

## **Evolution of human medical model and development course of medical humanistic spirit.**

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### **Abstract**

**Human medicine is continuously developing, and human medical model is also constantly evolving. In the evolution process of medical model, medical humanistic spirit is constantly developing as well. In order to build modern medical humanistic spirit, grasp of the evolution of human medical model as well as the development course of medical humanistic spirit is highly necessary. In this paper, the evolution of human medical model and the development course of medical humanistic spirit are analyzed and elaborated.**

**Keywords:** medical model; humanistic spirit; medical humanistic spirit

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### **Introduction**

As an academic term, model has different connotations in different disciplinary fields. It can either be an ideological system, or a way of thinking, which can be specifically called medical model in the medical field. Medical model is the ideas and methods by which people observe, analyze and handle problems related to human health and diseases in the medical practice; it is a historical category reflecting the characteristics, level, trends and objectives of medical development at a certain historical stage [1]. As the ideas and ways for people to medically recognize and solve problems, medical model always fits in with the development of science and technology at a particular time, as well as the overall level of philosophical thoughts at that time. Medical model, also known as medical view, is human's general views and essential generalization on diseases and health, which reflects the objects, methods and scope of medical research at a certain period [2-5]. Medical model is a dynamic concept; different medical models are affected and restricted by philosophical thoughts of different historical stages, and their development has undergone a course from spiritualism medical model, natural philosophy medical model, mechanistic medical model, and biomedical model to bio-psycho-social medical model. Medical revelation of human health and diseases has undergone a shallow to deep process, and medical understanding of human body has also undergone a process from "fuzzy human" to "biological human" and then to "full human", reflecting the twists and turns in the return of humanity and the development law of human's understanding of objective world.

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### **Spiritualism medical model and religious spirit**

#### *Spiritualism medical model*

From a philosophical sense, human medicine is born of spiritualism medical model, which emerged in the primitive society about 10,000 years ago. In ancient times, due to the limited levels of understanding and of productivity development, human life phenomenon, disease outcome, life and death and other issues appeared very mysterious as they were unable to be answered, and early medicine was also thus covered with a layer of mystery veil. In order to alleviate the suffering caused by diseases, people pinned their hope on the power of gods, and treated illness using witchcraft, thus forming a characteristic of indiscrimination between medicine and witchcraft. The spiritualism medical model at that time was built on the basis of intuitive understanding and stochastic epistemology, where the understanding of human life and diseases had a nonmaterial color, that was, rough and primitive, and thus was difficult to be risen to the theoretical form, and was unable to build the core achievements. People in the primitive and early slave societies had very limited understanding of themselves and nature, who firmly believed that the human life was given by the paramount "Heaven", and people were the servants of "Heaven". Because human life cycle was very short at that time, the instinctive desire to survive made people believe that the soul was immortal, the end of this lifetime was the beginning of the next lifetime, and death was "returning to Heaven", life was given a mysterious color. Moreover, people also believed that everything had a spirit, behind

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everything there was a divine presence, and behind each phenomenon was the reflection of divine power, always linking the unknown matters to the gods. Meanwhile, they also believed that the suffering from diseases was gods' punishment or ghosts' mischief, and that the incidence of diseases was not accidental results, but was targeted towards those particular persons, families or tribes who did evil or were guilty of negligence. Besides, people also considered the recovery of health as a gift, or gods' award. Therefore, witchcraft medicine let people get healthy body by praying to gods and expelling evils, which deeply expressed early human's fear of natural forces and ignorance. Religions cared for people's pain and illness, and a variety of methods were developed to help people relieve physical and psychological pain.

#### ***Spiritualism medical model and religious spirit***

Religion is the earliest cultural form and cultural dissemination carrier in human history; in the early human society, human diseases, death and other physiological phenomena were common thinking objects for medicine and religion. The integration of medicine and early religion clearly expresses and reflects early human's fear of natural forces and ignorance, the primitive concept produced therefrom was the basis for the birth of both medicine and religion. In this sense, primitive religion and early medicine had many same objects of study in terms of understanding human and nature. The medicine under the guidance of religious spirit had played a certain role in treatment of human physical and mental illness through mental regulation and behavioral norms, exerting a positive impact on the development of medical science. Guidelines on physical cleanliness, nutrition and diets and the like in the "Bible", knowledge on preventive medicine recorded in the ancient Jewish Law of Moses, and Chinese Taoist health-preserving theory and alchemy had all played a positive role in the construction of early medicine and public health. Meanwhile, medicine obtained an authoritative form under the protection of religion, which has been confirmed in ancient Greece "Hippocratic Oath" [6], clearly showing the relationship between the Hippocratic medicine and religion. Because the religion ruled the human spirit, medicine had been able to be improved to a height having its own scientific status and to a point having human dignity.

Although witch doctors with a religious and superstitious color treated diseases merely by praying for the blessings of gods, such often tended to play a positive role psychologically, temporarily alleviating the patients' pain. And in witchcraft rituals, witch doctors often let patients take herbal medicine, thereby giving rise to the early medical practice, contributing to the development of medical science. Religious spirit had played a remarkable role in promoting the development of medical science under the spiritualism medical model, but it is undeniable that the medicine at that time whether it is witchcraft medicine or

theology, they all took the care and psychological hint as the means to alleviate the pain of sick people, while lacking the basis for objective understanding of materials; most treatments were ineffective, or even counterproductive. Under the dominance of spiritualism medical model, whether it is in the level of knowledge form or practice form, the model has failed to reveal the essence of human diseases, nor has it provided people with the scientific methods of curing diseases. Witch doctors alleviated pain by expelling ghosts, which in fact aimed to constrain people's thoughts and behaviors by shackling their mind by the name of expelling diseases; in the long run, it will hinder the development of medical science.

Spiritualism medical model is a medical model easily understood and accepted by the public, such medical model presents the medical environment and concept at early stages of human society, and shows people's reverence for life and ignorance and fear of diseases and death, forming the early embryo of combined medicine and humanities. But from the philosophical perspective, the humanistic spirit is too idealistic at that time, or even anti-humanistic. For example, diseases were regarded as something evil's punishment on people, and in order to achieve the purpose of curing, god divination was deemed required to get rid of evil. Patients and doctors all absolutely worshipped the gods, who believed in the non-material power, thus hindering human from cognizing and exploring the objective world. Essentially, this is not "human-centeredness", but absurd "god-centeredness".

#### **(Natural philosophy medical model and humanistic spirit**

##### ***Natural philosophy medical model***

With the improvement of human capacity for understanding natural world, the development of productivity and the accumulation of pharmaceutical experience, people found that some diseases were not mysterious and unpredictable, but had rules, and thus began to doubt about the concept of health and diseases under spiritualism. Around 3000 BC, natural philosophy medical model emerged; humans began to objectively understand the world and try to change the world. Some people also began to ponder over natural phenomena, vaguely realizing the impacts of psychological and natural environments on health and diseases, and thus explained health and diseases from the natural philosophical perspective.

Natural philosophy medical model abandoned those ridiculous contents such as ghosts, witchcraft, etc., separating medicine from witchcraft, thus ending the early indiscriminate between "medicine" and "witchcraft". Things were gradually looked at from an overall perspective, and phenomenon of human life of and diseases were explained based on materiality, which have the characteris-

tics of naive materialism. Under the guidance of such naive materialist natural philosophy medical model, empirical medical system was formed. At this point, humans transited gradually from the original living state of coexistence with nature relying solely on physical power which was similar to animals to a living state using technology. In this process, humans have accumulated experience in treatment of diseases through observation, thinking and practice, alleviating pain and saving lives using these accumulated experiences when the same disease occurred again. However, due to the low level of technological development at that time, empirical medical system consisted of only very superficial understanding of human body and diseases, where many theories were mainly from subjective assumptions, lacking practical verification. Inner Canon of Yellow Emperor (hereinafter referred to as the Inner Canon) can be said to mark the transition between the spiritualism medical model and the natural philosophy medical model in China. Inner Canon formed a complete set of theoretical system, the holistic medical view which took the "correspondence between human and universe" and the "theory of yin-yang and five elements" as reasoning tools and the "organ and meridian theory", "qi-blood-body fluid" and "diseases by seven emotions" and other physiopathological theories as the core linked the health and diseases to the external environment mental activity for observation and reflection. Chinese medicine led by the Inner Canon believed that everything in the world was made of five elements, i.e. metal, wood, water, fire and earth, and that human organs corresponded to these five elements, mutually promoting, restraining and coordinating to guarantee human health. It believed that diseases were caused by imbalance of yin and yang, and deficiency and excess of vital qi and pathogen under the action of various internal and external pathogenic factors. Transition of spiritualism medical model to natural philosophy medical model in the west began by the study of Hippocrates, the father of medicine. Hippocrates abandoned all kinds of theological thoughts; he believed that the body was composed of four elements, namely air (wind), earth (ground), water and fire, which combined to form various parts of body. Each of these four elements had its own characteristics, i.e. coldness, hotness, dryness and wetness, and each part of body also had its main properties [7]. Hippocrates believed that the overall proportional relationship of fluid composition decides the personality, temperament, physical fitness and diseases of human. Hippocrates is neither a manager of nature, nor a destroyer of nature; he did not conform to the will of god or acted in the name of god, but was always ready to help the inherent healing power of nature by his own will and name. "Explore the cause of disease calmly, while not forgetting present purposes; use reason and experience, and get rid of preconceived ideas." [6] This is the basic principle of Hippocratic medicine. He explained that medicine was the conquer over natural forces, rather than the surrender to natural forces like re-

ligion. With the ideas and way of thinking of natural philosophy, his raised the medical experience to theory, abandoned absurd contents about ghosts, witchcraft and the like, highlighted the impacts of external environment on diseases based on materiality and integrity, emphasized natural therapies, and attached importance to doctors' medical ethics training.

From the perspective of modern development, the ancient natural philosophy medical system does have a lot of deficiencies and flaws. For example, while passing down empirical medicine, it often ignored the fact that things were always moving and developing, instead of static, thus ignoring the point of combining theory with practice. But many ancient medical books and prescriptions passed down to today are all the summary and accumulation of practical experiences, which not only have laid a good foundation for the development of today's medicine, but also have an important significance in promoting the development of medical model.

#### ***Natural philosophy medical model and humanistic spirit***

Natural philosophy medical model takes the view of naive materialism as the guiding ideology, believing that the body's physiopathological phenomena are not isolated, but are closely linked to the personality, lifestyle of people, as well as natural and social environments. In terms of understanding, prevention and treatment of diseases, the model lays emphasis on both body and mind, and pays attention to both human organism and relationship between human and nature. The development of natural philosophy medical model permeates with the glory of humanistic spirit. At that time, in ancient Greece and China, attitudes towards medicine began to transit from idealist treatment ideas to naive materialism, and gradually transformed from the exploration of unknown world to the relatively deep understanding of diseases. Medicine at that time was mainly humanities-oriented medicine. Under the natural philosophy medical model, humane care dominated the medicine, in such care, medical science began to be bred, humans transited from fearing diseases to trying to overcome them. Due to the influence of philosophical humanistic thought at that time, the medical humanistic spirit was relatively mature. Chinese confucianists put forward the respect for human life and patients' personality, and equal treatment to all patients [8]. Such naive humanism in ancient medical ethics is also reflected in the Hippocratic Oath, which focuses on stressing that the purpose of medical behavior is to serve the patients. Inner Canon of Yellow Emperor put forward the life-centered view of essence of medicine, at that time, medical humanistic spirit was understood as patients' lives were above all else, and doctors should be centered on patients' lives. Hippocrates believed that medicine had three factors — disease, patient and doctor. Doctors were servants of this art. He considered that the patients' lives were the most important, and doctors must make every

effort to be the servants of medicine. In such medical model, human's physical and mental feelings had been considered, valued and visible; the degree of integration between medical and humanistic spirits had made great progress compared with the spiritualism medical model, humane care had also become three-dimensional and full-oriented, no longer staying in the idealistic "fantasy", but gradually creating a more suitable environment for human survival through exploration and alteration of natural world, which was the best reflection of people-orientation.

## **Mechanistic medical model and objective spirit**

### ***Mechanistic medical model***

At the end of the 13th century, some advanced intellectuals from Italian emerging bourgeoisie created literary and artistic works, publicized humanistic spirit, and advocated individual liberation through the study of ancient Greek and Roman arts and literature. Subsequently, this ideological and cultural movement expanded to various Western European countries, and prevailed in the entire Europe in the 16th century. During the Renaissance, suspicion over dogmatism and opposition to authority had risen. Medical community also had a medical revolution represented by Paracelsus (1493-1541). Renaissance fully affirmed human values, and advocated optimistic attitude towards life, breaking the shackles of feudal theology, promoting the development of natural sciences, and establishing the modern science system based on experiments and framed by formal logic. With the constant improvement in the research of Newtonian mechanics system, a new conception of nature was gradually formed, namely the mechanical materialistic conception of nature. At that time, medicine had also been free of religious theology, and disciplines like human anatomy and physiology began to be established. Under the influence of mechanical materialistic conception of nature, a Belgian doctor Vesalius published a book *On the Fabric of the Human Body* in 1543, which became the world's first systematic human anatomy textbook, marking the beginning of experimental medicine era. Under the double influence of experimental medicine and mechanical materialistic conception of nature, a new medical model, i.e. mechanical materialistic medical model, was brought out, whose fundamental characteristic was absolute invariance of the natural world. The book *Man a Machine* published in 1784 by the French philosopher, physician La Mettrie is the most typical representative of this view. He regarded human body as a biological organism, believing that illness was pathomorphological and pathophysiological changes in tissues and organs of living organism, and regarded human body as a complex machine made up of various component parts, for example, heart was the water pump, blood vessels were water pipes, etc. This view explained all phenomena as the interaction of forces or the simple or complex arrangement of matter particles, while ignoring the fact that humans were complex organisms integrating

biological, psychological and social properties in one. Such one-sided understanding had made medicine gradually away from the humanities, completely departing from the humanistic spirit advocated by the Renaissance.

### ***Mechanistic medical model and objective spirit***

Theoretical background for the emergence of mechanistic medical model was the rise of the Renaissance. Core humanistic contents advocated by the Renaissance were: firstly, humanism believed that humans were above all else, who were the essence of the universe, naturally, realization of human value and improvement of self-responsibilities were placed in the first place, such shift of the center of focus sparked people's attention to the real world, arousing their interest in the exploration of objective world. Secondly, humanistic thought rose during the Renaissance broke the complete domination of gods, eliminated the religious spiritual shackles that people were born to be slaves to gods, and proposed the idea that people were above all else. At that time, in the aspect of medical development, the phenomenon was vividly called "God is dead", a growing number of physicians abandoned the theological illusion, and no longer remained in the mastery of past experience, thus freeing medicine from the shadow of theology. Thirdly, while affirming human interests were above all else, greatly affirmed real world and life, advocated personal fame and fortune, and opposed asceticism. Fourthly, rational thinking and exploration of world were promoted, and scientific research was advocated. The advent of Renaissance also brought about objective and rational trends.

It was precisely the proposition of humanism which gave rise to the formation of metaphysical mechanical materialistic view of nature explaining all natural phenomena with science. While bringing a rare harmonious era in the course of human history, Renaissance also contained a number of factors contrary to civilization and happiness. During the Renaissance, humanism criticized religious theocracy, rescuing people from the shackles of theocracy, and aroused people's pursue for good real life and long for exploration of the real world mysteries, thus playing a key role in fueling the development of modern science. Renaissance led people to objectively face the world, and opposed to religious theocracy, while also causing a lot of negative impacts. In terms of medicine, witchcraft medicine and empirical medical were forced to be in subordinate position, and objective spirit began to occupy dominant position. Medical science in the late Renaissance had already been relatively independent, which became independent of medical humanistic spirit and faced the world as an individual, creating analysis, reduction, observation, experiments and other scientific means. Medical science physicalized and chemicalized complex human organism, allowing people to have increasingly detailed understanding of their own biological properties. But at the same time, such reduction approach also formed metaphysical

way of thinking which investigated things without considering overall relations, so that humans were considered as machines, and human organs were seen as machine parts. Under the guidance of objective spirit, medical technology developed rapidly, on the one hand, enabling the anatomy and biology to achieve great progress, thus greatly promoting the development of medical science; and on the other hand, due to the worship of medical science, the glory of medical humanistic spirit faded gradually at that time, in the treatment process, doctors put the physical and chemical concepts in the first place, while putting medical humane care in second place. Medical humanistic spirit at that time showed a declining trend.

## **Biomedical model and scientific spirit**

### ***Biomedical model***

From the 18th century to the 19th century, a series of great discoveries emerged in the domain of natural science. With the development of cell theory, theory of evolution, law of conservation of energy and bacteriology, the metaphysical and mechanical materialistic view of nature was shaken; physiology, pathology, parasitology and other basic medical disciplines were all developing vigorously. Advances in biology enabled people to begin to look at things, life and relationship between health and disease from the biological perspective. Biomedicine made people at that time believe that biological factors were at work in the entire process from the occurrence, development to the treatment and prognosis of diseases. Each disease had its own specific biological or physicochemical factors, which could all bring morphological or chemical changes to human body's cells, tissues or organs, moreover, such changes could be measured. People believed that health was a dynamic balance between host (human body), environment and pathogen, and diseases would occur when such balance was disturbed. This medical model formed by the medical concept of maintaining ecological balance, i.e. biomedical model, was formally proposed by Flexner in 1910. Biomedical model enabled medicine to truly enter the era of rapid development, stimulated the research enthusiasm of physicians, and allowed more scientific understanding of the incidence, development, diagnosis and treatment of diseases. To the first half of the 20th century, many high and new medical technologies were widely used. Therefore, diagnosis and treatment of diseases became more accurate, convenient and effective. Application of high and new medical technologies enabled medicine to enter a new historical period, medicine gradually became a relatively complete disciplinary system. Many biological mechanisms inducing human diseases were found, thus enabling targeted prevention and treatment; three difficulties in surgery, i.e. pain, infection and blood loss, were overcome, and operative mortality was greatly reduced.

### ***Development of scientific spirit and lack of humanistic spirit in biomedical model***

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Under the biomedical model, medical science developed vigorously, different disciplines made in-depth study on various life phenomena under morphological structure, functional mechanism and pathological state of human body, and the mystery of human life as well as the course, causes and mechanisms of diseases were gradually revealed [9-10]. From the 19th century to the 20th century, modern scientific revolution with revolution in physics and information technology as the forerunner sprang up, enabling more profound and accurate understanding of human life phenomena and diseases from the perspective of biological properties. It was precisely such scientific spirit which promoted the development of basic and clinical medicine, letting the differentiation and integrative trends of modern medicine first clearly reflected in disciplinary construction. Based on the guidance of such scientific spirit, medicine developed splendidly from Galileo and Newton's preliminary exploration of natural world to the first half of the 20th century accompanying traditional natural science, providing huge scientific knowledge system such as advanced molecular biology, genetic engineering, biomedical engineering and artificial organ fabrication for future generations. This scientific way of thinking will continue to promote the development of biomedicine.

Only emphasis on the absoluteness of scientific spirit ignored the importance of humanistic spirit in medical development. If the separation between medical humanities and medical science was in its infancy in the mechanistic medical model, the biomedical model would be complete subjugation of medical humanistic attributes. Under the biomedical model, the advantages of high and new medical technologies were made full use of, contributing greatly to human health undertakings, and writing a significant chapter in the history of medicine and even the history of mankind. However, some accompanying disadvantages also gradually surfaced. The medicine under biomedical model relied overly on science and technology, while ignoring people's physical and mental feelings, thus giving rise to the bad situation of "no people only disease", which was vividly called "humans are dead". At that time, medicine and humanities already belonged to two different tracks in a separate state. It was mainly manifested in: firstly, in the treatment process, focus was laid only on biomedical diagnosis and treatment of diseases. Under biomedical model, diagnosis and treatment process was carried out around disease itself, whereas psychological, social and other factors were not included in the doctor's consideration. In modern society, diseases once had threatened human life, such as infectious diseases, are no longer major threats to human health. Many diseases were formed by the joint action of biological, psychological, social and other factors. However, treatment of patients from a mere biological perspective was one-sided and unsustainable. Biomedical model only saw the biological attributes of humans, while ignoring their social attributes.

Secondly, biomedical model saw human body with a static point of view. Biomedical model believed that every human disease is morphological and physicochemical changes in relevant organs, cells or macromolecules, and has its corresponding treatment. Such research approach certainly had promoted the development of medical science to deeper and broader direction, but it was also a metaphysical way of understanding, which diagnosed and treated patients statically from a mere biological aspect, while ignoring the fact that humans were constantly moving people in society. Therefore, the diagnosis and treatment process under biomedical model lacked holistic concept, and was incomprehensive. Thirdly, under the biomedical model, the doctor-patient relationship became increasingly distant.

Under the biomedical model, doctors paid increasing attention to the accumulation of technology and capital, while lacking humane care for patients, therefore, the doctor-patient relationship was not as good as it used to be. The rapid development of biotechnology had made the branches of medical science increasingly diversified, and patients were seen to be composed of various bodily components and parts; each part of body was taken charge by specialist physicians, and each specialist physician was also only responsible for the "components and parts" within his domain. Doctors were over-reliant on image data and various reports, who only considered whether various physiological parameters of patients were normal during the treatment process, while ignoring the emotional, social, environmental and other factors of humans. Thus, doctors and patients were separated by icy medical instruments, and science became increasingly departed from the humanities.

### **Bio-psycho-social medical model- Integration of humanistic and scientific spirits**

#### ***Bio-psycho-social medical model***

Bio-psycho-social medical model was proposed in 1977 by Engel, a professor and psychiatrist at the University of Rochester, USA. Its ideological roots can be traced back to the definition of health given by the World Health Organization (WHO), that is, health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [9,11-13]. Bio-psycho-social medical model corresponds to dialectical materialism, where dialectical thinking replaces "intellectual" thinking, and system theory replaces reductionist theory, that is, things are comprehensively grasped with a holistic, systematic, motional and procedural view. This new medical model transfers the research on diseases and health from substance-centeredness to the system-centeredness, that is, health and diseases are the results of interrelation and interaction among systems, and among elements comprising the systems in various hierarchical systems human body is involved. Human body is not a

machine, which needs holistic medical therapy centered on systemic regulation, and supported by topical treatment. This system is impacted not only by biological factors; psychological and social factors also play vital roles. Especially in modern society, people have to face more and more difficulties and pressure; busy life, tense emotion and other factors easily overlooked can all become a threat to human health.

Since the 20th century, the rapid development of science and technology has made people gradually lose subjectivity, becoming the appendages to high technology. In the innovation and development of medical science, the science and technology have become an interdependent opposite to the humanistic spirit. In history and reality, especially under special social state, the powerlessness demonstrated by technology is in stark contrast to the backbone role highlighted by the humanistic spirit. When there is no place for humanities in the development of medical science, medical science loses its direction and goal of advancement. Without the support from humanistic spirit, medical science will be rigid, mechanical, and lack of vigor and vitality, which is deviated from the current people-centered spirit. Return of the medical humanistic spirit is of great significance, which can not only make the medical service more humane, and improve the doctor-patient relationship, but more importantly, can help rebuild the spiritual home of medical professionals. Therefore, philosophical significance and cultural deposits of medical science should be taken seriously, humanistic spirit should be used as the logical starting point for medical research and development, and medical professionals' heartfelt reverence for life should be guided and promoted, so as to achieve the purpose of guarding the physical and mental health of others.

The bio-psycho-social medical model represented by the concept that people were organisms in the society with complex psychological changes in modern medicine comprehensively considered a variety of factors affecting human health, appealed for the return of humanistic spirit to the medical field, and advocated reintegration between the medicine and the humanities, thus pointing out the direction for modern medicine. However, although this model has been proposed for many years and recognized by the medical community, it is lagged in transiting practice. So far, modern medicine has still been left with the shadow of biomedical model, where this concept is not fully implemented.

#### ***Integration of humanistic and scientific spirits in science bio-psycho-social medical***

Ikeda Daisaku had once sighed that, "The greater the power of medical science to directly control human life, the bigger the problem how doctors use it. If properly used, the power of medical science can bring immeasurable happiness to humans. But if used indiscriminately, it can very easily destroy human life [14]." Therefore,

medical science under the bio-psycho-social medical model should integrate medical humanistic spirit with medical scientific spirit, rather than be mutually exclusive. Hippocrates had a famous saying: there are two things that can cure illness, one is drug, and the other is language. The "language" here can be extended to the humane care in today's medical practice, i.e. the construction of medical humanistic spirit. Medical humanistic spirit is the spirit to love for human life, and adhere to the people-orientation in medical activities. Humanistic spirit in the bio-psycho-social medical model is essentially a spirit treasuring the free and all-round development of humans. Only those organically integrating the understanding of scientific truths with the moral sincerity and emotional trends can be called the humanistic spirit in the bio-psycho-social medical model. "Drug", on the other hand, can be interpreted as application of technology in clinical settings extended to today, i.e. medical scientific spirit in practice. Under the influence of bio-psycho-social medical model, medical humanistic spirit and medical scientific spirit are attached equal importance, which are complementary and mutually reinforcing on the basis of mutual independence. Furthermore, medical humanistic spirit guides the direction for medical scientific spirit.

① Under the influence of bio-psycho-social medical model, humanistic spirit and medical practice go hand in hand. However, from the perspective of labor division, medical humanistic spirit and medical scientific spirit are independent of one another. Darwin's definition of science is as follows: science is to organize facts, found laws therefrom, and make conclusions. Medical scientific spirit is the objective fact-respecting, rigorous, truth-seeking and pragmatic spirit in the medical practice process, and the innovative spirit based on the inheritance and practice. Medical scientific spirit emphasizes the objective facts, and ignores the interference of subjective factors. As the noble spirit of human civilization, what scientific spirit expresses is the courage to uphold scientific thought and the continuously truth-seeking mind, where correct understanding of the movement of objective world is required. Therefore, objective reality and pursuit of truth are the primary requirements of scientific spirit; medical science is the application and manifestation of scientific spirit in medical and health practice, which is the spirit of dedication to biomedical research [15-16].

Medical humanistic spirit, on the other hand, is concerned about the psychological state of patients, emphasizes patients' true feelings in medical practice, pursues humane medical practice, and values emotional guidance. Medical science should only study and treat patients as an organism, but should also return to the social attributes of humans, and treat them as a social people. Development of medicine should always emphasize the penetration of medical humanistic spirit; medical humanistic spirit pays close attention to the people's quality of life and meaning

of existence, making them realize medical values around the humanistic values.

② As the guiding ideology of medical development, medical humanistic spirit indicates the humanistic course for the development of medical science. The core of medical research is humans, and the core of humanistic spirit is people-orientation. People-orientation is the fundamental principle for development and progress of human society, which decides the leading and guiding role of medical humanistic spirit to medical science. Medical science can only get rid of the utilitarian temptation under the guidance of medical humanities, shouldering the great mission of better survival and development for humans, and returning the humanistic attributes of medicine.

③ During medical practice, medical humanistic spirit and medical scientific spirit should be integrated, complementary and mutually reinforcing. Medical science alleviates and heals patients' diseases, while medical humanistic spirit provides psychological support to patients. Medical science can only deal with physical suffering of patients through advanced technological means, while medical humanistic spirit can appease patients' psychological trauma. Humans are composed of mind and body; in order to fully and completely resolve the suffering of patients, the two must supplement and complement each other. Sometimes, doctors' a few warm apt words can exert an effect which cannot be achieved by therapy, and win the deep trust of patients and their active cooperation during the treatment process. A good doctor should be the one possessing both medical humanistic and scientific spirits. Every step of the development of modern medicine is permeated with spiritual elements: knowledge learning, accumulation of experience, emotional care, strong will and so on. Throughout the history of medicine development, the development level of medical humanities has all along been deciding the development of medical science. Only by constantly injecting the medical humanistic ideology into medical science, can the medical science exert its positive effects to the greatest extent. Neither medical scientific spirit nor medical humanistic spirit can independently complete this great mission, or independently constitute modern medicine.

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### **Ethical approval**

Ethics Committee of Dalian Medical University

## Authors' contributions

Guarantor of integrity of the entire study and study design, manuscript review: Fuqing Gong; Manuscript preparation and editing: Yunpeng Diao, Taowen Pan; Data acquisition and analysis: Min Liu, Hongliang Sun.

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