Original Research Paper

Rural physician recruitment program in Thailand: factors associated with medical student enrollment and post-graduation intentions

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Abstract

Objectives: Thailand's Collaborative Project to Increase Production of Rural Doctor (CPIRD) recruits students with a rural background and provides clinical-year training in provincial teaching hospitals. We studied the main reasons for students attending this rural recruitment project and their intention to work in rural areas. **Methods:** In 2018, 2,870 4th–6th year medical students from 34 teaching hospitals under the CPIRD were sent a questionnaire surveying the following factors: their gender; year of study; size of the teaching hospital in which they were training; a domicile of origin and the province where they attended a high school; parent's occupation; family income and main reasons for choosing to attend the CPIRD rural medical schools, as well as their attitudes towards rural job placement. Factors associated with a student's intention to work in rural areas were also examined, using multiple logistic regression. **Results**: 1,349 (47%) students responded. 809 (60%) were female, 914 (68%) had adequate family income, 519 (38%) had a domicile of origin in rural areas, 247 (18%) had either a mother or father being health professionals. The top three main reasons for choosing to attend the rural medical schools were: intention to return to work in their hometown (32%); student recruitment being less competitive (18.5%); and pre-specified job placement in their home districts (15%). Medical students who had a domicile of origin in rural areas, CPIRD recruitment track, and trained in medium and small-sized teaching hospitals had higher intention to work in rural areas, with Odds ratio of 1.51 (95% confidence interval (CI) 1.06-2.15), 4.39 (95%CI 3.02-6.39), 1.54 (95% CI 1.09-2.17) and 1.74 (95% CI 1.14-2.65), respectively. 1,283 (95%) medical students had a favorable attitude towards rural placement after their graduation. **Conclusion:** Students´ rural background and training in provincial teaching hospitals may enhance their intention to start and remain working in rural healthcare services.

Keywords: rural background, rural medical school, rural health services, Thailand

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Introduction

The shortage of doctors in rural areas remains a significant problem in many countries worldwide.[1] To address this, the World Health Organization (WHO) deployed policy recommendations and guidelines on health workforce recruitment and retention in rural and remote areas.[2] It has been reported that strategies to improve recruitment, education and retention may help to address this shortage.[3-5] Recruitment of students from rural and remote areas and with ethnic minority origin has been reported to enhance their decision to work and remain in rural and remote areas in Australia, USA, China and Thailand.[6-11]

A 30-year-long special rural recruitment program in Thailand called the Collaborative Project to Increase Production of Rural Doctor (CPIRD) along with the One District One Doctor (ODOD) program has showed promising results—medical graduates from rural medical schools show high overall retention of 80%, 2.4-times higher than those who graduated from

conventional medical schools.[8-10] Different from Thailand's conventional medical training, this special recruitment program is a collaboration between the Ministry of Education and the Ministry of Public Health (MOPH) and includes 14 universities responsible for teaching pre-clinical subjects in partnership with 37 accredited MOPH hospitals nationwide, teaching 3-year long clinical subjects. CPIRD and ODOD programs recruit medical students from their rural areas of residence, mainly in mixed rural-urban provinces, with both high school and graduate entry depending on affiliated universities. The ODOD program differs from the CPIRD program as it is unique in its recruitment of medical students exclusively from remote rural areas, and full scholarship for all students in return for extended compulsory service in rural areas, with a higher penalty fine.[11]

However, it remains unclear what factors within rural medical schools, at individual and institutional levels, from pre-recruitment to post-graduation periods, impact favorable retention outcomes. This might partly be contributable to rural medical curriculum and supporting educational climates in rural medical schools.[12] However, individual-level student factors, such as preference to attend, the expectation of rural medical schools, and their associations with intention to work or remain in rural areas, have infrequently been explored.

In Australia, students for whom rural clinical schools was their first choice in enrollment were more likely to report favorable experience on clinical training and intention to practice in non-metropolitan areas.[13] In India, the main encouraging factors affecting medical students' interest to work in rural areas are: willingness to give back to disadvantaged communities; broader clinical exposure; and higher status and respect from the qualitative inquiry study.[14] The previous study in Thailand demonstrated the concept of rural recruitment, local training and hometown placement as the key recommendation for retention in Ministry of Public Health hospitals, after the 3-year compulsory public service period.[15]

Our study examines medical students´ main reasons for attending rural medical schools and explores their intention to then work in rural areas. We further investigated factors associated with intention to work in rural areas in the students of rural medical schools in Thailand.

Methods

Study design

This was a cross-sectional survey carried out by the Office of the Collaborative Project to Increase Production of Rural Doctors (CPIRD), with a primary aim to examine medical students´ main reasons for attending rural medical schools under the CPIRD network and their intention to work in rural areas. CPIRD is a government-funded initiative aimed to increase the production of doctors who are to work for Ministry of Public Health (MOPH) hospitals in rural areas. CPIRD is unique in its key features. Established in 1994, this special recruitment scheme is a collaboration between the Ministry of Education and the MOPH and includes 14 universities responsible for teaching pre-clinical subjects in partnership with 37 accredited MOPH hospitals nationwide teaching clinical subjects. It is a six-year rural medical curriculum with early exposure to healthcare services in provincial areas. Clinical teaching is operated by the medical education center (MEC) of each hospital with close collaboration and support from its affiliated university and CPIRD Office. Medical students under the CPIRD are recruited from their rural domiciles, mainly in mixed rural-urban provinces, with both high school and graduate entry, depending on affiliated universities. To further address maldistribution, regulations on rural job placement, duration of mandatory service, and non-adherence penalty obligation are applied.

Between December 2017 and August 2018, 2,870 4th to 6th year medical students from 34 rural teaching hospitals nationwide under the CPIRD network were invited to respond to an online questionnaire. The online questionnaire was sent to the students through the MEC of each teaching hospital. Medical teachers and medical education supporters helped liaise and facilitate responses from students with 2-3 repeated follow-ups for survey responses over the study period of 9 months. A total of 1,349 medical students responded to the questionnaire (a response rate of 47%). Before completing the questionnaire, the students were informed about the study objectives and procedures and reassured that survey data would be treated anonymously. The survey was carried out throughout the academic year; students responded to the questionnaire while studying in different departments and clerkships.

The questionnaire

The questionnaire had two parts: (i) the student´s characteristics including gender, year of study, the hospital in which they were trained (MEC), geographic regions, recruitment track, childhood domicile district, high school domicile district, whether their parents were health professionals and family income, and (ii) the student's reasons for choosing to attend rural medical schools and intention to work in rural areas after graduation.

The second part of the questionnaire was tested for its validity and reliability. The questionnaire showed high validity and reliability, with internal content validity (IOC) being 0.85 and Cronbach's alpha of 0.75

Data collection and analysis

The collected characteristics of students and teaching hospitals (MEC), student's reasons for attending CPIRD rural medical schools, and their intention to work in rural areas were summarized using descriptive statistics.

Intention to work in rural areas was compared across the variables—gender, years of study, recruitment scheme (CPIRD vs. ODOD), size of MEC, geographic region, childhood and high school domicile districts, whether their parents were health professionals, and family income, using chi-squared or Fisher's exact test. Factors associated with the intention to work in rural areas for a minimum of three years after graduation were examined using multiple logistic regression with odds ratio (OR) and 95% confidence interval reported. All variables potentially associated with the intention to work in rural areas were included in multiple logistic regression. A P-value of <0.05 was considered statistically significant.

Ethics approval

Ethical approval for the study was obtained from the Ethical Review Board of Chonburi Hospital (EC No 35/61)

Results

From 2,870 medical students invited from all teaching hospitals, 1,349 responded to the questionnaire (a response rate of 47%).

Table 1: Characteristics of medical students participating in the survey (n=1,349)

Characteristics	N (%)
Female sex	**809 (60)**
Year of study	
Fourth-year	**503 (37)**
Fifth-year	**476 (35)**
Sixth-year	**370 (28)**
Recruitment scheme	
CPIRD	**1129 (84)**
ODOD	**220 (16)**
Size of teaching hospitals*	
Small size	**467 (34.6)**
Medium size	**444 (33)**
Large size	**438 (32.4)**
Geographic region	
Northern	**474 (35.1)**
Southern	**315 (23.3)**
Northeastern	**374 (27.8)**
Central and Eastern	**186 (13.8)**
Rural childhood domicile district	**519 (38)**
Rural high school domicile district	**253 (19)**
Father being health professionals	**161 (12)**
Mother being health professionals	**247(18)**
Adequate family income	**1,299 (96)**

* Teaching hospitals were divided into three groups by their size: 1. Large-sized hospital teaching 120–180 medical students; 2. Medium-sized hospital teaching 90–119 medical students; and 3. Small-sized hospital teaching fewer than 90 medical students. Abbreviations: ODOD= One Doctor One District recruitment program and CPIRD= Collaborative Project to Increase Production of Rural Doctor recruitment program.

Table 1 shows characteristics of the medical students participating in this survey. Of 1,349 participants, 809 (60%) were female. There were 503 (37%) 4th-year students, 476 (35%) 5th-year students and 370 (28%) 6th-year students. A similar number of students were trained in large-, medium- and small-sized teaching hospitals. One-third of respondents were from northern Thailand, while only 14% were from central and eastern regions of Thailand. 519 (38%) medical students had childhood domicile districts in rural areas and 253 (19%) had high school domicile districts in rural areas. 247 (18%) medical students had either a mother or father working as a health professional and the large majority of medical students (96%) reported having adequate family income. Table 2 shows students´ reported reasons for attending CPIRD rural medical schools. The top three reasons for choosing to attend rural medical schools were: intention to return to work in their hometown (32%); student recruitment being less competitive than that of traditional medical schools (18.5%); and pre-specified job placement in their home districts (15%).

Table 2: Reasons for attending CPIRD rural medical schools (n=1,349)

Students´ reported reasons for attending rural medical schools	N(%)
- Intention to return to work in their hometown	430(32)
- Student recruitment being less competitive	250(18.5)
- Pre-specified job placement in their home districts	208(15.4)
- Early student selection	197(14.6)
- Others	92(6.8)
- Parents´ decision	91(6.75)
- Prefer universities in pre-clinical year	50(3.7)
- Prefer rural teaching hospitals in clinical year	31(2.3)

Table 3 describes a student's intention to work in rural areas after graduation. The majority of medical students had a favorable attitude towards rural work, as defined by intention to work in rural health services for at least three years. 492 medical students (37%) reported that they intended to work in rural areas lifelong, and two-fifths intended to work in rural areas for three years as indicated in contract agreement.

Table 4 shows factors associated with intention to work and retain in rural areas for at least three years. In multiple logistic regression, factors independently associated with intention to work in rural areas for at least three years were: year of study; recruitment scheme; size of teaching hospitals and rural childhood domicile district. Compared to 4th-year students, 5th-year medical students were 33% less likely to report having the intention to work in rural areas for at least three years (adjusted OR 0.67 (0.47-0.94), P=0.020). Students under the ODOD recruitment scheme had a more than 4-times higher odds of intention to work in rural areas than those under the CPIRD scheme (adjusted OR 4.39 (3.02-6.39), P<0.001). Students who were trained at small- and medium-sized teaching hospitals were 74% and 54% more likely to report they wanted to work in rural areas than students from large-sized teaching hospitals. Students from rural childhood domicile districts were 1.5-times more likely to want to work in rural areas than those from non-rural domicile districts (adjusted OR 1.51 (1.06-2.15), P=0.021).

Discussion

In this nationwide survey of students from 34 teaching hospitals under Thailand´s special rural recruitment program of medical training, four-fifths of responding medical students reported intention to work in rural areas for at least three years after their graduation. Factors associated with the intention to work in rural areas were: years of study, recruitment scheme, size of teaching hospitals and rural childhood domicile district.

Varying intention to work in rural areas has been reported across different countries and medical education programs. In a multinational survey of final year medical students from five low- and middle-income countries in southern and eastern Asia, intention to work in rural areas varied considerably, ranging from 57% in China to 92% in Thailand.[21] Our study showed that the majority of CPIRD/ODOD students, when they studied in clinical years, had a favorable attitude towards rural placement after their graduation. One of the main reasons for choosing to attend this special recruitment project in the first place was the student's intention to return to work in their hometown. Less than 34% of students in the rural-oriented tuition-waived medical training program in China intended to, or was not certain, if they would like to remain in the rural areas after the rural work contract expired.[21] In high-income countries, a slightly lower proportion of medical students intended to work in rural areas was reported, 33% in Australia[13] and 50% in USA.[17] This discrepancy across countries and medical training programs might be due to differences in healthcare systems and durations to work in rural areas questioned, and whether there were regulations on postgraduation job placement and duration of mandatory rural medical services.

Table 3: Intention to work in rural areas among 1,349 clinical year medical students under the CPIRD initiative

	Number (%)
Work in rural areas for: lifelong	492 (37)
Work in rural area for: three years	533 (40)
Work in rural area for: less than three years	258 (19)
Work in urban area	17 (1.3)
Others or not decided	49 (3.7)

Table 4: Factors associated with intention to work in rural areas for a minimum of three years after graduation using multiple logistic regression (n=1,300)

Factors	Adjusted odds ratio (95%CI)	P-value
Gender (male vs. female)	1.24 (0.93-1.65)	0.143
Year of study	1	
- Fourth year	0.67 (0.47-0.94)	0.020
- Fifth year	1.05(0.72-1.54)	0.776
Recruitment scheme (ODOD vs. CPIRD)	4.39 (3.02-6.39)	<0.001
Size of teaching hospitals		
- Large	1	
- Medium	1.54 (1.09-2.17)	0.014
- Small	1.74 (1.14-2.65)	0.009
Geographic region		
- Northern	1	
- Southern	1.58 (0.99-2.51)	0.051
- Northeastern	0.73 (0.47-1.13)	0.167
- Central and Eastern	1.17 (0.80-1.71)	0.402
Rural childhood domicile district	1.51 (1.06-2.15)	0.021
Rural high school domicile district	0.74 (0.50-1.09)	0.132
Father being health professional	0.87 (0.52-1.44)	0.592
Mother being health professional	0.86 (0.56-1.31)	0.482
Self-reported adequate family income	1.24 (0.60-2.53)	0.552

Students´ domicile of origin in rural areas has been associated with their intention to work or retain in rural areas. Our study strongly suggests that students with a domicile of origin in rural areas had a higher intention to work in rural areas. This is supported by a retrospective study in Thailand showing that overall and 3-year retention in rural and provincial health services was higher in those who graduated from our CPIRD program than those from traditional medical schools, whose students are mainly recruited from major urban cities.[9,10,26] Similarly, previous studies from both high-income and other low-and middle-income countries reported the beneficial effect of rural background on rural retention of medical students after graduation.[13-25] This may be explained by the fact that experience of life in a rural community can be a motivating factor for students to return to rural areas for medical practice.[16,19] Further, perceived proximity to family members and community of origin when working in a rural area may also influence this decision.[19] There is also evidence to suggest a positive interaction between rural background and rural clinical school exposure—which together enhance a student's decision to return to work in rural areas.[19,24]

Our study is among the first to demonstrate that size of teaching hospitals may be associated with intention to work in rural health services. In our study, medical students trained in medium- to small-sized teaching hospitals had higher intention to work in rural areas than those trained in large teaching hospitals. This may be due to the fact that small- and medium-sized teaching hospitals are located in small provinces with opportunities for students to engage and become more f

amiliar with rural health services. Besides, as opposed to large teaching hospitals where patients are likely referred and sophisticated cases, with teaching staff who are subspecialty physicians, small- and medium-sized teaching hospitals provide opportunities to learn from general physicians based on less sophisticated patients cases, which might possibly better prepare students to work in resource-limited rural health services.[12,27-29]

Consistent with a previous study in India,[30] our study showed that students in a more advanced year were likely to have lower intention to work in rural areas than those in earlier years. This might be explained by the idea that students in more advanced years may have learned more about any limitations of working in rural health services, as opposed to working in hospitals in big cities. Besides, students in advanced clinical years, especially in the final year, may have made decisions about their future specialist training, which in turns may impact their decision to start, or continue, working in rural areas.

Through its main strategies to recruit students with a rural background to be trained in rural teaching hospitals, CPIRD/ODOD may be one of the models of medical training that is effective in enhancing a student's decision to start and remain in rural health service. Although "intention to work" is not the same thing as actually working in rural areas, previous studies in Thailand report a higher retention in rural health services in CPIRD/ODOD students than in those graduated from traditional medical schools,[9-11, 31] suggesting that medical graduates´ intentions are translated into real-world services in rural areas.

Our study is among a few studies that examine medical students´ intention to work in rural areas, the associated factors in low–middle income countries, and included students from different clinical years. This also provides a better understanding of changes in the intention to work in rural areas, when students advance in their clinical years. However, our study has a number of limitations. First, due to the nature of the survey, we achieved a relatively low–moderate response rate, despite implementing boosting efforts. However, almost half of the total medical students nationwide responding to the questionnaire may reasonably represent the population well.

In this research, we were unable to obtain data on the reasons for students *not* participating. It may be possible that non-responders were those with different attitudes towards the CPIRD project and diverse intention to work in rural areas. Therefore, this might alter the findings on intention to work in rural areas and associated factors. Additionally, our study focused mainly on students under the special recruitment CPIRD and ODOD programs; generalizability to medical students in conventional medical schools may be limited, and the opportunity to officially compare intention to work in rural areas between the two main recruitment schemes is lacking. This warrants future studies to include both conventional and special recruitment programs with higher response rates. Also, future research on how "intention to work" is translated into real-world decision to work and remain in rural areas is needed.

Conclusions

The majority of students under the Thailand special rural recruitment program of medical training reported their intention to work in rural areas, and students recruited from remote and rural districts, with rural childhood domiciles, showed greater intention. This may suggest that the core values and goals of this special recruitment and training program have been achieved, to a certain extent. However, research on practical strategies to translate this positive intention as a student into the decision to start working and remain in rural healthcare services as a graduate may be needed.

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Declaration of Interest

The authors report no declarations of interest

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