

Scholastic Achievements: Graduate-entry vs. School-leaver-entry Medical Students

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Objective: The objective of the present study is to conduct a retrospective analysis comparing graduate-entry program (GEP) and school-leaver-entry program (SEP) students from the perspective of scholastic achievements from admission through the national examination for medical practitioners.

Methods: The number of students who repeated one or more years, because of their poor results on examinations, the scores of graduation examinations, and the pass rates for the national examination for medical practitioners were compared, retrospectively, over the last 8 academic years between GEP and SEP students at Tokai University School of Medicine.

Results: The ratio of students who graduated in the prescribed course length was significantly higher ($p = 0.002$) in GEP students than that in SEP students. There were no differences between the average scores on the graduation examinations for GEP and SEP students, except in two academic years. The pass rate of GEP students (97%) of the national examination for medical practitioners was significantly higher ($p < 0.001$) than that of SEP students (89%).

Conclusions: These results suggest that GEP students are more favorable candidates in terms of becoming physicians in the usual prescribed number of years than SEP students.

Key words: graduate-entry, school-leaver-entry medical students, graduation examination, national examination for medical practitioners

INTRODUCTION

Globally, there are two kinds of medical education programs, school-leaver-entry programs (SEPs) for a prescribed course length of 5 or 6 years, and graduate-entry programs (GEPs) for a shorter number of years. While GEPs are standard in the United States, SEPs are standard in most other countries. In recent years, GEPs have also been increasing throughout the world [1, 2]. In 1995, Australian medical schools began to offer GEPs and in 2000, two UK medical schools, St George's Hospital, London and Leicester-Warwick Medical School, Coventry, began to offer GEPs [3]. However, there has been a great controversy for many years over which system is better, GEPs or SEPs. Currently, 35 of 80 Japanese universities (44%) have adopted GEPs in addition to SEPs. No universities in Japan have GEPs exclusively. Tokai University began its GEP in 1989, now running concurrently with its SEP, and to date has produced the largest number of GEP physicians among all other Japanese universities.

The aim of the present study was to conduct a retrospective analysis comparing GEP and SEP students from the perspective of scholastic achievements from admission through the national examination for medical practitioners.

MATERIALS AND METHODS

Study design

This study was a retrospective quantitative cohort study using data from two groups collated over a 13-year period (Fig. 1).

Subjects

The graduates of a college or university (4-year course) or a junior college (2- or 3-year courses) can enter Tokai University School of Medicine via the GEP. Students who entered the GEP between 2002 and 2008 and students who entered the SEP between 2000 and 2007 composed the subjects of the present study. From 1989 to 2004, the GEP at Tokai University School of Medicine was a 4-year course in which graduate students started the curriculum by joining the third-year SEP students. Subsequently, because of the 1-year extension of the clinical clerkship term, the GEP was changed from a 4- to a 5-year course in 2005, from when the graduate students had begun the curriculum, entering with the second-year SEP students (Fig. 1).

Data

The rates of students who repeated one or more years because of their poor results in examinations were compared between the GEP students, who entered between 2002 and 2008, and the SEP students, who

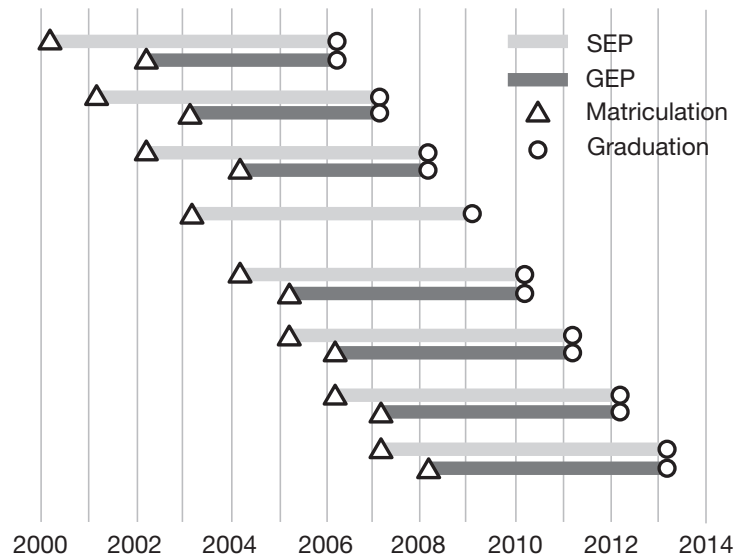


Fig. 1 GEP students who matriculated between 2002 and 2008, and SEP students who matriculated between 2000 and 2007 were investigated until the national examination just after their graduation.

entered between 2000 and 2007 (Fig. 1). In 2009, there were no GEP graduating students because in 2005, the GEP length was changed from 4 to 5 years due to the 1-year extension of the clinical clerkship term. The scores on the graduation examinations were compared between GEP students and SEP students for each year from 2006 through 2013, except for the year 2009 because of the 1-year extension of the clinical clerkship in 2005. Therefore, the pass rates for the national examination for medical practitioners, which all medical school graduates take in Japan just after graduation, was compared between GEP students and SEP students between 2006 and 2013 but not in 2009.

Statistical analysis

Statistical analyses were done using SPSS software (version 17.0). Student's *t*-test was used for analysis of the pass rates for the national examination. Pearson's chi-square test was used in the other comparisons of the GEP and SEP students. Values of $p < 0.05$ were considered to be significant.

Ethical approval

Ethical approval was given by the Tokai University Human Research Ethics Committee.

RESULTS

The age distributions of student-number component ratios of SEP students from 2000 through 2007 and GEP students from 2002 through 2008 at matriculation are shown in Fig. 2. From the year 2000 through 2007, 662 students were enrolled in the SEP. From 2002 through 2008, 192 students were enrolled in the GEP. Most of SEP students at matriculation were 18 years old. The age distribution of GEP students was wide, between 21 and 45 years old. Four 21-year-old junior college graduates entered the GEP. The academic backgrounds of GEP students were as follows. Liberal

arts: literature, historical science, pedagogy, philosophy, music, art, and other studies were 21%; social sciences: economics, politics, nomology, and other studies were 31%; science and technology: mathematics, chemistry, physical science, biology, and other studies were 29%; and medical sciences: pharmacology, nursing science, and dental sciences were 19%. The composition ratio of medical sciences was half from pharmacology and a quarter each from nursing sciences and dental sciences. Table 1 shows the numbers of students who repeated one or more years because of their poor results on examinations and of those who did not repeat. Among GEP students, 177 of 192 students (92%) graduated in the prescribed course length, and 15 students (8%) repeated one or more years and among SEP students, 519 of 662 students (78%) graduated in the prescribed course length, whereas 143 students (22%) repeated one or more years. The ratio of students who graduated in the prescribed course length was significantly higher ($p = 0.002$) among the GEP students than that among the SEP students.

Fig. 3 shows the average scores of the graduation examinations for GEP and SEP students between 2006 and 2013 but not in 2009. Although the GEP students' scores were significantly higher than those of the SEP students in 2011 and 2012, there were no significant differences between the scores of the GEP students and those of the SEP students in any other years.

Table 2 shows the pass rates of GEP and SEP students of the national examination for medical practitioners between 2006 through 2013. The pass rates for the national examination of GEP students and SEP students were 97% and 89% respectively, which was significant ($p < 0.001$).

DISCUSSION

We compared GEP and SEP students from the perspective of their scholastic achievements throughout

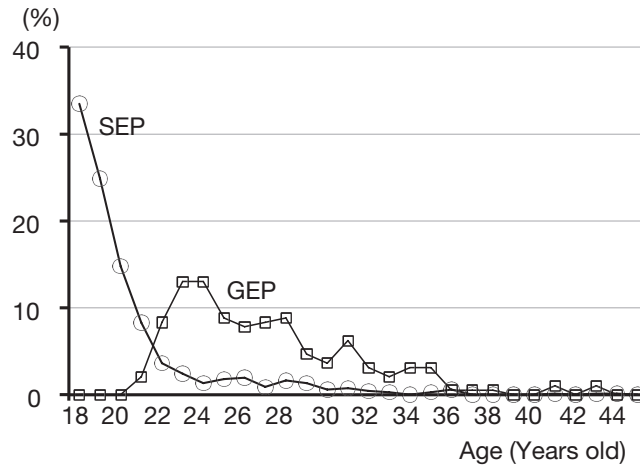


Fig. 2 Age distribution at matriculation of student-number component ratios of SEP and GEP students.
GEP = graduate-entry program; SEP = school-leaver-entry program.

Table 1 Students who repeated and those who did not repeat one or more years

	Repeated	Did not repeat
GEP	15 (8%)	177 (92%)
SEP	143 (22%)	519 (78%)

GEP: graduate-entry program
SEP: school-leaver-entry program

$p = 0.002$

medical school, from matriculation through to the national examination for medical practitioners that they take just after graduation. At Tokai University School of Medicine, GEP students began their curriculum joining the third-year SEP students until 2004, and joining the second-year SEP students from 2005. From the time they join the SEP students, the GEP students take the same classes, the same clinical clerkship programs, and the same examinations as do the SEP students. Based on certain controlled conditions, we have directly compared the students' learning propensities through scholastic achievements between GEP and SEP students. This objective comparison, under the controlled conditions we used, provides the strength and validity of this study.

In the present study, the average ages of the GEP and SEP students were 27.1 and 20.4 years old, respectively. The difference of which was 6.7 years, similar to that of previous studies [1, 4]. There are several papers suggesting that GEP students attain higher academic achievements than do SEP students. Some researchers suggest that GEP students are of a higher academic level than are the SEP students during the entire school period. Calvert *et al.* [5] reported that GEP students were significantly more likely to achieve honours degrees than were SEP students. Price and Wright [6] reported that Newcastle GEP students performed sig-

nificantly better in their assessments than did SEP students. Other researchers suggested that GEP students are of a higher academic level than are SEP students during the first half of the course. On the other hand, there are papers suggesting marginal or no advantage of GEP over SEP students except in the early years of the medical course. Dodds *et al.* [2] reported that GEP students had a marginal academic performance advantage during the early years of the medical course and that their performance advantage in clinical skills was less. Reid *et al.* [7] also reported that any academic performance advantage held by GEP students was limited to the early years of the medical course and was not evident during the clinical training in the later years. Shehmar *et al.* [3] reported that the performance on the final examination of GEP students was comparable to that of SEP students. The advantages among GEP students were believed to be due to much more basic knowledge, especially among those students with backgrounds in medical sciences, more advanced learning skills, and stronger motivation.

There have been no studies comparing students with low scholastic achievements between GEP and SEP students. In the present study, the rate of students who repeated one or more years was remarkably higher among SEP students compared with that among GEP students. The pass rate for the national examination

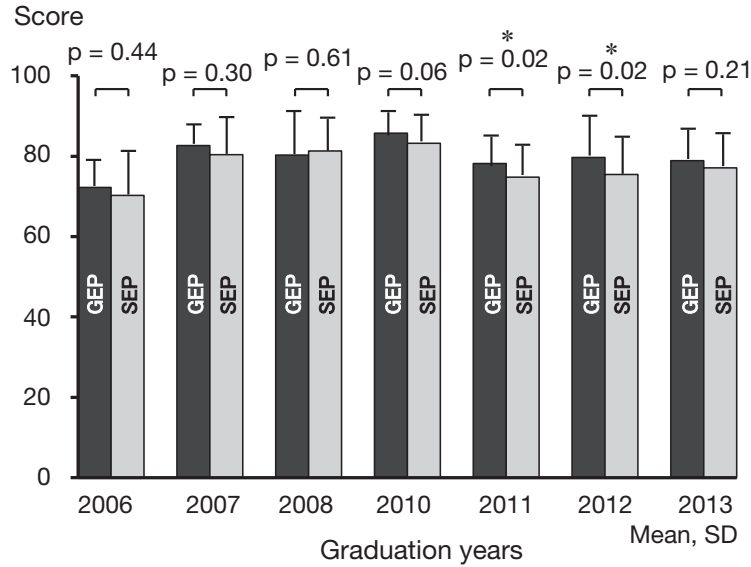


Fig. 3 GEP and SEP students' graduation examination scores from 2006 to 2013. GEP students' scores were significantly higher than those of SEP students. * $p < 0.05$. There were no GEP students in 2009 because the GEP was changed from 4 to 5 years during the observation period.

Table 2 Numbers of students who passed and those who failed the national examination for medical practitioners, N = 814

	Passed	Failed
GEP	180 (97%)	6 (3%)
SEP	562 (89%)	66 (11%)

Abbreviations: as in Table 1

$p < 0.001$

Table 3 Number of students who were present in the bottom 10% and in the top 90% of graduation examination score

	Bottom 10%	Top 90%
GEP	10 (5%)	180 (95%)
SEP	66 (10%)	582 (90%)

Abbreviations: as in Table 1

$p = 0.04$

for medical practitioners of the GEP students was significantly higher than that of the SEP students (Table 2), although there was no significant difference in the average graduation examination scores between the GEP and SEP students (Fig. 3). The nationwide average pass rate of the national examination for medical practitioners is about 90%. At the Tokai University School of Medicine graduation examinations, 10 of 190 (5%) GEP students were in the bottom 10%, as were 66 of 648 (10%) SEP students (Table 3). Therefore, the probability of students with poor scholastic achievements was significantly lower ($p = 0.04$) in the GEP students than that in the SEP students. All the SEP students

have a certain level of academic ability because they were all selected by their matriculation examinations. Poor results of SEP students seemed to be unexplained by their basic learning abilities. According to Malcolm Knowles' theory of andragogy, adults are independent and self-directing, they have accumulated a great deal of experience, which is a rich resource for learning, and they value learning that is integrated with the demands of their everyday life [8]. Before entering the medical program, all GEP students experienced learning as adults in universities, and they have rock-steady motivation to become physicians based on their social experiences after graduation. Thus, GEP students learn

mostly based on their own initiative. On the other hand, most SEP students have pedagogical experience and limited social experience; therefore, some of them might have low motivation upon matriculation. Most SEP students mature greatly during their medical studies, but some of them may still be minimally motivated and cannot learn well actively. In the medical curricula, which necessarily are built upon active learning, our results suggest that most GEP students have an advantage in scholastic achievements.

LIMITATIONS

We did not assess the clinical or academic performances of this cohort of students after their graduation. We assessed the scholastic achievements of GEP and SEP students in only one of the 80 medical schools in Japan.

CONCLUSIONS

This is the first large-scale study in Japan that compares the scholastic achievements of GEP students and SEP students. Although 35 of 80 Japanese universities have adopted GEPs, the number of students enrolled in GEPs remains small (about 3%). At Tokai University School of Medicine, the ratio of GEP students was 19% during the observation period. We were able to statistically and accurately compare the scholastic achievements of GEP students to those of SEP students because the number of GEP students was relatively large. We compared the scholastic achievements of GEP students directly to those of SEP students, because both GEP and SEP students studied together in the same classes, took the same examinations, and followed the same curricula. The rates of students who repeated one or more years, the scores of the graduation examinations, and the pass rates for the national examination for medical practitioners were compared between GEP and SEP students. The average score for the graduation examination among GEP students

was similar to that among SEP students. However, the ratio of SEP students with poor scholastic achievements was significantly higher compared with that of GEP students. These results suggest that GEP students have a higher probability of completing the medical curricular requirements and becoming physicians in fewer medical school years than do SEP students.

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