Perceptions and vocational tendency of undergraduate clinical medical students in China to general practice: A cross-sectional study

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wen Ren
Zhejiang University

Yan Qiu
Zhejiang University

Ying Liu
Zhejiang University

Xiangming Fang
Zhejiang University

Yan Wu
Capital Medical University

qinqin Yan
Xi'an Jiaotong University School of Medicine

zhengzhi jiang
Ningxia Medical University

Jingjing ren

3204092@zju.edu.cn

Corresponding Author

Yongchen Wang
Harbin Medical University

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Abstract
Background Undergraduate education determines the overall quality of general practitioners in the future, however, there were lack of standard objectives and teaching content of general practice in the academic sessions in China. This paper explore on the perception of general practice and vocational tendency of undergraduate clinical medical students. Methods A questionnaire was sent to clinical medical students from those 5 universities at the first semester by Wenjuanxing software. 30 valid questionnaires in each grade of each university were selected. Main outcome included the general information, cognizance of general medicine and attitude to be general practitioners. Results Among the 750 medical students, 87.9% thought it was necessary to developing this course and 54.5% thought it should be a required subject in the undergraduate years. Multimode teaching (74.1%) was the favorite teaching mode. The percentage of clinical medical students willing to be general practitioners was only 34.9%, the most important reason for medical students willing or unwilling to be general practitioners was both career prospect. In those who eager to be general practitioners 63.2% were unwilling to work in the community health service center. In logistic regression analysis, the grade (Odds Ratio OR = 1.55, 95% Confidence Interval CI: 1.20-2.0), the place of birth (OR = 0.82; 95% CI: 0.72-0.94), and the universities (OR = 1.24, 95% CI: 1.10-1.41) were significantly associated with the willingness of becoming general practitioners (P<0.05). The students who thought it was worth to developing general practice course were more prefer to be general practitioner, and students from schools who had made it a compulsory course. Conclusions In order to improve the perceptibility about general practice and attract more medical students to be general practitioners, the government should establish a perfect educational system, explore new teaching patterns and offer a bright career future.

Background
General practice is a discipline that has largely evolved over the past 30 years in the field of primary healthcare. It originated in the 18th century in Europe. General practice education abroad includes undergraduate education, graduate education and continued education, the undergraduate education was the base for promoting the rapid development of general practice. In Europe and America
countries, more than 90 percent of medical schools had set up the department, teaching and research offices of general practice. At US medical schools Departments of family medicine—including departments of family and community medicine, departments of family and preventive medicine, and departments of family practice\(^1\). In developed countries such as Australia and the UK, a general practice teaching curriculum has been well supported in undergraduate training \(^2\). Curriculum not only includes lecture sessions, 8 weeks practice sessions were included in the UK\(^3\).General practice was introduced to China in the late 1980s. At that time, most general practitioners (GP) were barefoot doctors, practicing specialists, or technicians who were retrained, with more than 60% of doctors having no GP training\(^4\).But now the education and training of GPs in mainland China include undergraduate education, graduate education, postgraduate education, and continued education throughout the individual’s career\(^5\). General practice teaching has undergone several milestones in China \(^6\). In 1992, the undergraduate general practice teaching programme was initiated in the Capital Medical University in Beijing. In 1999, ‘Directives on Chinese general practice education’ was issued by the Ministry of Health.\(^4\) In 2006, the Chinese government adopted new strategies for the development of general practice teaching and community health service. In 2009, the Central committee of the State Council issued ‘The Guidelines for Furthering the Reform of Health Care System’, which emphasized improving the health care system to better serve both urban and rural residents. The proposal states that a large number of high quality GPs is necessary for the continued improvement of community health services. In July 2011\(^7\), Premier Wen Jiabao, the State Council Executive, put forward the ‘establish the GP system’ in meeting of the State Council and requested that a unified and standard training mode called ‘5 + 3’ mode for GPs should be formed with several years of efforts. The issue also put forward that up until the year 2020, there would be approximately 2-3 qualified general practitioners per million urban residents. Calculated based on two general practitioners per million residents, the number of general practitioners in China should reach 350,000. Nevertheless, there are only 170,000 GPs, among which 150,000 people were through standardized training or on-the-job training. And only 30% were registered as general practitioners. In other words,
that means nearly 70% of them don't want to register as GPs.

Over the last two decades, the number of medical schools with family medicine teaching has significantly increased. Indeed, only undergraduate teaching may provide more competent general practitioners in China, so contact the general practice at the beginning of the university period may make more medical students knowing of general practice and willing to become general practitioners.

A general description of undergraduate general practice teaching in the last two decades is lacking, a survey of 128 Chinese medical school points out that only 55 medical schools began to include general practice as part of the undergraduate curriculum until 2008. Furthermore, there were lack of standard objectives and teaching content of general practice in the academic sessions and the monitoring system on the teaching quality and feedback evaluation.

This research intends to investigate the perception of general practice and vocational tendency of undergraduate clinical medical students. Also, most importantly, we attempted to identify some factors, which may affect the vocational tendency of undergraduate clinical medical students.

Methods

Selection of participants

The study was a cross-sectional survey from September 1st to October 30th in 2017. The questionnaire was self-designed on the basis of references and opinions of GP experts. As economic development and the general practice development may have impact on educational level and the vocational tendency of clinical medical students, we choose Harbin Medical University, Capital Medical University, Ningxia Medical University, Xi'an Jiaotong University, Zhejiang University. Clinical Medical students from those 5 universities were invited to complete the questionnaire at the first semester by Wenjuanxing software. All questionnaire forms were anonymous. We chose 30 valid questionnaires in each grade of each university.

The questionnaire covered the general information, cognizance of general medicine and attitude to be general practitioners. Requested general information included the medical students’ age, gender, grade, university, source of students, the place of birth, study general practice or not? The perceptions of general medicine included ‘How much do you know about the general practice?’,
whether it was worth to developing this course?’, ‘Is general practice required or elective in your university?’, ‘Which way do you like? ’, ‘What kind of teaching methods do you like? ’ and ‘What have you gained from the course of general practice? ’. The vocational tendency included whether the students willing or unwilling to pursue their master’s degree of general practice, to attend the standardized training of general practitioners, to be general practitioners after graduation and to work in the community health center?

**Statistical analysis**

All statistical analyses were performed using SPSS 19.0 (SPSS Inc., IL, USA). Continuous variables were expressed as mean ± standard deviation. Categorical variables were expressed as absolute values and percentages. Differences in continuous variables were tested using the $F$ or $t$ test, and differences in categorical variables were assessed using the Pearson $\chi^2$ test. We ran simple logistic regression and multiple logistic regression analyses to determine the factors (ie, sex, source of students, the place of birth, university, grade and knowledge about the general practice) which may influence the vocational tendency of undergraduate clinical medical students. The minimum statistical significance level for all analyses was $P < 0.05$.

**Results**

**General characteristics of medical students**

A total of 750 clinical medical students from 5 different medical schools participated in the survey. The mean age of clinical medical students was 20.47±1.85 years, and 36.9% were male. The mean age of the male was 20.66±1.89 years old, while that of the female was 20.36±1.81 years old; there was no significant difference between the two groups ($t = 2.19 \ P > 0.05$). Among the 750 medical students, 35.7% (268/750) were out-of-province students. 33.2% (249/750) were from county-level city. Table 1 shows the general characteristic of medical students.

**The perceptions of medical students to general practice**

Perceptions of medical students to general practice were given in Table 2. In all, 34.2% of the clinical medical students have no idea of the general practice, 49.5% without ever having taken a single course in general practice of any kind. However, 87.9% thought it was necessary to
developing this course and 54.5% thought it should be a required subject in the undergraduate years. Multimode teaching (74.1%) was the favorite teaching mode. The greatest gain of learning general medicine was changing idea among those who have learned.

**Vocational tendency of clinical medical students**

The study showed that a total of 52.5% clinical medical students will consider to attending the standardized training of general practitioners (see Table 3). However, the percentage of clinical medical students willing to be general practitioners was only 34.9%, 20% did not care and 45.1% were reluctant to be General practitioners. The majority of respondents strongly agreed that their motivation for becoming a general practitioner was having room for personal development. Loving general medicine and a low-stress job were another two main reasons. Only 37.3% respondents like to pursue the general practice master degree and 21.3% would like to work in the community health center.

**Logistic Regression Model of the willingness of becoming general practitioners**

In logistic regression analysis, the grade (Odds Ratio [OR] = 1.55, 95% Confidence Interval [CI]: 1.20-2.0), the place of birth (OR = 0.82; 95% CI: 0.72-0.94), and the universities (OR = 1.24, 95% CI: 1.10-1.41) were significantly associated with the willingness of becoming general practitioners (P<0.05). The students who thought it was worth to developing general practice course were more prefer to be general practitioner, and students from schools who had made it a compulsory course. Gender and age of the clinical medical student’s, source of students, the knowledge of general practice of students and whether the students had studied with the general practice-related course were not significantly factors of the willingness of becoming general practitioners.

**Discussion**

**Establish a perfect educational system**

General practice medicine teaching in Chinese medical schools has changed very significantly in the last decade, expanding from 0 to 59 schools. Among the five universities we surveyed, General
practice medicine teaching in the Capital Medical University starts during the fifth semester, Xi’an Medical University, Ningxia medical university and Zhejiang University in the sixth semester, Harbin Medical University in the eighth semester, and these five schools had taken general practice as a necessary course. In our study, 34.2% of the clinical medical students have no idea of the general practice, 49.5% without ever having taken a single course in general practice of any kind. These may be related to the grade of the students and the school curriculum setting. Most of the students (87.9%) thought it was necessary to develop general practice course, which was consistent with one study of Shanghai Jiaotong University (70.6%)\(^\text{10}\). Chinese policy now plays an important role in developing general practice teaching in Chinese medical schools. However, it may not be enough to meet the demand for general practice in such a highly-populated country\(^\text{9}\). There was a lack of standard objectives and teaching content of general practice in the academic sessions. Most medical schools started the ‘essentials of general practice’, some have courses such as ‘health education and promotion’ and ‘community health service management’, but other important topics are not incorporated in undergraduate general practice medicine teaching. Students from schools who had made general practice a compulsory course was significantly associated with the willingness of becoming general practitioners (OR=1.67, \(P<0.01\)). Therefore undergraduate education reform of general practice is an immediate emergency in China. The Undergraduate education quality will affect the perceptibility about general practice of medical students and may influence their choice of future job.

**Explore new teaching patterns**

Conventional general practice teaching was based mainly on theory lecture, and some universities have made it an optional course. In our study, changing idea was the greatest gain of learning general practice, and multimode teaching (74.1%) was the favorite teaching mode. A case-centered\^{}problem-based and community-oriented teaching model (CPC) was established in the First Affiliated Hospital of China Medical University. The investigation showed that 83.7% of the students believed that this mode was more helpful in deepening the understanding of general practice and
community health services. The faculty at Baylor University College of Medicine also used standardized patients in teaching prevention principles during the clerkship. At the University of Colorado, a case-based approach was also used. Louisiana State University required each clerkship student to maintain logbook data about patients the student sees. Using these data and other resources, the student describes the patient population served, identifies their most common health problems, and develops an intervention plan for one of the most common health problem. General practice is a discipline with strong practicality, thus we should be active in exploring and practicing the diversity teaching models for general practice education to better the present situation and to improve the perceptibility about general practice.

Offer a bright career future

Significant progress had been made in the development of general practice in China, but the social status and salary of general practitioners were greatly inferior to that of the developed countries. Thus that’s one factor why general practitioner was unattractive to medical students in China. Our survey showed that 34.9% of medical students were willing to be general practitioners. Interestingly enough, our research found that the most important reason for medical students willing or unwilling to be general practitioners was both career prospect. Some other studies found that the willing proportion of Qiqihar University of Medicine was 64.4% and the most important reason was with more development space. 66.3% of the students of Shanghai Jiaotong University School of Medicine were willing to become general practitioners and the main reason was employment pressure (31.1%). Students who were unwilling to be general practitioners due to small room for potential development and lower social status 30.0%. In those who eager to be general practitioners 63.2% were unwilling to work in the community health service center. In March of 2010, ‘Planning for the construction of primary medical and health services team with the focus of general practitioners’ was issued and encourage to set up the department of general practice in comprehensive hospitals. Most medical students tend to work in the comprehensive hospitals. Tedious work, poor treatment and low social status prevent many undergraduate students from
choosing a career in general practice. So in order to attract more medical students, the government should expand general practitioners career path and improve position promotion measures\textsuperscript{13}.

There were several limitations of this study. Five universities may not sufficient to represent the undergraduate education of China and the perceptions of all medical students. And these five schools all had taken general practice as a necessary course, which may have some effect on the results.

**Conclusions**

China requires a continuous growth of general practice education in medical schools to provide more general practitioners serving the primary care needs of the community. Undergraduate education determines the overall quality of general practitioners in the future. In order to improve the perceptibility about general practice and attract more medical students to be general practitioners, the government should establish a perfect educational system, explore new teaching patterns and offer a bright career future.

**Abbreviations**

GP: General Practitioner; CPC: Case-centered Problem-based and Community-oriented teaching model

**Declarations**

**Ethics approval and consent to participate**

This study was approved by the Institutional Ethical Review Board of the First Affiliated Hospital College of Medicine, Zhejiang University. Informed consent was given at the beginning of the questionnaire powered by www.wjx.cn and the completion of our survey was considered implied consent to participate. All participants' information was anonymous.

**Consent for publication**

Not applicable.

**Availability of data and material**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The authors declare that they have no competing interests.
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Authors’ Contributions
RW made a substantial contribution to the conception of the study, supported reviewing of the literature, supported data collection, managed data capture, cleaning and analyses. QY & LY managed data collection, provided important intellectual content and led the drafting process. FM, WY, YQ & LZ supported reviewing of the literature and data collection, made a substantial contribution to critically informing the analyses. WC & RJ made a substantial contribution to the conception of the study, and provided important intellectual content to support the drafting process. All authors approved the final version of the manuscript to be published.

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### Tables

**Table 1 General characteristic of medical students**

| Characteristics               | N (%)          |
|------------------------------|----------------|
| Sex                          |                |
| Male                         | 277 (36.9%)    |
| Female                       | 473 (63.1%)    |
| Source of students           |                |
| Students to the province     | 482 (64.3%)    |
| Out-of-province students     | 268 (35.7%)    |
| The place of birth           |                |
| Capital city                 | 171 (22.8%)    |
| Prefecture city              | 163 (21.7%)    |
| County city                  | 249 (33.2%)    |
| Town                         | 34 (4.5%)      |
| Country                      | 133 (17.7%)    |
Table 2 Perceptions of medical students to general medicine

| Perceptions                                                                 | N (%)   |
|----------------------------------------------------------------------------|---------|
| How much do you know about general practice?                               |         |
| Much                                                                       | 435.7%  |
| Little                                                                     | 45060%  |
| None                                                                       | 25734.3%|
| Whether it was worth to developing this course?                            |         |
| Yes                                                                        | 65987.9%|
| No                                                                         | 9112.1% |
| Is general practice required or elective of your university?               |         |
| Required                                                                   | 39152.1%|
| Elective                                                                   | 35947.9%|
| Which way do you like?                                                     |         |
| Compulsory                                                                 | 409(54.5%)|
| Optional                                                                   | 234(31.2%)|
| Lecture                                                                    | 93(12.4%)|
| Others                                                                     | 14(1.9%) |
| What kind of teaching methods do you like?                                 |         |
| Role play                                                                  | 275(36.7%)|
| Case study                                                                 | 559(74.5%)|
| Community practice                                                         | 509(67.9%)|
| Multimode teaching                                                         | 556(74.1%)|
| Others                                                                     | 22(2.9%) |
| What have you gained from the course of general practice?                  |         |
| Change ideas                                                               | 17222.9%|
| Increase theory knowledge                                                  | 10914.5%|
| Improve skills                                                             | 7910.5% |
| Never learning                                                             | 37149.5%|
| Others                                                                     | 192.5%  |

Table 3 Vocational tendency of clinical medical students

| Vocational tendency                                                                 | N (%)   |
|-------------------------------------------------------------------------------------|---------|
| Whether the students willing or not to pursue their master's degree of general practice? |         |
| Yes                                                                                 | 280(37.3%)|
| No                                                                                  | 322(42.9%)|
| Do not care                                                                         | 148(19.7%)|
| Whether the students willing or not to attend the standardized training of general practitioners? |         |
| Yes                                                                                 | 394(52.5%)|
| No                                                                                  | 246(32.8%)|
| Do not care                                                                         | 110(14.7%)|
| Whether the students willing or not to work in the community health center?         |         |
| Yes                                                                                 | 160(21.3%)|
| No                                                                                  | 474(63.2%)|
| Do not care                                                                         | 116(15.5%)|
| Whether the students willing or not to be general practitioners?                    |         |
| Yes                                                                                 | 262(34.9%)|
| No                                                                                  | 338(45.1%)|
| Do not care                                                                         | 150(20.0%)|
| Willing to be because n=262                                                          |         |
| Loving general practice                                                              | 124(47.3%)|
| Have chance for development                                                          | 176(67.2%)|
| Low-stress job                                                                       | 83(31.7%)|
| Difficult to finding jobs                                                            | 65(24.8%)|
| Proper income                                                                        | 63(24.0%)|
| Can stay in the city                                                                 | 78(29.8%)|
| Others                                                                              | 21(8.0%) |
| Unwilling to be because n=338                                                        |         |
| Low social status                                                                    | 96(28.4%)|
| Disadvantage of future development                                                   | 179(53.0%)|
| Low income                                                                           | 124(36.7%)|
| Unfamiliar to primary health center                                                  | 139(41.1%)|
| Work is tedious                                                                      | 140(41.4%)|
| Others                                                                              | 58(17.2%)|
### Table 4 Logistic Regression Model of the willingness of becoming general practitioners

| Factors                        | Odds Ratio | Standard error | 95%CI      | P value |
|--------------------------------|------------|----------------|------------|---------|
| Gender                         | 1.25       | 0.18           | 0.88-1.78  | 0.220   |
| Age                            | 0.92       | 0.10           | 0.76-1.11  | 0.362   |
| Grade                          | 1.55       | 0.13           | 1.20-2.00  | 0.001   |
| Source of students             | 1.19       | 0.19           | 0.83-1.71  | 0.354   |
| The place of birth             | 0.82       | 0.07           | 0.72-0.94  | 0.004   |
| University                     | 1.24       | 0.06           | 1.10-1.41  | 0.001   |
| Study general practice or not  | 0.94       | 0.20           | 0.75-0.94  | 0.747   |
| Worth to developing GP course  | 1.91       | 0.30           | 1.06-3.42  | 0.030   |
| Required or elective course    | 1.67       | 0.19           | 1.15-2.41  | 0.007   |
| Knowledge of general practice  | 1.19       | 0.17           | 0.85-1.66  | 0.318   |

### Supplementary Files

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