Perceived incentives and willingness of university medical students toward working in rural primary healthcare

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Abstract

Background

Primary healthcare (PHC) is vital for providing more equitable, accessible and affordable healthcare to the population. However, there is a general lacking and disparity of distribution of PHC workforce, especially for rural areas in China as it is very hard to attract and retain high quality medical students to rural PHC. This study was to investigate the willingness of university medical students toward working in rural PHC and their perceived incentives and compare that between medical programmes.

Methods

An online questionnaire survey was conducted in a leading medical university of Western China in 2017. All second-year Preventive Medicine (MBP, 5 years programme) and third-year Doctorate of Medicine (MD, 8 years programme) students participated. The willingness and perceived incentives toward working in rural PHC were analysed and compared between students of the two programmes.

Results

A total of 201 students, including 115 MBP and 86 MD students, participated in the study. The overall willingness rate toward working in rural PHC was 16%. More MBP (23%) than MD students (7%) expressed willingness without mention of incentives (p<0.05). The most preferred incentives were adequate remuneration (62%), non-inferior working and living conditions to urban area (58%), limited service years (56%) and privilege to postgraduate education and promotion (55%), though 13% expressed willingness under no circumstances. More MBP than MD students preferred to postgraduate education and promotion (65% vs. 43%, p<0.05) and limited service years (63% vs. 56%, p<0.05), but similar in other incentives (p>0.05). The willingness rate increased from 2%~5%, 9%~14%, 27%~25%, to 81% with single-, two-, three-, four- incentives as mentioned above, and similar between students of the two programmes.

Conclusions

The willingness of university medical students to work in rural PHC was low. However, more MBP students show willingness than MD students. Multiple incentives including adequate remuneration, opportunities of postgraduate education and promotion, proper working and living conditions and
limited service years may be much more effective than any single incentive to attract university medical students especially MBP students to rural PHC service. Further investigation of appropriate incentives in details and interventional studies are warranted to inform relevant policy making.

Background

Primary healthcare (PHC) is fundamental for providing more accessible, equitable and affordable healthcare for protecting and improving individual and population health[1, 2]. It is evident that health systems with stronger PHC often lead to better health system performance and population health outcomes[3-6]. A strong PHC workforce is vital toward a strong PHC system. However, there is a general lacking and also disparity of distribution of PHC workforce in China as in many other countries[7-9]. PHC in rural, deprived, and remote areas are most difficult to attract and retain high quality medical students[10-13].

There are rich literatures on the willingness of medical students toward PHC or rural PHC career and associated determinants and motivations, from both developed countries and developing countries including China[9, 12, 14, 15]. Determinants were classified as demographic, personal, social, intrinsic or extrinsic, monetary or non-monetary, experience and educational factors, etc.[14, 16-18]. It reveals that while sharing some similarities, determinants may be (to some extend) different between developed and developing countries[14, 19], even across developed countries with varied socio-economic and cultural contexts[20, 21], and between different medical professionals[22-24]. Some interventions or policies have been designed and implemented based on previous research findings on the determinants, such as recruit medical student with rural background, wavier of tuition fee for students choosing a rural PHC career, curricular training in rural PHC settings, or their combination, etc. However, the effectiveness of these interventions or programmes are controversial[25-29].

A more understanding of the willingness and perceived incentives from students’ perspective may be helpful to develop more effective strategies to attract and attain high quality medical students toward rural PHC service. Moreover, as rural PHC is expected to delivery both basic public health and medical services, which demands medical students from different specialties, it would be interesting and helpful to know if there is any difference between students of different medical programmes, to
enable a targeted approach in relevant health policy design addressing their concerns, hopefully with more effectiveness. However, research from this perspective is insufficient, especially in China. This study was aimed to fill the gap by conducting a survey of willingness and students’ perceived incentives toward working in rural PHC in a leading medical university in western China and comparing that between students of different medical curriculums to inform further interventional study and relevant health policy design.

Methods
Study design and participants
A cross-sectional survey was conducted via online self-administered questionnaire in a leading medical university of western China. All second-year Bachelor of Preventive Medicine (MBP, 5 years programme) and third-year Doctorate of Medicine (MD, 8 years programme) in the university were invited to participate in the survey. MBP students were invited as they are expected to be the leaders of basic public health services, and MD students are considered as the highest quality medical students in both academic achievement and medical practices in the medical education system of China.

Measurement and questionnaire
The structured online questionnaire was designed by the research team of West China School of Public Health, collecting information anonymously about the student’s medical programme, willingness toward working in rural PHC, and on which perceived conditions they would like to work in rural PHC (multiple choices).

Data analysis
Descriptive analyses were conducted on the willingness and perceived conditions of university medical students toward working in rural PHC, and comparison were made between MBP and MD students using Chi square test. Statistical analyses were conducted using Microsoft Excel and Stata 13.0 SE. The significance level was 0.05.

Results
Willingness toward working in rural primary healthcare
The response rate was 100%. Overall, 201 medical students participated in the survey, including 115 second-year MBP and 86 third-year MD students, among which 68% were female (Table 1). Overall, there were 16% of students willing to work in rural PHC without mention of incentives. There were significantly more MBP students (23%) than MD students (7%) expressed willingness (p<0.05).

Perceived incentives toward working in rural primary healthcare

When asking in what conditions (multiple choices) they would like to work for rural PHC, most students preferred adequate remuneration (62%), non-inferior working and living conditions to urban area (58%), limited service years (56%), and privilege to postgraduate education and promotion (55%), though 13% of students preferred to work in rural PHC under no circumstances.

It is notable that significantly more MBP than MD students preferred privileges to postgraduate education and career promotion (65% vs. 43%, p=0.000) and limited service years (63% vs. 46%, p=0.016), but similar with regard to other conditions (Table 2).

Multiple incentives and increased willingness

It is impressive that the majority of students (81%) expressed willingness toward working in rural PHC with multiple incentives. With quadruple incentives of adequate remuneration, non-inferior working and living conditions to urban area, limited service years, and privilege to postgraduate education and promotion, 81% of students expressed willingness. However, the rate dropped to 21%~27%, 9%~14% and 5% or less with triple-, double- and single- incentive(s), respectively, which trend was similar between MBP and MD students (Figure 1).

Discussion

We have several findings in this study. Firstly, this study found that very few (16%) university medical students (5 or 8 years programme) were willing to work in rural PHC. The finding of low willingness of university medical students to work in rural PHC was in accordance with other studies in China [9, 30, 31]. And it seems that the willingness rate has not been improved in the last decade, if not diminished [32, 33]. Zhang and colleagues found in a survey that only 19.1% of 5-years programme medical students expressed definite willingness toward primary care career in community health centres with the majority considered it as a temporary transition or a backup option[9]. Another study found that
only 12.2% university medical students finally worked in PHC facilities, while only 0.7% preferred work in rural areas [12].

Secondly, we found more MBP students expressed willingness than MD students to work in rural PHC. Direct comparison between students of the two medical programmes have been rare, so (but) other related studies need to be considered (may help to explain) [34-37]. One the one hand, it is possible that MD students, who were elites among excellence in academic achievements among top medical university students, may have higher expectation of personal and professional development[38]. On the other hand, MBP students may be more prone to public health and value of social equality, thus would more like to do some good for rural PHC. However, more research is warranted to explore the underlying reasons and potential implementation in health policy making.

Thirdly, overall most students preferred adequate remuneration (63%), non-inferior working and living conditions to urban areas (58%), limited service years (56%) and privilege of graduated education and career promotion (55%) as incentives to work in rural PHC. The findings reflected main concerns of university medical students as regard to personal and professional development and are in accordance with previous research findings in developing countries including China [14, 37, 39-42], which were different from that of developed countries[16, 17]. Moreover, more MPB students than MD students preferred privilege of postgraduate medical education and promotion (65% vs. 43%) and limited service years (63% vs. 46%), indicating that they have great concerns of personal and professional development[37].

Finally, more than 80% of students showed willingness toward PHC services with multiple incentives, which sharply declined as incentives diminishing. This may explain the failure of some former health workforce policies which only address parts of concerns of university medical students, mainly on financial aspect or targeted rural PHC programs[43]. This indicates that multifaceted policies are warranted to attract high quality university medical students to work in rural PHC, considering remuneration, personal development, working and living conditions, and importantly, a limited service years in the policy package[17].

The study has several limitations. It was conducted in a leading medical university of western China,
though all students invited were involved, caution is need to generalise these findings to other settings. The items of questionnaire were tailored but limited, some unchangeable factors (such as rural background) potentially related to the willingness of working in rural PHC were not collected, though they were not the focus of this study. Future research may be enhanced by expanding representative samples and taking more factors of interest into account. More insights may be shed by inducing more questions and options offering more detailed information to specific multifaceted policy design at attracting university medical students to rural PHC services.

Conclusions
There are few university medical students willing to work in rural PHC in China under no additional incentives. However, more MBP students expressed willingness than MD students. Most students would work in rural PHC provided adequate remuneration, proper working and living conditions, privilege of postgraduate education and promotion and limited service years. Multifaceted policies addressing these concerns may be much more attractive than any single incentive. More research is warranted to investigate tailored multifaceted incentives in details as appropriate and access their effectiveness in attracting university medical students to rural PHC services.

Abbreviations
PHC: primary healthcare
MBP: Bachelor of Preventive Medicine
MD: Doctorate of Medicine

Declarations
Ethics approval and consent to participate: Institutional board ethics approval was exempt by the Ethics Committee of West China Fourth Hospital as this is an anonymous survey that that no survey participant can be identified directly or through identifiers linked to them. All participants were informed and consented to participate in the online questionnaire survey.

Consent for publication: not applicable.

Availability of data and material: The data of the study are available from the corresponding author on reasonable request.

Competing interests: all authors declared no competing interests.
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**Authors’ contribution:** DC conceptualised the study and collected the data. KZ conducted data analyses. DC and KZ discussed and interpreted the research findings. KZ made the first draft. DC and KZ revised the approved the final manuscript.

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Tables

Table 1 Characteristics of university medical students and willingness toward working in rural primary healthcare

|                                | Overall | MBP  | MD  |
|--------------------------------|---------|------|-----|
| Number of students             | 201     | 115  | 86  |
| Academic year                  | 2       | 3    |     |
| Programme years                | 5       | 8    |     |
| Sex                            |         |      |     |
| Male                           | 67      | 32%  | 24  | 21% | 41  | 48% |
| Female                         | 134     | 68%  | 91  | 79% | 45  | 52% |
| Willing to work in rural PHC   |         |      |     |
| Yes                            | 34      | 16%  | 28  | 24% | 6   | 7%  |
| No                             | 149     | 74%  | 72  | 63% | 77  | 90% |
| Not mind                       | 18      | 9%   | 15  | 13% | 3   | 3%  |

MBP: Bachelor of Preventive Medicine, MD: Doctorate of Medicine
Table 2 Perceived incentives of university medical students toward working in rural primary healthcare

|                                                               | Overall | MBP  | MD   |
|----------------------------------------------------------------|---------|------|------|
| Total number of students                                      | 201     | 115  | 86   |
| No. of perceived incentives, mean (SD)                        |         |      |      |
| Adequate remuneration                                         | 129     | 63%  | 75   | 65%  | 51   | 60%  |
| Non-inferior working and living condition to urban area       | 117     | 58%  | 68   | 59%  | 49   | 57%  |
| Limited service years                                         | 113     | 56%  | 73   | 63%  | 40   | 46%  |
| Privilege to postgraduate education and promotion             | 112     | 55%  | 75   | 65%  | 37   | 43%  |
| Others                                                         | 12      | 6%   | 5    | 4%   | 7    | 8%   |
| Under no circumstance                                         | 26      | 13%  | 12   | 10%  | 14   | 16%  |

PHC: primary healthcare, MBP: Bachelor of Preventive Medicine, MD: Doctorate of Medicine

Figures
Multiple incentives and willingness of university medical students toward working in rural primary healthcare MBP: Bachelor of Preventive Medicine, MD: Doctorate of Medicine, a: adequate remuneration, b: privilege to postgraduate education and promotion, c: non-inferior working and living conditions to urban areas, d: limited service years, plus: other conditions, n99: under no circumstances