

# Reforming Teaching Methods for Pathology Courses in Traditional Chinese Medicine

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## ABSTRACT

**Background:** "New medical science" policy of the Chinese Ministry of Education, a reform of the Traditional Chinese Medicine (TCM) teaching and training curriculum has been underway for some years. **Aim:** assess whether the final examination results, questionnaire survey of general pathology and TCM scores are related to traditional education. **Materials and Methods:** We selected the traditional teaching grades of 2016, 2017 and 2018 as our research objects and used statistical software to analyze the final examination and questionnaire results of pathology. **Results:** Compared to the mean student score in the 2016 control group, the research grades of 2017 ( $80.0 \pm 9.3$ ,  $p < 0.001$ ) and 2018 ( $81.8 \pm 11.6$ ,  $p < 0.001$ ) were significantly different. Comparing the questionnaire survey results of the research and control group, there were significant differences between the 2016 and 2017 results in terms of learning interest, teachers' mastery of TCM theory and students' comprehension ability ( $p = 0.088$ ,  $0.005$  and  $0.0003$ , respectively). There were significant differences in learning interest, teachers' mastery of TCM theory and teachers' mastery of TCM theory between the 2016 and 2018 results ( $p = 0.038$ ,  $< 0.001$  and  $0.001$ , respectively). **Conclusion:** The content of "pathology" courses in higher TCM education in China is related to Western Medical Pathology (WMP) to some extent and has a mutually beneficial effect. Second, the ideas of reforming pathology courses in higher TCM education should be explored via convergence of TCM and Western pathology theories. Third, our study provides useful lessons for building a high-level application-oriented talent training system and a first-grade pathology course for TCM majors.

**Keywords:** New medical department, Pathology course, Reform ideas, Traditional Chinese medicine, Western medical pathology.

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## INTRODUCTION

The World Health Organization defines traditional medicine as medicines that uses plant- and mineral-based drugs, psychotherapy and limb therapy to treat, diagnose and prevent diseases or maintain health. On June 18, 2018, the World Health Organization released the 11th edition of the International Classification of Diseases which contains some new chapters, one of which involves Traditional medicine. This chapter has been included for the first time, completely changing the current lack of information on traditional medicine and health statistics in the International Classification of Diseases (ICD). The background, structure, content and characteristics of the chapter on Traditional

medicine were systematically analyzed, with emphasis on its positive role in promoting the development and utilization of traditional medicine worldwide.<sup>1</sup> The three major Traditional medicine systems in the world include TCM in China, Ayurveda in India and Greek Arab Medicine.<sup>2</sup> Other large-scale traditional medicine disciplines have been developed, including Traditional Korean medicine in South Korea, Traditional Mongolian medicine and Traditional Tibetan medicine in Mongolia.<sup>3</sup> TCM is characterized by the individual regulation of multiple components and targets that transform the body from an abnormal to a normal state. Therefore, further research is required in this area. Looking ahead, it is important not only to appreciate the existing successes and potential contribution of TCM to modern medicine, but also to strive to better realize this potential. Given the widespread application of TCM for treating various diseases in China, it is not surprising that clinical data are now widely available. However, the quality of clinical research in terms of research methodology and the elimination of bias remain important areas



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of concern in TCM clinical research.<sup>4</sup> Ancient texts of the Indian Traditional medicine system mention Ayurvedic medicine which can be explored and verified in combination with modern science and technology. The efficacy of Ayurvedic drugs can be improved by assessing the identity, purity, safety, stability, physical and biological characteristics of Ayurvedic medicines. Chemical analysis, standardization and biological research are essential for the scientific assessment and maintenance of validation documents. Ayurveda is a self-sustaining system of Traditional medicine. Hence, Ayurvedic knowledge has become increasingly important in drug discovery and healthcare. With the emergence of the scientific verification of this ancient medical system, new avenues for scientific exploration are being opened. Therefore, an evidence-based comprehensive study of Ayurveda can provide millions of people with the opportunity to benefit from a better healthcare system. Traditional medicine has made significant contributions to the world.<sup>5</sup>

In October 2018, driven by the Healthy China Strategy and the Fourth Scientific and Technological Revolution, the Ministry of Education proposed to accelerate the creation of a "New Medical Science".<sup>6</sup> "New medical science" is a new concept proposed to employ the technological revolution to improve life sciences, medicine and education model development in this new era. Under the educational banner of a "new medical science," various new subjects or sub-disciplines of TCM are being developed in Chinese colleges and universities to respond to an urgent need for reform, reflecting on the shortcomings of the current TCM curriculum and putting forward new ideas for the building of first-class specialties and talent training measures.

Pathology is a fundamental medical science that studies the causes, mechanisms and developmental patterns of human diseases as well as the anatomy, physiology, metabolism, pathological outcomes and prognosis of the body during the disease process.<sup>7</sup> It plays an important role in guiding the precise diagnosis, treatment and post-treatment outcomes of diseases and is therefore known as the "gold standard" for diagnosing diseases.<sup>8</sup> The teaching philosophy followed by New Medical Science" is scientific and advanced. Construction should actively lay out, establish, build and develop various related major areas of study and cultivate outstanding medical talent at various levels and of different types.<sup>9</sup> The "Pathology" course in Chinese medical universities is based on the concepts, methods and rationale associated with pathology courses in Western medicine. Most pathology faculty working in Chinese medical universities have graduated from Western medical universities and have little or no understanding of TCM. Inspired by innovative ideas, it is even more necessary for pathology faculty members to inherit and promote TCM pathology theory to enrich the content of the "pathology" course. This not only enhances students' interest in pathology but also deepens their understanding of pathology and TCM, achieving a win-win effect.<sup>10</sup> If college faculty members do

not have the knowledge that is needed to teach a TCM course and do not know how to integrate other disciplines into the pathology curriculum, it is difficult to show students the overall advantages of TCM<sup>11</sup> and it is difficult for students to form a clinical perspective that includes TCM. It is difficult for pathology students to link the knowledge learned during clinical practice with the potential of TCM.

The implementation of a "new medical science" approach requires the joint efforts of academic management personnel, teachers and students from various TCM universities. Updating traditional teaching concepts requires enhancing the awareness and feelings of teachers, students and academic management personnel towards the new concepts and firmly establishing the new pathology concept of TCM.<sup>12</sup> Teachers and students adhere to a universal perspective for understanding and analyzing diseases, comprehensively grasp the differences in the theoretical systems of Chinese and Western medicine, cultivate their ability to apply different thinking methods to learn, explore and integrate relevant knowledge and truly learn and apply these concepts.<sup>13,14</sup> The Pathology Teaching and Research Department of the Medical College of Yanbian University has changed the traditional education methods under the guidance of the "new medical science" policy and the results of our teaching research on TCM students in the perspective of integrated traditional and western medicine are detailed below.

## **MATERIALS AND METHODS**

### **Research objectives, methods and statistical analysis**

#### *Research objectives and lecture content*

We selected 64 students of grade 2016, 64 students of grade 2017 and 103 students of grade 2018 to serve as the control group, while students with a background of general pathology plus a knowledge of TCM were selected as the research group. The topic was designed according to the key points and difficulties in the pathology syllabus. The textbook we chose was the 10<sup>th</sup> edition of Pathology, edited by Yufang Huang and Chunying Liu, published in 2016 by the China TCM Press. The knowledge tested covered the key points of each chapter and the pathology system of knowledge as a whole.

#### **Research Methods**

The test was conducted in a closed book format and lasted 120 min. The questionnaire survey was also administered and lasted for 10 min. The test results were analyzed to formulate final pathology exam student scores. The questionnaire included questions on students' learning interest, learning quality, teachers' mastery of TCM theory and students' understanding of the curriculum.

#### **Statistical methods**

The score data for the three years 2016-2018 showed a skewed distribution, so the Kruaskal Wallis test method was used.

The significance values have been adjusted by the Bonferroni correction for multiple tests. The comparison of percentages was conducted using Chi square test. Graphs and figures were created using GraphPad Prism Version 9.1.1 (GraphPad Software, LLC, San Diego, CA, USA). SPSS26.0 statistical software was used to compare pathology exam student scores via the Kruskal-Wallis test, while the Chi-square test was employed to analyze the questionnaire survey results.  $p < 0.05$  was considered to be statistically significant.

## RESULTS

### Comparison of test results between TCM control group and study group

A comparison of the results for the control and research scores is shown in Figure 1. These data show that the mean student scores in the two research groups of 2017 and 2018 were  $80.0 \pm 9.3$  ( $p < 0.001$ ) points and  $81.8 \pm 11.6$  ( $p < 0.001$ ) points, respectively. Compared to the control class of 2016, the mean student scores were  $70.3 \pm 13.9$  points and the mean student scores of the research groups of 2017 and 2018 were significantly different, being significantly higher ( $p < 0.001$ ) than that of the control class (Figure 1).

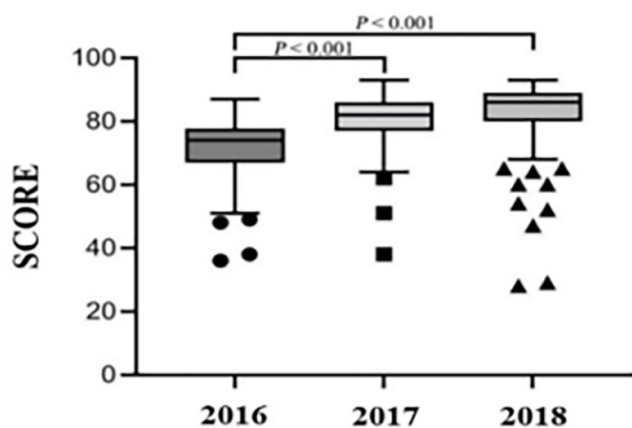


Figure 1: Comparison of final scores of 2016, 2017 and 2018.

### Comparison of the results of the questionnaire survey between the control group and the research group

The research group conducted a questionnaire-based survey to gauge various student learning parameters. The response score scales used for this survey were as follows. For the quality of learning interest, a 1-3 scoring scale was used where a score of 3=good, 2=average and 1=poor. Similar 1-3 scoring scales were employed for evaluating responses to teachers' mastery of TCM theory and students' degree of understanding of course material. There was no statistically significant difference in the learning interest student scores of grades 2016 and 2017 ( $p = 0.088$ ); however, there was a significant difference in the student scores from the survey for teachers' mastery of TCM theory and students' understanding of course material ( $p = 0.0005$  and  $0.0003$ , respectively).

In summary, the scores of the 2017 and 2018 study groups were significantly higher than those of the 2016 control group, with statistical significance (Figure 2A-C).

### Comparison of questionnaire survey results between control group and research group

For statistical analysis, the questionnaire was formatted to record one of three choices for each question on the survey, namely "good," "average" and "poor." Specifically, a 1-3 scoring scale was used where a score of 3=good, 2=average and 1=poor. A Forest map was drawn to investigate the degree of benefit to students and there were significant differences between the group with good learning interest, teachers' mastery of TCM theory and students' course understanding and the group with poor scores for all three indices (Odds Ratio [OR]=4.576; 1.855-11.286;  $p = 0.001$ ) (Figure 3).

The comparison of the results between scores 2016 and 2018 showed that there were significant differences between the group with good learning interest, teachers' mastery of TCM theory and students' course understanding and the group with poor scores

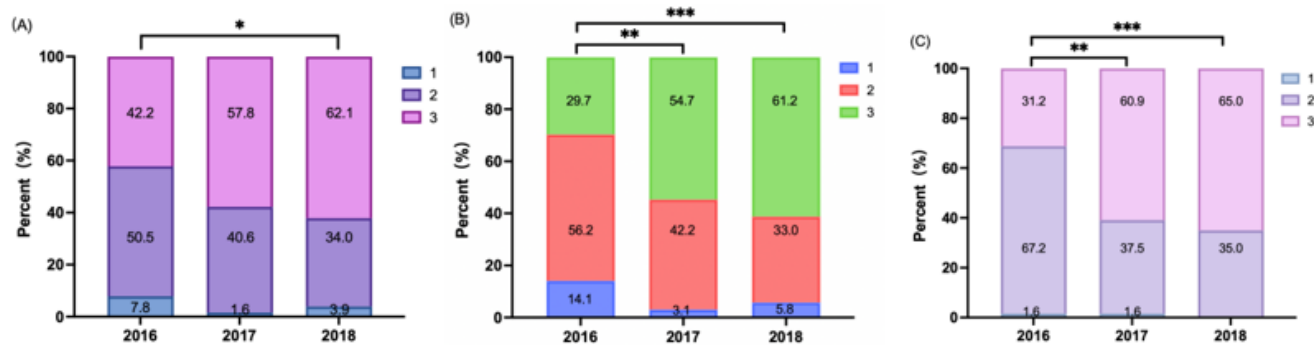
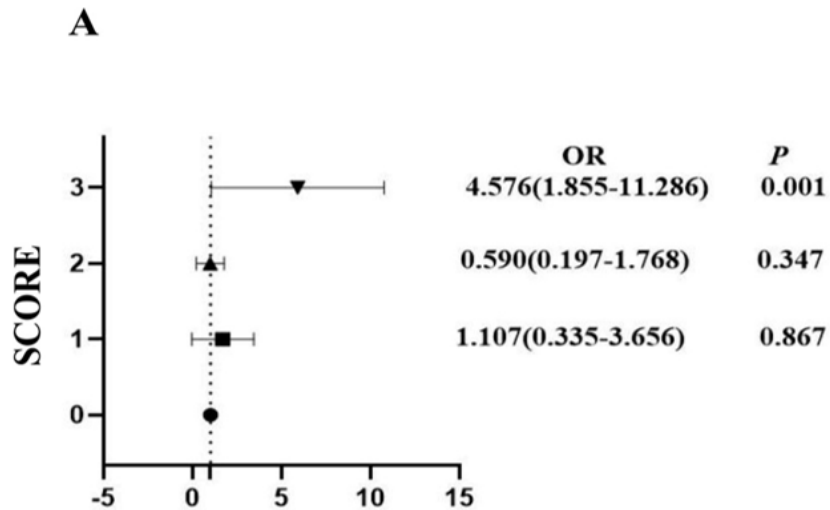
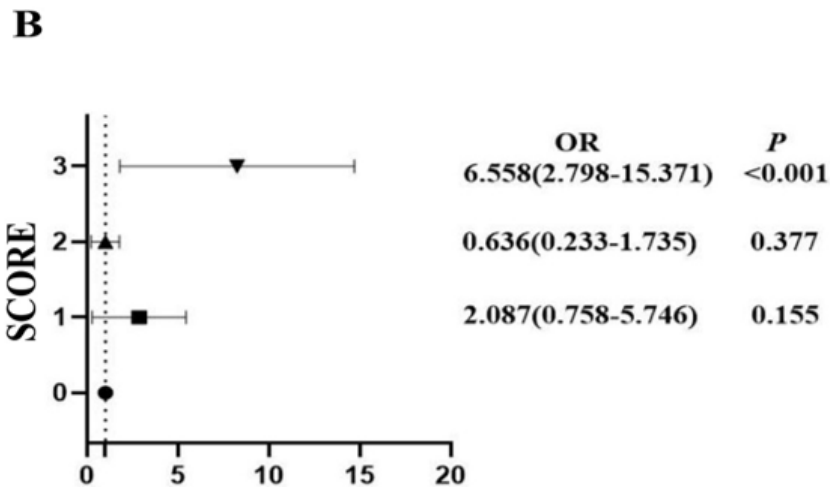


Figure 2: Learning interest, mastery and understanding of TCM theory of grade 2016, 2017 and 2018. (A): Learning interest, (B): TCM Mastery, (C): Understanding. \*:  $p < 0.05$ , \*\*:  $p < 0.01$ , \*\*\*:  $p < 0.001$ .



**Figure 3:** Comparison of scores between 2016 and 2017.



**Figure 4:** Comparison scores of 2016 and 2018.

for all three indices (OR=6.558; 2.798-15.371;  $p < 0.001$ ) (Figure 4).

## DISCUSSION

Through a 3-year investigation, the research group found that the mean student score in the TCM pathology curriculum theory examination for the years 2017 and 2018 was significantly different from the mean student scores in the control group for the year 2016 and that the scores of the research class was significantly higher than that of the control group. In the questionnaire survey, the scores of the 2017 and 2018 research groups were higher than those of the 2016 control group. The above survey results found that professional teachers integrate the holistic and dialectical thinking of TCM into teaching plans and use comparative teaching or medical plan teaching methods to improve students' grades, quality of learning interest, mastery

of TCM theory and course understanding. However, the number of students in our survey was relatively small and there is a possibility of false positives. Therefore, in this study, due to the school's enrollment policy, the annual enrollment of students majoring in Traditional Chinese Medicine was limited, making it impossible to validate our results in more samples. Therefore, it is necessary to re validate our results in other regions or schools. In future research, closely monitor student performance and teacher teaching quality.

## CONCLUSION

The "New Medical Science" policy has brought challenges and opportunities for the development of college and university level TCM courses. The Educational Administration Department has provided strong support for the construction of a first-class TCM specialty. Teachers constantly learn and improve their

knowledge base while students fully absorb their knowledge and improve their practical abilities. With the joint efforts of educational administration personnel, teachers and students of the university, the educational administration department promotes the cultivation of top-notch high-quality talents in TCM and the goal of building a first-class TCM specialty under the "new medical science" initiative has been successfully achieved. In conclusion, we should give full play to the advantage of pathology as a "bridge discipline" between the basic medical sciences and clinical medicine, build a bridge between western medicine and TCM, carry out research on the core competence of TCM professionals in pathology, develop the core competence standards and curriculum training models for Chinese medicine professionals in pathology and cultivate talented TCM professionals in an integrated traditional and WMP discipline, to promote the development of Traditional medicine and prevent and treat diseases, especially in cultivating rural doctors like Hua Tuo in remote areas; these efforts will be of great significance and will contribute to global medicine. In addition, pathology is an executive course of clinical medicine and is an important course for students of Traditional medicine in various countries. However, currently, the pathology curriculum design for traditional medicine in various countries is based on the pathology model of clinical medicine. These teaching models are not conducive to cultivating students. Therefore, this study used TCM as an example to examine teaching plans for pathology.

After three years of research, it was found that examination results and teachers' satisfaction with TCM have improved significantly and this teaching model may also be suitable for Traditional medicine students in other countries.

## ABBREVIATIONS

**TCM:** Traditional Chinese Medicine; **WMP:** Western Medical Pathology; **ICD:** International Classification of Diseases; **OR:** Odds Ratio.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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