A tentative discussion of medical education and cultures of science

Guoqiang Chen
Shanghai Jiao Tong University School of Medicine, China

Abstract
Medical education is an important part of health care. Many medical educators have thought deeply about it since the outbreak of COVID-19. Based on my own experience and thinking during the pandemic, I now believe more strongly in the importance of the cultures of medicine and science, which reflect the views of life amongst medical and scientific professionals. The two cultures derive from the lives of medical workers and scientists and manifest in their attitudes towards clinical practice, scientific research and teaching. They also embody the spirit, essence and philosophy of the medical and scientific professions – the common belief in seeking the truth and the common will to pursue kindness. Education today is not simply a matter of passing on knowledge. More importantly, the next generation shall inherit the scientific culture of seeking the truth, pursuing kindness and exploring beauty and humanity. This is crucial to medical education and clinical practice.

Keywords
Medical culture, medical education, professionalism

Since the outbreak of COVID-19, China’s 1.4 billion people have fought with one heart and one mind against the disease and scored major strategic achievements in containing the virus. In this war without gun smoke, 42,600 medical workers have been called to duty and rushed without hesitation to fight the disease in Wuhan and other areas of Hubei, where countless acts of heroism emerged. They have saved precious lives with their courage and sacrifice, giving a shining example of the medical professionals’ respect for life and unconditional love.

As the chancellor of Shanghai Jiao Tong University School of Medicine, I still cherish many fresh memories of this whole process. On 24 January, the eve of the Chinese New Year, I was at Ruijin Hospital, an affiliated agency of our school of medicine, to see off two intensive care clinicians who were amongst the first medical workers dispatched to Wuhan. Given the circumstances at that time, going to Wuhan – the epicentre of the disease – was a life-and-death test, full of uncertainties and also a tough test of body and mind. I will never forget how nurse Shen Hong, in less than 6 hours, packed her bags after arriving home from her daytime shift and returned to the hospital, ready for departure to Wuhan. When interviewed, she said, ‘When I entered the school of medicine in 2006, my teacher told me that to choose the medical profession is to choose sacrifice. In the face of the pandemic, everyone gets

Corresponding author:
Guoqiang Chen, State Key Lab of Oncogenes and Related Genes, Shanghai Cancer Institute, Shanghai Jiao Tong University School of Medicine, No. 280, Chongqing South Road, Shanghai 200025, China.
Email: chengq@shsmu.edu.cn

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scared, and no one is a born hero. Clinicians are ordinary people as well’. Hearing those words, I was choked up, feeling both worried and touched. During the whole process, Shanghai Jiao Tong University School of Medicine sent 569 medical staff to support Wuhan, and I have many more touching stories to share from that time.

However, there were also concerns. After seeing off the first group of medical staff to Wuhan, I received an email from a medical student on rotation. Rather than asking me to send him to Wuhan, he informed me that he wished to quit his rotation because it was too dangerous. The next day, the first of the new year, I was about to send the deputy chancellor in charge of student affairs to the hospital to talk to this student. However, that very night he wrote another email, this time on behalf of the whole class, saying that they were only medical students, not licensed doctors yet. And to implement the education department’s decision of ‘keeping students at home without stopping the courses’, he proposed suspending the rotation for the sake of the students’ safety.

Frankly, I was disappointed and worried when I received that email. I asked myself, ‘Are we training sophisticated egoists? What makes the medical discipline special?’ In the face of a pandemic, students of other disciplines can choose to study at home, but for senior medical students it is a good time to train and practise. They should have the courage to face the challenge and take the responsibility. How can they step back and miss such a good opportunity? A pandemic is the best timing to cultivate values and virtues, and to examine the moral education. People with strong minds are never changed by compliments or ridicule. They grow up through trial and error and make progress by self-reflection. If we just see touching scenes but do not reflect on our mistakes, can we avoid something even more damaging the next time? Right then, as I was seeing off our medical staff with relief supplies, I started to reflect on medical education in the context of the pandemic.

On 16 February, we posted an open letter titled ‘Love medicine, now is the best time!’ to high school graduates on our school website. It reads as follows:

If you have ever aspired to save lives and protect the health of others, please believe in the choice you make and do not be deterred by the ravages of the virus. If you have ever aspired to learn all available medical knowledge and share that knowledge with the world, please believe in the choice you make and do not be cowed by temporary difficulties. There is nothing more important than people’s lives. And doctors save people’s lives. Therefore, a virtuous doctor shall not seek fame or fortune. An accomplished doctor shall be able to save the ill from dying and cure the patients. And a knowledgeable doctor shall leave their legacy by writings or teachings. These three characteristics are as important as medical skills to any doctor. It is our earnest hope that you will keep to your original aspiration, ignore the distractions and pursue your dream of medicine!

On 18 February, I presented some of my reflections on medical education over the past two weeks in an article titled ‘Learning the hard lesson! Revisiting medical education’. Published in the Shanghai section of the People’s Daily website, it had more than 2.8 million views in one day. This shows that medical education is still being paid high attention by the Chinese people, which makes me feel encouraged. In the article, I pointed out that the start of 2020 brought the greatest ever awareness amongst Chinese people of the greatness of doctors. Moreover, medical science can save a nation. If medical science is strong, the nation is strong; if medical science prospers, the nation prospers. The essence of medical science is to preserve and enhance human health. In fact, human welfare is the ultimate purpose of scientific experiments. At a time when the lives and health of the people are under serious threat, it is also imperative to revisit and improve medical education, which is the source of medical science.

In the early stage of the pandemic, the shortage of epidemiological professionals and the casualties caused by clinicians’ inadequate awareness of the pandemic and lack of capacity to protect themselves fully exposed the lack of systematic arrangements in our medical education and the weak points in our preparedness for public health crises. In the past, we focused too much on ‘tactics’ rather than ‘strategies’;
on ‘treatment’ rather than ‘prevention’; and on ‘specialized disciplines’ rather than ‘integrated disciplines’. Consequently, when the virus struck, we were caught unprepared, reacted passively and learned a painful lesson. Therefore, I summarised my thoughts from three macro perspectives: the weak foundation; the emphasis on chronic and critical diseases while marginalising infectious diseases, pathology, anesthesiology, and pediatrics, etc; and being a virtuous person before being a good doctor. In conclusion, I noted that medical workers have all performed exceptionally well in battling against the virus. Yet, judged by the overall response to the pandemic, medical education, research and practices all need to be seriously examined and revisited at both the macro and the micro levels, so that we can wake up to reality, make corrections and prevent the virus from spreading again.

About a month later, invited by Guangming Daily, I wrote an article titled ‘Knowing history and law, being professional and knowledgeable and seeking truth and goodness’, reflecting on medical education from three micro perspectives. I argued that medical jurisprudence and medical history should become compulsory courses in the medical discipline. I also called for ‘being well versed in knowledge before joining the medical profession’ to become the creed of medical education and observed that the compassion of medicine is manifested in the harmony between rigidity and flexibility. The core spirit of medical science is to pursue truth, goodness and beauty. The value of medicine lies both in virtue – a caring heart that treats patients like family – and in truth – honouring science and revering the truth behind the occurrence, development and consequences of diseases. As medical workers, we need to believe in science and avoid blind faith in authority; we need to keep to the truth and be prudent in thinking and action to heal the sick.

There is no ‘one size fits all’ rule in medical science. The same disease can manifest differently in different people, and each individual case is a new research subject. Accordingly, we should always learn from our patients, as if walking on thin ice or standing on the edge of an abyss. Medical students deal with people’s lives. Medicine is not just a science or an art, but an intermediate between the two, or an integral whole of natural, social and humanistic sciences. Medicine is the most scientific of all humanistic sciences and also the most humanistic of all scientific disciplines. When I reflected on medical education, I did not directly touch on the subject of medical culture. Yet, in reality, this topic matters to all levels of thinking, macro and micro alike and its importance cannot be emphasized enough.

Culture is a fundamental, deep-rooted and enduring force. What is culture? I agree with the explanation given by Liang Xiaosheng, a well-known writer from Peking University. Culture is a virtue rooted in one’s heart, a self-motivated and spontaneous action, a freedom premised on constraint and a caring heart for all. Thinking about this, I cannot but recall the ancient sage Zhang Zhongjing. He lived in a time when epidemics were prevalent. At the end of the Eastern Han Dynasty, (around AD 200) two-thirds of his family – a big family of more than 200 people – died of plague. Having lived through such hardship, he decided to study the diagnosis and treatment of typhoid fever; through decades of painstaking efforts, he wrote the Shang Han Za Bing Lun (Treatise on Cold Diseases and Miscellaneous Diseases), a monumental work in the field of medical science. Of all his words of wisdom, what impresses me most is this: ‘Be a good premier to save the country; or be a good doctor to save the people’. This is perhaps the earliest illustration of the compassionate spirit that defines the medical profession.

Before the pandemic, a student sent me an email referring to a full-page article written by me in the People’s Daily in 2007. In the article, I predicted that the superficial and utilitarian atmosphere in society would diminish sooner or later, and people should and must return to science itself in 10 or 20 years. He asked me, as 12 years had now passed, whether I believed that the utilitarian and superficial tendency still exists in the scientific world. To be honest, I could only tell him that I was not a prophet and that returning to science itself has always been my ideal. I also responded that, instead of giving people money, it is better to give them hope. He then asked where this hope came from. I replied that the answer could be found in the title of the 2007 article ‘Dream, passion and originality’. How can a nation and people rise if they have no dreams, no passion and no
creativity? How can knowledge be created if the intellectual community has no imagination?

At last year’s commencement ceremony for our school, I spoke about how medical science is consciously and unconsciously entering an era of materialisation and mechanisation. No matter how gaudy the shift in technologies may become, the life of a doctor is always dedicated to others, not to oneself. A doctor shall neither be content with a life of ease nor seek fame and fortune but shall always be ready to make sacrifices and save others. This should be the culture of medicine. As early as the commencement ceremony of 2012, I appealed directly to the medical students:

When you cherish your past, feel satisfied about your present and be optimistic in your future, you will have reached the peak of your life. When you know deep down in your heart that success will not indulge you, failure will not crush you and dullness will not drown you, you will have reached the peak of the circle of life. When you always have hope, when you cherish your responsibility over power, when you are concerned about others’ misfortunes and focused on salvation and comfort, you will have reached the peak of your inner world.

Those three highest morals are the culture of medicine, in my mind.

The cultures of medicine and science show the life attitude of medical workers and scientists, their way of life in medical practice, scientific research, teaching and learning activities and their shared conviction on the value of truth and the goodness of people. In the cultures of medicine and science, the quest for truth, virtue and beauty is the essence. If all the scientists in an era and a society are lying and only talking the talk, how can we expect the next generation to develop the scientific spirit? That question deserves a serious answer.

The scientific spirit must be the organic combination of a truth-seeking outlook on knowledge, a value system based on virtue and an artistic quest for beauty. Doubt and criticism are the lifeblood of medicine. Imagine a doctor who treats a patient but refuses to accept any doubt about or questioning of his authority. If anything goes wrong with his diagnosis, he might just kill the patient. There can only be a few authoritative voices in medicine, and of course medical disciplines are increasingly subdivided, yet life is an integral whole. Doubt and criticism are also the internal driving force of medical development, while truth-seeking, pragmatism, tolerance and openness are core to the medical spirit. If people had no tolerance for medical science, doctor–patient relationships would inevitably become strained, as uncertainty is amongst the most defining features of medicine. How terrible it would be if one were to pursue credit, fame and fortune rather than truth, goodness and beauty.

Scientific and technological innovation is a highly risky adventure, with perhaps only a 10% chance of success. So who would want to be amongst the 90% who are losers? Is there any relationship between abuse at medical workers and the cultures of medicine and science and social rationality? I shared those worries at the commencement ceremony in 2018, in a speech that the netizens dubbed ‘Uncle Guoqiang’s worries’. At that time, I was worried about whether the students had only themselves in mind, or even whether they only cared for themselves. If that is the case, it is hard to imagine what future doctors will be like. I was also worried that the students would lose their independence and self-esteem to vanity. Nowadays, everyone wants to be in the spotlight or centre-stage and make his or her presence felt. The only thing they desire is public attention, positive or otherwise. I was even more worried about whether the students would be patient enough to stay in the medical profession and whether they would match their words with actions. A decent man shall never behave contrary to his words. Whether a leader or a teacher, one should observe the same rules. Otherwise, how can one teach the next generation to contribute to the society? It is extremely important to be loyal to one’s words. I have openly said that a school chancellor must be honest in what he thinks and what he says. This must be a basic principle in the school’s moral education. One thing I ask of myself is to be a role model for medical students, be true to myself, speak the truth, do practical things and deliver pragmatic results. The job of a chancellor is always to educate students to be better than he is.
A positive attitude is a precondition for a healthy mindset, which in turn creates a favourable atmosphere. If we study and work only to seek fame and conduct research only want to achieve an outstanding youth award or to become a Yangtze scholar or an academician, we would all be crushed by the burden on our shoulders. In the 1980s, people of my generation had the conviction that we were studying to prosper the Chinese nation. That conviction came from the bottom of our hearts. With such a sense of purpose, we will have a healthy mindset. On the contrary, if an unhealthy mindset prevails, the academic atmosphere will be harmed and all kinds of academic misconduct will follow. If our mindset goes wrong, everything goes wrong.

The most urgent task now is to build a sound scientific ecosystem. That can never be done by issuing documents. To build the culture of science, it is important to convert from the faction culture to a collective culture, from individual development to proactive cultivation and from knowledge supply to capacity enhancement.

We live in an age of information explosion. Given the test of the pandemic, I have an increasingly strong feeling that today’s education is not just about passing on knowledge but about instilling the spirit of science and humanity in the next generation. Recently, I gave my first online lecture on the platform of the Yangtze River Delta Medical Education Alliance as part of a course titled ‘A conversation with science’. I used real examples of scientific research to inform my students that conducting scientific research is a challenging but happy experience and that the essence of the scientific spirit is seeking truth from various facts. I deliver a lecture in this course once a week. Every lecture draws an audience of almost 200,000, which is indeed heartwarming. But, more importantly, it shows that young people today are eager to pursue the spirit of science and return to science itself.

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Author biography
Guoqiang Chen is a professor in pathophysiology of Shanghai Jiao Tong University School of Medicine. As a scientist, he has devoted himself to investigating cellular and molecular mechanisms of cancer and leukaemogenesis. As the chancellor of Shanghai Jiao Tong University School of Medicine since 2010, he works for the reform, development and innovation of the medical school. During his tenure, the medical school has became a top one in China and made great progress.