2017. 115 p. (in Rus.).
4. Vitch R. Models of moral medicine in the era of revolutionary changes. *Voprosy filosofii = Questions of Philosophy*. 1994;3:67–72. (in Rus.).
5. Ivanyushkin A.Ya. Bioethics and psychiatry. *Voprosy filosofii = Questions of Philosophy*. 1994;3:77–90. (in Rus.).
6. Yastrebov V.S. Organization of Psychiatric Care: A Historical Sketch. *Rukovodstvo po psikhiiatrii = Guide to Psychiatry*. Ed. A.S. Tiganova. Moscow: Medicine, 1999. Vol. 1. 712 p. (in Rus.).
7. Lekhtsiyer V.L. The logic of care versus the logic of choice in modern concepts of medical practice. *Interaktsiya. Interv'yuu. Interpretatsiya = Interaction. Interview. Interpretation*. 2019;11(20):36–53. (in Rus.).
8. Sidorova T.A., Zhichina Ye.Yu. Bioethical Content of Informed Voluntary Consent. *Meditsinskoye pravo: teoriya i praktika = Medical Law: Theory and Practice*. 2016;2(1):239–244. (in Rus.).
9. Tronto J.C. Moral Boundaries: A Political Argument for an Ethic of Care. NY: Routledge, 1993.
10. Mol A. The Logic of Care: Health and the Problem of Patient Choice. London: Routledge; New York, 2008. 129 p.

СПИСОК ИСТОЧНИКОВ

1. Veatch R.M. Hippocratic, religious, and secular ethics: The points of conflict // *Theoretical Medicine and Bioethics Philosophy of Medical Research and Practice*. 2012. Vol. 33 No. 1.
2. Силуанова И.В. Избранные. О призвании врача. М.: Изд-во ООО «Форма», 2008. 256 с.
3. Старобинец А.А. Посмотри на него. М.: АСТ, 2017. 115 с.
4. Витч Р. Модели моральной медицины в эпоху революционных изменений // *Вопросы философии*. 1994. № 3. С. 67–72.
5. Иванюшкин А.Я. Биоэтика и психиатрия // *Вопросы философии*. 1994. № 3. С. 77–90.
6. Ястребов В.С. Организация психиатрической помощи: Исторический очерк // *Руководство по психиатрии / под ред. А.С. Тиганова. М.: Медицина, 1999. Т.1. 712 с.*
7. Лехтсиер В.Л. Логика заботы versus логики выбора в современных концепциях медицинской практики // *Интеракция. Интервью. Интерпретация*. 2019. Т. 11(20). С. 36–53.
8. Сидорова Т.А., Жичина Е.Ю. Биоэтическое содержание информированного добровольного согласия // *Медицинское право: теория и практика*. 2016. Т. 2(1). С. 239–244.
9. Tronto J.C. Moral Boundaries: A Political Argument for an Ethic of Care. NY: Routledge, 1993.
10. Mol A. The Logic of Care: Health and the Problem of Patient Choice. London: Routledge; New York, 2008. 129 p.

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