Residents' Experience of Scholarly Activities is Associated with Higher Satisfaction with Residency Training

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BACKGROUND: The Ministry of Health, Labour and Welfare of Japan has been promoting participation in scholarly activities for physicians during residency training. However, there is debate regarding whether this is worthwhile for residents.

OBJECTIVE: To evaluate residents' opinions of engaging in scholarly activities and identify factors associated with overall satisfaction with their training program.

DESIGN: Cross-sectional national survey.

PARTICIPANTS: 1,124 second-year residents in teaching hospitals in Japan in 2007

MEASUREMENTS: Collected data included demographics, teaching hospital characteristics and resources, residents' research experiences, including type of activities, barriers to performing scholarly activities, residents' opinions of scholarly requirements, and resident satisfaction with their residency program.

RESULTS: 1,124 residents/1,500 responded for a response rate of 74.9%. Our data showed that 60.2% of Japanese residents engaged in some type of scholarly activity. Barriers included: "No resident time"; "No mentor;" and "No resident interest." Sixty-three percent of residents thought that research should be a residency requirement. In multivariate logistic analysis, residents' overall satisfaction with their residency program was significantly associated with participation in research activity (odds ratio (OR), 1.5; 95% confidence interval (CI), 1.1–2.1); male gender (OR, 1.5; 95% CI: 1.1–2.2); satisfaction with residency compensation (OR, 3.8; 95% CI, 2.6–5.0), and satisfaction with the residency curriculum (OR, 19.5; 95% CI, 13.7–27.7).

CONCLUSIONS: The majority of residents surveyed thought that research activity was worthwhile. Residents' participation in research activity was associated with higher levels of satisfaction with residency training. Implementing measures to overcome existing barriers may have educational benefits for residents.

KEY WORDS: residency; clinical research; job satisfaction; medical education; Japan.

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INTRODUCTION

Resident research activities have several benefits, including imparting skills relevant to evidence-based medicine, promoting lifelong learning, and influencing residents' career choices and continued scholarly work.^{1,2} Thus, the Accreditation Council for Graduate Medical Education (ACGME) as well as the Japanese Ministry of Health, Labour and Welfare identify research activity as an important component of residency training.^{3,4} Previous studies support this research requirement. In two reports, program directors at United States internal medicine residency training programs valued the inclusion of a research requirement for residents.^{2,5} Another paper reported that 66% of senior residents who completed a scholarly project in a United States internal medicine training program agreed that all physicians should have research experience during their residency.¹

Although many institutions and individuals support a research requirement for residents, there are some arguments against its inclusion. Research activity may take time away from clinical learning, which many view as the primary goal of residency training. Additionally, previous reports of survey data show that there are many barriers to residents successfully engaging in research activities. These barriers include lack of time, faculty mentors, funding, and technical support.¹ To garner the support necessary to promote resident scholarly activity in the face of these barriers, the educational merits of research should be demonstrable.²

In 2004, a new matching system was introduced in Japan to place graduating students into residencies.^{6,7} This resulted in an important shift in training site preference patterns, with new graduates favoring non-university teaching hospitals compared with university hospitals.⁸ Thus, hospitals now have stiff competition in recruiting graduating students to their residency programs. This makes the issue of overall job satisfaction during residency especially important.⁹ Few studies have evaluated the association between resident scholarly activity and resident satisfaction. If an association can be demonstrated, it may motivate program directors and graduate medical educators in Japan to overcome existing

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barriers and further develop curricula for conducting scholarly activities.

Moreover, to date in Japan, there has been no formal assessment to determine the incidence and type of scholarly activities that residents have engaged in. Thus, the purposes of the current study were 1) to characterize current scholarly activities of residents during their training, 2) to identify barriers that prevent residents from engaging in scholarly activities, and 3) to assess the association between residents' satisfaction with their training program and participation in scholarly activity.

METHODS

Study Design and Subjects

This survey was a part of a larger multiyear program entitled, "Evaluation of the new post-graduate medical education program in Japan," supported by the Japanese Ministry of Health, Labour and Welfare (MHLW). We conducted a cross-sectional nationwide survey in March 2007. The Japanese academic calendar begins April 1st; thus, we conducted this survey at the end of the academic calendar to get the opinions of residents at the end of their mandatory training.

We mailed questionnaires to program directors at each of the 1,044 MHLW-approved teaching hospitals where the 7,495 second-year residents received their residency training. One in every five residents was randomly selected for recruitment at each hospital. Therefore, our target sample of subjects was comprised of 1,500 residents. All participants provided informed consent before completing the survey. We sent a reminder letter to program directors via conventional post twice to encourage them to remind their residents to participate in the survey. The Institutional Review Board of St. Luke's International Hospital approved the study.

Questionnaires

We developed survey questions regarding resident scholarly activities based on one used in a previous study of an internal medicine residency training program in the United States.² The survey was modified following an iterative process with five experts in medical education in Japan. The 21-item questionnaire was organized into the following five topics: 1) resident characteristics, such as sex, age, and medical school; 2) residency program characteristics, including university affiliation, number of hospital beds, and maximum number of patients per resident; 3) resident satisfaction, including overall satisfaction with residency, satisfaction with the curriculum, and satisfaction with level of compensation; 4) career plans after residency, including pursuit of a senior residency program, and work setting, such as clinical, medical education, and research; 5) resident scholarly activities, including type, barriers, and residents' opinions of scholarly work. Scholarly activities were defined in this survey as original clinical research, including case reports, case series, and hypothesis-driven research, presenting at a regional, national, or international medical conference, and publishing articles in journals. The surveys were completed anonymously.

The dependent variable of interest, overall satisfaction with residency, was measured using a 3-point rating scale (1:

satisfied; 2: indeterminate; 3: not satisfied). Because the focus of this research was to determine whether scholarly activities are associated with satisfaction, we dichotomized the responses into two groups: "satisfied" and "other-than-satisfied," which included the "indeterminate" and "not satisfied" responses. Responses were then analyzed as a categorical variable. In addition to scholarly activities, potential determinants of residents' overall satisfaction were selected based on findings from previous studies and discussion with medical education experts in Japan. These included demographic data (age and sex), type of program affiliation (university program or non-university program), satisfaction with compensation (current income, amount of leisure time, and access to education resources, such as Internet, computers, etc.), satisfaction with residency curriculum, and workload characteristics (maximum number of patients at a time).⁹⁻¹² Compensation and residency program satisfaction were measured with the same 3-point rating scale (1: satisfied; 2: indeterminate; 3: not satisfied); and we again dichotomized responses into "satisfied" and "other-than-satisfied" categorical variables.

Statistical Analysis

Responses were analyzed by using descriptive statistics, including mean and standard deviation (SD), frequencies, and percents. Ninety-five percent confidence intervals (CI) were calculated for continuous variables and categorical variables using the normal distribution or normal approximation methods, as appropriate. Chi-square or Fisher's exact tests were used for cross-tabulated data and the *t*-test was used to compare means of continuous data. Before using the *t*-test, we verified the normal distribution of the data using graphical methods, including histograms and normal plots and verified the equal variances assumption using the *F*-test.

For the multivariate logistic analysis, we chose the potential independent variables that had *p* values < 0.25 using univariate analysis, and known clinical importance.¹³ Goodness-of-fit was assessed by the Hosmer-Lemeshow tests.¹³ The data were analyzed using SPSS 15.0J (SPSS Japan, Tokyo, Japan). *P*<0.05 was regarded as statistically significant.

RESULTS

A total of 1,124 of 1,500 (74.9%) subjects returned a survey. Some surveys had missing data. For each variable reported, the denominator used to calculate the proportion was the number of surveys with a value for that variable. The respondents mean age was 27.9 (SD, 3.1) years, 69.3% (776/1,120) of respondents were men, and 62.5% (702/1,124) of respondents were training at a non-university teaching hospital (Table 1).

The data show that 60.2% (662/1,099) of respondents engaged in some kind of scholarly activity during their 2-year program. Residents in non-university teaching hospitals were more likely to engage in scholarly activities (64.4%, 441/685) than those in university hospitals (53.4%, 221/414; *p*<0.01). The types of activities for all respondents were: case-report (46.1%, 507/1,099), presenting at a regional, national, or international conference (18.8%, 206/1,094), publishing in a medical journal (7.5%, 82/1,094), and hypothesis-driven clinical research (3.8%, 42/1,094) (Fig. 1). Residents who had no experience with scholarly activities during their residency

Figure 1. Variation of resident scholarly activities during residency in university hospitals and non-university teaching hospitals (n=1,099). * $p < 0.01$, chi-square test for comparison of residents between non-university versus university hospitals.

reported barriers to participation that included “No time for residents” (40.4%, 110/272), “No mentor” (32.0%, 88/275), “No interest” (25.4%, 69/272), “No time for faculty” (18.8%, 51/271), “Lack of technical support, such as data analysis” (13.5%, 37/274), and “No funds” (6.5%, 18/275).

Overall, 63% (681/1,084) of respondents thought that scholarly activities should be a residency requirement, whereas only 7% (73/1,084) disagreed with such a requirement. The remaining 30% (330/1,084) were undecided/neutral. Of the subgroup of residents with career plans that included research, 71% (97/137) valued the scholarly activity requirement during their residency, whereas 7% (9/137) disagreed with such a requirement. The remaining 23% (31/137) were undecided/neutral. On the other hand, 62% (585/947) of residents without such career plans valued the scholarly activity requirement, whereas 6% (61/947) of them disagreed with it and 32% (301/947) were undecided/neutral. However, this difference in attitudes toward scholarly activity requirement between groups was not statistically significant ($p = 0.1$).

In multivariate logistic analysis after adjusting for location of residency (university or non-university program) and residents' age, overall resident satisfaction with the residency program was significantly associated with the following: experience of scholarly activity (odds ratio (OR), 1.5; 95% CI, 1.1–2.1), male gender (OR, 1.5; 95% CI, 1.1–2.2), satisfaction with residency compensation (OR, 3.8; 95% CI, 2.6–5), and satisfaction with residency curriculum (OR, 19.5; 95% CI, 13.7–27.7) (Table 2). This model was found to fit the data well (Hosmer-Lemeshow, $p = 0.2$).

DISCUSSION

Our results, from a large national survey in Japan, show that the majority of residents value scholarly activity as a worthwhile experience. This reaffirms the utility of making it a requirement during residency, despite some barriers. In addition, it seems that resident experience of scholarly activity may be associated with overall satisfaction with residency.

Experience of Scholarly Activity

Our survey showed that more than 60% of respondents achieved the goal of the Ministry of Health, Labour and Welfare in Japan by engaging in some kind of scholarly activity during their 2-year program. Case reports and conference presentations were the most commonly reported activities. Only 5% of residents conducted hypothesis-driven research and published their work in a peer-reviewed journal.

Compared with the findings from a study of U.S. internal medicine residents in 2002,² the residents in our survey reported that they were more likely to perform case reports and less likely to do hypothesis-driven research. The methodology of the U.S. study was different from the present study in that resident scholarly activity was estimated by the program directors, whereas ours was self-reported by residents. Despite the difference in methodologies, the different findings are likely representative. Fukui et al.¹⁴ categorized the level of sophistication of study design and statistical analyses reported in the medical literature for the period of 1990–1999. They reported that studies conducted in Japan were more likely

Table 1. Baseline Characteristics of Residents in University Hospitals and Non-university Teaching Hospitals

	University Hospital (n=422)	Non-University Hospital (n=702)	Total (n=1,124)	p value
Mean age, yr (SD) (n=1,110)	27.9 (3.2)	27.9 (3.1)	27.9 (3.1)	0.8
Gender, n (%) (n=1,120)				
Male	276 (65.4)	500 (71.6)	776 (69.3)	0.3
Female	146 (34.6)	198 (28.4)	344 (30.7)	
Scholarly activities, n (%) (n=1,099)	221 (53.4)	441 (64.4)	662 (60.2)	<0.01
Career plan includes research, n (%) (n=1,116)	55 (13.1)	86 (12.3)	141 (12.6)	0.8
No. of beds, n (%) (n=1,088)				<0.01
<300	5 (1.3)	102 (14.7)	107 (9.8)	
300–499	19 (4.8)	275 (39.7)	294 (27.0)	
≥500	372 (93.9)	315 (45.5)	687 (63.1)	
Mean maximum no. of patients at one time, n (SD) (n=1,102)	16.9 (9.3)	17.9 (10.2)	17.5 (9.9)	0.1
Mean maximum no. of on-call per month, n (SD) (n=1,116)	7.6 (4)	6.3 (2.9)	6.8 (3.4)	<0.01
Satisfaction with residency, n (%)				
Overall (n=1,101)	182 (43.9)	460 (67.1)	642 (58.3)	<0.01
Curriculum (n=1,100)	209 (50.2)	443 (64.8)	652 (59.3)	<0.01
Compensation (n=1,102)	118 (28.3)	469 (68.5)	587 (53.3)	<0.01

Table 2. Univariate and Multivariate Logistic Analysis of Factors Related to Overall Satisfaction with Residency Program (n=1,016)

Variable	Unadjusted OR (95% CI)	p value	Adjusted OR (95% CI)	p value
Age (yr)	0.9 (0.9–1.1)	0.2	–	0.1
Male gender	1.5 (1.1–1.8)	0.01	1.5 (1.1–2.2)	0.04
Scholarly activity experience	1.6 (1.3–2.1)	<0.01	1.5 (1.1–2.1)	0.03
Affiliation of program, University hospital	0.4 (0.3–0.5)	<0.01	–	0.2
No. of beds		<0.01	–	0.7
<300	1.8 (1.2–2.8)			
300–499	1.8 (1.3–2.4)			
≥500	1			
Mean maximum no. of on-call per month	0.9 (0.93–0.99)	0.02	–	0.8
Satisfaction				<0.01
Compensation package	5.5 (4.2–7.2)	<0.01	3.8 (2.6–5)	
Residency curriculum	22.4 (16.3–30.8)	<0.01	19.5 (13.7–27.7)	<0.01

to use simpler or inappropriate study designs and non-inferential statistical methods than those conducted in the United States.¹⁴ This phenomenon likely represents a lack of clinical research training and role models in the Japanese clinical research community. Japanese residents likely have limited research skills and a small repertoire of study designs and statistics due to scarcity of appropriately trained mentors. This may in part explain the difference in the type of scholarly activities performed by Japanese residents compared with their U.S. counterparts. Program directors and educational leaders in Japan should give not only their residents but also mentors more opportunities to learn about and conduct research projects that use various study designs and statistical methodologies.

As shown in the **RESULTS**, residents in non-university teaching hospitals were more likely to conduct scholarly activities than those in university hospitals. A previous study has reported similar results.⁵ Levine et al. reported that residents in non-university-based programs were more likely to conduct case reports (40% vs. 25%) and present at local or regional conferences (25% vs. 20%) than those in university-based programs, whereas those in university-based programs were more likely to publish in peer-reviewed journals (10% vs. 5%).² In our survey, residents in non-university-based programs were more likely to conduct not only case reports and present at local or national conferences but also to publish in medical journals compared with those in university-based programs. In Japan, university-based programs typically require more non-clinical service (commonly referred to as “scut work”), and faculty members traditionally are more involved in basic science research rather than clinical research.¹⁵ This may help explain one of the findings of the current study: that non-university-based programs had higher rates of scholarly activity.

Barriers

The lack of residents' time and lack of faculty mentors were commonly cited barriers among residents who had not conducted scholarly activities during their residency. This confirms findings from previous studies.^{1,5} Although the Ministry of Health, Labour and Welfare proposes that residents engage in scholarly activities during training, programs may not provide adequate protected time or mentors for residents to achieve this goal. Training programs are effective for both

residents and faculty members in increasing research knowledge and may promote resident scholarly activities.¹⁶

Job Satisfaction and Scholarly Activity in Multivariate Analysis

Resident job satisfaction is an important factor to students in selecting a residency program. It also may be associated with higher motivation among residents to work hard and to maximize learning.¹⁷ There are likely many factors that contribute to this association. Among these, one factor is that intellectual stimulation is an important positive factor in physicians' job satisfaction.¹² It is likely that scholarly activity is intellectually stimulating and therefore provides a positive learning experience. This should result in improved quality of care.⁹ Our study demonstrated that residents' experience with scholarly activities was significantly associated with overall satisfaction with residency. Therefore, residency program directors and graduate clinical medical educators should strive to overcome existing barriers to research and to further develop curricula for conducting scholarly activities.

In our survey, female residents were less likely to express overall satisfaction with residency than their male counterparts. This finding is consistent with that of a previous study.¹⁰ Collier et al. reported that female residents were more likely to report increased cynicism and multiple depressive symptoms than male residents.¹⁸ Depressive symptoms may be related to overall satisfaction and job burnout. In Japan, because the percentage of female residents is increasing (from 25.2% in 1996 to 33.4% in 2007¹⁹), residency program directors and medical education leaders should consider the lower rating of overall satisfaction with residency by female residents. Further research of this area should be encouraged.

Limitations

This study has several limitations. First, these data are derived from self-reports, which may introduce bias. For example, residents may not have been familiar with all support services available to them to engage in scholarly activities at their training program, and thus listed lack of support services as a barrier. Second, because this survey is a cross-sectional study, causality cannot be determined. Third, we instructed program directors at teaching hospitals to randomly select one in five residents to complete the survey, but we had no way of monitoring whether

the process was performed as instructed. If randomization instructions were not followed, the subjects might represent a convenience sample, which may explain the high response rate seen in this study. Finally, despite the use of multivariate logistic analyses, the possibility of unmeasured confounders remains.

CONCLUSIONS

The majority of residents surveyed thought research activity was a worthwhile experience despite some barriers. Moreover, it seems that residents' experience of research activity is associated with higher satisfaction with residency training. If there is a causal relationship, requiring participation in scholarly activities should be promoted. To better meet the goal of the MHLW to have residents engage in scholarly activities, residency program directors should provide protected research time, appropriate mentoring, and effective training programs for both residents and faculty members to increase research knowledge and productivity. Future research also should assess the impact of these types of activities on the quality of patient care.

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