

# Teaching Reform of Clinical Medicine in Western Comprehensive University

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**Abstract:** With the rapid development of medical education, how to train high-quality medical talents in line with social needs is an important problem of medical education reform faced by western medical colleges with lack of faculty and limited medical resources. Based on promoting the excellent physician program of the ministry of education, medical college of Shihezi University has been achieved certain reform efforts by integrating basic medical courses, strengthening the cultivation of medical thinking, integrating humanistic education, and changing the examination mode. Under the educational idea of inheriting the "three foundations" and advocating the "three early", a new training mode was initially established by combining integration of preclinical medical courses centered on organ systems with humanistic quality education. It is of vital practical significance to train medical talents with comprehensive post competence such as humanistic spirit, innovation ability, scientific research ability and community comprehensive service ability.

**Keywords:** Medical Education, Clinical Medicine, Course Integration

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## 1. Introduction

The five-year clinical medical education is the main body of higher medical education in China and an important basis for the cultivating outstanding and innovative medical talents. The reform of medical education at home and abroad has been never stopped, mainly through science-based curriculum Stage, the problem-based teaching innovation stage and system organ-based medical education stage with core of post competence [1]. Many domestic universities have already integrated basic medical courses, explored

organ system-based curriculum system, and accumulated some worthy experience [2, 3, 4]. After becoming a pilot unit of the Ministry of Education and the Ministry of Health's outstanding physician education training plan and combining with own characteristics, Shihezi University, a 211 university in western China, has been carried out a bold reform on the training mode of clinical medical talents, which has revitalized the clinical medical education, laid a foundation for the training of outstanding doctors, and promoted the

development of clinical medical education.

## 2. Current Status of Clinical Medicine Teaching

### 2.1. *There Is a Shortage of Teaching Staff in Teaching Hospitals, and Medical Students have Insufficient Clinical Practice Capabilities*

The scale of medical students has increased, but the number of teaching hospitals has not increased correspondingly. Our school is located in the underdeveloped XPCC (Xinjiang Production and Construction Corps), so few high-educated medical graduates are willing to support the construction of Xinjiang. The reform of the health care system has accelerated competition among the hospitals and increased the difficulty for teaching hospitals to deal with the relationship between clinical job and students' education. It leads to low effects for student clinical training, while employment pressure and the increase of the number of postgraduate entrance exams further affect the practice and weaken the quality of practical teaching.

### 2.2. *The Setting of Clinical Medical Curriculum System Is Solidified*

At present, the traditional medical education mode centered on the discipline is still used. The teaching contradiction between basic courses and clinical courses is becoming more and more prominent because the teaching process in these two stages is disconnected each other. When medical students enter the hospital for clinical probation, they are not good at communicating with patients and identifying the disease because of the lack of clinical thinking. In addition, the setting of clinical medicine curriculum emphasizes subject education, lacks humanities and social science courses, has few optional courses, and has a small proportion of practical courses, so that the cultivation of students' self-study ability is being ignored.

### 2.3. *The Teaching Methods Are Invariable and Lack of Thinking and Humanistic Quality Education*

Traditional mode based on classroom teaching is still the main method in most colleges and universities. In recent years, relying on informatization construction, the application of rain classrooms and blended teaching, a series of changes have taken place in classroom teaching, which promote teaching reforms to a certain extent, but it is difficult to carry out the teaching reform that touches on the cultivation of deep thinking and humanistic quality, and it is difficult for medical students to achieve professional literacy in teaching. To meet the development of modern education methods and the requirements for doctors' quality, the simple teaching method of traditional classrooms can no longer adapt to the development of modern medicine.

## 3. Reform of Preclinical Medical Courses Integration Oriented by Post Competence

The post-competence-oriented curriculum is the direction of curriculum integration [5]. Firstly, the clinical problems to be solved are determined, and then the medical work abilities that graduates should have are analyzed. Finally, the curriculum setting is adjusted to cultivate these abilities.

### 3.1. *Establish a Model of Basic Medical Courses Centered on Organ Systems, and Promote Medical Student Training*

The system organ-centered education mode emphasizes the education idea based on clinical needs. Firstly, the contents of relevance course are closely linked together, and then the analysis of the intersections among disciplines can avoid the overlap and disconnection on the basis of satisfying the teaching objectives and requirements, so that students can establish an overall concept of an organ or system in a short period. The last, by taking the syllabus of licensed physician as the criterion, the courses are rearranged for training excellent physicians, so as to motivate students' intrinsic initiative and enable them to conduct early clinical practice, multi-clinical practice and repeated clinical practice.

According to the organic connection between basic medical subjects, we integrated and restructured 8 related courses to form a new basic medical system module with the organ system as the main line, namely, the integration of human anatomy, histoembryology, physiology, pathology, pathophysiology, pathogen biology, medical immunology, and Pharmacology, so totally 7 system modules and 1 special module are formed, including neuroendocrine system, blood immune system, respiratory system, circulatory system, urinary system, digestive system, infection and disease, and viral hepatitis module. In addition, the contents that are closely related to the above courses and does not belong to each organ system are organized together to form two "Introduction to Basic Medicine" modules. There are one or two PBL cases teaching in the 10 modules, and the several teaching methods are used, such as Sandwich teaching and rain classroom. From clinical grade 2014, one class was selected as the teaching reform class to implement this training program every year. Meanwhile, in the process of continuous exploration and improvement, the mature experience will be applied in the whole grade timely.

### 3.2. *Cultivation Mode Combining Curriculum Integration and Humanistic Quality Education*

In the background of university education reform in the new era, medical humanistic education is always the first priority and runs through the entire medical education. Cultivating medical humanistic quality is the basic premise for medical students to have medical ethics. Through the construction of medical humanistic materials database, medical humanistic education runs through the whole

teaching activities, involving all aspects of teaching. In the course of introduction to medicine, the ideological education is integrated. Through compiled medical humanistic stories applied in each module, students are encouraged to understand the sacred duty of practicing medicine and cultivate the students' spirit of "cherishing life and healing sincerity". At the same time, with the advantage of the comprehensive university, the students have more chance to choose elective course and expand the scope of students' knowledge.

### **3.3. Guide Dialectical Thinking and Promote Clinical Thinking Training for Medical Students**

Medical knowledge is constantly updated and endless to learn, but cultivating thinking is the soul. The curriculum integration has completed the reconstruction on the knowledge level, and achieved the transformation of the knowledge framework through the scientific and orderly reorganization of the curriculum and textbook content, while the transformation of the way of thinking is to enable students to gradually establish the ability of dialectical critical thinking, which is our fundamental goal.

According to the principle of materialistic dialectics, the essence of dialectical thinking is to grasp the object of cognition in connection and development, and to recognize matter in the unity of opposites. Only by insisting on the dialectical thinking can we achieve the leap from perceptual knowledge to rational knowledge. In the traditional teaching, the knowledge in the textbooks is often regarded as correct and invariable. When analyzing a clinical phenomenon, it is customary to solidify a certain phenomenon and analyze a certain cause, instead of explaining how to form the phenomenon in a developing dynamic. In addition, we must understand the theory in practice rather than only memorize it. Such as, by using PBL and inviting clinical doctors to guide clinical case analysis, it helps to cultivate the ability for the students to find, ask, analyze and solve the clinical problem. Therefore, medical education reform requires not only curriculum integration, but also the cultivation of dialectical thinking on the basis of the original logical thinking, which has become an important goal and leading trend of the education reform [6].

## **4. Advocate the "Three Early" Educational Thoughts and Cultivate Excellent Physicians**

The "three foundations" medical education, that is, basic theory, basic knowledge, and basic skills, has been the fine traditional education idea [7]. But now, based on that, we are advocating and gradually improving the "three early" education mode in the new period, that is, early contact with the clinic, early contact with social practice, and early contact with scientific research. In our school the leaders insist on improving the quality of undergraduate teaching as the core, stressing that all resources of the school serve the teaching,

and promoting reform through rules and regulations. In addition to being cultivated solid basic theories and skills, medical students should have medical thinking and medical ethics, humanistic spirit and humanistic quality, critical thinking ability, innovation ability and community comprehensive service ability. Relying on the construction of "excellent physician" project, "three early" educational thoughts promotes the construction of clinical medicine, the reform of talent training mode, and the reform of course teaching, which helps to cultivate the "excellent physician" with post competence so as to better meet the needs of the economic and social development for outstanding medical talents and medical service team in XPCC.

### **4.1. Early Contact with the Clinic**

Medical courses in China are based on medical disciplines. Early exposure to clinical practice helps students to understand basic disciplines from the perspective of diseases. In foreign medical schools, through curriculum integration, clinical contents are introduced in preclinical courses, which is helpful for students to learn clinical knowledge [8, 9]. Mainly method is to establish the case library. We have built four specialized case libraries, including 13 cases of pathogen biology, 9 cases of genetic diseases, 11 cases of immune-related diseases and 18 cases of pathophysiological mechanisms. It has been used in three grades. Students generally reflect that this method is beneficial to the practical application of basic medical knowledge and also realizes the importance of basic medical knowledge. In addition, after the integration of preclinical medical courses, the combination of basic and clinical teaching is adopted. In each module, clinical teachers are invited to explain a part of the content together. In order to promote effects on early contact with clinic, we change the teaching methods and introduce PBL (problem-based Learning) and CBL (Case Study Based Learning), which effectively solved the problem of the integration of the whole medical course due to the shortage of teachers and provided students with the opportunity to get in touch with the clinic at an early stage.

### **4.2. Early Contact Social Practice**

In foreign country, early experience was most commonly provided in community settings, aiming to recruit primary care practitioners for underserved populations. It increased the popularity of primary care residencies [10]. Limited by our system, we provide social practice opportunities for the students during every summer vacation, which lay the foundation for cultivating "excellent talents" with post competence [11]. During the summer vacation of the first academic year, we carried out the medical service for student participating in the work of medical guidance and nursing in the medical unit, and then submitting the practice summary and the unit certificate, which makes the students understand doctor-patient communication skills, cultivates students' professional identity, establishes professional faith, and enhances students' ability to adapt to the society. Then, in

summer vacation of the second academic year, we arranged the community practice for student to participate in community practice and submit internship thesis, which helps to cultivate students' medical humanistic quality, enhance social responsibility for medical services, and improve social service capabilities.

In order to better carry out social practice, we have carried out a comprehensive reform of experimental teaching, including applied clinical cases in experimental classes, actively carried out design experiments to guide students to discuss and think, used animation simulation experiments to learn disease from basic to clinic while testing at same time, and carried out skills competitions to improve students' practical ability.

#### **4.3. Early Contact with Scientific Research Training**

There is an increasingly growing trend towards integrating scientific research training into undergraduate medical education [12-14]. In contemporary times, it is a strategic requirement to foster undergraduates' primary scientific research ability [15]. It is beneficial for medical students to use scientific research thinking to think deeply about clinical issues after completing clinical work. From the third academic year, students need to take part in scientific research activities with their tutors. By participating in the tutor's graduate group meeting, entering the laboratory to assist graduate student work, students can be grow in thinking consciousness, understanding the scientific research process, cultivating scientific research thinking design, experimental analysis, and familiarity with basic scientific research techniques. In addition, students with scientific research potential will actively be guided to enter the postgraduate stage.

### **5. Develop a "Four-Stage" Clinical Examination System Oriented by Clinical Physician**

At present, the two parts of the examination of medical practitioners, comprehensive written test and practical skills, are completed at one time, which is not only stressful for students, but also difficult to reflect the actual level. So China began empirical study of a phased examination for the qualifications of doctors from 2015. The first phase will be test for medical students after completing clinical probation. Only those who pass the examination can take part in the second phase. The second phase of examinations is scheduled after one year of residency training or one year of trial in a medical institution after graduating from college. A phased examination is in line with the laws of medical student education and the growth of doctors, and in line with international practices. Our college has been one of the pilot universities since 2016.

For the national phased examination, "four-phase" examination is carried out to increase the comprehensive ability of students in our college. After the theoretical teaching

of basic courses is completed, a comprehensive examination of basic knowledge is set up, namely the first phase, the examination before the probation, which mainly assesses the memory of basic knowledge, understanding and simple application, so as to make basic medical education better. Through the first phase, students can enter the clinical probation. Before the internship, Clinical comprehensive examination, namely the second phase, is hold by national organization. It is carried out in the form of theoretical examinations and multi-station assessments, which assesses clinical thinking and clinical skills, so as to ensure the quality before the internship. Students who pass the comprehensive clinical examination can enter the internship process, and will be tested after the completion of every course. The intensive training examination, that is, the third phase, before the end of the internship, focuses on the cultivation of clinical thinking, involved indications, contraindications, complications and treatment. After this, graduation examination, namely the fourth phase, covers both theoretical and practical assessment. The graduation score is composed of the graduation examination score (60%) and the internship examination score (40%), which assesses the comprehensive understanding ability, comprehensive analysis ability, and the ability to deal with patients independently. Through training for 5 years, students have laid a solid foundation for participating in the national second-phase exam after one year of graduation.

## **6. Conclusion**

After five years of the medical reform, a new training mode was initially established by combining integration of preclinical medical courses centered on organ systems with humanistic quality education. Under the educational idea of inheriting the "three foundations" and advocating the "three early", students easily digest knowledge by social practice and scientific research training. While gradually changing the teacher's original thinking mode of subject teaching, this mode is benefit for students to strengthen humanities education, cultivate clinical thinking and clinical skills. At same time, depending strengthen the examination system, we can check the effect of medical education reform through the national examination of medical practitioners.

The new teaching mode, not only shows the internal relationship among the basic courses, but also through the collaborative teaching with the clinic teacher, has formed a humanities material library, the medical case library, video resource library, and teaching plan database. Through the feedback of clinical practitioners' staged examinations, the pass rate of students has significantly improved, so this mode is worth of reference for other medical colleges with similar teaching condition.

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## References

- [1] J. Y. Xiao, W Qu, J. M. Yang, H. Gao, A. M. Wang, J. Xu, Y. Z. Wang, and M. Cong, "Research and practice on basic clinical integration curriculum system for clinical medicine specialty", *Med Edu Mgt*, 2017, Vol. 3, pp. 408-412.
- [2] P. He, M. H. Yang, X. S. Lin, M. J. Luo, and D. Y. Huang, "Constructing a system-based integrated curriculum for clinical undergraduates", *China Higher Medical Education*, 2003, (03), pp. 5-7.
- [3] J. Q. Chen, Q. Xia, L. Q. Fu, S. C. Ling, R. Zhou, Y. J. Yang, Z. N. Cai, and H. F. Tang, "Integrated teaching practice of preclinical medical sciences", *China Higher Medical Education*, 2006, (11), pp. 73-75.
- [4] Z. W. Chen, Y. Guo, Y. X. Shen, X. M. Jia, X. R. Chen, L. Yu, G. L. Xu, S. Y. Wang, and Y. X. Lu, "Preliminary exploration on the construction of course integration system of basic medicine for clinical medical specialty", *Basic Medical Education*, 2015, Vol. 17, pp. 1054-1056.
- [5] J. Lu, Y. Shi, and L. Zhou. "Review on post competence model on the basis of medical education reform", *Basic Medical Education*, 2019, Vol. 21, pp. 1005-1012.
- [6] Y. Zhai and J. C. Zhai. "Application of Critical Thinking in Medical Education", *Medicine & Philosophy (A)*, 2018, Vol. 39, pp. 81-83.
- [7] Z. Q. Xu, Y. Xu, and H. Liang. "Exploration of clinical practice teaching for students in eight-year program in neurology (4+4 mode)", *Chin J Med Edu Res*, 2019, Vol. 18, pp. 1002-1005.
- [8] H. D. Liu, F. Liu, J. Ma, F. Y. Xu, and X. L. Li, "Enlightenment of training model of scientific research in foreign higher educational institutions to medical education in China: Take the experience of the Medical University of South Carolina as an example", *China Medical Education Technology*, 2019, Vol. 33, pp. 675-678.
- [9] M. C. Petrizzo, M. L. Barilla-LaBarca, Y. S. Lim, A. M. Jongco, M. Cassara, J. Anglim, and J. N. H. Stern, "Utilization of high-fidelity simulation to address challenges with the basic science immunology education of preclinical medical students", *BMC medical education*, 2019, Vol. 19, pp. 352-359.
- [10] N. Gimpel, T. Kindratt, A. Dawson, and P. Pagels, "Community action research track: Community-based participatory research and service-learning experiences for medical students", *Perspectives on Medical Education*, 2018, 7, pp. 139-143.
- [11] S. O. Li, W. H. Deng, B. Hao, G. Q. Li, Y. F. Wang, D. P. Wang, and X. Lian, "College, General Hospital, and Community Trinity Jointly Train General Medical Students", *China Health Industry*, 2019, Vol. 16, pp. 6-7.
- [12] A. Z. Ahmed, A. Khaled, "Integration of scientific research training into undergraduate medical education: a reminder call", *Medical Education Online*, 2013, 18: 22832, DOI: 10.3402/meo.v18i0.22832.
- [13] Y. R. Zhang, "Perspective of British Higher Medical Education", *Zhejiang Medical Education*, 2019, Vol. 18, pp. 5-7.
- [14] J. W. Wilson, R. D. Baer, and S. Villalona, "Patient Shadowing: A Useful Research Method, Teaching Tool, and Approach to Student Professional Development for Premedical Undergraduates", *Academic medicine*, 2019, Vol. 94, pp. 1722-1727.
- [15] S. H. Qing, H. Li, J. Q. Wen, "Construction and Practice of Basic Medical Scientific Research Training System characterized by "Base-Curriculum-Subject" Combination", *Medicine Teaching in University (Electronic Edition)*, 2017, Vol. 7, pp. 53-56.