

**ORIGINAL****Feelings toward medicine in remote areas among medical students aiming to become generalists : A comparison with other specialists**

Keisuke Kawahito<sup>1</sup>, Harutaka Yamaguchi<sup>1</sup>, Yoshinori Nakanishi<sup>2</sup>, Shingo Kawaminami<sup>1</sup>, Ryo Tabata<sup>1</sup>, Yoshihiro Okura<sup>2</sup>, and Kenji Tani<sup>1,2</sup>

<sup>1</sup>Department of General Medicine, Institute of Biomedical Sciences, Tokushima University Graduate School, Tokushima, Japan, <sup>2</sup>General Medicine and Primary Care, Tokushima University Hospital, Tokushima, Japan

**Abstract :** Geographic maldistribution of physicians is a serious problem in Japan, resulting in a few physicians in remote areas. We distributed questionnaires to 396 medical students at Tokushima University from 2013 to 2016. We examined the intensity of medical students toward medicine in remote areas by using a visual analog scale and investigated what medical specialty they chose after two years of clinical training. The intensity of interest in medicine and the intensity of willingness to contribute to it in remote areas were statistically higher among medical students who intended to choose general medicine. After graduation, only five participants chose to specialize in general medicine. Of the 14 medical students who originally chose general medicine, six chose internal medicine, three chose general medicine, and the others chose surgery, neurosurgery, anesthesiology, orthopedics, or emergency medicine. This study demonstrated that medical students who intend to choose general medicine have a higher intensity of willingness to contribute to medicine in remote areas, indicating that the support program for these students to become general practitioners after graduation increases the number of physicians in remote areas. *J. Med. Invest.* 70: 129-134, February, 2023

**Keywords :** general medicine, general practitioner, medicine in remote area, medical students

**INTRODUCTION**

In Japan, the aging society, especially the declining population in rural areas, has become a serious social problem (1). Moreover, there is a geographic maldistribution of physicians; that is, a concentration of physicians in urban areas and a shortage in remote areas (2). In remote areas, with few physicians, general practitioners who can deal with a wide range of diseases and multiple comorbidities are in demand (3).

Medical education in Japan requires two years of initial clinical training after six years of education in medical schools (4). Subsequently, they can decide on their own specialty with no restrictions by the department's decision. In Japan, a new medical specialty system was established and general practitioners were recognized as a new specialty in 2018. However, the number of doctors enrolled in general medicine training did not increase as expected, reaching 2.19% (184 out of 8410) in 2018 and 2.65% (250 out of 9448) in 2022 (5).

There have been some reports on the factors influencing medical students choosing general and family medicine (6-10). However, the relationship between these factors and the actual career choice of a specialty is unclear.

In this study, we examined the characteristics of students who were interested in medicine in remote areas based on the intention for medical specialty and investigated what kind of career paths they actually took. We also discussed the reasons why the number of general practitioners has not increased and

the countermeasures that should be taken.

**MATERIALS AND METHODS***Participants and design*

All medical students at the University of Tokushima's Faculty of Medicine participated in community-based clinical practice for a week in the fifth-grade clinical clerkship. A total of 396 university medical students, enrolled in the university for four years (from 2013 to 2016), were given a questionnaire immediately after community-based clinical practice.

We excluded students who did not complete the questionnaire, postponed graduation, and failed to pass the national examination. This study was approved by the ethics committee of Tokushima University Hospital (No.3277).

*Questionnaire*

We distributed questionnaires to medical students regarding medicine in remote areas. Table 1 shows a list of questionnaire items that consisted of questions about interest in (Q1), sense of fulfillment in (Q2), understanding of (Q3), and willingness to contribute to medicine in remote areas (Q4), in addition to questions regarding sex and hometown prefectures. In this

**Table 1.** Questions to medical students regarding medicine in remote areas

Q1) Are you interested in medicine in remote areas?
Q2) Do you feel a sense of fulfillment working in medicine in remote areas?
Q3) Do you understand medicine in remote areas?
Q4) Do you want to contribute to medicine in remote areas?

Received for publication September 27, 2022; accepted November 25, 2022.

Address correspondence and reprint requests to Kenji Tani, M.D., Department of General Medicine, Institute of Biomedical Sciences, The University of Tokushima Graduate School, 18-15 Kuramoto-cho 3, Tokushima 770-8503, Japan and Fax : +81-88-633-9687. E-mail : taniken@tokushima-u.ac.jp

study, community medicine performed in rural areas is referred to as medicine in remote areas. The intensity of each student's attitudes was estimated using a visual analog scale (VAS). The VAS is a simple method for obtaining self-ratings. We used a horizontal 100 mm VAS, with endpoints of 100 (strongest state) on the right and 0 (weakest state) on the left.

#### Intended specialties and selected participants

Fifth-grade medical students were asked to choose the medical specialty they intended to choose from the following: internal medicine, surgery, pediatrics, obstetrics and gynecology, otorhinolaryngology, neurosurgery, anesthesiology, psychiatry, orthopedics, ophthalmology, urology, radiology, dermatology, rehabilitation, emergency medicine, plastic surgery, pathology, and general medicine, or "undecided" or "other." We then investigated what specialty they actually chose from these after obtaining their medical license and completing two years of initial clinical training. For research on career paths, we used medical school alumni magazines, lists of working doctors from each hospital website, and personal contacts.

#### Statistical analysis

Differences in the measured variables were analyzed using the Kruskal-Wallis and Mann-Whitney U tests. A p-value of <0.05 was considered significant. All statistical analyses were performed using the IBM SPSS Statistics version 24 software.

## RESULTS

Of the 396 students, 340 completed the questionnaire—a response rate of 85.9%. Of these, data from 326 individuals, whose actual specialty of choice after completing two years of initial clinical training was obtained, were used in the study. The sample included 217 (66.6%) males and 109 (33.4%) females. Further, 140 (42.9%) were from Tokushima Prefecture and 186 (57.1%) were from other prefectures.

#### Relationship between intended specialties and attitudes toward medicine in remote areas

The distribution of intensity for each question is presented using a VAS in Fig. 1. As shown in Fig. 2A, a high-intensity sense of fulfillment in medicine in remote areas was seen in all intended specialties, with no difference among them. However, the intensity of interest in medicine and the intensity of willingness to contribute to it in remote areas were statistically higher in medical students who intended to choose general medicine as

a career (Figs. 2B and 2C). There was no significant difference in the intensity of understanding of medicine in remote areas among the intended specialties (Fig. 2D).

#### Relationship between hometown prefectures and attitudes toward medicine in remote areas

There was no significant difference in the intensity of sense of fulfillment, interest, and willingness to work in medicine in remote areas between students from Tokushima Prefecture and those from other prefectures (Figs. 3A, 3B, and 3C). However, the intensity of understanding of medicine in remote areas was statistically higher among students from Tokushima Prefecture than in those from other prefectures (Fig. 3D). No sex differences were found for each question.

#### Intended specialties and actual specialties chosen as a career

Table 2 shows the number of medical students, their intended specialties, and their actual choice after two years of clinical training. The most common intended specialty by the medical students was internal medicine (n=123; 37.7%), followed by surgery (n=56; 17.2%), pediatrics (n=21; 6.4%), orthopedics (n=17; 5.2%), and general medicine (n=14; 4.3%). The most common specialty actually chosen as a career was internal medicine (n=110; 33.7%), followed by surgery (n=31; 9.5%), anesthesiology (n=25; 7.7%), orthopedics (n=18; 5.5%), and psychiatry (n=18; 5.5%). In internal medicine, surgery, pediatrics, and general medicine, the number of students who actually chose it was smaller than the intended number; however, in other clinical departments, the number of students who actually selected the specialties was larger than the intended number. Only five students chose to specialize in general medicine. Next, to examine the relationship between the intended clinical department before graduation and the clinical department that was actually selected, the percentage of students choosing the same specialties as they intended was determined (Fig. 4). Only three (21.4%) of the 14 medical students who intended to pursue general medicine chose the same. Of the 14 medical students, six (42.9%) chose internal medicine, three (21.4%) chose general medicine, and the others chose surgery, neurosurgery, anesthesiology, orthopedics, and emergency medicine (7.1%). Of the five students who actually chose general medicine, two initially intended to pursue internal medicine and emergency medicine, respectively. By contrast, medical students who intended to choose neurosurgery, pathology, dermatology, plastic surgery, obstetrics and gynecology, psychiatry, and internal medicine were more likely (> 50%) to choose the same specialty as their intended specialty.

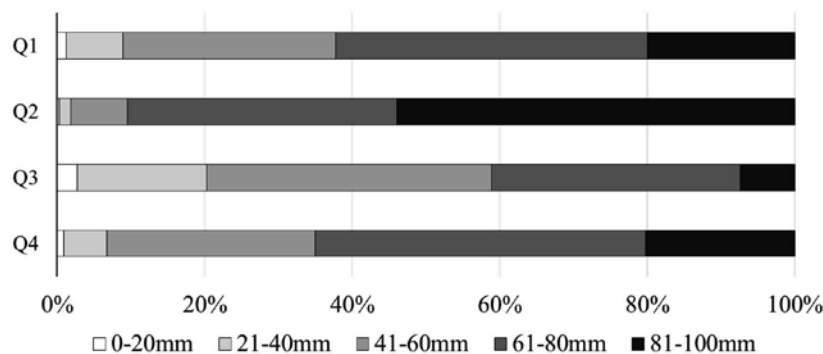


Figure 1. The distribution of intensity for each question using a visual analogue scale.

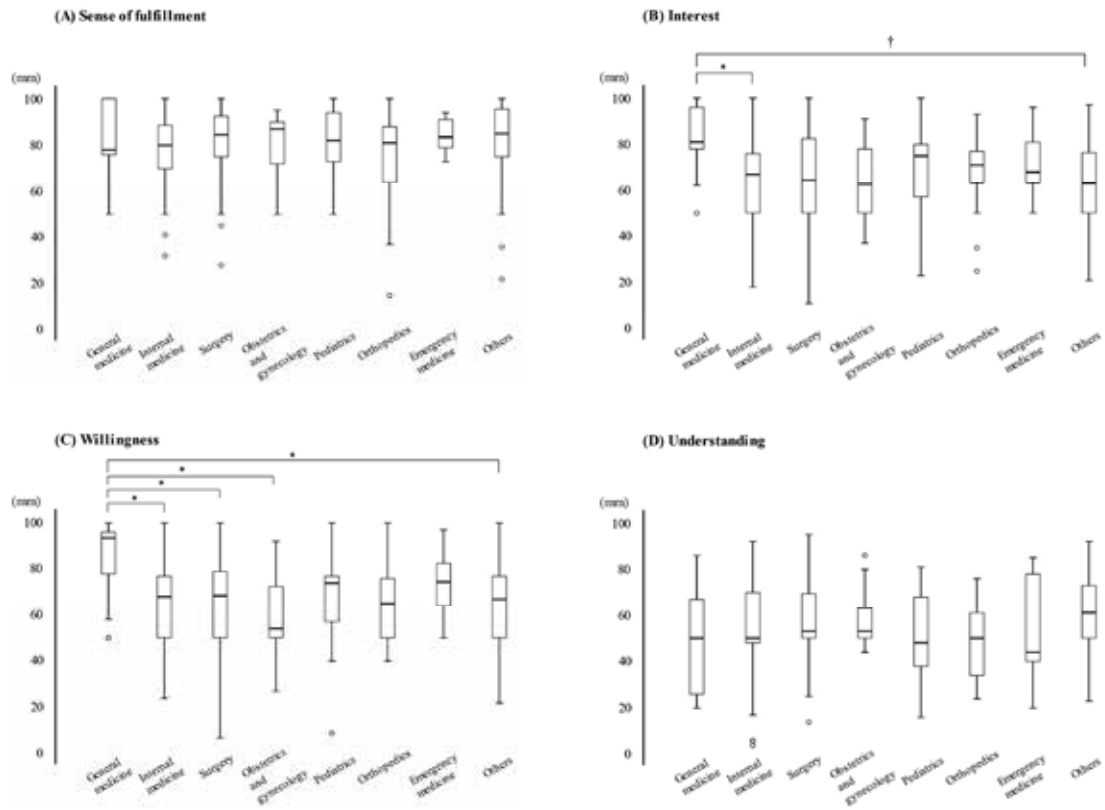


Figure 2. The intensity of sense of fulfillment in (A), interest in (B), willingness to work in (C), and understanding of (D) medicine in remote areas compared among intended medical specialties. The intensity is shown using a visual analogue scale. Data are presented as median and interquartile range. \* $p < 0.05$  † $p = 0.006$

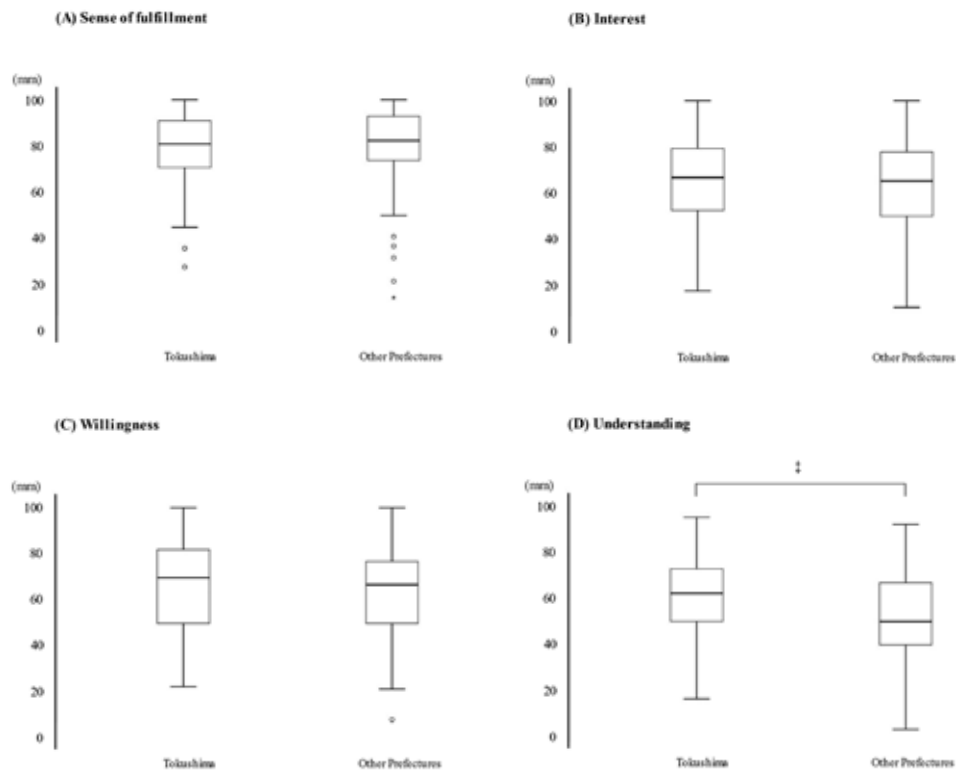


Figure 3. The intensity of sense of fulfillment in (A), interest in (B), willingness to work in (C), and understanding of (D) medicine in remote areas compared by hometown prefectures (Tokushima Prefecture and other prefectures). The intensity is shown using a visual analogue scale. Data are presented as median and interquartile range. ‡ $p = 0.002$

Table 2. The number of medical students and their intended choices, and that of their actually chosen specialties

	intended [n (%)]	actual [n (%)]
Internal medicine	123 (37.7)	110 (33.7)
Surgery	56 (17.2)	31 (9.5)
Pediatrics	21 (6.4)	15 (4.6)
Orthopedics	17 (5.2)	18 (5.5)
General medicine	14 (4.3)	5 (1.5)
Obstetrics and gynecology	12 (3.7)	13 (4.0)
Anesthesiology	11 (3.4)	25 (7.7)
Psychiatry	9 (2.8)	18 (5.5)
Emergency medicine	8 (2.5)	13 (4.0)
Neurosurgery	8 (2.5)	14 (4.3)
Urology	5 (1.5)	10 (3.1)
Plastic surgery	3 (0.9)	12 (3.7)
Pathology	3 (0.9)	5 (1.5)
Otorhinolaryngology	2 (0.6)	9 (2.8)
Radiology	2 (0.6)	11 (3.4)
Dermatology	1 (0.3)	10 (3.1)
Ophthalmology	0 (0)	6 (1.8)
Rehabilitation	0 (0)	1 (0.3)
Undecided	30 (9.2)	
Others	1 (0.3)	
Total	326 (100)	326 (100)

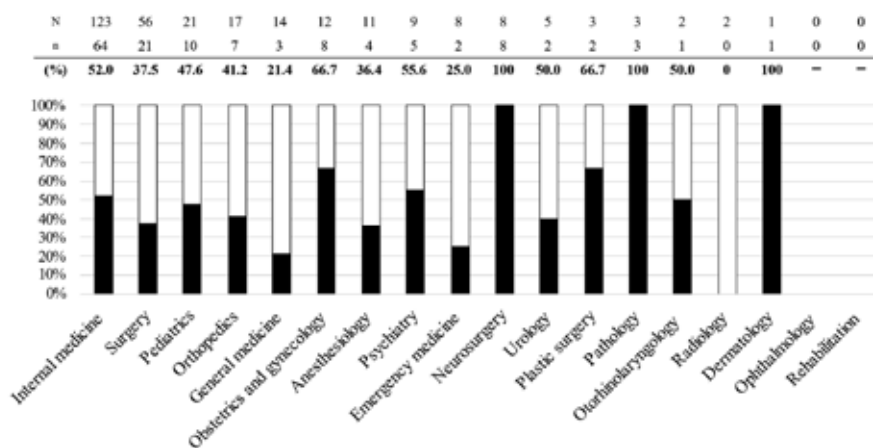


Figure 4. Percentages of choosing the same specialties as the original intention. N=number of medical students who intended to choose each specialty ; n=number of persons who chose the same specialty out of N. Black columns show the selection of the same specialty and white columns show different specialty.

DISCUSSION

In this study, we clarified that the intensity of interest in medicine and willingness to contribute to it in remote areas were significantly higher among medical students who intended to choose general medicine than those who intended to choose other specialties, suggesting that an increase in the number of general practitioners leads to an increase in the number of physicians who contribute to medical care in remote areas. Similarly,

a study reported that medical students who aspire to become general practitioners and family physicians were highly willing to work in remote areas (11). Additionally, physicians who choose highly comprehensive practices are more likely to work in remote areas (12, 13). Thus, there is high affinity between general medicine and medicine in remote areas.

The results showed that few medical students chose general practice as their future specialty. It has been reported that a considerable number of medical students aspire to practice

general medicine. In a nationwide multicenter survey in Japan, the top five preferred specialties chosen by medical students were internal medicine, general medicine, pediatrics, surgery, and emergency medicine, with trends similar to our results (6). The discrepancy in the number of medical students who aspire to become general practitioners may be due to the way the questionnaire was administered. In this study, medical students chose the most intended specialty, but multiple choices have been used in most other studies (6-8).

The findings suggest that an increase in the number of medical students who are interested in general medicine results in an increase in the number of general practitioners who have a role in supporting medicine in remote areas. Previous studies have shown that factors that positively influence medical students' intentions for general and family medicine include sex (being female) (14, 15), age (being older) (8, 14, 15), background (rural background) (14-16), admission from hometown (9), existence of a role model (17, 18), intent for rural practice (9, 16), work-life balance (9, 19, 20), interest in clinical diagnostic reasoning (7, 8), interest in community-oriented practice (7, 8), involvement in preventive medicine (7, 8), and lower interest in research (16, 21). In addition, it has been demonstrated that community-based medical education among undergraduates increases attitudes toward rural medicine in Japan (22-25). Our previous studies have shown that community-based practice is meaningful in increasing motivation, which leads to desire for working in remote area medicine, and that motivation may affect students' course after graduation (22, 23). These findings suggest that education to raise interest in medicine in remote areas is important in increasing interest in work, and in the recruitment of medical students with a high affinity for rural medicine.

In this study, there were no sex differences, however, this has been pointed out in previous studies as a factor that influences medical students' intentions to pursue general and family medicine. However, a sub-analysis by hometown prefecture revealed that students from Tokushima Prefecture had a significantly higher intensity of understanding of medicine in remote areas compared to those from other prefectures. In Japan, since 2008 many universities have established the regional quota system (*chiikiwaku*) (26). Under which, applicants to a medical school are limited to those from the specific geographical background of the prefecture where the medical school is located. Most of the quota programs offer student loan for six years of undergraduate education. In this system, if students fulfill their obligation to work in their prefecture (including its rural areas) for nine years after graduating from medical school, they are not required to repay their student loan. Every year, students from Tokushima Prefecture are admitted to the University of Tokushima under this system. Many of the students from Tokushima Prefecture in this study are students from this system, which may have influenced the intensity of understanding of medicine in remote areas.

Three of the 14 participants who originally intended to choose general medicine became general practitioners after graduation, whereas most students ultimately chose internal medicine. The factors that influenced this change in career path from general medicine to other medical specialties are unclear. A previous study investigated changes in the desired department between the time of university admission and pre-clinical training, which showed that students who changed their career path from family medicine to other specialty medicine were influenced by economics or politics, competence or skills, positive clinical exposure, and encouragement from mentors (27). Since the student attitude survey in our study was conducted after community-based clinical practice, we assume that there was some influence on the career path changes during the initial clinical training after graduation. Deutsch *et al.* demonstrated the following factors for

not choosing general practice: reluctance to establish a practice or perceived associated risks and impairments, stronger preference for another field, perception of workload being too heavy or an unfavorable work-life balance, perception of too low or inadequate earning opportunities, perception of general practitioners as distributor stations with limited diagnostic and therapeutic facilities, perception of limited specialization or options for further sub-specializations, rejection of (psycho)social aspects and demands in general practice, and perceived monotony (28). In addition, in a Japanese qualitative study on physicians who chose to be specialists despite their interest in general practice, uncertainty about the future career and criticism pointed out by specialists were cited as barriers to choosing general practice (29). Further studies are required to clarify the factors that influence changes in career paths from general medicine to other medical specialties.

To our knowledge, this is the first study to show real trends in medical students who want to become general practitioners compared to those who choose other specialties. The findings showed that the percentage of participants choosing the same medical specialty as the one they intended to choose varied. The percentage of participants choosing the same specialty in general medicine was low compared to those of other specialties. Since the number of participants who actually chose general medicine was small, the factors corresponding to them could not be determined.

The intensities of a sense of fulfillment in and understanding of medicine in remote areas were observed to some extent in medical students not only who wanted to become general practitioners but also who did to become other specialties, suggesting that all medical students are able to contribute to rural medicine regardless of the specialty selected. Therefore, to increase the number of physicians in remote areas, it is important to maintain motivation for rural medicine among all physicians after graduation.

This study has several limitations. First, this study examined the medical specialties of students just two years after graduation. To determine whether they actually contributed to medicine in remote areas, long-term follow-up research in their current workplace is required. Second, this study was conducted on a limited number of students from a local university. Finally, although the orientation toward medicine in remote areas was examined only from the perspective of specialty choice in this study, other influential factors should also be considered.

## CONCLUSION

Attempts to increase the number of medical students aiming to become general practitioners are important. However, the present study revealed that only a few students who wanted to become general practitioners actually chose to become general practitioners. Medical students who intend to choose general medicine have a higher intensity of willingness to contribute to medicine in remote areas, indicating that the support program for these students to become general practitioners after graduation increases the number of physicians in remote areas. Further research is required to determine ways to encourage medical students who wish to become general practitioners.

## CONFLICT OF INTEREST

None of the authors have any conflicts of interest to declare.

## ACKNOWLEDGEMENTS

The authors thank Ms. Yayoi Tagawa for her valuable secretarial support and Editage (www.editage.com) for English language editing.

## REFERENCES

- Ministry of Health, Labour and Welfare : References about General Welfare and Labour in 2021. Available from : <https://www.mhlw.go.jp/english/wp/wp-hw14/dl/01e.pdf> [accessed on 11 September 2022]
- World Health Organization : Increasing access to health workers in remote and rural areas through improved retention : global policy recommendations. Geneva : WHO, 2010
- Matsumoto M, Takeuchi K, Yokobayashi K, Tazuma S : Geographic maldistribution of physicians in Japan : Increasing the number of generalists is one solution. *J Gen Family Med* 16 (4) : 260-264, 2015
- Kozu T : Medical education in Japan. *Acad Med* 81(12) : 1069-75, 2006
- Japanese Medical Specialty Board : Number of residents in 2018 and 2021. Available from : [https://jmsb.or.jp/wp-content/uploads/2022/04/recruit\\_2022\\_03.pdf](https://jmsb.or.jp/wp-content/uploads/2022/04/recruit_2022_03.pdf), [https://jmsb.or.jp/wp-content/uploads/2019/09/180927\\_saiyo.pdf](https://jmsb.or.jp/wp-content/uploads/2019/09/180927_saiyo.pdf) [accessed on 11 September 2022]
- Ie K, Murata A, Tahara M, Komiyama M, Ichikawa S, Takemura YC, Onishi H : Relationship between medical students' career priority and specialty choice : A nationwide multicenter survey. *J Gen Fam Med* 21(6) : 219-225, 2020
- Ie K, Murata A, Tahara M, Komiyama M, Ichikawa S, Takemura YC, Onishi H : What determines medical students' career preference for general practice residency training? : A multicenter survey in Japan. *Asia Pac Fam Med* 17 : 2, 2018
- Bilal M, Haseeb A, Mari A, Hussham Arshad M, Ali Khan MR, Ahmed A, Jeoffrey R, Saleem Z, Irfan MA, Aamir Khan A, Husain S, Najeeb S, Fuad Garib A, Mustafa Attarwala F, Hasnain Mankani M : Factors determining Pakistani medical students' career preference for general practice residency Training. *Cureus* 10(8) : e3114, 2018
- Kawamoto R, Ninomiya D, Kasai Y, Kusunoki T, Ohtsuka N, Kumagi T, Abe M : Factors associated with the choice of general medicine as a career among Japanese medical students. *Med Educ Online* 21 : 29448, 2016
- Nishikawa K, Ohta R, Sano C : Factors Associated with Motivation for General Medicine among Rural Medical Students : A Cross-Sectional Study. *Int J Environ Res Public Health* 19(9) : 5102, 2022
- Kawamoto R, Uemoto A, Ninomiya D, Hasegawa Y, Ohtsuka N, Kusunoki T, Kumagi T, Abe M : Characteristics of Japanese medical students associated with their intention for rural practice. *Rural Remote Health* 15(2) : 3112, 2015
- Brooks RG, Walsh M, Mardon RE, Lewis M, Clawson A : The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas : a review of the literature. *Acad Med* 77(8) : 790-8, 2002
- Matsumoto M, Inoue K, Kajii E : A contract-based training system for rural physicians : follow-up of Jichi Medical University graduates (1978-2006). *J Rural Health* 24(4) : 360-8, 2008
- Gill H, McLeod S, Duerksen K, Szafran O : Factors influencing medical students' choice of family medicine : Effects of rural versus urban background. *Can Fam Phys* 58(11) : 649-657, 2012
- Kost A, Cawse-Lucas J, Evans DV, Overstreet F, Andrilla CH, Dobie S : Medical student participation in family medicine department extracurricular experiences and choosing to become a family physician. *Fam Med* 47(10) : 763-9, 2015
- Senf JH, Campos-Outcalt D, Kutob R : Factors related to the choice of family medicine : A reassessment and literature review. *J Am Board Fam Pract* 16 : 502-12, 2003
- Selva Olid A, Zurro AM, Villa JJ, Hajar AM, Tuduri XM, Puime AO, Dalmau GM, Coello PA : Medical students' perceptions and attitudes about family practice : A qualitative research synthesis. *BMC Med Educ* 12 : 81, 2012
- Jordan J, Brown JB, Russell G : Choosing family medicine : What influences medical students? *Can Fam Physician* 49 : 1131-1137, 2003
- Osborn HA, Glicksman JT, Brandt MG, Doyle PC, Fung K : Primary care specialty career choice among Canadian medical students : Understanding the factors that influence their decisions. *Can Fam Physician* 63(2) : e107-e113, 2017
- Levaillant M, Levaillant L, Lerolle N, Vallet B, Hamel-Broza JF : Factors influencing medical students' choice of specialization : A gender based systematic review. *E Clinical Medicine* 28 : 100589, 2020
- Scott I, Gowans M, Wright B, Brenneis F, Banner S, Boone J : Determinants of choosing a career in family medicine. *CMAJ* 183(1) : e1-8, 2011
- Tani K, Okura Y, Tabata R, Yuasa S, Kawaminami S, Nakanishi Y, Kawahito K, Inaba K, Inaba K, Kageji T, Tanaka H, Suzuki Y, Yamaguchi H : Characteristics of medical students who would like to be a generalist physician and contribute to remote area medicine. *J Med Invest* 64(3.4) : 210-216, 2017
- Tani K, Yamaguchi H, Tada S, Kondo S, Tabata R, Yuasa S, Kawaminami S, Nakanishi Y, Ito J, Shimizu N, Obata F, Shin T, Bando H, Kohno M : Community-based clinical education increases motivation of medical students to medicine of remote area : Comparison between lecture and practice. *J Med Invest* 61(1-2) : 156-61, 2014
- Kawamoto R, Ninomiya D, Akase T, Kikuchi A, Kumagi T : The effect of short-term exposure to rural interprofessional work on medical students. *Int J Med Educ* 11 : 136-137, 2020
- Ohta R, Ryu Y, Sano C : The contribution of citizens to community-based medical education in Japan : A systematic review. *Int J Environ Res Public Health* 18(4) : 1575, 2021
- Matsumoto M, Matsuyama Y, Kashima S, Koike S, Okazaki Y, Kotani K, Owaki T, Ishikawa S, Iguchi S, Okazaki H, Maeda T : Education policies to increase rural physicians in Japan : A nationwide cohort study. *Hum Resour Health* 19(1) : 102, 2021
- Scott I, Gowans MC, Wright B, Brenneis F : Why medical students switch careers : Changing course during the preclinical years of medical school. *Can Fam Physician* 53(1) : e.1-94, 2007
- Deutsch T, Lippmann S, Heitzer M, Frese T, Sandholzer H : Choosing to become a general practitioner—What attracts and what deters? An analysis of German medical graduates' motives. *J Family Med Prim Care* 5(1) : 34-41, 2016
- Tsuchida T, Ie K, Nishisako H, Matsuda H : Why did you choose not to be a generalist? A qualitative study about career decision-making among physicians who were interested in general practice but chose to be a specialist. *J Gen Fam Med* 42 : 134-140, 2019 (in Japanese)