The Shift of Residents From University to Non-University Hospitals in Japan: A Survey Study

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BACKGROUND: Between 2003 and 2004, when the new postgraduate medical education program was introduced in Japan, the number of university residents decreased from 5,923 to 3,264 (−31%), whereas the number of non-university residents increased from 2,243 to 4,110 (+45%).

OBJECTIVE: To identify potential reasons for the shift of residents from university to non-university hospitals.

DESIGN: Cross-sectional mailed survey.

PARTICIPANTS: The subjects were 1,794 2nd-year residents at 91 university hospitals and 2,010 2nd-year residents at 659 non-university hospitals.

MEASUREMENTS: Data on hospital demographics, resident demographics, and resident satisfaction with training were collected in 2006 and were compared between university and non-university hospitals.

RESULTS: Compared to non-university hospitals, university hospitals were more likely to have >700 beds (55% vs. 10%, $p<0.001$) and to have more teaching resources and free access to international medical journals (84% vs. 62%, $p<0.001$). Nevertheless, one-half (47%) of the university residents reported that they were not satisfied with the residency system and clinical skills training and attributed their dissatisfaction to "daily chores," "low salary," and "poor clinical opportunities." Logistic regression analyses indicated that the proportions of residents who were satisfied with income (OR: 0.32, 95% CI: 0.26–0.40) and the residency system (OR: 0.52, 95% CI: 0.40–0.68) and clinical skills training (OR: 0.77, 95% CI: 0.60–0.99) were significantly lower for university residents than for non-university residents.

CONCLUSIONS: Hospital size and teaching resources do not overcome the other characteristics of university hospitals that lead to residents' dissatisfaction.

KEY WORDS: non-university hospital; postgraduate medical education program; resident characteristics; resident satisfaction; University hospitals.

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INTRODUCTION

In Japan, because firsthand clinical experience for medical students is limited, residents are still not proficient in their clinical skills after completing the 6-year undergraduate medical program and passing the national board examination for physicians. Therefore, the Postgraduate Medical Education Program (PGME) is vital because it gives physicians the opportunity to learn basic clinical skills and knowledge[1].

In 2004, the Japanese government introduced a new PGME program to improve residency training and working conditions[2]. Under the new program, newly certified physicians must receive postgraduate training at university or non-university teaching hospitals designated by the Ministry of Health, Labour, and Welfare[3]. Unlike in the US, community hospitals in Japan are not affiliated with a university and are not regarded as academic centers. The new PGME program introduced a matching program through which residents apply directly to each teaching hospital. Before this, approximately 75–80% of newly certified physicians were affiliated with universities, and their residency programs were completed at university hospitals.

After the introduction of the new PGME program, both the numbers of non-university hospitals and residents who chose non-university hospitals for their residency increased considerably. The number of non-university hospitals almost doubled between the 1999 and 2005 academic years, and no new university school has opened since 1979. In 2003, immediately before the introduction of the new PGME, 5,923 residents (73%) chose university hospitals for their residency, and 2,243 residents chose non-university hospitals. By contrast, in 2004, after the introduction of the new PGME, 3,262 residents (44%) chose university hospitals for their residency, and 4,110 residents chose non-university hospitals[2].

The shift of residents from university to non-university hospitals has created a severe shortage of physicians in rural areas because university hospitals play a key role in allocating physicians to rural areas. Consequently, many hospitals in rural areas have been forced to end services in some specialties. This may jeopardize community health care in Japan.

The selection of teaching hospitals by residents may also influence the effects of the new PGME. Yano and colleagues pointed out significant differences between university and non-university hospitals in terms of the patients' length of stay[4], medical costs[5], and residents' weekly schedule[6]. In addition, Yano et al.[7] reported that residents' clinical competence was generally poor, especially among university residents. Hence, the ultimate outcome of the new PGME may be affected by the change in the ratio of university to non-university residents.

To identify potential reasons for the shift of residents from university hospitals to non-university hospitals, we surveyed 2nd-year residents who participated in the new PGME program. We compared resident satisfaction and the characteristics of teaching hospitals and residents between residents at university and non-university hospitals.

METHODS

Study Subjects

This study was a part of a scientific research program entitled "Evaluation of the new PGME program," which was supported by and obtained ethical approval from the Ministry of Health, Labour, and Welfare of Japan. All of the participants provided informed consent before taking part in the survey. A questionnaire was sent to 849 teaching hospitals (104 university hospitals with 4,563 2nd-year residents and 745 non-university hospitals with 3,193 2nd-year residents) in March 2006[8]. Our study consisted of two surveys: a hospital survey and a resident survey. The subjects of the hospital survey were program directors, and those of the resident survey were 2nd-year residents who had participated in the new PGME program. The program director at each hospital was asked to recruit residents to complete the self-administered questionnaire. The academic calendar in Japan starts on 1 April and ends 31 March of the following year; therefore, the survey was conducted toward the end of the 2005 academic year.

Surveys

The hospital survey comprised 11 sections with 42 questions in total. The 11 sections included hospital characteristics, matching scheme, program details, program management, instructor education, residency conditions, program curriculum, salary/housing, resident assessment, program assessment, and influence of the new PGME on the hospital. Of these, the variables investigated here were the number of beds, employment conditions (*i.e.*, resident annual income and social security and medical malpractice insurance for residents), and teaching resources (*i.e.*, availability of personal computers with internet access, availability of online clinical journals, and education opportunities for residents and teaching staff).

The resident survey comprised 16 sections with 26 questions in total. The 16 sections included resident characteristics, rotation schedule, working hours, number of patients treated, satisfaction/dissatisfaction, unexpected troubles, consulting, career plans, target clinical subjects, targeted higher qualification, eventual career choice, balance between work and individual life, clinical knowledge, skills and behaviors experienced, and number of clinical cases experienced. Of these, the variables investigated here were resident characteristics and the satisfaction of residents with their salary, residency system and clinical skills training, and clinical achievements. In addition to gender and age, the questionnaire surveyed the attitudes of residents toward obtaining certified specialist qualifications or the academic degree, Doctor of Medical Sciences (DMSc; wish to be qualified/do not wish/do not know). We also inquired about future career choices by asking, "Which field do you wish to work in? (clinical/teaching or research or administration/do not know)" and work/life balance by asking, "Which do you value more, work or your overall quality of life? (work-oriented/life-oriented/between)." Resident were asked if they were satisfied with their income, the residency system, clinical skills training, and their clinical achievements (satisfied/not satisfied/do not know). Residents were then asked to indicate if they were satisfied (or not satisfied, or do not know) with attributes that led to overall satisfaction, or dissatisfaction, with the residency system and clinical skills training using lists of attributes that were provided to them. Specific clinical skills training included "primary care skills", "humanistic care skills", and "clinical skills as specialists." Residents were asked if they felt they were trained or not trained in the skills needed for the three items. The hospital and resident surveys, which are written in Japanese, are available upon request.

Data Analyses

We used the chi-square statistic to assess the bivariate relationships between type of teaching hospital (university vs. non-university) and each item concerning hospital characteristics (*i.e.*, number of beds, employment conditions, and teaching resources) from the hospital survey and each item concerning resident characteristics and satisfaction from the resident survey. We used a logistic regression model to investigate the effect of resident characteristics and satisfaction on the selection of teaching hospitals (university hospital=1 vs. non-university hospital=0). Univariate and adjusted odds ratios (OR) for the type of teaching hospital were computed along with 95% confidence intervals (CI). Variables selected at a significance level of 0.1% in univariate models were entered into multivariate logistic models. The Cochran-Armitage trend test was used to assess trends in age groups and work/life balance; the Wald chi-square test was used to assess the significance of the other variables. Statistical interactions of the teaching hospitals were assessed between possible pairs in the multivariate models. A value of $p<0.05$ was considered significant, and analyses were performed using SAS v. 8.12 for Windows.

RESULTS

Responses were obtained from 91 (88%) university hospitals and 1,794 (39%) of their residents (37% of the respondents were females) and 659 (88%) non-university hospitals and 2,010 (63%) of their residents (32% females). Table 1 shows the characteristics of university and non-university hospitals in the 2005 academic year. Compared to non-university hospitals, university hospitals were more likely to have >700 beds (55% vs. 10%; $p<0.001$), free access to the internet (49% vs. 32%; $p<0.001$), international online medical journals (84% vs. 62%; $p<0.001$). By contrast, the annual incomes of residents at university hospitals were much lower than those at non-

Table 1. Characteristics of University and Non-University Hospitals in the 2005 Academic Year

Characteristic	University hospitals (n=91)	Non-university hospitals (n=659)	p*
Number of beds, n (%)			<0.001
<499	11 (12)	428 (65)	
500–699	30 (33)	164 (25)	
>700	50 (55)	62 (10)	
Employment conditions			
Annual income (US$), mean ± SD			
1st-year residents	28,301±4,120	39,901±8,910	<0.001
2nd-year residents	28,751±4,834	45,740±11,396	<0.001
Social security for residents, n (%)	91 (100)	651 (99)	0.60
Resident malpractice insurance, n (%)	76 (84)	581 (90)	0.14
Teaching resources, n (%)			
Computer available for Internet access	45 (49)	209 (32)	<0.001
Online journals available			
Domestic journals	78 (86)	519 (79)	0.12
International journals	76 (84)	408 (62)	<0.001
Educational resources for residents, n (%)			
Seminars by teaching staff	90 (99)	608 (92)	0.01
Seminars by outside lecturers	68 (75)	472 (72)	0.54
Voluntary conferences by residents	28 (31)	277 (42)	0.04
Educational resources for teaching staff, n (%)			
Seminars by inside lecturers	61 (67)	53 (8)	<0.001
Seminars by outside lecturers	49 (54)	621 (94)	<0.001

**Based on chi-square test or Fisher's exact test for categorical variables and t-test for income.*

university hospitals. The mean annual salary of 2nd-year residents was US$ 28,751 vs. US$ 45,740, respectively ($p<0.001$). The teaching staff gave seminars more frequently at university hospitals (99% vs. 92%, $p=0.01$), whereas voluntary conferences by residents were more frequent at non-university hospitals (31% vs. 42%, $p=0.04$). University hospitals provided more educational opportunities for teaching staff through their own human resources than did non-university hospitals (67% vs. 8%, $p<0.001$).

Out of the 1,794 university residents, only 40% were satisfied overall with the residency system compared to 66% of the 2,010 non-university residents (Table 2). Of the residents satisfied with the residency system, the majority were satisfied with "atmosphere at the workplace," "clinical opportunities," and "excellence in teaching." Thirty-eight percent of university and 57% of non-university residents were satisfied with the clinical skills training overall. Of those satisfied with overall training, 33% of the university and 67% of the non-university residents were satisfied with their training in primary care skills. In contrast, among the 844 (47%) university residents who were not satisfied with the residency system (data not shown in table), the majority were dissatisfied with "daily chores" (59%) and "salary" (57%) followed by "clinical opportunities" (41%). Among the 858 (48%) university residents who were not satisfied with the clinical skills training, nearly half (42%) were dissatisfied with their training in primary care skills.

Table 3 shows univariate and multivariate associations for residents' characteristics and attributes associated with residents' satisfaction by the type of teaching hospital. After adjusting for variables with a univariate association with type of hospital (p<0.1%), the numbers of female residents (OR 1.35, 95% CI 1.08–1.70) and those seeking a DMSc degree (OR 2.19, 95% CI 1.77–2.71) remained significantly associated with university hospitals. Residents' satisfaction with their income (OR 0.32, 95% CI 0.26–0.40), the residency system (OR 0.52, 95% CI 0.40–0.68), and clinical skills training (OR 0.77, 95% CI 0.60 – 0.99) was significantly associated with non-university hospitals. For teaching hospitals, a statistical interaction was observed between the DMSc-oriented characteristic and income satisfaction (p=0.009). Residents at university hospitals who wished to obtain the DMSc degree were more satisfied with their income compared to those at university hospitals who were not interested in the DMSc. There were no statistical interactions observed between other possible pairs.

Table 2. Percent of Residents' who are Satisfied with Attributes Associated with Overall Satisfaction with the Residency System and Clinical Skills Training*

Attributes	University residents (n=1,794)	Non-university residents (n=2,010)	p
	n (%)	n (%)	
Residency system, overall	708 (40)	1325 (66)	
Educational opportunities			
Excellence in teaching	465 (66)	742 (56)	<0.001
Clinical opportunities	317 (45)	840 (63)	<0.001
Teaching resources	211 (30)	172 (13)	<0.001
Consultation system	116 (16)	293 (22)	0.002
Working conditions			
Atmosphere at the workplace	352 (50)	876 (66)	<0.001
Daily chores	71 (10)	549 (41)	<0.001
Salary	92 (13)	486 (37)	<0.001
Cooperation among departments	113 (16)	388 (29)	<0.001
Coordination with paramedical staff	132 (19)	568 (43)	<0.001
Clinical skills training, overall	675 (38)	1,143 (57)	<0.001
Primary care skills	224 (33)	763 (67)	<0.001
Humanistic care skills	120 (18)	353 (31)	<0.001
Clinical skills as specialists	253 (37)	332 (29)	0.001

**The remaining residents were "not satisfied" (with residency system: 47% vs. 23%, university and non-university, respectively; with clinical skills training: 48% vs. 30%, respectively) or "do not know (with residency system: 13% vs. 11%, respectively; with clinical skills training: 14% vs. 13%, respectively)*

Table 3. Univariate and Multivariate Associations Between Residents' Characteristics and Satisfaction and Type of Teaching Hospital

	University hospital (n=1,794)	Non-university hospital (n=2,010)	Univariate analyses	Multivariate analyses (n=1831)
	n (%)	n (%)	OR (95% CI)	OR (95% CI)
Resident characteristics				
Gender				
Female	670 (37)	649 (32)	1.25 (1.09, 1.43)	1.35 (1.08, 1.70)
Age (24–35 years)*	1,772 (98)	1,978 (98)	1.03 (0.65, 1.63)	–
Specialist oriented	1,662 (93)	1,866 (93)	0.70 (0.41, 1.21)	–
Doctor of Medical Science oriented	737 (41)	627 (31)	1.88 (1.60, 2.22)	2.19 (1.77, 2.71)
Future career choice of clinical medicine†	98 (6)	123 (6)	1.11 (0.84, 1.47)	–
Work-life balance				
Work oriented	415 (23)	574 (29)	0.72 (0.60, 0.87)	0.78 (0.57, 1.06)
Between	960 (54)	1,035 (52)	0.92 (0.78, 1.09)	1.03 (0.78, 1.35)
Resident satisfaction				
Income	504 (28)	1,234 (61)	0.22 (0.19, 0.25)	0.32 (0.26, 0.40)
Residency system	708 (40)	1,325 (66)	0.28 (0.24, 0.33)	0.52 (0.40, 0.68)
Clinical skill training	675 (38)	1,143 (57)	0.41 (0.36, 0.48)	0.77 (0.60, 0.99)
Clinical achievement	1,040 (58)	1,434 (71)	0.41 (0.35, 0.47)	0.79 (0.61, 1.00)

Reference condition of "36 years and older"
†Reference condition of "Education/research/administration"
Multivariate analysis was conducted adjusting for gender; Doctor of Medical Science oriented; work-life balance; and resident satisfaction with income, residency system, clinical skill training, and clinical achievement

DISCUSSION

The characteristics of teaching hospitals, educational opportunities, and working conditions under the new PGME program differed significantly between university and non-university hospitals. These factors may determine the difference in resident characteristics and satisfaction with university and non-university hospitals. Residents at university hospitals were more likely female or wanting a DMSc degree. Residents at non-university hospitals were more likely to be satisfied with income, the residency system, and clinical skills training.

In September 2006, the Emergency Statement issued by the Association of Japanese Medical Colleges (AJMC) announced that the shift of residents from university hospitals was causing the collapse of medical services in certain communities, as well as stagnation in academic research, because of the shortage of physicians at university hospitals[9]. To increase the number of university residents, the AJMC emphasized the importance of improvements in teaching conditions, including teaching resources, at university hospitals. However, our results indicate that better education resources do not overcome the other characteristics of university hospitals that lead to resident dissatisfaction. Similarly, Levine et al.[10] investigated resident research and scholarly activity and found that non-university hospitals had greater barriers to this kind of activity, but that the residents still completed a variety of scholarly projects. Therefore, merely improving the teaching conditions at university hospitals may not increase the levels of resident satisfaction or resident clinical achievement.

Although the number of hospital beds was not statistically assessed in relation to resident satisfaction, it may influence the residency conditions that affect the level of resident satisfaction. Because there were fewer teaching staff at non-university than university hospitals, residents might have the opportunity to see patients with various health problems on their own, which would increase the clinical experience of the non-university residents. Moreover, the majority of non-university residents reported that they were satisfied with the good coordination with nurses and paramedical staff, which may prevent the residents from having to perform a high amount of extraneous work that university residents might have to perform.

The observed preference of females for university hospitals may not help to alleviate the disparity of physicians in rural areas because female physicians tend to switch from full-time to part-time employment due to family constraints[12]. In Japan, only 14% of all physicians are female[11], and this issue needs to be monitored carefully in future investigations.

Only universities can grant a DMSc degree. Therefore, residents who want this degree are more likely to choose a university hospital, as confirmed by our survey. In addition, this finding had a statistical interaction with the satisfaction of residents with their salary. Residents at university hospitals were generally not satisfied with their incomes; however, if they were interested in the DMSc degree, they were less dissatisfied than those who were not interested. Under the traditional department system at university hospitals in Japan, residents and young physicians are required to perform hard work and are compensated minimally[13]. This unrewarding work system has been regarded by physicians as a necessary sacrifice before obtaining the DMSc degree from a university. However, the DMSc title does not guarantee a high-wage job or an increased chance of employment. Consequently, the popularity of this degree has gradually been replaced by that for the title of specialist, certified by an academic society for each specialty, for which physicians can be candidates regardless of university or non-university affiliation. A report from Canada[14] indicated that the interest of trainees in pursuing academic medicine wanes as they progress through their residency. In addition, a formal teaching curriculum for the DMSc degree is seldom provided in medical schools in Japan.

Several limitations of our study need to be discussed. First, our results might have been influenced by sampling bias. The

response rate was relatively high for hospitals, but was low for resident. This was mainly due to technical reasons, including the fact that residents go for clinical training outside their own hospitals (i.e., visits to public health centers or to affiliated small local hospitals). In addition, because the number of residents per program director is larger at university hospitals, the directors may have been too busy to publicize the survey widely. Second, our survey only investigated the resident perception of "satisfaction," and not clinical or educational outcomes. Therefore, we cannot estimate the direct difference in educational outcome between university and non-university hospitals. Finally, because of the cross-sectional nature of the survey, we cannot determine causality. Therefore, our results require careful interpretation.

In conclusion, despite the limited evidence, we found that the differences in the characteristics of teaching hospitals and residents and the levels of resident satisfaction may explain the major shift of residents from university to non-university hospitals. Hospital size and the teaching resources of university hospitals did not overcome the other characteristics that led to resident dissatisfaction. Thus, to attract residents, university hospitals need to improve the conditions of their residency programs.

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