

# The Research on the Cognitive Status of Clinical Epidemiology and the Influence Factors of the Teaching Result of the Medical Postgraduates in a College

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## Research

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# Abstract

## Background

To understand the cognitive status of clinical epidemiology of medical postgraduates, and find out the key factors influencing the clinical epidemiology teaching result through the analysis of factors that influence the teaching result, so as to provide the scientific basis for the establishment of measures to improve the teaching effect.

## Methods

Selecting all the medical postgraduate of 2015 grade in a certain university located in Zhengzhou as investigation object, adopts the unified self-administration questionnaire to survey the cognitive status of clinical epidemiological situation of the postgraduates, and adopt the method of multiple linear regression analysis to analyze the factors that affect the learning effect.

## Results

The medical postgraduates have a limited knowledge reserve of clinical epidemiology and a lack of the importance of this course, elder, female, Seven-year medical students, frequently preview before class, review after class, and often participate in class discussion have a positive effect on the learning effect.

## Conclusions

Clinical epidemiology is a discipline that requires constant learning and practice. It is necessary to set up this course for medical postgraduates. The teaching of clinical epidemiology for postgraduate students should emphasize the importance of the conversion of the way to reflect, targeted teaching depends on the characteristics of each student should be implemented in the process of the course in order to better improve the teaching effectiveness of the course.

# Background

Clinical epidemiology is a discipline that introduces the basic principles and methods of modern epidemiology, health statistics, molecular biology and other related disciplines into the field of modern medicine and study the rules of clinical disease outcomes, etiology, diagnosis, treatment, prognosis, prevention and other clinical medical events through the strict design, measurement and evaluation as well as the research that expands from the diagnosis and treatment of individuals to the whole clinical patients in order to improve the level of clinical diagnosis and treatment and scientific research (1–3). With the continuous development and improvement of modern medicine, clinical epidemiology has gradually become an indispensable methodology in the medical field, which is of great significance for improving the quality of clinical research and promoting the development of clinical medicine (4, 5). Hence, its role is far greater than the treatment of disease alone to a certain extent, because it is essential for medical workers to improve their scientific innovation ability and promote medical development (6, 7).

Currently, many medical colleges have already set up this course for master's degree students, but there is still insufficient data on how the master's degree students view the course, as well as the cognitive status of clinical epidemiology and the factors affecting the teaching effect. The purpose of this study is to understand the cognitive status of clinical epidemiology and the factors affecting the teaching effect of the postgraduate students in this school, and provide a scientific basis for further improvement of the teaching methods and teaching effect.

## **Materials And Methods**

### **Research object**

The 2015 Master of Medicine of the People's Hospital of Zhengzhou University was selected as the research object. The survey was conducted from March 2016 to May 2016.

### **Survey tools and methods**

In the reference to the relevant literature (8) and the combination of daily experience and consultation with relevant experts, the design of the "Medical epidemiological cognitive status of medical graduate students and the influencing factors of academic achievement" was divided into two parts. The first part is the basic situation of the individual, including age, gender, major, and the doctor's qualification; the second part is the understanding of clinical epidemiology and learning attitude.

### **Research content and collection methods**

All the subjects used the uniformly designed questionnaire, and the questionnaire survey was conducted by investigators that are uniformly trained and qualified before and after the lecture to learn about the general situation and the cognitive status of clinical epidemiology. After giving a unified instruction before the investigation, the subject was asked to complete the questionnaire in 30 minutes. The performance in class discussion and the final grade were finally supplemented by the instructor. Ten subjects were selected for pre-test. The reliability and validity of the survey were 0.894 and 0.853, and the Cronbach's  $\alpha$  correlation coefficient was 0.911.

### **Quality Control**

This study developed and implemented a detailed and practical implementation plan with a unified questionnaire, trained personnel to conduct questionnaires survey and data collection and processing was appointed; all results were independently reviewed by two staff members, and only after the correction check was carried out could the data be logged to the database.

# Statistical analysis

The database was built using Epidata 3.0, and was independently entered by two trained researchers. After checking, the SPSS 19.0 statistical software was used for statistical analysis. When the measurement data met the normal distribution, the mean  $\pm$  standard deviation ( $\bar{x} \pm S$ ) was used to describe its central tendency and discrete trend, single factor was analyzed by t test; count data was analyzed by statistical analysis of frequency, using  $\chi^2$  test for differential analysis, analysis of the influencing factors of the final score was through multiple linear regression analysis. The test level is set to 0.05.

## Results

### Scores of clinical epidemiological of postgraduate students with different characteristics

107 questionnaires were distributed and collected in this survey, including 107 valid questionnaires, and the effective recovery rate was 100%. The statistical analysis of the questionnaire showed that there were 46 males and 61 females, and the ratio is 0.75:1, and the average age is 24.1 (22 ~ 26) years old. Clinical professional 96.4% of them are major in clinical medicine and 3.6% in basic medicine. In terms of general information, the clinical epidemiological scores of postgraduate students of different genders, different ages, different majors and different categories were different, and the difference was statistically significant as shown in Table 1.

As for the cognitive status of clinical epidemiology, 86.9% (93) of the graduate students surveyed had heard of epidemiology before the start of the course; 54.2% (58 people) had heard about clinical epidemiology before the start of the course; 60.7% (65 people) had learned or had contacted with clinical epidemiology knowledge and trained in various ways. The clinical epidemiological scores of postgraduates who had previously studied epidemiology were better than those who had not been studied, and the difference was statistically significant ( $t = 3.603$ ,  $P < 0.001$ ) as shown in Table 1.

In terms of learning interests and attitudes, 54.2% (58 people) were interested in the course before the start of the course, and 42.1% (45 people) thought the course was important; At the end of the course, the proportion of interest in the class increased to 94.4% (101), which is considered to be a significant increase to 97.2% (104), with statistically significant differences.

### Analysis of the influencing factors of postgraduate clinical epidemiological results

Using the written test scores as the dependent variable, the factors that are significant in the single variable analysis such as age, gender, major, learned clinical epidemiology related courses before,

interested in the course, the importance of the course, pre-study, after-school review and class discussion as independent variables, in which pre-study, after-class review, class discussion are multi-category variables, and dummy variables are followed by multiple stepwise linear regression analysis. The specific analysis variables and assignments are shown in Table 2. The results of the analysis showed that gender, age, postgraduate category, interested in the course, pre-study, after-school review, and class discussion were independent factors influencing the clinical epidemiological scores of medical graduate students. The age was relatively bigger, female, 7 years program, students who regularly pre-study, after-school review, and regularly participated in class discussions scored better ( $P < 0.05$ ). According to the absolute value of the standardization coefficient, the degree of promotion of learning effect in sequence is often involved in class discussion, frequent pre-study, interested in the course, regular after-school review, older, female, 7 years system are shown in Table 3.

## Discussion

Scientific research ability is an indispensable part of measuring the comprehensive ability of clinicians. Generally, the evaluation of proficiency ought to offer understanding into actual performance as well as the capability to adapt to adjustment, unveil novel knowledge, and advance overall performance (9, 10) It is imperative to set up a basic course of clinical epidemiology for clinical students, especially in medical master's degree education so as to enhance not only the competence but also the capacity of the medical students (11–13). Clinical epidemiology is one of the new compulsory courses for medical graduate students in our hospital. The students' cognitive status is still until unclear. Therefore, this study uses questionnaires to understand the cognitive status of graduate students, and analyze the influence factors of teaching effect, in order to provide information and scientific basis for guiding the teaching of postgraduate clinical epidemiology.

Currently there are few studies on the cognitive status of clinical epidemiology among postgraduates in China (13), so the data that can be used for horizontal comparison is very limited. The results of this study showed that only 54.2% (58 people) were interested in the course before the start of the course, and 42.1% (45 people) thought the course was important; at the end of the course, the proportion of interest in the class increased to 94.4% ( $n = 101$ ), the portion who thought course was very important increased to 97.2% ( $n = 104$ ), and the difference was statistically significant, which indicates that the majority of medical graduates lack sufficient understanding of clinical epidemiology before they start the course, setting up the course is necessary to meet the needs of most students. The analysis of factors affecting the learning effect of clinical epidemiological shows that gender, age, postgraduate category, interest in the course, pre-study, after-school review, and class discussion are independent factors influencing the clinical epidemiological scores of medical graduate students. Relatively elder, female, 7-year program, regular pre-study, after-school review and frequent participation in class discussions have a positive effect on learning. This study found that female performed better in clinical epidemiological studies, which may due to the difference of the research subjects, and the requirement of circumspection and patience of study of clinical epidemiology as a scientific research method discipline, the promotion effect of pre-school preparation, after-school review, and classroom discussion is consistent with the results of

former study. In addition, this study found that the previous knowledge of clinical epidemiology had no statistically significant effect on the clinical epidemiological academic performance during the master's degree, this may be related to way of previous studies of clinical epidemiology that is mainly through conferences, lectures, self-study, and the insufficient of learning time as well as a non-systematically learning experience (14). It is also suggested that even if you have studied clinical epidemiology before, you still should pay attention to clinical epidemiology during your postgraduate studies, because as a clinical method clinical epidemiology requires continuous learning and practice for life. Clinical personnel need to constantly practice and learn the relevant knowledge and skills of clinical epidemiology in future study and work experience, instead of just to deal with exams and graduation (15, 16)

Due to the limitation of resources, this paper only took medical masters of 2015 in a medical college of Zhengzhou as the research object. There is no scientific estimation of the sample size in advance, although the selected school is titled with "211", which represents its excellence, and the recruited graduate students are involved of various provinces across the country, and also cover various medical specialty, which endowed this study certain representativeness, however also certain restrictions on the extrapolation of research results.

## **Conclusions**

Currently the postgraduates lack sufficient knowledge of clinical epidemiology and awareness of the importance of this course. It is necessary to set up such a course titled "Pay attention to clinical epidemiology", actively carry out pre-study preparations, review after class, and actively participate in class discussions affects the learning effects. The study also suggests that teaching of clinical epidemiology in postgraduates should focus on supervising the transformation of students' thinking mode, and adopting targeted teaching methods according to different types and majors of the students to improve the learning effect of the course.

## **Declarations**

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### **Availability of data and materials**

No additional data available.

### **Authors' contributions**

All the authors contributed in the preparation of this paper. ZWX was responsible for data collection, analysis and drafting of the article. AMO, XMW, QRZ, were responsible for analysis and drafting of the article. XJZ and GZL made substantial contributions to manuscript conception and design and participated in its critical review and final editing. All authors read and approved the final manuscript.

### **Ethics approval and consent to participate**

Not applicable.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare that they have no competing interests.

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## **References**

1. Fung IC. Chinese journals: a guide for epidemiologists. *Emerging Themes in Epidemiology*. 2008;5(1):20.
2. Jekel JF, Katz DL, Elmore JG, Wild D. *Epidemiology, biostatistics and preventive medicine*: Elsevier Health Sciences; 2007.
3. Bhopal RS. *Concepts of epidemiology: integrating the ideas, theories, principles, and methods of epidemiology*: Oxford University Press; 2016.
4. Banta D. The development of health technology assessment. *Health policy*. 2003;63(2):121-32.
5. Khoury MJ, Dorman JS. *The human genome epidemiology network*. Oxford University Press; 1998.
6. Brownson RC, Kreuter MW, Arrington BA, True WR. From the schools of public health. *Public health reports*. 2006;121(1):97-103.
7. Haq C, Steele DJ, Marchand L, Seibert C, Brody D. Integrating the art and science of medical practice: innovations in teaching medical communication skills. *Family Medicine-Kansas city-*. 2004;36(1; SUPP):S43-S50.
8. Stroup DF, Thacker SB. Epidemiology and education: using public health for teaching mathematics and science. *Public Health Reports*. 2007;122(3):283-91.
9. Epstein RM. Assessment in medical education. *New England journal of medicine*. 2007;356(4):387-96.

10. Fraser SW, Greenhalgh T. Coping with complexity: educating for capability. *Bmj*. 2001;323(7316):799-803.
11. Ocek Z, GURSOY ST, CICEKLIOGLU M, AKSU F, SOYER MT. Student evaluation of an integrated, spiral model of epidemiology education at the Ege University. *Education for Health*. 2008;21(2):126.
12. Jiang TT, GE BJ, Wang MX. Survey on Cognition of Echinococcosis in Nursing Students in Xinjiang [J]. *Journal of Nursing*. 2011;8.
13. Sun Y, Zhang B, Rui L, Dilidaer K, Wang H, Azierguli A-e, et al. The investigation and analysis of college students' awareness, cognition and usage of shared courses on the internet. *Chinese Journal of Medical Education Research*. 2018;17(9):952-7.
14. Zhang SY, Yang ZC, Sun P. Improving Undergraduates' Comprehensive Quality with Teacher-student Role Exchange Method [J]. *Northwest Medical Education*. 2007;6.
15. Dandavino M, Snell L, Wiseman J. Why medical students should learn how to teach. *Medical teacher*. 2007;29(6):558-65.
16. Coppus SF, Emparanza JI, Hadley J, Kulier R, Weinbrenner S, Arvanitis TN, et al. A clinically integrated curriculum in evidence-based medicine for just-in-time learning through on-the-job training: the EU-EBM project. *BMC medical education*. 2007;7(1):46.

## Tables

**Table 1 Comparison of clinical epidemiological scores of graduate students with different characteristics**

Factor	n	Score	t	P
<b>Gender</b>				
male	93	86.46±4.97	-2.048	0.043
Female	14	89.39±5.14		
<b>Age</b>				
≤24	56	88.42±4.91	-1.996	0.024
>24	51	90.36±5.14		
<b>Certification</b>				
have	8	89.33±5.01	1.013	0.314
no	99	87.42±5.14		
<b>Major</b>				
clinical	96	89.32±5.12	2.684	0.008
basis	11	85.98±4.77		
<b>Graduate category</b>				
Enrollment	78	86.41±4.94	-3.55	0.001
7-year program	29	90.26±5.11		
<b>Heard of epidemiology</b>				
Yes	93	89.32±4.95	0.954	0.342
No	14	87.96±5.14		
<b>Heard of clinical epidemiology</b>				
Yes	58	88.91±5.05	1.066	0.289
No	49	87.86±5.11		
<b>Learned epidemiology</b>				
Yes	65	89.71±5.14	3.603	0.001
No	42	86.12±4.86		
<b>The way to learn epidemiology</b>				
Undergraduate course	48	88.43±5.13	0.207	0.934

	Academic conference	13	88.77±5.02		
	Campus lecture	17	87.43±4.99		
	Self study	7	89.12±5.17		
	other	3	88.64±5.09		
Interested in the course					
	Yes	58	88.73±5.11	0.624	0.534
	No	49	88.12±4.96		
The course is important					
	Yes	55	89.42±4.88	1.188	0.237
	No	52	88.27±5.13		
Pre-view					
	often	67	91.63±5.15	8.704	0.001
	occasionally	21	88.83±4.98		
	Never	19	86.39±5.02		
After class review					
	often	74	90.12±5.02	3.544	0.032
	occasionally	24	88.53±4.89		
	Never	9	85.74±5.11		
Course discussion					
	often	60	89.11±5.07	3.728	0.027
	occasionally	33	87.74±5.01		
	Never	14	85.12±4.97		

Table 2 Analysis variables and their assignment	
Analytical variable	Assignment
Score (Y)	Take specific values
Gender (X1)	Male =0 Female =1
Age (X2)	≤24=0 >24=1
Profession (X3)	Clinical=0 Basis =1
The course is important (X4)	No=0 Yes=1
Learned epidemiology (X5)	No=0 Yes=1
Interested in the course (X6)	No=0 Yes=1
Pre-study (X7)	Never=000 Occasionally=100 Often=0,1
After class review (X8)	Never=000 Occasionally=100 Often=0,1
Course discussion (X9)	Never=000 Occasionally=100 Often=0,1
Graduate category (X10)	Enrollment=0 7-year system=1

**Table 3 Results of multivariate linear regression analysis of clinical epidemiological results affecting medical masters**

<b>factor</b>	<b><i>b</i></b>	<b><i>Sb</i></b>	<b><i>b'</i></b>	<b><i>t</i></b>	<b><i>P</i></b>
gender	1.632	0.565	0.802	2.888	0.024
age	1.266	0.239	0.812	5.297	0.001
Graduate category	-0.931	0.171	0.611	-5.444	0.001
Interested in the course	2.312	0.553	1.279	4.181	0.003
Pre-study (ref: Never)					
occasionally	1.368	0.476	0.937	2.874	0.026
often	2.176	0.521	1.465	4.177	0.006
After class review (ref: Never)					
occasionally	1.911	0.423	0.911	4.518	0.001
often	2.257	0.507	1.131	4.452	0.001
Course discussion (ref: Never)					
occasionally	1.461	0.814	0.972	1.795	0.037
often	3.649	0.973	2.351	3.750	0.012
Constant	-4.952	1.141	—	-4.340	0.006