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Secular Changes in Career Preferences Among Medical Students in Japan

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Abstract

Introduction: Career-related research is one of the important tasks in institutional research at medical schools. This study investigated changes in the career preferences of medical students in Japan per specialty and year to identify solutions to the maldistribution of medical specialties. Methods: The study recruited 873 medical students who were enrolled during academic years 2018–2023. The survey enabled multiple responses to their interests in 22 medical specialties. The survey covered seven periods from enrollment to graduation and investigated choice rates, changes (selection and shift), and trends in student choices. Results: Several specialties exhibited more than 5% difference in choice rate by period. Fifth-year students obtained a significantly higher change rate compared with those in other levels. Internal medicine, orthopedics, radiology, and plastic surgery displayed significantly higher rates for selection, while pediatrics produced higher rates for shift. Each student demonstrated a characteristic choice trend. Discussion: these results were consistent with previous studies on many comprehensive specialties except for surgery and also revealed that clinical clerkship is very important in their career choice. In conclusion, we found that establishing education designed based on an understanding of each student's type as well as appropriate timing of education are crucial.
Keywords: Specialty Maldistribution, Institutional Research, Career Choice

1 Introduction

Conducting surveys on students is one of the most important methods for evaluating the effectiveness of education and is highly prioritized in institutional research (IR) activities of universities to collect a wide range of information [1]. Nearly all medical schools establish their contribution to community health care through a diploma policy or graduate competency [2, 3]; therefore, many IR departments in medical schools conduct surveys on career preferences.

In addition, the career choice of graduates is one of the crucial factors of medical policy for securing health care resources [4]. While the uneven distribution (maldistribution) of the number of physicians at the regional level remains a major issue, the maldistribution of medical specialties has emerged as another issue in recent years. The Ministry of Health, Labor and Welfare (MHLW) has changed its policy of decreasing into increasing the number of physicians

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since 2008. However, the maldistribution of specialty choice has been notable [5]. According to a survey by the MHWL, the number of physicians in comprehensive medical specialties, such as surgery and pediatrics, has decreased between 2010 and 2020 [6]. The underlying reason is a change in medical specialties that young physicians intend to practice and increased differentiation into more specialized clinical areas [5, 7]. Therefore, examining the interest of medical students in terms of specialty choice from the time they are medical students and providing them with education from undergraduate are necessary to prevent spoiling their interest.

Many studies have been conducted in western countries on the career preferences of medical students [4, 8-13]. Although the backgrounds of western countries differ from those of Japan, a number of factors, such as controllable lifestyle [11], good labor conditions [12], and student experience [13], are relatively common. In Japan, many recent studies have been conducted on career preferences. For example, Fukuda and Harada [14] reported that the most common specialty was internal medicine followed by surgery, pediatrics, and emergency medicine [14]. However, compared with the report of the MHLW, the results of their article are controversial. This fact indicates that medical students target a comprehensive specialty during undergraduate education, but the actual number of career choice is decreasing. Thus, the current study infers that, at a certain point in time, the number of applicants may have declined. However, the actual process of when they change their career preferences remains unclear.

Therefore, based on a career survey conducted as part of IR activities, we examined preferences for each medical specialty according to the year level of medical students and investigated changes in these preferences over time.

2 Material and Methods

The recent context of medical education in Japan requires medical students to undertake a six-year program [2, 15]. Although differences in curricula exist among universities, medical students undertake liberal arts education in the first year, basic medicine in the second and third years, and clinical medicine in the third and fourth years. After passing common examinations, clinical clerkship is conducted in the fifth and sixth years. If they pass the national medical examination, then junior residents undergo two years of initial clinical training. In general, physicians determine their specialty at the end of this training.

The study conducted a survey on 873 medical students at Nagoya City University during academic years 2018–2023 and posed the following question: “Do you have a future specialty in mind?” This item was rated using a four-point scale (1 = yes, 2= to a certain extent yes, 3 = to a certain extent no, 4 = no). Respondents who selected “Yes” or “Yes, to a certain extent” were requested to answer a follow-up question (Which specialties are you interested in?) with 22 specialties as options (internal medicine, pediatrics, dermatology, psychiatry, surgery, orthopedics, obstetrics & gynecology, ophthalmology, otolaryngology, urology, neurosurgery, radiology, anesthesiology, pathology, clinical laboratory, emergency medicine, plastic surgery, rehabilitation medicine, general medicine, basic medicine, social medicine, among others). Multiple answers were allowed. The survey was administered at seven time points: at enrollment (period 1), at the

start of the second to sixth year levels (periods 2–6), and at graduation (period 7). Data was organized according to student ID number to determine whether changes occurred in specialty choices per period, and a χ-square test with Bonferroni's correction was conducted. The number of changes of choice in consecutive period was counted; "selection" pertains to the specialty choice of medical students, while "shift" refers a change in specialty choice at any of the periods. Furthermore, we used Fisher's exact test to examine trends for selection and shift per specialty. Finally, we counted the number of students with complete data from the beginning of clinical lectures (period 4) to graduation (period 7) and classified their patterns of specialty choices into four categories:

- Narrow down: a shift occurred as the period progressed (i.e., their choices narrowed down when they undertook clinical clerkship).
- Hesitation: repeated cycles of selection and shift regardless of period (i.e., they became interested in another specialty during clinical clerkship or become unsure of which specialty is suitable for them).
- Fixed: one specialty choice was made across periods; and
- No answer: the students never decided or did not want to disclose (**Figure 1**).

Google Forms was used for the questionnaire, and R ver. 4.3.1 for Windows was used for statistical testing. Significance was set to $p < 0.05$. The Nagoya City University Ethics Committee (date: 14/11/2023, reference number: 60-23-0095) granted ethical approval. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Type1：Narrow down

Period	Specialty preference
4	None
5	None
6	A, B, C, D
7	A, B

Type3：Fixed

Period	Specialty preference
4	A
5	A
6	A
7	A

Type2：Hesitation

Period	Specialty preference
4	A, B
5	C, D
6	A, C, D
7	A, B, C, D

Type4：No answer

Period	Specialty preference
4	None
5	None
6	None
7	None

Figure 1: Patterns of changes in specialty choices

3 Results

The study obtained 2,286 cases (number of questionnaires answered per period) (period 1: 453, period 2: 1, 243, period 3: 321, period 4: 306, period 5: 361, period 6: 138, period 7: 464). **Table 1** presents the choice rate of specialty by period. The specialties with a difference of more than 5% between the maximum and minimum choice rates by period (senior–junior) were internal medicine (period 1 versus 7: 16.9%), pediatrics (period 1 versus 6: −5.1%), surgery (period 5 versus 6: 11.6%), obstetrics & gynecology (period 2 versus 4: −5.3%), radiology (period 4 versus 6: 11.3%), emergency medicine (period 1 versus 6: −8.6%), and general medicine (period 2 versus 6: −8.2%).

Table 1: Choice of specialty by period (in percent)

	Period						
Specialty	1	2	3	4	5	6	7
Internal medicine	13.5	13.6	14.3	15.0	15.8	30.4	34.9
Pediatrics	15.2	15.6	12.5	11.8	10.8	10.1	11.2
Dermatology	3.5	4.1	3.4	5.2	4.4	2.9	2.6
Psychiatry	2.4	3.3	4.4	2.9	4.4	4.3	5.2
Surgery	12.1	11.1	8.1	8.8	5.8	17.4	10.6
Orthopedics	7.3	9.9	6.5	5.6	8.9	10.1	7.5
Obstetrics and gynecology	7.9	9.9	6.2	4.6	6.1	8.7	6.5
Ophthalmology	2.2	3.3	4.7	3.3	3.9	4.3	3.2
Otolaryngology	2.0	4.1	2.8	2.6	2.8	2.9	3.0
Urology	0.2	0.0	0.6	1.6	1.7	0.7	2.6
Neurosurgery	6.4	4.5	3.4	2.6	1.9	2.9	1.9
Radiology	1.5	2.9	1.2	1.0	5.8	12.3	7.5
Anesthesiology	2.2	4.1	3.7	3.6	4.7	6.5	4.7
Pathology	2.2	0.8	1.9	2.6	1.9	0.7	0.4
Clinical laboratory	0.0	0.0	0.6	0.0	0.3	0.0	0.9
Emergency medicine	11.5	7.4	5.3	4.9	6.1	2.9	3.2
Plastic Surgery	1.1	2.9	1.6	2.0	2.5	3.6	2.8
Rehabilitation	0.9	0.8	0.6	0.3	1.9	1.4	1.5
General medicine	7.3	11.1	5.3	2.9	6.1	3.6	3.4
Basic medicine	2.2	0.4	2.2	2.6	1.4	2.2	0.9
Social medicine	1.8	1.2	0.9	1.3	3.3	0.7	1.3
Others	2.6	1.6	2.8	2.0	1.7	0.7	2.2

Next, to elucidate the number of periods with changes in career preference, we selected 964 cases (out of the 2,286 cases) with consecutive periods and examined the numbers of selection and shift across 21,208 data points for all specialties. We found changes in specialty choice in 1,053 data points (564 selection and 489 shift). We also performed χ-square test with Bonferroni's correction on the rate of change per period. The result revealed that the rate of change was significantly greater for periods 5→6 (i.e., fifth year) compared with other periods (**Table 2**). Examining the difference between selection and shift, the rates for selection were higher for periods 4→5 and 5→6 (59 and 43, respectively), while the rates for shift were higher for periods 2→3 and 3→4 (−20 and −24, respectively).

Table 2: Changes, selection, and shift for specialties at each consecutive period

Consecutive Period	Change	No Change	Total	% (Change /Total)	Selection	Shift	Difference (Selection − Shift)
1→2	234	4408	4642	5.0	121	113	8
2→3	112	2418	2530	4.4	46	66	-20
3→4	180	4066	4246	4.2	78	102	-24
4→5	227	4327	4554	5.0	143	84	59
5→6	193	2601	2794	6.9	118	75	43
6→7	107	2335	2442	4.4	58	49	9
Total	1053	20155	21208	5.0	564	489	75

Moreover, to elucidate whether changes in specialty choice since medical school triggered the maldistribution, we analyzed the magnitude of the differences in selection and shift per specialty. We found positive significant differences for internal medicine (OR: 1.57, $p = 0.011$), orthopedics (OR: 2.05, $p = 0.01$), radiology (OR: 2.25, $p = 0.015$), and plastic surgery (OR: 4.30, $p = 0.007$) but a negative significant difference for pediatrics (OR: 0.62, $p = 0.045$; **Table 3**).

Table 3: Numbers of selection and shift per specialty, * $p < 0.05$, **p < 0.01

Specialty	Selection	Shift	Difference	Significance
Internal medicine	91	60	31	*
Pediatrics	33	52	-19	*
Dermatology	25	19	6	
Psychiatry	22	18	4	
Surgery	55	44	11	
Orthopedics	42	21	21	*
Obstetrics and gynecology	30	25	5	
Ophthalmology	19	26	-7	
Otolaryngology	16	20	-4	
Urology	9	7	2	
Neurosurgery	17	19	-2	
Radiology	31	14	17	*
Anesthesiology	36	25	11	
Pathology	9	11	-2	
Clinical laboratory	1	2	-1	
Emergency medicine	23	33	-10	
Plastic Surgery	17	4	13	**
Rehabilitation	9	7	2	
General medicine	40	36	4	
Basic medicine	12	14	-2	
Social medicine	12	16	-4	
Others	15	16	-1	

Finally, we identified patterns of changes in specialty choice after they begin studying clinical medicine on 50 medical students with complete data from periods 4 to 7. The results demonstrated that 29, 16, 3, and 2 students have narrowed down, hesitated, fixed, and provided no answers in terms of specialty choices, respectively.

4 Discussion

This study intended to determine the specialty choice of medical students in Japan according to year level. Previous studies mainly address the research question of whether each specialty with a sense of crisis is interested in its own specialty and what tendencies those who chose it have; moreover, the majority of studies were specific to certain departments [7, 9, 12-14]. The current study aims to address this concern to determine stages in medical education that require career-related support.

Specialties that exhibited a decrease of more than 5% in choice rate from junior (periods 1 and 2) to senior (periods 6 and 7) year levels were pediatrics, emergency medicine, and general medicine, which is consistent with the results of previous studies that identified a decrease in interest in comprehensive medicine [5-7, 14, 16]. Conversely, the specialties that presented an increase of more than 5% in selection rate were internal medicine, surgery, and radiology, which may be due to specific circumstances. For example, many students select internal medicine from no choice (data not shown), and the study infers that they are considering deeper subspecialties from internal medicine in terms of career choice. Meanwhile, previous studies point out that surgery is a specialty that has been declining [6, 17], which differs from the current results. A detailed examination of the results by period indicates that the choice rate was high in the junior grades but decreased in the middle grades (periods 3–5) followed by a V-shaped recovery in the senior grades. The same trend was observed for obstetrics and gynecology, which showed a decrease of more than 5% (**Table 1**). These results indicate that although interest was high at the time of enrollment, it declined during the inactive lecture. However, the choice rate increased after the students undertook surgical training during clinical clerkship. Furthermore, the decrease in the number of junior residents who opt to pursue advanced training may be due to the fact that, while students can comply with clinical clerkship to a certain extent, they continue to face the harsh working environment of surgeons during initial training. In addition, knowledge in radiology is required to read images in most specialties; thus, the students may have realized this need during clinical clerkship, which influenced their choice.

We then examined at which point and the degree to which the specialty choice of the same students changed within consecutive periods. We found that shift significantly increased from the lower to middle grades, while selection significantly increased from the middle to upper grades. These results imply that clinical clerkship is crucial as a trigger of specialty choices, and the period from the lower to middle grades is mainly devoted to basic medical education and less to clinical education, which resulted in a decrease of interest in clinical clerkship. Thus, vertical integration and educational initiatives may be necessary to prevent a decline in clinical interest [18, 19].

Furthermore, we conducted statistical analysis to determine whether changes in specialty choice among the same medical students triggered the maldistribution of medical specialties. The results indicated that internal medicine and radiology displayed trends like those in **Table 1**. The trend for plastic surgery was also identical to that for surgery but may reflect the current situation [20].

Finally, when choice tendencies were categorized according to pattern and counted, the study found that clinical clerkship is clearly the source of many decisions and hesitations in specialty choice to a certain extent, many of whom go on to shape their careers. This result points to the need for ongoing career education designed based on an understanding of each student's type as well as appropriate timing of education [21].

This study has several limitations. First, data were derived from a single university, and specific circumstances such as popularity of faculty and facilities are inherent and lack generality. Second, the actual choice for specialty training is unknown. Tracking post-graduation careers is difficult to obtain at the university levels, because doing so requires cooperation with alumni associations.

Therefore, establishing a nationwide, seamless data collection system is desirable. In addition, student cooperation is essential for obtaining data across six consecutive years. Thus, data from the survey is incomplete due to the lack of a high response rate. For this reason, additional surveys are required. Third, although the definition of categorization is based on changes in specialty choice, it is not inferential, statistical, but arbitrary. The present study is also an interim report; thus, we intend to incorporate more advanced longitudinal statistical models that consider gender differences and student backgrounds in the future.

5 Conclusions

The specialty choice of medical students varies by academic year and may contribute to correcting the maldistribution in specialty choice through the formulation of individualized educational programs tailored to the characteristics of each student and the timing of education. To maintain and develop medical standards in Japan, collecting IR data for the improvement of medical education is desirable.

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