

Mid-career changes in the occupation or specialty among general surgeons, from youth to middle age, have accelerated the shortage of general surgeons in Japan

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Abstract

Purposes Concerns have been raised regarding an apparent shortage of general surgeons in Japan, but the actual situation is actually not altogether clear. To clarify the trends in the number of general surgeons in Japan, we studied the number of doctors by specialty over time.

Methods This study investigated the covered trends in the number of doctors over time, a comparison of work formats (employment in hospitals versus clinics), and the trends in the ratio of female doctors. We used data from the Survey of Doctors, Dentists and Pharmacists from 1996, 1998, 2000, 2002, 2004, and 2006.

Results Between 1994 and 2006, the number of general surgeons fell by 12.7 %, from 24,718 to 21,574. More than 20 % of the general surgeons, aged 25 to 54 years old,

either changed jobs or changed specialties between 1996 and 2006. Among the general surgeons, aged 25 to 54 years old, the number of those working in hospitals fell by 2,567 (16.2 %) between 2000 and 2006, while the number working in health clinics rose by 348 (19.8 %). The ratio of female general surgeons rose from 2.4 % in 1996 to 4.5 % in 2006.

Conclusions The decrease in general surgeons in Japan is largely often due to mid-career job separation.

Keywords The number of doctors · Hospitals · Clinics · Female doctors · Job separation · Doctor shortage

Background

General surgeons play an essential role in the medical field, performing elective surgeries on the digestive system and for breast disease, and emergency surgeries to combat traumatic injuries and acute abdominal conditions. In recent years, however, many countries have reported shortages of general surgeons [1–3] and concerns have been raised regarding the negative impact of this trend on health care [1].

However, little empirical research has been conducted on the apparent decrease in the number of general surgeons and the impact of this on medical practice, leaving the actual situation unclear. A study by Lynge et al. [4] showed that there were changes in the number of general surgeons over the past 20 years in the US, while a study by Williams et al [5] used the number of new general surgeons and the number of retiring general surgeons to calculate the number of general surgeons per capita, and to predict future declines in the number of general surgeons.

Consideration must be given to a variety of factors when discussing shortages in the number of general surgeons,

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including factors related to doctors and others related to patients. For example, the number of general surgeons is determined using the net balance between new surgeons and retiring surgeons. A clear reduction has been seen in the number of people wanting to become general surgeons [6], but the impact of occupational changes (changes in specialty, changes in job, retirement) is unclear.

We studied the trends in the number of general surgeons in Japan using data published every 2 years by the Ministry of Health, Labour and Welfare.

Methods

Survey subjects and data collection

This study examined the number of doctors for each specialty, by year. We surveyed those medical license holders who reported being employees of a medical facility (in 2006, this represented 94.8 % of all doctors reporting [7]), and we defined this pool as the “total practicing doctors”. We used data from the Survey of Doctors, Dentists and Pharmacists (for 1996, 1998, 2000, 2002, 2004, and 2006) to determine the number of doctors [7]. This survey is conducted every 2 years to identify the distribution of doctors, dentists, and pharmacists by gender, age, occupation, employer, and specialty (excluding pharmacists), and the results are made available to the public.

The medical system in Japan

To become a doctor in Japan, a person has to graduate from the medical school of a university and pass the national medical exam. Up until 2003, doctors could start their own specialized practice soon after passing the national medical exam. In 2004, however, the government changed the rules, requiring new doctors to spend 2 years in training after passing the exam. Under this system, since doctors train for 2 years in the fields of internal medicine, surgery, emergency medicine, pediatrics, obstetrics/gynecology, psychiatry, and community health medicine under this system, the selection of a specialty is postponed by 2 years. The selection of a specialty is left up to the individual, and is not regulated by the government or medical community.

Definitions

“General surgeons” are defined as those doctors who selected “surgery” in the section in which they were asked to identify their specialty (only one answer allowed) on the Survey of Doctors, Dentists and Pharmacists. “Surgical doctors” are doctors who selected any of the following as their specialty: surgery; orthopedic surgery; reconstructive

surgery; cosmetic surgery; neurosurgery; respiratory surgery; cardiac surgery; pediatric surgery; or colorectal surgery. “Internal medicine doctors” are those who selected any of the following as their specialty: internal medicine; psychosomatic medicine; pulmonology; digestive organs (gastroenterology); cardiovascular medicine; allergy immunology; rheumatology; pediatrics; psychiatry; neurology; or neuromedicine. “Ob/gyn doctors” are doctors who selected obstetrics/gynecology, obstetrics, or gynecology as their specialty. In addition to those listed above, the following specialties could also be selected: ophthalmology; otolaryngology; bronchoesophagology; dermatology; urology; venereology; rehabilitation (physical therapy); radiology; anesthesiology; and other (classifications of pathology, critical care, and resident were added in 2006).

This study defined the employment facilities based on the Medical Service Act. Hospitals are medical facilities with an in-patient ward with 20 beds, and clinics are medical facilities with either an in-patient ward with 19 beds, or no in-patient ward. Surgeries for serious injuries and other major surgeries are not usually performed at clinics. Furthermore, doctors in Japan do not generally work at more than one hospital, and it is rare for someone working at a clinic to perform surgery at a hospital.

Purpose of the study

The purpose of this study was to examine the trends in the number of general surgeons in Japan, and to identify factors influencing these trends.

Data analysis

This retrospective longitudinal survey of the number of doctors used age groups in 1996 (X) as the parent population, and compared this against the same age groups in 2006 ($X + 10$). As the <24- and 75-year-old age groups in 1996 did not have equivalent age groups in 2006, this study examined doctors between 25 and 74 years old in 1996.

Results

Trends in the number of general surgeons and the total number of practicing doctors

Figure 1 shows the trends in the number of general surgeons and the total number of practicing doctors. The total number of practicing doctors rose gradually by 19.3 % over the 12-year period, but the number of general surgeons fell gradually by 12.7 %. The ratio of general surgeons to total practicing doctors was 11.2 % in 1994, but fell consistently after that point, reaching 8.2 % in 2006.

Fig. 1 Trends in the number of general surgeons and the total number of practicing doctors by year. **a** Number of general surgeons. **b** Total number of doctors

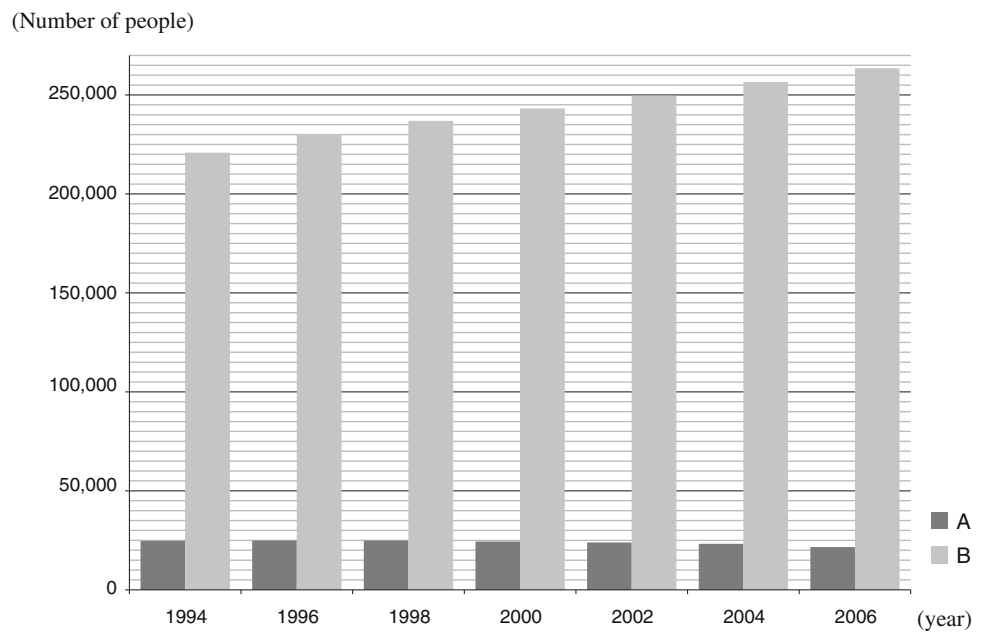
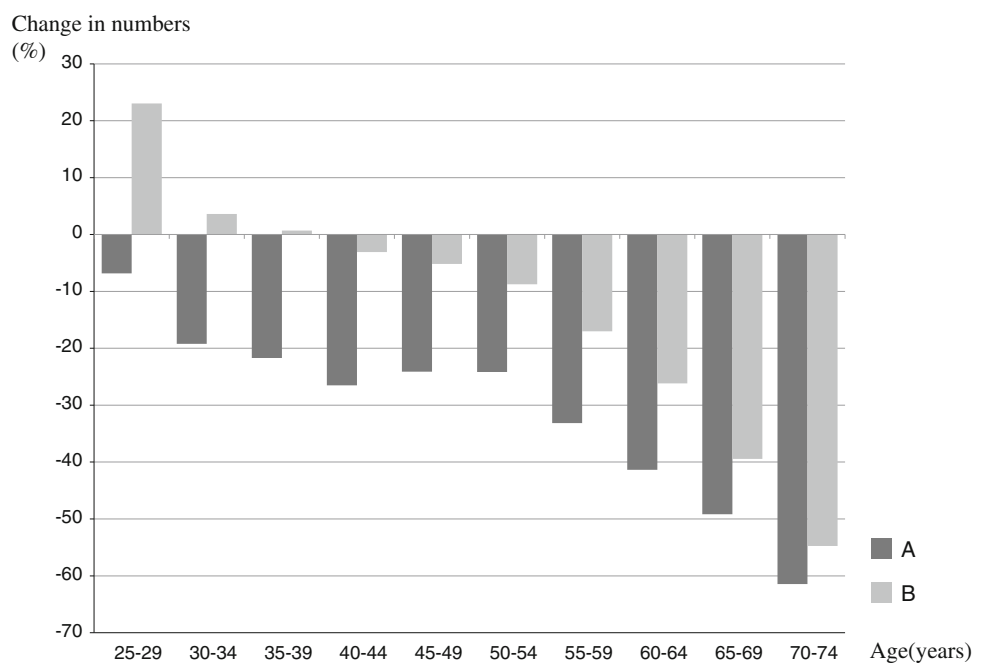


Fig. 2 The rates of the increases/decreases in the number of general surgeons and the total number of practicing doctors from 1996 to 2006, by age group. **a** Number of general surgeons. **b** Total number of doctors



The decrease in general surgeons

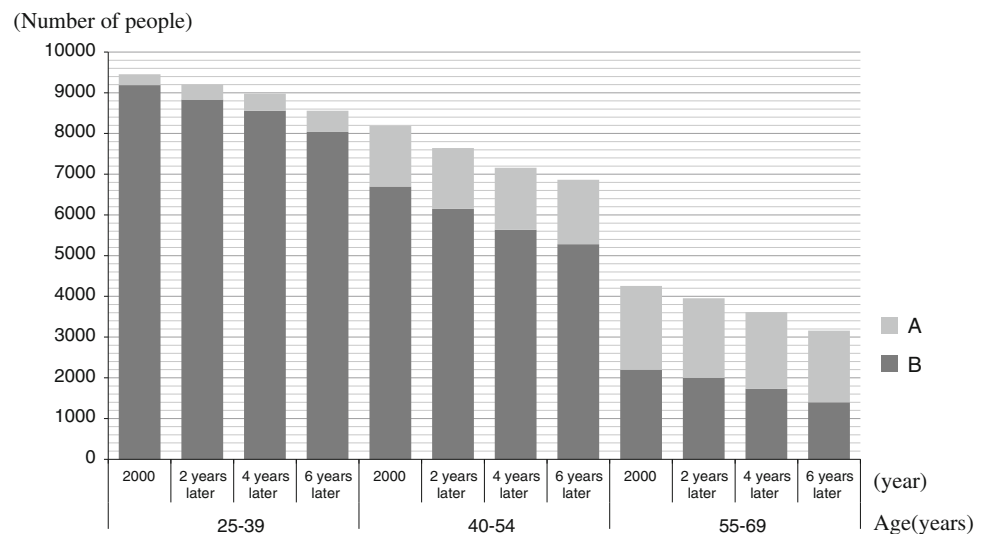
Figure 2 shows the number of general surgeons and the total number of practicing doctors in each age group in 1996 and the rate of change in those numbers over a 10-year period. Among the doctors who were 39 years old, the total number of practicing doctors increased, while the number of general surgeons decreased. Both numbers fell among doctors who were 40 years old, but the decrease in the number of general surgeons was

particularly significant. In the 30- to 40-year-old group, the total number of practicing doctors decreased by 0.7 %, while the number of general surgeons decreased by 22.6 %.

Comparison of hospitals and clinics

Figure 3 shows the number of general surgeons working in hospitals and clinics in 2000, and the trends in those numbers after 2, 4, and 6 years. In all age groups, the

Fig. 3 Trends in the number of general surgeons working in clinics and hospitals by age group in 2000, and the changes by age. The calculations of the number of general surgeons was performed after assuming that the number of people in each age group was 1/5 the number of people in the five age groups. **a** Number of general surgeons working in clinics. **b** Number of general surgeons working in hospitals



number of doctors working in hospitals decreased each year, but the rate of decrease was largest in the higher age groups. The number of doctors working in clinics increased slightly among doctors, aged 25–39 and 40–54 years, but decreased steadily among those aged 55–69 years.

Changes over a 10-year period in each specialty

Table 1 shows the changes in the number of doctors aged 25–74 years in 1996, for each specialty, over a 10-year period. The rate of decrease in the number of all surgical doctors and ob/gyn doctors was greater than the rate of decrease in the total number of practicing doctors. A breakdown of the internal medicine field showed that the rate of decrease in general surgeons (26.6 %) was larger than the rate of decrease in doctors in other specialties (4.3 %).

Table 1 Change in the number of doctors according to each specialty

	1996 (n)	2006 (n)	Change (%)
Total no. of practicing doctors	219,410	203,669	−7.2
Surgical medicine	51,101	43,528	−14.8
General surgery	24,185	17,757	−26.6
Other surgery	26,916	25,771	−4.3
Orthopedic surgery	16,180	15,514	−4.1
Neurosurgery	5,616	5,068	−9.8
Cardiovascular surgery	2,021	1,900	−6.0
Respiratory surgery	744	949	27.6
Internal medicine	110,997	104,884	−5.5
Obstetrics/gynecology	11,859	9,768	−17.6

Trends in the ratio of female doctors

Figure 4 shows the ratio of female doctors to all practicing doctors and to general surgeons from 1996 to 2006. The ratio of female doctors to all practicing doctors and to general surgeons has been increasing, but the ratio among general surgeons is lower than the ratio among all doctors.

Discussion

This study is the first to clarify the trends in the number of general surgeons in Japan. The number of general surgeons fell by 12.7 % from 1994 to 2006. This situation is being made even worse by the shortage of doctors in obstetrics/gynecology, which is becoming a social problem (Table 1) [8].

The decrease in general surgeons in Japan is largely often due to mid-career job separation. The rate of job

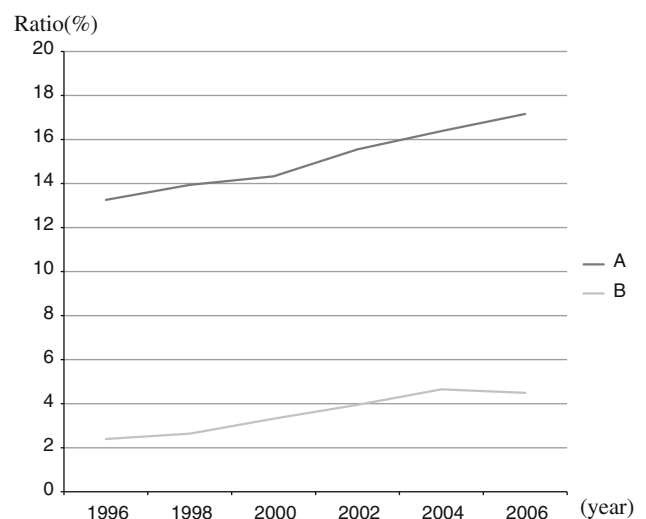


Fig. 4 Trends in the ratio of female doctors by year. **a** Total number of doctors. **b** Number of general surgeons

separation is particularly high among those in their 30s and 40s. Many studies have been conducted on the shortage of general surgeons from the perspective of the “shortage of candidates” [6], and this problem has not been adequately discussed. Nonetheless, considering that doctors in their 30s and 40s are on the front lines of general surgical medicine and play a central role in the education of their successors, and given that time is required to train general surgeons, this represents an extremely important problem. As long as this situation continues, the loss of general surgeons is highly likely to continue to worsen at an accelerated pace.

Of particular interest in this study is the fact that the decrease in the number of general surgeons is much more pronounced than the decrease in other specialties. Overwork, medical lawsuits, and low wages [9, 10] have been identified as reasons for the shortage of doctors working in the fields of surgery and obstetrics, but it would be difficult to imagine that these factors would be significantly different between general surgery and other specialties. The decrease in general surgeons may be associated with other reasons that have not yet been identified. Further research is thus warranted.

In this study, the job separation rate among general surgeons working in hospitals was higher than that among those working in clinics. This is reflective of the poor working conditions facing hospital doctors, as compared with doctors in private practice [11, 12]. Still, considering that most major surgeries are performed in hospitals on injured or seriously injured patients [13], the high number of general surgeons working in hospitals who leave their hospital jobs indicates that the wait times for surgery may increase, and suggests a risk that emergency surgeries may not be able to be accommodated.

One issue worth mentioning is that, among all age groups, the decrease in the number of general surgeons working in hospitals exceeded the increase in the number of general surgeons working in clinics (Fig. 3). Many people think that Japanese doctors work in hospitals until they are 40 to 50 years old, then open their own practice in that same specialty. However, this is not the reality. A doctor working at a hospital is more likely to leave general surgery for another specialty, or to change specialties when they open their own practice.

The ratio of female doctors to all practicing doctors and to general surgeons has been increasing every year (Fig. 4). However, a large gender gap remains in both categories. The ratio of female doctors to all practicing doctors was 17.2 % in 2006, but the ratio to general surgeons was only a low 4.5 %. Female doctors are probably not being adequately utilized in the field of general surgery. The number of female doctors is expected to increase in the future [14]. To end the

shortage of general surgeons, better utilizing female doctors in this field, encouraging young female doctors to enter the field and creating a work environments that is welcoming to female doctors will be important.

This study has provided valuable information regarding the actual nature of the shortage of general surgeons in Japan, but also has several limitations that must be noted. First, this study does not provide any information on the reasons for the job separation among general surgeons, or the paths followed by general surgeons after leaving their jobs. Understanding these issues will be important for identifying measures to prevent general surgeons from leaving their specialties. Under the conventional Japanese training system, surgeons would often start out in general surgery, only later to proceed to a specialized surgical field, such as cardiac surgery. The revisions made to the clinical training system [15] in 2004 have had an impact on this conventional career path for surgical doctors, and may have biased the present results. Second, this study was not able to adequately discuss the problem of the “lack of candidates” wanting to work in surgery in the first place. Further research on these topics is needed.

Finally, it is necessary to discuss the establishment of an optimal strategy to manage this issue. One of the approaches could be to increase the number of the high-volume centers. Concentrating general surgeons in the high-volume centers may improve the performance of the medical team. In fact, such high-volume centers for cancers are now being established in Japan. On the other hand, the efficacy of such centers remains controversial. Namely, some general surgeons are concerned about a potential worsening of accessibility to such clinics by patients living in rural areas. Future investigations will thus be needed to accurately evaluate the current situation. It may also be useful to allow or encourage general surgeons who leave general surgery for another specialty or who opening their own private practice to perform surgery at their hospitals. Since operations are usually carried out by two or more general surgeons, this can help hospital general surgeons who carry out the operations as a chief operator. The team of general surgeons at the hospital may therefore be able to perform more operations by utilizing such a system.

In summary, we herein demonstrated that the decrease in general surgeons in Japan is largely due to mid-career job separation. Between 1994 and 2006, the number of general surgeons fell by 12.7 %, from 24,718 to 21,574. More than 20 % of the general surgeons aged 25 to 54 years old either changed jobs or changed specialties between 1996 and 2006. Among the general surgeons aged 25 to 54 years old, the number working in hospitals fell by 2,567 (16.2 %) between 2000 and 2006, while the number working in health clinics rose by 348 (19.8 %). These

findings will help to establish an optimal strategy to manage patients despite the decrease in the number of general surgeons in Japan. This information will also be useful for evaluating the healthcare situation in countries, where similar trends have also been reported.

Conflict of interest The authors declare no conflict of interest.

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