# Changes in Japanese Medical Students' Attitudes Toward Traditional Japanese Medicine over the Course of Medical School

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**Objective: No report of newly enrolled medical students discusses their attitudes toward traditional Japanese medicine (TJM), Kampo medicine, or acupuncture and moxibustion (AM), or their changes over the course of medical school. This study evaluates these changing attitudes.**
**Methods: At Tokai University School of Medicine, from 2006 through 2015, 852 students were analyzed 3 times, pre-1st-year introduction Kampo lecture, pre-4th-year 6-hour lectures, and post-3-hour experience-based learning (EBL) course. The 7-item questionnaire included: general impression about Kampo medicine, interest, learning motivation, future involvement, and image, interest in AM, and learning motivation.**
**Results: Their attitudes toward TJM became positive during the 3 years even without TJM education. The 4th-year TJM lectures and EBL course significantly changed their attitudes toward more positive. Females' attitudes were more positive regarding TJM from the 1st year than were the males which became more positive after the EBL course. Students with TJM learning or work experience had positive attitudes from their 1st year and throughout medical school. Students with less positive attitudes became more active in TJM and positive at graduation.**
**Conclusion: Appropriate TJM education and standard medical education in preclinical years of medical school has helped make students' attitudes toward Kampo medicine and AM more positive.**

**Key words: Kampo medicine, Acupuncture and moxibustion, Medical education, Change of attitude, Questionnaire survey**

## INTRODUCTION

Traditional Japanese medicine (TJM) is classified as one kind of complementary and alternative medicine (CAM), and generally includes not only Kampo medicine but also massage, moxibustion, acupuncture, and acupressure [1]. In Japan, Kampo medicine broadly means TJM, but it is narrowly defined as Japanese herbal medicine in this study. In recent years, there has been a tendency to incorporate CAM into medical education worldwide. Kampo medicine has been introduced into education in all the medical schools in Japan [2], and acupuncture and moxibustion (AM) have been introduced in some medical schools. Nevertheless, the classes are limited, with an average of only 8.28 classes to graduation [3]. Even with so few classes, many medical students were already interested in Kampo medicine before the TJM classes and were becoming more positive in Kampo medicine because of the classes [4]. However, to our knowledge, there have been no reports published of newly enrolled medical students discussing their attitudes toward TJM and how their attitudes change over the course of medical school.

The current system of Japanese medical schools is different from that of American medical schools, most of which require graduation from a 4-year college or university and a track record of volunteering in medical related work for admission. In Japan, on the other hand, students who have graduated from high school may take the entrance examinations for the medical schools of their choice. The education in the Japanese medical schools is a standard 6-year course, which can be roughly divided into preclinical years for learning basic knowledge of medicine from the 1st to the 4th years followed by the clinical years for clinical rotations at hospitals in the 5th and 6th years. During the preclinical years, liberal arts are mainly taught in the 1st year, basic medicine in the 2nd year, and clinical medicine in the 3rd and 4th years.

Therefore, the objective of this study was to evaluate the effects on the students' attitudes toward TJM with standard preclinical education without TJM education, and then with TJM lectures and the experience-based learning (EBL) course in the 4th year by following their changing attitudes throughout medical school.

## MATERIALS AND METHODS

A total of 852 medical students (531 males and 321 females), who enrolled in Tokai University School of Medicine during the 10 years from 2006 through 2015, excluding transfer students and repeating students, were analyzed in this study.

The questionnaire was conducted 3 times, before the 1-hour Kampo introduction lecture in the 1st year, before the 6 hours of lectures (5 hours of Kampo

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lectures and a 1-hour AM lecture) in the 4th year, and after the subsequent 3-hour EBL course (a 1-hour session for each of 3 subjects: Kampo medicine, AM, and crude drugs). The questionnaire included 7 items: the students' general impression about Kampo medicine, interest, learning motivation, future involvement, and images, and regarding AM their interest and learning motivation. All the students gave their written informed consent (Additional file). However, no questionnaire was conducted after the 1st-year Kampo introduction lecture, and the questionnaire was simplified after the 4th-year EBL course, excluding the questions about learning motivation toward Kampo medicine and AM and general impressions about Kampo medicine because there were too many other questions for the students to answer in a short time.

The Kruskal-Wallis test was used to compare the median in the annual questionnaire. The Wilcoxon signed-rank test was used to compare the results of pre-lecture questionnaires in the 1st and 4th years, and before the lectures and after the EBL course in the 4th year. And the Chi-squared test was used to compare the images of Kampo medicine before the lectures in the 1st and 4th years and the differences in attitudes toward Kampo medicine by gender and experience with TJM.

This study was approved by the Institutional Review Board for Clinical Research of Tokai University School of Medicine (20R-301) and conformed to the principles of the Helsinki Declaration.

## RESULTS

To examine whether there was a significant difference among the results of the annual questionnaires, the answers to each question were visually compared in a graph for each year and statistically considered using the Chi-square test. As a result, there were no significant differences in the distribution of responses between the years. Therefore, in this study, the questionnaire responses were analyzed together for 10 consecutive years (2006–2015 enrollees).

There were 453 (241 males, 212 females) effective responses from 852 students, who responded validly to all 3 questionnaire surveys taken before the 1st-year lecture, before the 4th-year lectures, and after the 4th-year EBL course. Among them, 84 (19%) had experiences studying or working with CAM.

During the 3 years from the Kampo lecture in the 1st year to the TJM lectures in the 4th year, there were no classes on TJM but only the regular international standard medical education, and there was no significant change in the general impression of Kampo medicine ($p = 0.8171$) (Fig. 1(a)). However, regarding interest in Kampo medicine, there were significant increases in student interest before the 4th-year lectures compared to before the 1st-year lecture, and after the EBL course comparing before the lectures in the 4th year ($p = 0.0208, < 0.0001$, respectively) (Fig. 1(b)). In addition, the motivation for studying Kampo medicine increased significantly during the period without TJM education between the 1st-year classes and the 4th-year classes ($p = 0.0004$) (Fig. 1(c)).

Regarding prescribing Kampo formulas in the future, 323 students excluding those who answered "no idea" in the pre-lecture questionnaires in either the 1st or 4th year, and 389 students excluding those who answered "no idea" in the questionnaires before lectures or after the EBL course in the 4th year were analyzed, with the results showing that in both the attitudes for prescribing Kampo medicine became significantly more positive ($p = 0.0093$, $p = 0.0057$, respectively) (Fig. 2).

The students' interest in AM did not increase in the comparison between the pre-lecture questionnaire in the 1st year and that in the 4th year ($p = 0.1130$), but increased significantly between before the 4th-year lectures and after the EBL course ($p < 0.0001$) (Fig. 3(a)). The motivation for studying AM increased significantly before the 4th-year lectures compared to that before the 1st-year lecture ($p < 0.0001$) (Fig. 3(b)).

Regarding the images of Kampo medicine, compared to the pre-lecture questionnaire in the 1st year, that in the 4th year, the number of students who answered "difficult" increased, and that for "doubtful" decreased significantly before the 4th-year lectures ($p = 0.0387$, $p = 0.0451$ respectively). There were no other statistical differences (Fig. 4).

Regarding gender differences, in the 1st year, compared to male students, female students were more interested in Kampo medicine ($p = 0.0005$), had higher motivation for learning Kampo medicine ($p = 0.0001$), a better general impression of Kampo medicine ($p = 0.0267$), more interest in AM ($p = 0.0461$), and higher motivation for learning AM ($p = 0.0035$). However, there was no gender deference regarding future involvement with Kampo medicine ($p = 0.5100$) (Table 1(a)). Most of the male students' answers to questions about Kampo medicine and AM showed increased awareness before the 4th-year lectures and after the 4th-year EBL course. On the other hand, female students became more aware of Kampo medicine and AM after the 4th-year EBL course, but their awareness did not increase before the 4th-year lectures except for their motivation to learn AM. Therefore, most of the answers after the 4th-year EBL course had no gender differences (Table 1(b)).

We subsequently examined the differences in the attitudes toward TJM according to learning about or work experiences with CAM. In the 1st year, the students who had learning or work experiences were more interested in Kampo medicine ($p = 0.0024$), had higher motivation for learning Kampo medicine ($p = 0.0048$), and more positive future involvement with Kampo medicine ($p = 0.0153$) than did the lesser inexperienced students, but there were no differences in their general impression of Kampo medicine ($p = 0.1751$), nor interest in AM ($p = 0.2018$), nor learning motivation for AM ($p = 0.3806$) (Table 2(a)). Those who had TJM experiences did not significantly change the answers to the questions about Kampo medicine before the 4th-year lectures and after the 4th-year EBL course, but their interest in AM increased significantly after the EBL course ($p < 0.0001$). Furthermore, the lesser inexperienced students showed a significant increase in awareness in most of their answers on Kampo medicine and AM, not only after the 4th-year EBL course, but also before the 4th-year lectures without TJM classes over the past 3 years (Table 2(b)).

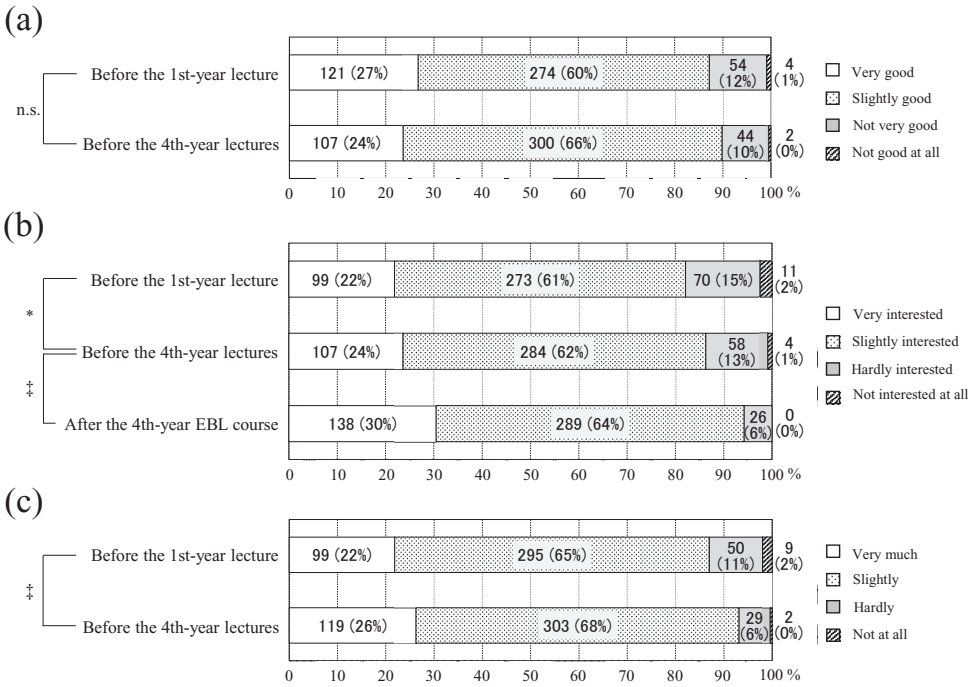


**Fig. 1** Changes in the students' attitudes toward Kampo medicine before the 1st- and 4th-year lectures and after the EBL course. A. General impression of Kampo medicine, B. Interest in Kampo medicine, C. Motivation to study Kampo medicine; Wilcoxon's signed-rank test, $n = 453$; $*p < 0.05$; $‡p < 0.001$.

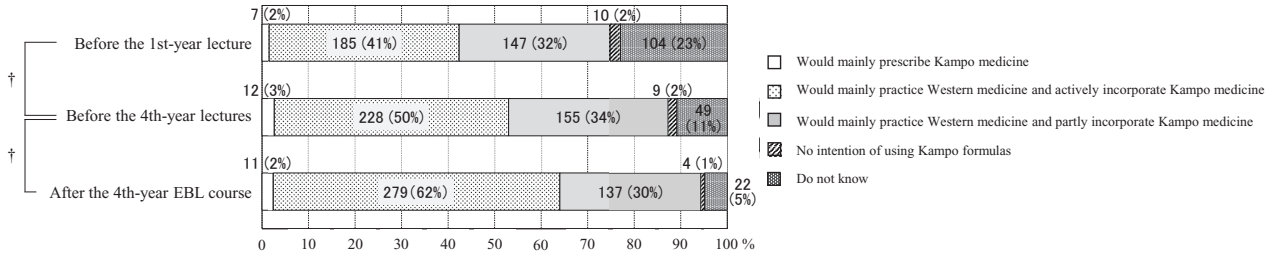


**Fig. 2** Changes in the students' attitudes toward prescribing Kampo formulas in the future as a practicing physician before the 1st- and 4th-year lectures and after the EBL course. Wilcoxon's signed-rank test, comparison between the two groups, analyzed excluding those who answered, "Do not know"; before the 1st- or 4th-year lecture, $n = 323$; before the 4th-year lecture or after the EBL course, $n = 389$; $†p < 0.01$.

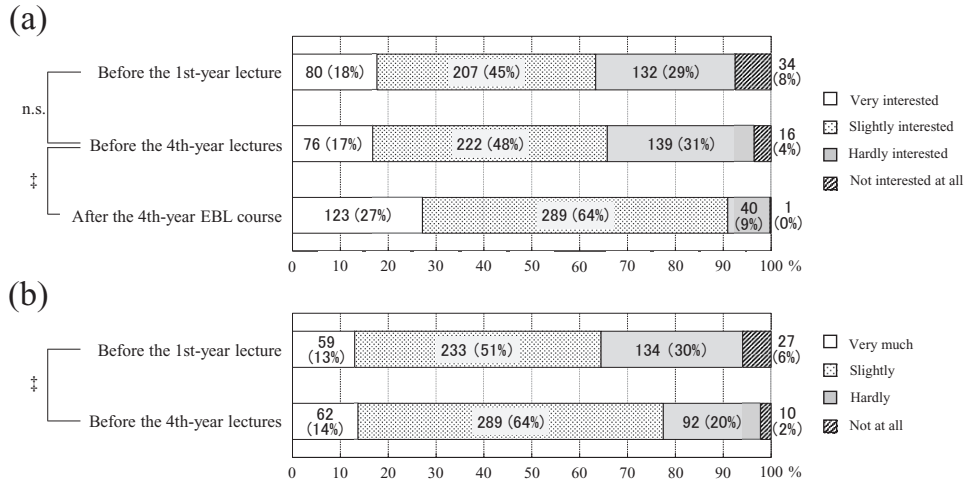


**Fig. 3** Changes in the students' attitudes toward AM before the 1st- and 4th-year lectures and after the EBL course. A. Interest in Acupuncture and Moxibustion; B. Motivation to study Acupuncture and Moxibustion; Wilcoxon's signed-rank test, $n = 453$; $‡p < 0.001$.

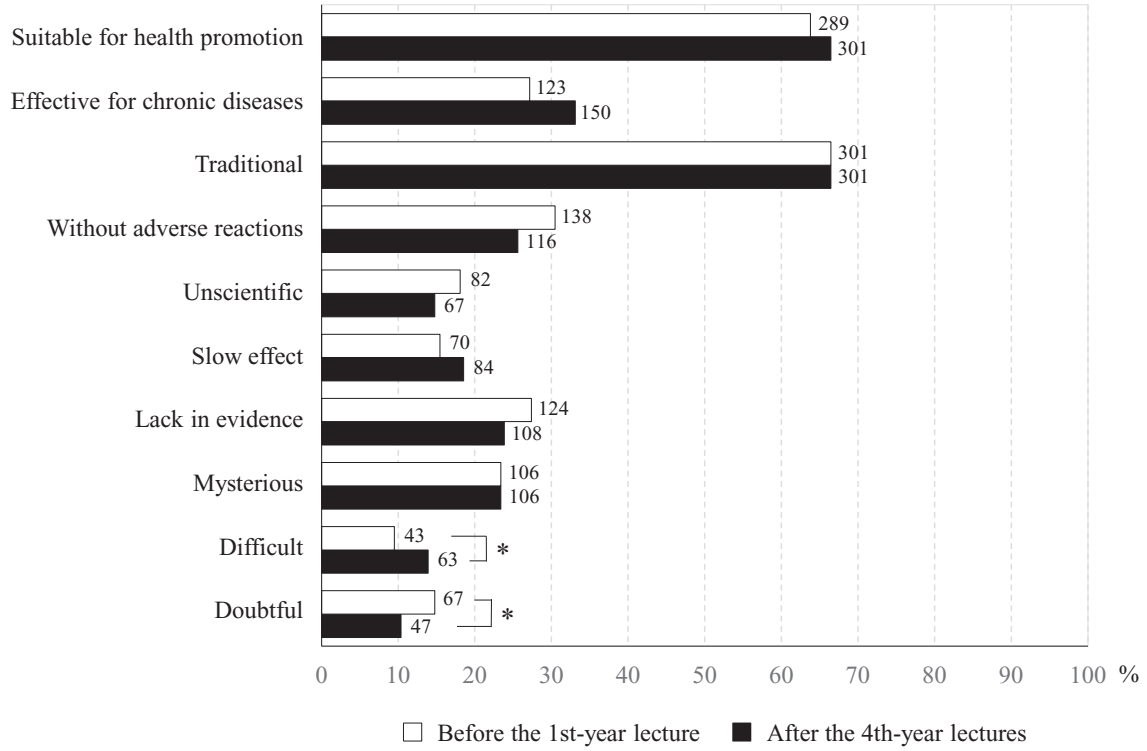


**Fig. 4** Impressions of Kampo medicine before the 1st- and 4th-year lectures (multiple responses allowed). Chi-squared test; $*p < 0.05$.

**Table 1** P value for gender differences in attitudes toward Kampo medicine and AM.

| | | | Kampo medicine | | | | AM | |
|---|---|---|---|---|---|---|---|---|
| | | | General impression | Interest | Learning motivation | Future involvement | Interest | Learning motivation |
| (a) | Gender differences ($n = 453$) (all female dominant) | Before the 1st-year lecture | 0.0267 | 0.0005 | 0.0001 | 0.5100 | 0.0461 | 0.0035 |
| | | Before the 4th-year lectures | 0.8377 | 0.2131 | 0.0314 | 0.5571 | 0.6571 | 0.1329 |
| | | After the 4th-year EBL course | – | 0.1336 | – | 0.6266 | 0.0096 | – |
| (b) | Male ($n = 241$) | Before the 1st-year lecture vs. Before the 4th-year lectures | 0.2011 | 0.0056 | 0.0008 | 0.0007 | 0.0580 | 0.0002 |
| | | Before the 4th-year lectures vs. After the 4th-year EBL course | – | 0.0001 | – | 0.2798 | < 0.0001 | – |
| | Female ($n = 212$) | Before the 1st-year lecture vs. Before the 4th-year lectures | 0.1142 | 0.7545 | 0.1633 | 0.5957 | 0.7688 | 0.0080 |
| | | Before the 4th-year lectures vs. After the 4th-year EBL course | – | 0.0001 | – | 0.0008 | < 0.0001 | – |

AM, acupuncture and moxibustion; EBL, experience-based learning; Wilcoxon's signed-rank test.

**Table 2** P value for the differences in attitudes toward TJM according to learning or work experience about CAM.

| | | | Kampo medicine | | | | AM | |
|---|---|---|---|---|---|---|---|---|
| | | | General impression | Interest | Learning motivation | Future involvement | Interest | Learning motivation |
| (a) | Experience differences ($n = 453$) (all experienced dominant) | Before the 1st-year lecture | 0.1751 | 0.0024 | 0.0048 | 0.0153 | 0.2018 | 0.3806 |
| | | Before the 4th-year lectures | 0.0014 | 0.0031 | 0.0050 | 0.0878 | 0.6698 | 0.6026 |
| | | After the 4th-year EBL course | – | 0.0421 | – | 0.0488 | 0.1120 | – |
| (b) | Experienced ($n = 84$) | Before the 1st-year lecture vs. Before the 4th-year lectures | 0.1624 | 0.3367 | 0.1621 | 0.4892 | 0.6732 | 0.0666 |
| | | Before the 4th-year lectures vs. After the 4th-year EBL course | – | 0.0975 | – | 0.2761 | < 0.0001 | – |
| | Non-experienced ($n = 369$) | Before the 1st-year lecture vs. Before the 4th-year lectures | 0.6230 | 0.0352 | 0.0010 | 0.0092 | 0.0734 | < 0.0001 |
| | | Before the 4th-year lectures vs. After the 4th-year EBL course | – | < 0.0001 | – | 0.0002 | < 0.0001 | – |

AM, acupuncture and moxibustion; EBL, experience-based learning; Wilcoxon's signed-rank test.

## DISCUSSION

As Kampo prescriptions used in TJM have a long developing history of more than 1500 years and they have been familiar to the Japanese for that long or even longer, currently they are readily available at drug stores in any Japanese city and widely used as medicines for self-medication [5]. According to a field survey in Japan, 53% of the residents were interested in CAM such as Kampo medicine, and 8.4% were actually receiving some kind of CAM treatment [6]. An internet survey also reported that 12.8% of the respondents used some form of CAM in the last 12 months [7]. Compared to these people, many Japanese medical students, who were not expected to have many social experiences before entering medical schools, were considered to have almost the same opportunities to come into contact with Kampo medicine. Therefore, we speculated at first that the percentage of medical students who were interested in Kampo medicine at the time of enrollment was around 50%, which was almost the same as the result of the previous field survey. After entering medical school, their motivation for learning general medicine would increase; and at the same time, their attitudes toward Kampo medicine would gradually become more positive.

However, contrary to our speculation, the results of this study showed that 83% of 1st-year medical students were already interested in Kampo medicine. Considering previous reports that the 1st- and 2nd-year medical students in the preclinical phase had a higher level of motivation for learning general medicine [8], they must have been highly motivated about Kampo medicine. It was also reported that nearly all 1st- and 2nd-year medical students were more positive about CAM because they thought that CAM included ideas and methods from which Western medicine could benefit, that the knowledge about CAM was important to them as students and their future as practicing health professionals, and that CAM should be included in the curriculum [9]. Moreover, some studies showed that most medical students changed their specialty choices, regardless of their initial interest [10], and that positive clinical exposure was one of the important factors when switching career choices [11]. Therefore, educational exposure to CAM, in many forms and in many articles, would be shown to significantly affect medical students' attitudes toward CAM, especially in their preclinical years [12]. There has been some fear expressed in medical academia that newer medical students, such as the 1st- and 2nd-year students in the present study, lacked a sound basis in rigorous medical training and, therefore, might be less critical of CAM therapies [13].

Contrarily, among clinical students who have received medical training, it was reported that they are less willing to use CAM compared to preclinical students [14]. However, the results of this study showed that students' attitudes toward Kampo medicine became more positive before the 4th-year lectures despite not having TJM education other than the 1-hour introductory Kampo lecture in the 1st year. This change in attitudes may stem from the differences in the medical education in Japan compared to that in other countries and the somewhat unique ways of thinking of the Japanese students. I.e., they have little experience in social activities such as working and volunteering before admission to medical schools, so that their main motivation for becoming a doctor might not be so much an admiration for professionalism with a sense of mission to help other people as the acquisition of the relatively high academic ability required to pass a medical school examination. Unlike university students from other countries, the reason Japanese university students generally lack academic motivation may be due to their more negative views and outlook, and applying to medical school for extraneous reasons and not necessarily on their own volition [15]. And from immediately after enrolling in medical school, various early exposures to medicine, such as lectures, hands-on training, tutorials, exchanges of opinions, and volunteer activities, might have increased their academic motivation. Although, upon admission to medical school, the decrease in high motivation of preclinical-year students may relate to a ceiling of high scores in attitude toward learning, loss of idealism, and the impact of an unintended curriculum [16], from the results of the present study, the peak of Japanese medical students' motivation for learning would seem to appear much later, after enrollment.

Regarding AM, the students' interest before the 4th-year lectures did not increase compared to that in the 1st year. Many general physicians have experiences using Kampo prescriptions in their daily practice because most Kampo prescriptions are covered by the national health insurance and are exceedingly popular in Japan [17]. However, AM is currently one of the relatively minor CAMs among Japanese physicians, despite the fact that it is an important part of TJM, because AM treatment is usually not covered by the national health insurance and most practitioners are acupuncturists with the national license that is different from a medical doctor's license [18]. Therefore, without AM classes, students would have scarce opportunities to become familiar with AM and, therefore, would most likely not be interested in it.

The differences in the attitudes toward TJM between males and females, and those depending on practice or learning experiences with CAM were also examined in this study. As a result, compared to male students, female students at the 1st year were significantly more interested in Kampo medicine and AM and expressed a desire to study them. A study of the use of CAM in Norway pointed out that neglect of women's health care needed in public health care might contribute to the fact that women to a higher degree than men turn to CAM and CAM products [19]. Other reports mentioned that female students were more likely than male students to recognize that CAM has an important role in health care, and it is noteworthy that this difference increased all through medical schools [20]. It was also reported that compared to male students, female students in the first 2 years were more likely to recommend CAM to their friends [21]. Furthermore, in the present study, it was speculated that the reason the gender difference narrowed despite the increased motivation before the 4th-year lectures was that female students, at the time of admission, were already at the ceiling of attitude scores. Regarding the difference in the attitude depending on practice or learning experiences of CAM, those who had experiences with them

had positive attitudes toward Kampo medicine at the time they entered the medical schools, but there were no differences between those who had experience with AM and those who did not. This result may indicate that AM is generally less popular in Japan than is Kampo medicine.

We then examined the impact of the 6 hours of lectures and the 3-hour EBL course provided to 4th-year students on their attitudes toward TJM. Because of repeated ingenuity in a series of Kampo lessons, such as focusing on the core concept of Kampo medicine [4], introducing a unique Kampo sommelier practice in the EBL course [22], and letting students experience AM techniques [23], students' awareness of Kampo medicine and AM, which had been raised before the 4th-year lectures, improved dramatically after the EBL course. As a result, the attitude of male students had become positive, so that there was no longer any gender difference with female students. It was reported that appropriate TJM education raised medical students' awareness of Kampo medicine and AM [24], and the results of this study also supported that finding. However, questions on Kampo medicine and AM are seldom asked on the national examination for medical practitioners in Japan, so that students' motivation to learn both Kampo medicine and AM will likely decline again after graduating from medical school [25, 26]. Therefore, in the future, continuous and seamless postgraduate education in TJM, mainly Kampo medicine, and clinical opportunities to practice TJM should be required.

There are several limitations in this study. We reported that the motivation to learn Kampo medicine and AM increased in the first 3 years even without TJM education, but this result was inconsistent with those in other reports in which the learning motivation for CAM decreased after admission to medical schools. Although we speculated reasons for this, further consideration such as comparing the backgrounds of medical students in Japan to those in other countries will be needed. Next, since we did not conduct a questionnaire after the Kampo introduction lecture in the 1st year, the impact of the lecture on the attitudes of the students was not evaluated. Even if the lecture was only 1 hour long, the questionnaire should have been conducted after that. Then, over the course of this study, we did not investigate changes in the students' attitudes toward Western medicine. The study may have broadened by examining the differences in the students' attitudes between TJM and Western medicine as well. Finally, students were asked to register in all three questionnaire surveys so that we could track the changes in each student's attitudes toward TJM over the 10-year period of the survey. Even though it was clearly stated at the top of each questionnaire that the purpose of this survey was not to evaluate personal knowledge about Kampo medicine, having each student's name registered might have affected the results of the survey.

## CONCLUSIONS

The Tokai University medical students' attitudes toward Kampo medicine and AM were analyzed at three time points: before the introductory lecture in the 1st year of medical school, before the TJM lectures in the 4th year, and after the subsequent EBL course, revealing that students' attitudes toward Kampo medicine and AM became more positive even during the standard Japanese medical education period when TJM education was not given for more than 3 years, from the 1st to the 4th year. Moreover, the 4th-year TJM lectures and EBL course significantly helped to change their attitudes about TJM toward the positive. Female students had more positive attitudes in the 1st year, but after the EBL course, the male students' attitudes became more positive, so that gender differences disappeared. Not only appropriate TJM education but also the standard medical education in the preclinical years has contributed to making the Japanese medical students' attitudes toward Kampo medicine and AM more positive.

## COMPETING INTERESTS

The Department of Kampo Medicine, Tokai University School of Medicine, received a grant from Tsumura & Co., a Japanese manufacturer of Kampo medicine; however, the authors declare that there are no conflicts of interest regarding the publication of this paper.

## AUTHORS' CONTRIBUTIONS

MA and MT conceived the study and collected the data. YN and TN collected the data. MA analyzed and interpreted the data and wrote and carefully revised the manuscript. All the authors read and approved the final manuscript.

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## REFERENCES

1) The Japan Society for Oriental Medicine. Introduction to Kampo: Japanese Traditional Medicine. Tokyo: Elsevier Japan K.K., 2005.
2) Arai M, Katai S, Muramatsu S, Namiki T, Hanawa T, Izumi S. Current status of Kampo medicine curricula in all Japanese medical schools. BMC Complement Altern Med 2012; 12: 207. doi: 10.1186/1472-6882-12-207.
3) Nogami T, Arai M, Ishigami T, Nakada Y, Matsuda H, Odaguchi H, *et al*. Comparison of the 2011 and 2019 Kampo medicine curricula across all Japanese medical schools. Tokai J Exp Clin Med 2021; 46: 75–82.
4) Arai M, Arai K, Hioki C, Takashi M, Honda M. Evaluation of Kampo education with a focus on the selected core concepts. Tokai J Exp Clin Med 2013; 38: 12–20.
5) Yakubo S, Ito M, Ueda Y, Okamoto H, Kimura Y, Amano Y, *et al*. Pattern classification in Kampo medicine. Evid Based Complement Alternat Med 2014; 2014: 535146. doi: 10.1155/2014/535146.
6) Arai M, Okabe R, Ookishima S, Kojimahara N, Ikeda I, Tanada R, *et al*. Epidemiologic survey of subjective symptoms based on Kampo medicine in Hase Village, Nagano. Kampo Med 2010; 61: 154–68 (in Japanese). doi: 10.3937/kampomed.61.154.
7) Motoo Y, Yukawa K, Arai I, Hisamura K, Tsutani K. Use of Complementary and Alternative Medicine in Japan: A Cross-sectional Internet Survey Using the Japanese Version of the International Complementary and Alternative Medicine Questionnaire. JMA J 2019; 2: 35–46. doi: 10.31662/jmaj.2018-

0044.
8) Silva GMC, Borges AR, Ezequiel OS, Lucchetti ALG, Lucchetti G. Comparison of students' motivation at different phases of medical school. Rev Assoc Med Bras 2018; 64: 902–8, doi: 10.1590/1806-9282.64.10.902.
9) Chaterji R, Tractenberg RE, Amri H, Lumpkin M, Amorosi SBW, Haramati A. A large-sample survey of first- and second-year medical student attitudes toward complementary and alternative medicine in the curriculum and in practice. Altern Ther Health Med 2007; 13: 30–5.
10) Compton MT, Frank E, Elon L, Carrera J. Changes in U.S. medical students' specialty interests over the course of medical school. J Gen Intern Med 2008; 23: 1095–100. doi: 10.1007/s11606-008-0579-z.
11) Scott I, Gowans MC, Wright B, Brenneis F. Why medical students switch careers: changing course during the preclinical years of medical school. Can Fam Physician 2007; 53: 95, 95: e.1–5, 94.
12) Joyce P, Wardle J, Zaslawski C. Medical student attitudes towards complementary and alternative medicine (CAM) in medical education: a critical review. J Complement Integr Med 2016; 13: 333–45. doi: 10.1515/jcim-2014-0053.
13) Halterman-Cox M, Sierpina VS, Sadoski M, Sanders C. CAM attitudes in first- and second-year medical students: a pre- and post-course survey. Integr Med 2009; 7: 34–42.
14) Loh KP, Ghorab H, Clarke E, Conroy R, Barlow J. Medical students' knowledge, perceptions, and interest in complementary and alternative medicine. J Altern Complement Med 2013; 19: 360–6. doi: 10.1089/acm.2012.0014.
15) Manalo E, Koyasu M, Hashimoto K, Miyauchi T. Factors that impact on the academic motivation of Japanese university students in Japan and in New Zealand. Psychologia 2006; 49: 114–31. doi: 10.2117/psysoc.2006.114.
16) Woloschuk W, Harasym PH, Temple W. Attitude change during medical school: a cohort study. Med Educ 2004; 38: 522–34. doi: 10.1046/j.1365-2929.2004.01820.x.
17) Muramatsu S, Aihara M, Shimizu I, Arai M, Kajii E. Current status of Kampo medicine in community health care. Gen Med 2012; 13: 37–45. doi: 10.14442/general.13.37.
18) Ishizaki N, Yano T, Kawakita K. Public status and prevalence of acupuncture in Japan. Evid Based Complement Alternat Med 2010; 7: 493–500. doi: 10.1093/ecam/nen037.
19) Kristoffersen AE, Stub T, Salamonsen A, Musial F, Hamberg K. Gender differences in prevalence and associations for use of CAM in a large population study. BMC Complement Altern Med 2014; 14: 463.
20) Greenfield SM, Brown R, Dawlatly SL, Reynolds JA, Roberts S, Dawlatly RJ. Gender differences among medical students in attitudes to learning about complementary and alternative medicine. Complement Ther Med 2006; 14: 207–12.
21) DeSylvia D, Stuber M, Fung CC, Bazargan-Hejazi S, Cooper E. The knowledge, attitudes and usage of complementary and alternative medicine of medical students. Evid Based Complement Alternat Med 2011; 2011: 728902. doi: 10.1093/ecam/nen075.
22) Kinoue T, Arai M, Nakada Y, Kajiwara K. "Kampo-sommelier practice": a trial for an active learning program in Kampo (Japanese traditional) medicine. Tokai J Exp Clin Med 2020; 45: 63–8.
23) Takashi M, Nakada Y, Arai K, Arai M. Educational importance of acupuncture and moxibustion: a survey at the Tokai University School of Medicine Japan. Tokai J Exp Clin Med 2016; 41: 76–80.
24) Takayama S, Ishii S, Takahashi F, Saito N, Arita R, Kaneko S, *et al*. Questionnaire-based development of an educational program of traditional Japanese Kampo medicine. Tohoku J Exp Med 2016; 240: 123–30.
25) Arai M, Nakada Y, Izumi S. The education of traditional Japanese (Kampo) medicine: surveys of training hospitals and residents. BMC Complement Altern Med 2017; 17: 134. doi: 10.1186/s12906-017-1634-2.
26) Nakada Y, Takashi M, Arai K, Arai M. Medical residents' interest in and current status of Japanese postgraduate education in acupuncture and moxibustion: a follow-up survey. Acupunct Med 2017; 35: 297–302. doi: 10.1136/acupmed-2016-011204.

**Additional file**

**Questionnaire to measure students' attitudes toward Kampo medicine and Acupuncture and Moxibustion**

The purpose of this questionnaire is to assess the current Kampo medicine education program in Japanese universities with an eye on its future development and for use in presentations at academic society meetings.

The purpose of this questionnaire is not to test or evaluate your personal knowledge of Kampo medicine.

The results of the questionnaire will only be used as references and for reviewing the Kampo medicine education program through presentations at academic society meetings.

Confidential information will never be disclosed. Your privacy is respected and will always be protected.

You will not be disadvantaged in any way even if you do not consent to respond to this questionnaire.

1) What is your general impression about Kampo medicine?
   1. Very good
   2. Slightly good
   3. Not very good
   4. Not good at all

2) Are you interested in Kampo medicine?
   1. Very interested
   2. Slightly interested
   3. Hardly interested
   4. Not interested at all

3) Do you want to study Kampo medicine?
   1. Very much
   2. Slightly
   3. Hardly
   4. Not at all

4) Would you prescribe Kampo formulas in the future when you have become a practicing physician?
   1. Would mainly prescribe Kampo medicine
   2. Would mainly practice Western medicine and actively incorporate Kampo medicine
   3. Would mainly practice Western medicine and partly incorporate Kampo medicine
   4. No intention of using Kampo formulas
   5. Do not know

5) Mark any that apply to your image of Kampo medicine.
   1. Suitable for health promotion
   2. Effective for chronic diseases
   3. Traditional
   4. No adverse reactions
   5. Unscientific
   6. Slow effect
   7. Lack in evidence
   8. Mysterious
   9. Difficult
   10. Doubtful

6) Are you interested in Acupuncture and Moxibustion?
   1. Very interested
   2. Slightly interested
   3. Hardly interested
   4. Not interested at all

7) Do you want to study Acupuncture and Moxibustion?
   1. Very much
   2. Slightly
   3. Hardly
   4. Not at all