Surgery Today (2019) 49:870–876
https://doi.org/10.1007/s00595-019-01819-4

ORIGINAL ARTICLE

A snapshot of surgical resident training in Japan: results of a national-level needs assessment survey

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Received: 9 November 2018 / Accepted: 13 April 2019 / Published online: 17 May 2019

Abstract
Purpose To evaluate the status of surgical training in Japan through a national-level needs assessment.
Methods A survey was sent to all 909 graduating residents (GRs) and their 611 program directors (PDs) for the year 2016. A working group of surgical educators from around the country was formed under the education committee of the Japan Surgical Society. The survey items were developed by consensus of this working group. The survey investigated the knowledge and problems of the current curriculum, and the status of the current residency training.
Results The response rates were 56.3% of the GRs and 76.8% of the PDs. Among the participants, 47.6% of the GRs and 29.4% of the PDs believed that the residency curriculum did not match the clinical experience. Over 80% of the GRs and PDs agreed on the importance of training outside of the OR, whereas only 13% of the GRs had received such training regularly. Trainees also reported a lower satisfaction rate about the opportunity to train outside of the OR.
Conclusion This national-level needs assessment of surgical training in Japan identified several gaps in the curriculum. These results provide valuable data to assist the ongoing efforts for surgical residency curriculum improvement.

Keywords Needs assessment survey · Surgical residency training · Surgical education · Curriculum

Introduction

In 1904, W S Halsted introduced the apprenticeship model of "See one, do one, teach one" which has been the backbone of surgical education worldwide for more than a century [1]. In the last few decades, the field of surgical education has undergone remarkable evidence-based transformation through the incorporation of simulation training, objective evaluation of residents, and feedback. Especially in North America, several national studies have been published to define this new training paradigm in surgery [2, 3]. Despite these advances in other countries, surgical education in Japan remains in its infancy and has not caught up with the changes.

Residency training in Japan is traditionally overseen by various societies. The Japan Surgical Society has been setting the surgical residency training curriculum and conducting board certification examinations [4]. For the board certification of surgery, trainees first need to complete a minimum of 2 years of training after internship to be able to sit the written examination. After passing this examination and achieving the minimum required operative experience of 350 cases and academic achievement, trainees are allowed to sit for the final board certification examination, held 1 year after the written examination. The trainees passing this exam are then recognized as board-certified surgeons (https://www.jssoc.or.jp/). A new slightly modified version of the surgical residency curriculum was introduced in Japan in April, 2018. However, a nationwide needs assessment of surgical trainees and program directors (PDs) has not been performed.

A recent study on the state of the surgical residency system in one region of Japan identified limitations in the structure and evaluation system of surgical residency training programs in this country [5]. However, this study surveyed only the opinions of PDs. There is currently no national-level

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Extended author information available on the last page of the article study available that has evaluated surgical residency training in Japan and that has included the perspectives of both residents and PDs. The viewpoint of the surgical trainees and surgery PDs may help identify any gaps and areas for improvement in the surgical curriculum. Thus, the objective of this study was to conduct a national-level needs assessment survey of all graduating residents (GR) and their PDs to identify areas for improvement in the Japanese surgical training curriculum.

Methods

Ethical issues

This research proposal was approved by the institutional review board of the Japan Surgical Society (JSS2016-1). Only participants who gave their written informed consent for participation in the survey were included in this study. Each participant was provided with a unique identification code and informed of their right to retract their response. Identification codes were managed by the staff of the Japan Surgical Society, and only the researchers had access to the survey data.

Development of the survey

The surgical training curriculum of the Japan Surgical Society, which is currently used for the training of surgical residents in Japan, was reviewed by the researchers. Focus groups were held with local residents and PDs. Finally, a literature review of previously published relevant studies was conducted to identify potential gaps in the surgical residency curriculum in Japan. A working group was formed under the auspices of the educational committee of the Japan Surgical Society and included medical and surgical educators from various Japanese institutions. The members of this working group were chosen based on their interest and prior work related to medical and surgical education in Japan. The working group selected the questions to be included in the survey. Questions inquired about the participants' demographic information (age, gender, years in training, location, type of program and number of procedures performed under general anesthesia), knowledge and perceived problems regarding the current surgical residency training curriculum, opportunity for training outside of the operating room (OR), satisfaction with their training, and overall opinion on the current surgical training system. Questions on the survey for the PDs were modified to include information on the program they represented.

Survey

The participants of this survey were all the GRs who had passed their final board certification examinations in 2016, and their PDs. The survey was distributed in December, 2016. The survey material consisted of an explanation of the objective of the survey, informed consent form, consent withdrawal form, return envelope, envelope for the survey, and a link to an online survey for those who were more comfortable filling out the survey online. An online platform was created on www.surveymonkey.com. The survey was open for 40 days and two e-mail reminders with a link to the online survey were sent during this period.

Results

Graduating residents

A 13-item survey was sent out to the 909 GRs of 2016. The response rate was 56.33% (512 out of 909). More than half of the responding GRs had needed more than the minimum required 4 years of training to graduate. The majority had trained in both university- and community hospitals and were planning to subspecialize in gastrointestinal surgery. While 67% of them had performed more than 200 cases under general anesthesia, nearly 7% had graduated with experience of fewer than 100 cases (Table 1).

Program directors

An 11-item survey was sent out to the 611 PDs of the GRs of 2016. The response rate was 76.8% (469 out of 611). PDs were predominantly male and had graduated in the 1980s (Table 2). A total of 70.6% (311/469) of the PDs identified themselves as gastrointestinal surgeons, whereas 16.8% (79/469) had more than one subspecialty.

Curriculum

Only about 20% of the responding GRs and 30–40% of the PDs were aware that the current curriculum mandated that surgical trainees obtain experience in several infrequent procedures (Table 3). Only 7% of the responding GRs reported having achieved the minimum case number required for graduating without any issues. Most (56.9%) had difficulty acquiring experience of trauma cases (Table 4).

Nearly half of the GRs (47.6%) and almost one-third (29.4%) of the PDs believed that the current curriculum requirements did not match the actual clinical experience.

Table 1 Demographics of the responding graduating residents

	Number of respondents (%)
Age, mean (SD)	32.8 (3.1) years
Sex	
Male	397 (79.7)
Female	101 (20.3)
Medical school graduation year	
2011	224 (44.2)
2010	115 (22.7)
2009	55 (11)
< 2009	99 (19.5)
Years in training (years)	
4	254 (49.5)
5	110 (21.6)
6	63 (12.4)
> 6	83 (6.3)
Training institute	
University hospital only	15 (3)
Community hospital only	140 (27.6)
Both	350 (68.9)
Subspecialty orientation	
Gastroenterological	292 (57.0)
Cardiovascular	57 (11.1)
Thoracic	58 (11.3)
Breast	41 (8.0)
Other	50 (9.8)
Not decided	14 (2.7)
General anesthesia procedures performed	
< 100	35 (6.9)
100–149	60 (11.9)
150–199	72 (14.2)
> 200	339 (67.0)

Table 2 Demographics of the responding program directors

	Number of respondents (%)
Sex	
Male	457 (98.5)
Female	7 (1.5)
Medical school graduation year	
> 2000	7 (1.5)
1990s	68 (14.6)
1980s	237 (58.5)
1970s	89 (19)
< 1969	28 (6)
Institute category	
University hospital	170 (36.5)
University affiliated hospital	209 (44.8)
Community hospital	87 (18.7)
Subspecialty	
Gastroenterological	331 (70.6)
Cardiovascular	59 (12.6)
Thoracic	42 (9.0)
Breast	68 (14.5)
Other	58 (12.4)

Table 3 Knowledge of the content of the curriculum

	Residents	Program directors
Ultrasound examination	67.5	85.8
Epidural anesthesia	21.7	37.2
Insertion and monitoring of a Swan–Ganz Catheter	16.2	29.4
Pericardial puncture	23.4	42.5
Cricothyrotomy	60.3	64.1
Team work	94.9	95.6
Terminal care	85.2	91.1

Results are expressed as the percentage of responders who knew that these procedures were listed in the curriculum

One-third of the responding GRs reported that they did not understand the curriculum properly. About 30% of the PDs indicated that there was no problem with the current curriculum, whereas 33% felt that having goals in the curriculum that were not evaluated was a problem (Table 5). Forty-two of the responding GRs (8%) and 32 of the responding PDs (7%) left their comments on the problems with the current curriculum in the free-comments section. The most frequent comment was that there is a need for a program designed to consider the subspecialty that the trainees want to pursue.

Residency training

Most of the responding GRs (86%) and PDs (90%) agreed that training outside of the OR was necessary, whereas only 13% of the responding GRs received regular training outside the OR. Nearly 70% of the institutes of the responding GRs and PDs offer training outside the OR on an irregular basis (Table 6). Most of the responding GRs and PDs were satisfied with the number of cases, variety of cases, number of instructors, time allocated for instruction, and quality of the instructors. However, both the GRs and PDs were comparatively unsatisfied with the opportunity for training outside of the OR and lectures. The PDs were also unsatisfied with the budget allocated for education (Table 7).

Table 4 In which area did you find it difficult to collect the required minimum number of cases?

Area (minimum requirement)	Respondents
Gastroenterological and abdominal solid organs (50 cases)	1 (0.2%)
Breast (10 cases)	6 (1.2%)
Thoracic (10 cases)	13 (2.6%)
Cardiovascular (10 cases)	87 (17.1%)
Peripheral vascular (10 cases)	29 (5.7%)
Head, neck, body surface, endocrine (10 cases)	7 (1.4%)
Pediatric surgery (10 cases)	63 (12.4%)
Trauma (10 points)	290 (56.9%)
Endoscopic surgery (10 cases)	0 (0.0%)
Had no problem	36 (7.1%)
Unknown	0 (0.0%)

Results are expressed as the number of respondents (%)

Table 5 Did you participate (residents)/administer (program directors) training outside of the operating room?

	Residents	Program directors
Regularly	13.3	21.2
Irregular	70.9	67.1
None	15.8	11.8

Results are expressed as the percentage of responders

Table 6 Do you agree with the statement that "training outside of the operating room is necessary for the acquisition of surgical technique"?

	Residents	Program directors
Strongly agree	44.7	33.3
Agree	41.4	56.4
Neither	9.2	7.7
Disagree	3.7	2.4
Strongly Disagree	1.0	0.2

Results are expressed as the percentage of responders

Discussion

This study evaluates the first national-level survey to assess the surgical residency training system in Japan. It had a robust response rate and thus presents a picture of the residency training system in Japan. The data showed various areas with potential for improvement.

Unlike most other countries, where there is fixed number of years for residency, Japan has only a minimum number of years in its training requirement. Surgical training in Japan is a continuous process and general surgery training often overlaps with training for subspecialties and super specialties, with trainees gradually gaining independence based on their superior's confidence in their ability. This system has the merit of being able to educate until the trainee becomes truly independent; however, the Japan board certification does not carry tangible benefits, contrary to that in many other countries. Board certification is not necessary for independent practice and it does not influence salary or other benefits. The lack of board certification does not restrict surgeons from working in an institute or department of their choice or from performing any procedures. This can lead to a lack of motivation among trainees to obtain board certification within a certain period. In the current survey, less than half of the trainees graduated within the minimum training period. The current system also lacks definitive endpoints for training completion. The absence of defined goals in surgical residency can also make the certification process difficult to grasp by the public.

In our survey, more than 80% of the PDs identified themselves as having one subspecialty. Similarly, almost all the GRs had decided on the subspecialty they wanted to pursue. The reality that most surgeons in Japan pursue specialization may undermine the importance of general surgery training. Accordingly, early on, general surgery residents may focus on the skills required for their subspecialty of choice rather than on those required to become a competent general surgeon. In fact, nearly half of the GRs who responded to our survey pointed out that this tendency may cause a discrepancy between the actual clinical training the residents are receiving and the curriculum goals of the Japan Surgical Society. Another contributing factor may be that most of the respondents were not fully aware of the curriculum's content. Indeed, half of the PDs were not aware of some of the goals and content of the curriculum, while 80% of the GRs who finished their training under this curriculum were unfamiliar with its goals. One of the main reasons for this may be that the curriculum has several goals, including those we asked about in this survey, which are not assessed during the certification process and, therefore, are not given appropriate attention by the trainees. As trainees focus their efforts on achieving the minimum case number requirement for the certification process, they ignore other curriculum components that are not assessed or required for certification. Thus, the disconnection between the curriculum goals and certification assessment undermines the value of the curriculum itself. As such, the goals set in the curriculum, as well as their importance in clinical practice, need to be reassessed. The procedures and skills that are deemed important to all trainees across all subspecialties should be prerequisite to sitting the certification examination. A flexible curriculum that respects clinical practice focusing on a subspecialty

Table 7 Satisfaction of various aspects of the residency training

	Highly satisfied	Satisfied	Neither	Unsatisfied	Highly unsatisfied
Number of procedures					
Residents	32.7	46.6	12.3	7.2	1.2
Program directors	45.7	39.8	8.0	5.6	0.9
Variation of procedures					
Residents	22.6	51.0	17.7	7.3	1.6
Program directors	36.9	40.6	12.0	9.2	1.3
Number of instructors					
Residents	20.2	56.4	19.0	4.1	0.4
Program directors	45.9	37.6	8.6	7.3	0.6
Time for instruction					
Residents	16.4	46.6	27.6	8.2	1.2
Program directors	23.5	38.6	26.9	10.3	0.7
Quality of the instructors					
Residents	16.7	51.5	23.2	7.3	1.4
Program directors	23.6	49.1	22.3	4.6	0.4
Training outside OR					
Residents	7.1	26.6	33.5	25.1	7.8
Program directors	9.7	26.6	24.9	28.1	10.7
Lectures					
Residents	4.5	17.9	47.5	24.6	5.5
Program directors	7.3	23.7	34.9	28.2	5.8
Resident evaluation					
Program directors	9.1	31.2	39.5	18.2	2.0
Resident feedback					
Program directors	8.4	33.5	36.9	19.7	1.5
Budget for education					
Program directors	2.8	13.3	29.5	36.1	18.3

Results are expressed as the percentage of responders

would also be advisable. We need to have training goals for each subspecialty, in addition to the essential training goals for all surgical trainees.

More than half of the GRs reported that they found it difficult to acquire the required number of trauma cases, which is mainly because Japan has few trauma cases and many are now managed non-operatively. In consideration of this fact, the requirement was changed from 10 trauma cases during the training period to a points system in which points are allocated for surgical experience and various trauma courses and lectures. This change was introduced a few months before the application process began and many residents were unaware of the change. Several responding GRs commented that they were unaware of the change in this regulation. Future residents are expected to be better prepared and equipped to collect trauma points.

The importance of simulation in surgical training is widely accepted and the number of simulation centers and training programs incorporating simulation training in their curriculum has been increasing worldwide [6]. However, a recent systematic review, highlighted the lack of studies on how simulation is implemented in the residency curriculum [7]. In a recent study from Germany, while 91% of the responding PDs agreed that simulation improves operative skills, only 27% of their respective institutes were equipped with a skills lab [8]. Our survey revealed similar results, with 86% of the GRs and 90% of the PDs agreeing that simulation improved surgical skills. Other studies have reported the enthusiasm of trainees toward simulation training [9]. However, in the present study, it was readily available to only 13% of the GRs. Neither the PDs nor GRs were satisfied with the opportunity for training outside of the OR and lectures. The results of this survey highlight the need to increase training opportunities involving simulation for surgical trainees.

In summary, the GRs were mainly concerned with the discrepancy between the surgical training curriculum of the Japan Surgical Society and the actual residency training, whereas the PDs were mainly concerned with the items in the curriculum that were not evaluated. Both the GRs and PDs were unfamiliar with some aspects of the curriculum and agreed that resident training outside of the OR was necessary. They also both voiced concerns about the limited budget for surgical education to enable this type of experience. Based on these findings, we recommend revision of the current curriculum to enable it to be more flexible, offering options based on subspecialty orientation. We also recommend increasing the budget for surgical education and establishing regional simulation centers. Training and testing in such centers may improve the skills of residents across the nation.

This study has several limitations. First, as residents often rotate around multiple institutions during their training, we were not able to differentiate the experience of the residents based on the class size of their training program. Similarly, as we had only data from the prefectures where the trainees were based, we were not able to differentiate between the experience of trainees in rural areas and those in cities or investigate the effect of hospital size on their training. These data were hard to capture, mainly because of the rotation of the residents around various hospitals during their residency training, with nearly 70% of the GRs rotating between the university hospital and the community hospitals. Finally, the PD participants of the survey were predominantly gastrointestinal surgeons and most of the trainees were also interested in gastrointestinal surgery, which may have introduced bias in the survey results. However, subgroup analysis between the groups did not show any difference in the answer patterns between those interested in gastrointestinal surgery and those not interested in this specialty, which suggests that our results accurately reflect the state of surgical residency training in Japan.

Conclusion

We conducted the first national-level needs assessment survey of surgical residency training in Japan. We identified several gaps in the curriculum and provided recommendations that could enhance the surgical residency training curriculum in Japan.

Acknowledgement We acknowledge the Association of Surgical Education, Surgical Education Research Fellowship (SERF) program for supporting Dr Saseem Poudel during this project. We thank all those who participated in this survey and we also thank Hidetaka Suzuki, Takamichi Sugiyama, Suguru Kuramochi, Azumi Hirano and the staff of the Japan Surgical Society Secretariat for providing logistics support during this study.

Compliance with ethical standards

Conflict of interest Saseem Poudel and his co-authors have no conflicts of interest to declare.

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