

A Survey of Medical Students' Attitudes Concerning Career Decisions

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Abstract

Background

There is currently a chronic shortage of surgeons, particularly cardiac surgeons, in Japan and worldwide. Additionally, the number of female medical students has been increasing worldwide; half of our university's medical students are females. We assessed the attitudes of medical students regarding preferred lifestyles and specialties, aiming to identify strategies for increasing the number of surgeons in Japan.

Methods

We conducted a questionnaire survey among second- and fifth-year medical students at Aichi Medical University, to assess their career priorities and ideal lifestyles when choosing specialties. In total, 71 second-year (male:female, 36:35) and 55 fifth-year (male:female, 27:28) students were surveyed. Differences were compared between school year and sex.

Results

Few students considered becoming general surgeons (19%) or cardiac surgeons (14%). Most students were more interested in how interesting (92%) and rewarding a particular field (88%) would be, rather than in dedication to work (7%) or career advancement (6%), regardless of school year or sex. Females were particularly concerned about a heavy workload (79% vs 68%) and were less likely to prefer surgery (9% vs 27%) compared with males. The importance of acquiring useful skills (77% vs 95%) and wanting to train in the neighboring Tokai area tended to increase (21% vs 60%) with increasing grade.

Conclusions

Most students had decided their ideal career path in the lower grades and desired controlled lifestyle. To increase the number of surgeons, it is necessary to improve surgeons' lifestyles, reduce their workloads, develop medical students' interest in surgery, and ensure development of useful skills.

Background

Perceived poor access to postgraduate training and heavy workload dissuade students worldwide from considering careers in surgery [1]; furthermore, interest in surgery among medical students has declined over the past decade [2]. Incompatibility with lifestyle or family commitments was noted to be the main reason for not wishing to pursue a career in surgery, which was closely followed by poor teaching of anatomy at medical school and perceived strong, competitive, and aggressive surgical culture [3]. The most common causes of attrition were the uncontrolled lifestyle of surgeons and choosing to pursue

another specialty [3, 4]. Uncontrolled lifestyle results from situations which surgeons must be available all times for emergent surgeries or high demand with a limited number of surgeons. In addition, limited exposure to surgery and the operating room during medical school may deter students from entering surgical careers [2]. Similar problems have also been noted in Japan [5, 6].

Nearly half of the medical school graduates are females who are less likely to pursue a career in surgery [7]. Similarly, almost half of the medical students at our university are females, and female residents often discourage female medical students from pursuing a surgical career, specifically because of the difficulties in balancing pregnancy and motherhood with training [7].

Interestingly, however, residents in the United Kingdom reportedly had a strong desire to choose cardiac surgery once they had an experience in the department [8]. Cardiothoracic surgery has been shown to be the least popular subspecialty for core surgical trainees across all surgical fields; however, among those who have had earlier experience in the specialty, it is immensely popular [8]. Some trainees have reported that workshops have a significant effect in influencing undergraduate medical students toward a career in cardiothoracic surgery [9]. The present study aimed to assess the attitudes of medical students regarding preferred lifestyles and medical specialties, with the goal of identifying strategies for increasing the number of surgeons in Japan.

Methods

We conducted a questionnaire survey among second- and fifth-year medical students at Aichi Medical University, Japan. A total of 71 second-year (36 males, 35 females) and 55 fifth-year students (27 males, 28 females) were included. The differences in outcomes were compared between the school year and sex.

The survey comprised seven sections that included 23 questions (**Figure 1**). The questions asked about the age, sex, ideal lifestyles, and specialty preferences of the medical students. Regarding an ideal lifestyle, questions about the students' career path, work–life balance, private life, wishes of having a family, and present vision of their future life were asked. The students were also asked about their priorities for decision-making, that is, if they were interested in a surgical career, in achieving job satisfaction, or in dedicating themselves to their work. They were also asked if they had concerns about heavy workload, working overtime or on nights and weekends, their personal welfare, harassment, salary, lawsuits, and having a good departmental atmosphere. The answers were assigned grades by the students to indicate their level of interest or concern.

The second-year medical students in our university study basic medicine and general liberal arts, and their questionnaire survey was administered in a class about professionalism. The fifth-year medical students had started their first-year clinical internship at Aichi Medical University Hospital, and their questionnaire survey was administered during their training in the Department of Cardiac Surgery. However, in 2020, some students could not attend the training because of self-isolation due to the coronavirus disease 2019 outbreak.

All procedures were performed in accordance with the protocols of the Ethics Committee of Aichi Medical University Hospital. The identities of the students were protected. All students provided written consent regarding use of the data containing their answers in scientific presentations or publications.

Data analysis and statistical methods

Continuous variables are expressed as the mean \pm SD or median (range), and categorical variables are expressed as the number (%) of patients. Data were analysed by Fisher's exact test for categorical variables. Continuous variables were compared using the Student's t-test, whereas the Mann–Whitney U-test was used for nonparametric variables. All data analyses were performed with JMP 14.1 software (SAS Institute, Cary, NC, USA). $P < 0.05$ was considered statistically significant.

Results

Our study population comprised 126 medical students from one university. The response rate was 76% (71/93) for the second-year students and 42% (55/108) for the fifth-year students. The response rate was small because of the abovementioned self-isolation of the fifth-year students. Moreover, some students were absent from the class and refused to answer the questionnaire. There were 71 second-year students (33 females, 46%) and 55 fifth-year students (27 females, 49%). Overall, 60 (48%) of the respondents were female.

The results for all students are shown in Fig. 2. Regarding the question about ideal lifestyles, few students considered becoming general surgeons (19%) or cardiac surgeons (14%), few were interested in dedication to work (7%) and career advancement (6%), and few were disinterested in having a family (14%). Regarding the question about their priorities for decision-making, most of the students focused on interest in the field (92%), rewarding work (88%), acquiring useful skills (86%), and a good departmental atmosphere (92%).

Tables 1a and 1b present the results of the comparisons between the second-year and fifth-year students. With increasing grade, more students tended to give importance to acquiring useful skills ($p = 0.0021$, Table 1b) and wanting to train in the neighboring Tokai area ($p < 0.0001$, Table 1a).

Table 1a
 Comparison of questionnaire results about ideal lifestyles between second-year and fifth-year students

	Second-year (n = 71)	Fifth-year (n = 55)	P value
Age (y)	21 (19–26)	23 (21–30)	< 0.0001
Sex (male, %)	36 (51)	27 (49)	0.43
Impressive experience (%)	49 (69)	44 (80)	0.16
Role model (%)	45 (63)	31 (56)	0.43
Surgeon (%)	10 (14)	13 (24)	0.17
Cardiac surgeon (%)	10 (14)	8 (15)	0.94
Training hospital (%)	15 (21)	33 (60)	< 0.0001
Dedication to work (%)	6 (8)	2 (4)	0.24
Less interested in having family (%)	4 (6)	4 (7)	0.74
Career advancement (%)	9 (13)	8 (15)	0.80
Subsidiary business (%)	18 (25)	18 (33)	0.41
Life centered on private life (%)	31 (44)	33 (60)	0.087
Family-centered life (%)	36 (51)	31 (56)	0.62
Private life with hobbies (%)	51 (72)	43 (78)	0.64
Statistical significance was defined as $p < 0.05$.			

Table 1b

Comparison of questionnaire results about priorities for deciding future career paths between the second-year and fifth-year students

	Second-year (n = 71)	Fifth-year (n = 55)	P value
Interest (%)	63 (89)	52 (95)	0.82
Atmosphere of the department (%)	63 (89)	52 (95)	0.56
Rewarding (%)	61 (86)	49 (89)	0.95
Acquiring useful skills (%)	55 (77)	52 (95)	0.0021
Secure welfare (%)	53 (75)	42 (76)	0.99
Harassment (%)	52 (73)	42 (76)	0.98
Salary (%)	49 (69)	44 (80)	0.28
Overtime work or urgent calls (%)	50 (70)	39 (71)	0.77
Lawsuits (%)	52 (73)	35 (64)	0.12
Heavy workload (%)	51 (72)	34 (62)	0.12
Training period (%)	44 (62)	37 (67)	0.74
Statistical significance was defined as $p < 0.05$.			

Tables 2a and 2b present the results of the comparisons by sex. Female students significantly considered heavy workload to be a problem ($p = 0.025$, Table 2b) and were less likely to consider becoming surgeons compared with male students ($p = 0.018$, Table 2a). In contrast, female students were more impressed by medical problems ($p = 0.0027$, Table 2a) whereas male students were more interested in being involved in side business ($p = 0.036$, Table 2a).

Table 2a
Comparison of questionnaire results about ideal lifestyles by sex.

	Male (n = 62)	Female (n = 58)	P value
Second year: Fifth year	36:27:00	33:27:00	0.43
Impressive experience (%)	40 (65)	52 (90)	0.0027
Role model (%)	33 (79)	40 (69)	0.16
Surgeon (%)	17 (27)	5 (9)	0.018
Cardiac surgeon (%)	10 (16)	7 (12)	0.11
Training hospital (%)	24 (39)	23 (40)	0.38
Dedication to work (%)	4 (6)	4 (7)	0.93
Less interested in having family (%)	4 (6)	4 (7)	0.93
Career advancement (%)	7 (11)	10 (17)	0.58
Subsidiary business (%)	23 (37)	12 (21)	0.036
Life centered on private life (%)	36 (63)	27 (47)	0.21
Family-centered life (%)	34 (55)	32 (55)	0.55
Private life with hobbies (%)	49 (79)	44 (76)	0.58
Statistical significance was defined as $p < 0.05$.			

Table 2b
Comparison of questionnaire results about priorities for deciding future career paths by sex.

	male (n = 62)	female (n = 58)	p
Second year: Fifth year	36:27:00	33:27:00	0.43
Interest (%)	58 (94)	56 (97)	0.88
Atmosphere of the department (%)	57 (92)	57 (98)	0.24
Rewarding (%)	54 (87)	55 (95)	0.30
Acquiring useful skills (%)	54 (87)	52 (90)	0.69
Secure welfare (%)	46 (74)	48 (83)	0.49
Harassment (%)	45 (73)	48 (83)	0.32
Salary (%)	47 (76)	45 (78)	0.75
Overtime work or urgent calls (%)	42 (68)	46 (79)	0.26
Lawsuits (%)	42 (68)	45 (78)	0.13
Heavy workload (%)	37 (60)	47 (81)	0.025
Training period (%)	42 (68)	38 (66)	0.65
Statistical significance was defined as $p < 0.05$.			

Discussion

Interest in surgery among medical students has declined over the past decade [2]. There has also been a tidal change in recruitment into cardiothoracic surgery careers, with declining applicant numbers in the United Kingdom [9]. In Canada, surgical specialties have also seen a reduction in applications, whereas an increasing proportion of applications for “controlled lifestyle” specialties, such as radiology, emergency medicine, and anesthesiology [2]. The cardiothoracic surgery subspecialty has a poor reputation because of the difficult lifestyle [10]. The shortage of cardiac surgeons is a global problem [11]. The major reasons for the decrease in the number of cardiac surgeons are uncontrolled lifestyle, competitive and aggressive culture, and very long training period [3]. Uncontrolled lifestyle results from situations which surgeons must be available all times for emergent surgeries or high demand with a limited number of surgeons. Here, in Japan, we suffer from the same crisis [5, 12]. The present survey showed interesting similarities to previous ones conducted in other countries. Most students regardless of their school year or sex desired having a controlled lifestyle with their family in the future. Consistent with previous reports, the most common cause of attrition was the uncontrollable lifestyle of surgeons [4]. Peel et al. [2] found that most medical students did not see their lives as compatible with surgery, so they considered a career-focused surgical lifestyle as a primary deterrent to specializing in surgery.

Despite the introduction of national regulations on resident duty-hour restrictions in 2003, resident attrition remains a significant issue, particularly in general surgery training programs [4]. The same situation will probably occur in Japan when the work-style reformation program by the government will begin in 2024. To increase the number of surgeons, working surgeons should change their work-centered lifestyle into a controlled lifestyle that provides adequate work–life balance. The survey results reveal that appeal to medical students regarding dedication to work or career advancement would not be useful. Instead, we need to highlight good work environment and recognize most students' desire to have a family and be able to spend sufficient time with them. Moreover, it goes without saying that prospective students should be interested in surgery and that rewarding work, acquisition of very useful skills, and good departmental atmosphere are important.

The present survey revealed that female students particularly considered a heavy workload to be a significant problem and were less likely to consider becoming surgeons compared with male students. One of the major reasons for the decrease in the number of cardiac surgeons is that the number of female medical students has been increasing. Female students are less likely to pursue a career in surgery [1]. According to an American survey of female surgical residents who were pregnant, 29% considered dropping out and nearly 30% would advise female medical students to pursue a different career [13]. The main cause of discouragement and attrition in female residents was the difficulty in balancing pregnancy and motherhood with training [7]. The perception of sex discrimination is frequently reported during surgical experiences and has been shown to decrease interest in the pursuit of further surgical training [2]. The lack of female role models has also been reported as a cause of reduced interest in surgery among female students [2]. The present study revealed that female students were more impressed by medical problems than male students, but they were not interested in a career as a surgeon. We need to encourage talented and passionate female candidates to pursue surgical careers. To increase the number of female surgeons, working surgeons should seek to reduce their heavy workloads and change the work-centered lifestyle into a balanced lifestyle. Furthermore, we should eliminate sex discrimination and increase female role models.

Additionally, a national survey in the United Kingdom reported that poor teaching of anatomy to medical students was one of the reasons why residents did not choose to pursue a career in surgery. Some studies have reported that early exposure to surgeries and communication with surgeons was effective for increasing interest among medical students in surgical careers [3, 14]. The Surgical Exploration and Discovery Program is a unique combination of (1) internship, (2) informal discussions on surgical careers, and (3) hands-on simulation workshops [14]. Participation in the program also positively influenced their interest in pursuing a career in surgery [14]. The lack of female students' interest in cardiothoracic surgery may stem from a lack of experience in the field during medical school [15]. Furthermore, Burnside et al. [8] reported that residents had a strong desire to choose cardiac surgery once they had gained experience in the field of cardiac surgery. Cardiothoracic surgery has been shown to be the least popular subspecialty for surgical trainees, but it is immensely popular among those who have previously worked in the specialty [8]. In the present study, most students prioritized acquiring useful skills, working in a specialty that interested them, performing rewarding work, and a good departmental

atmosphere when deciding their future career path. In accordance with these results, working and teaching surgeons should consider establishing good relationships with medical students in earlier grades before their clinical internship, emphasizing the attractions of cardiac surgery, and giving residents opportunities to acquire useful skills.

Study Limitations

Our study had several limitations. First, we were able to collect data from only one institution, which may undermine the general applicability of our findings. Second, because our university is private, it may differ in some ways from national and public universities. Third, the results may not be universal because student awareness changes year to year. Nevertheless, our findings provide some insight into how to overcome the current worldwide shortage of cardiothoracic surgeons.

Conclusion

Most students already decide their future course in the lower grades.

They desire having a controlled lifestyle with their family and were not as interested in strictly dedicating their lives to work or career advancement.

To increase the number of cardiac surgeons, surgeons should change our own lifestyles, decrease heavy workloads, establish good relationships with medical students in earlier grades, emphasize the attractions of cardiac surgery, and provide residents opportunities to acquire useful skills.

Declarations

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Authors' contributions

KS and KM conceived of, designed the study and obtained the funding. KS designed the interview schedule. KS conducted and transcribed the interviews. KS and HW analysed the data. KS and KM drafted the manuscript. All authors contributed to the subsequent critical revision of the article. All authors have read and approved the final manuscript.

Availability of data and materials

The datasets generated and analysed during the current study are not publicly available as this may compromise participant anonymity.

Ethics approval and consent to participate

The need for ethics approval was waived in accordance with the protocols of the Ethics Committee of Aichi Medical University Hospital. In this study, verbal consent was obtained because it is based on a non-invasive questionnaire for medical students and the identities of the students were protected. In addition, the ethics committee approved this procedure.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Conflicts of interest

The authors declare that they have no competing interests.

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Figures

Questionnaire

1. Have you ever had impressive experiences by watching medical books, dramas, and movies?
2. Have you ever met role models?
3. Have you already chosen a specialty? If yes, which field did you choose?
 - Yes, surgeon
 - Yes, physician
 - Yes, other clinician, such as radiologist, anesthesiologist, or psychiatrist
 - Yes, basic medicine
 - No, not yet.
4. How much have you considered cardiac surgery?
 - Not a candidate at all
 - Rather not be a candidate
 - Can't say either way
 - I would consider being a candidate
 - Very interested in being a candidate
5. What kind of hospital are you planning to work in as a trainee?
 - Large hospital in Tokai area
 - Small hospital in Tokai area
 - Large hospital in other areas
 - Small hospital in other areas
 - Not yet
6. Which considerations are important for your ideal life-style? (Yes or no)
 - a. Dedication to work
 - b. Not interested in having a family
 - c. Career advancement
 - d. side business
 - e. A life centered on my private interest
 - f. A life centered on having a family
 - g. Private life with hobbies
7. How important are the following factors for choosing a career path? 1) strongly disagree, 2) disagree, 3) neither agree or disagree, 4) agree, 5) strongly agree
 - a. Interest in the area
 - b. Atmosphere of the department
 - c. Rewarding
 - d. Acquire useful skills
 - e. Secure welfare
 - f. Harassment
 - g. Salary
 - h. Overtime work or urgent calls
 - i. Potential for lawsuits
 - j. Heavy workload
 - k. Training period

Age () Male • Female Thank you for your cooperation

Figure 1

Questionnaire

Results for all students

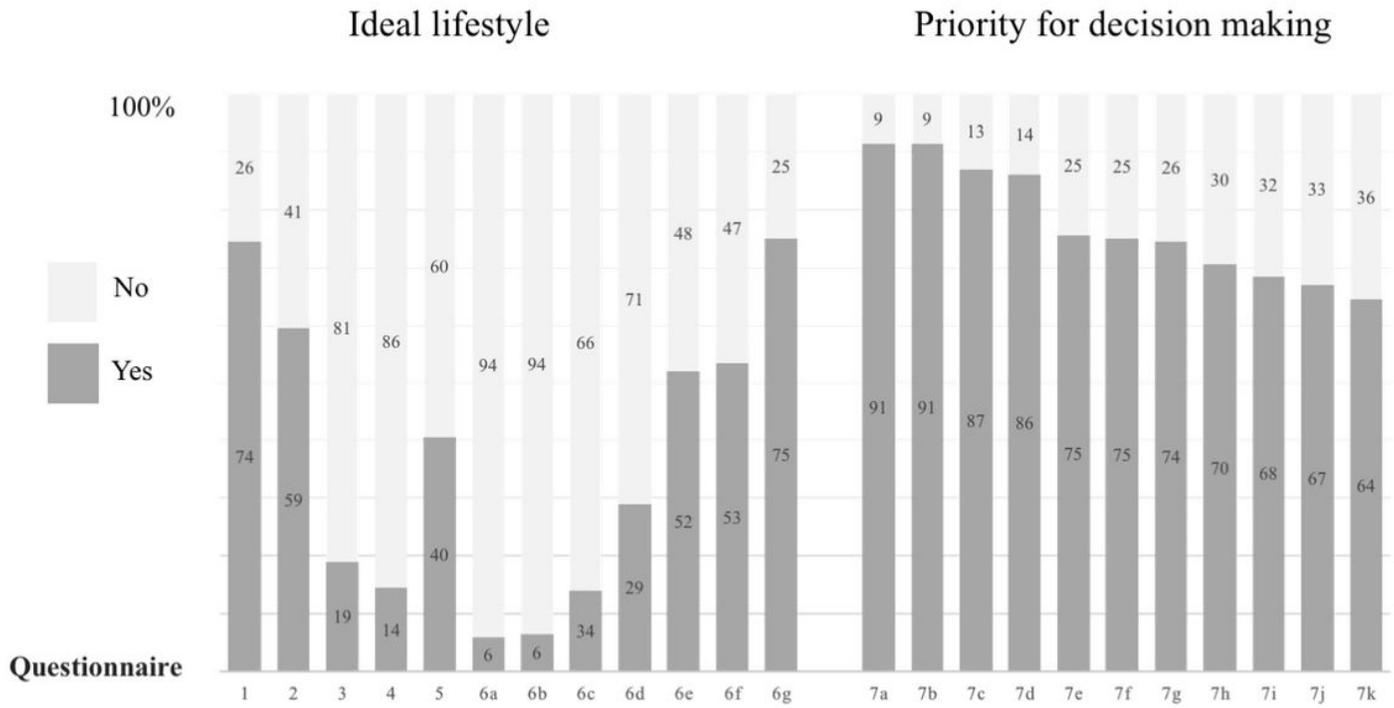


Figure 2

Questionnaire results of all students