Differential effects of interprofessional education by gender and discipline among medical and dental students in Japan

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Abstract

Background and Aims: Studies investigating whether the effects of interprofessional education (IPE) workshops vary depending on the students’ characteristics have found mixed results. The objectives of this study were to assess the impact of IPE workshops and how it was related to students’ discipline and gender.

Methods: The data included medical and dental students who attended our IPE workshop (N=108). Pre- and post-workshop questionnaires on IPE were filled out by the students. After the workshop, workshop satisfaction was evaluated. The relationship between score changes in the questions on IPE and students’ satisfaction were assessed by regression analysis. The students’ responses to open-ended questions were analyzed qualitatively by explanatory sequential design.

Results: The increase in scores for workshop necessity was related to satisfaction in medical and dental students. The medical students tended to discuss their own role in IPE. In the dental students, realizing the differences in perspective among professions was associated with satisfaction (OR: 6.3, 95% CI: 1.7, 23.9). In both male and female medical students, increased scores for workshop necessity, patient understanding, and the role of each profession were associated with satisfaction. In male students, understanding one's own roles and limitations were associated with satisfaction.

Conclusions: Factors contributing to workshop satisfaction varied according to the students' discipline and gender, which provides important information for tailoring workshops.
Introduction

Interprofessional education (IPE) for students in healthcare professions is a form of education where students in different disciplines "learn about, from and with each other" (World Health Organization, 2010) and which aims to promote effective collaboration between healthcare professions for improving the quality of care and health outcomes (World Health Organization, 2010).

Previous systematic reviews reported that IPE can improve the students' knowledge and skills that are necessary for interprofessional collaboration (Thistlethwaite, 2012; Reeves et al., 2016). IPE positively affects the students’ attitudes toward working collaboratively as well as their perception and understanding of the roles and responsibility of other healthcare professions (Thistlethwaite, 2012; Reeves et al., 2016). Interestingly, Tamás et al. reported that female students were more open to discuss their knowledge gaps than male students during IPE workshops (Tamás, 2017). Studies evaluating the differences in the effects of interpersonal education workshops that take into account characteristics, such as the students’ gender and discipline, are important since future educational workshops could be more effectively tailored to the students by incorporating the findings of such studies. However, studies investigating whether the effects of an IPE workshop vary depending on the students' characteristics have found mixed results (Reynolds, 2003; Pollard, Miers and Gilchrist, 2005; Pollard et al., 2006; Pollard and Miers, 2008; Bradley, Cooper and Duncan, 2009; McFadyen et al., 2010; Lindh Falk, Hammar and Nystrom, 2015; Reeves et al., 2016; Tamás, 2017).

Since 2012, we have conducted annual IPE workshops in healthcare at Tokyo Medical and Dental University (TMDU), Tokyo, Japan. Here, by analyzing the longitudinal data of the students, our study objectives were 1) to assess the association between the impact of IPE, assessed by changes in knowledge, skills and perception, and the student’s satisfaction with the program, 2) to examine whether the associations and the effects varied depending on the students’ discipline and gender, and 3) to investigate the effects of the workshop on the medical students’ perspective related to clinical problem solving and whether this was related to gender.

Methods

Sample population
The two-day IPE workshops in healthcare have been conducted annually at TMDU, Tokyo, Japan. Each year, specialists in healthcare education from various fields (e.g., medicine, dentistry, nursing science, medical technology, and oral health care sciences) designed the workshop. Using a simulated clinical case scenario, students learned how to work together effectively and interact as a team. Out of all the successive annual workshops that have taken place since 2012, this study selected data from the workshop conducted in 2013. In total, 257 students from different healthcare disciplines including medicine, dentistry, nursing science, medical technology, and the oral healthcare sciences have participated in the workshop. Since co-medical students did not attend both days of the two-day workshop, we limited our analysis to the medical and dental students who participated in both of the two days of the workshop. In 2013, as shown in Figure 1, from among the 136 medical and dental students who were in the final year of their undergraduate program, 122 students participated in the workshop and answered the outcome questions. After excluding 8 students who did not respond to the pre-workshop survey and 6 students with a missing value in response to any of the questions, data from 108 students was used in this study.

Figure 1: Study design and enrolment
Multiple questions were asked to students about IPE before and after the workshop. After the workshop, all 108 students were asked open-ended questions about their contribution to the discussion in the IPE workshop and the difference in the content of their discussions between the IPE workshop and workshops that focused on a single discipline. Furthermore, at the time of graduation, the medical students who participated in the workshop in 2013 were asked about the impact of the IPE workshop on their perspective related to problem-solving during their clinical rounds after the workshop.

This study involved secondary analysis of data that was obtained for educational purposes. Students were informed of their right to refuse to allow researchers to conduct a secondary analysis of their data. This study did not include any minors. This study was approved by the Ethics Committee at Tokyo Medical and Dental University (M2000-1786) and the need for consent was waived by the ethics committee.

**Intervention: the IPE workshop**

In 2013, the two-day IPE workshop was conducted at TMDU. The medical and dental students attended both days of the workshop. The nursing science students and oral healthcare sciences students attended the first day only, whereas the medical technology students attended the second day only. Students were divided into groups of six to eight students from different disciplines and learned how to work together effectively and interact as a team, using a
simulated clinical case scenario related to systemic and oral health problems. During the two-day session, students discussed the case as a team for about six hours in total. Students also attended short lectures, conducted team presentations and received feedback from instructors.

Measures

Independent variables

Before and after the workshop (pre-survey and post-survey, respectively), eight questions were asked to students about IPE. The content of the questions is shown in Table 1. The responses for questions 1-5 were classified using a four-point Likert scale: "Always", "Often", "Sometimes", and "Never". The responses for questions 6-8 were: "Strongly agree", "Agree", "Disagree", and "Strongly disagree". The changes in scores between pre-survey and post-survey were calculated and used for the analyses.

Table 1: Content of questions that were asked in pre- and post-surveys

| Q1 | I am able to explain the roles and professional skills of healthcare professions. |
| Q2 | I am able to explain the views of each type of healthcare professional in addressing patients’ needs. |
| Q3 | I am able to explain the roles of each profession in interprofessional work to the patient. |
| Q4 | I am able to explain the relationship between other professions and my own profession in interprofessional work. |
| Q5 | I am able to use my expertise to have discussions with other professionals. |
| Q6 | Participation in interprofessional workshops can increase understanding of patients. |
| Q7 | Participation in interprofessional workshop scan increase my understanding of my own roles and limitations. |
| Q8 | Interprofessional education is necessary for all students studying the health sciences. |

Dependent variables

Satisfaction with the workshop:

After the workshop, the students were asked whether the workshop had exceeded their expectations. The responses included: "Strongly agree", "Agree", "Disagree", and "Strongly disagree". In the analysis, "Disagree" and "Strongly disagree" were merged into one category ("Disagree"), and three categories were used for the analyses.

Impact of the workshop:

At the time of graduation in 2013, the medical students who participated in the 2013 workshop were asked whether their perspective related to problem-solving during their clinical rounds had changed after the workshop. The responses included: "There was no change at all" and "There was a marked change".

Effect modifiers

The students' disciplines and gender were obtained from the students' administrative data.

Statistical analyses

Multinomial logistic regression was conducted to determine the changes in students' scores after the surveys on the satisfaction categories (i.e. strongly satisfied, satisfied, and dissatisfied) of the program. Prior studies have shown that Japanese have a tendency to choose an intermediate (less positive) response to positively worded items (Iwata, Roberts and Kawakami, 1995; Shimazu et al., 2010). Thus, if the response was "strongly satisfied", it would signify greater satisfaction for the respondents. Multinomial logistic regression enabled us to extract the positive responses and to clarify the factors associated with greater satisfaction by focusing on the "strongly satisfied" response. To
assess whether the scores in the pre-survey, the post-survey, or the changes in scores on the outcome varied according to effect modifiers, such as the students’ disciplines and gender, an interaction term for the scores in the pre-survey, the post-survey, or the changes in scores, and the effect modifiers (students’ disciplines and gender) was used for the assessment. The differences in the scores for pre-survey, post-survey, and the changes in score by gender and by students’ discipline were assessed using the Welch’s t-test. All statistical analyses were conducted using the STATA SE statistical package, version 14 (StataCorp LP, College Station, TX, USA).

**Qualitative analyses**

After the IPE workshop, all 108 students who answered the closed questions for quantitative data also provided comments for open-ended questions regarding their contribution to the discussion in the IPE workshop and the differences between the contents of their discussions in the IPE workshop and in the workshops that focused on a single discipline. The contents of the responses for open-ended questions were analyzed qualitatively. We used an explanatory sequential design in which the results of the qualitative analysis were used to explain the results of the quantitative analyses (Creswell and Clark, 2017). We used deductive coding where the list of predetermined codes was derived from key factors that were identified in the quantitative analyses (Creswell and Clark, 2017; Miles, Huberman and Saldana, 2019). We also allowed other codes to emerge during the coding process if a significant theme emerged from the data that could be useful for explaining the findings of the quantitative analyses (Miles, Huberman and Saldana, 2019). The codes were applied to the comments for the open-ended questions by three coders (NN, KY, CK) relating to the discussion of quality assurance. Any discrepancies in coding were resolved by team discussion among the three coders. Representative quotes for codes were examined and presented side by side with the quantitative results to integrate the quantitative and qualitative results in a joint display (Creswell and Clark, 2017). For triangulation, when needed, we asked our key informants who have substantial experience in the education of the students in our university to verify the accuracy of our interpretation and to ensure credibility (Miles, Huberman and Saldana, 2019).

**Patient involvement**

In this study, no patients were involved.

**Results/Analysis**

Table 2 shows the characteristics of the sample population. Among the 108 students who were included in this study, 61.1% were medical students, and 38.9% were dental students. The number of male students was greater than that of female students.

| Variable | Total (n=108) |
|----------|--------------|
| Discipline | N | % |
| medicine  | Male | 43 | 39.8 |
|           | Female | 23 | 21.3 |
| dentistry | Male | 28 | 25.9 |
|           | Female | 14 | 13.0 |

Table 3 shows the associations between changes in the scores of the questions and the satisfaction with the workshop among the medical students and dental students. Among the medical students, satisfaction with the workshop was positively associated with an increase in the scores for questions 3 (able to explain the roles of each profession in interprofessional collaboration), 6 (workshop participation can increase the understanding of the patient), and 8 (the
Table 3: Associations between changes in scores for questions and workshop satisfaction in medical and dental students

| Medical students (N=66) (ref: dissatisfied) | Dental students (N=42) (ref: dissatisfied) |
|--------------------------------------------|--------------------------------------------|
| Strongly satisfied | Satisfied | Strongly satisfied | Satisfied |
| **Changes in questions** | **OR** | **95% CI** | **OR** | **95% CI** | **OR** | **95% CI** |
| Q1 | 1.17 | (0.27, 4.97) | 1.40 | (0.33, 6.04) | **12.77** | (1.45, 112.82) | 8.20 | (0.97, 69.73) |
| Q2 | 0.72 | (0.20, 2.64) | 0.59 | (0.16, 2.21) | **6.29** | (1.66, 23.88) | 2.01 | (0.67, 6.04) |
| Q3 | **13.6** | (2.25, 82.65) | 4.21 | (0.80, 22.2) | 2.56 | (0.49, 13.24) | 1.08 | (0.22, 5.24) |
| Q4 | 3.07 | (0.62, 15.15) | 0.87 | (0.18, 4.22) | 3.69 | (0.77, 17.73) | 3.17 | (0.67, 15.10) |
| Q5 | 1.49 | (0.37, 5.95) | 0.55 | (0.14, 2.24) | 2.10 | (0.60, 7.36) | 1.21 | (0.35, 4.18) |
| Q6 | **4.35** | (1.32, 14.28) | 2.91 | (0.94, 8.96) | 2.18 | (0.72, 6.65) | 1.18 | (0.41, 3.39) |
| Q7 | 3.21 | (0.87, 11.91) | 3.50 | (0.92, 13.32) | 1.41 | (0.39, 5.14) | 0.82 | (0.23, 2.94) |
| Q8 | **9.35** | (1.72, 50.92) | **6.02** | (1.17, 31.07) | **7.90** | (1.66, 37.67) | 2.38 | (0.61, 9.32) |

Q2 | "The ideas that popped up during the workshop would not emerge in a workshop that focused on a single discipline (dentistry)."
| During the two-day workshop, I clearly realized the differences in perspective and knowledge among the specific fields."

Q3 | "As a medical student...I searched for scientific evidence about how to make a decision on treatment, and contributed to discussions."
| "I shared medical knowledge and medical perspective with students from other disciplines."

Among the dental students, satisfaction with the workshop was positively associated with an increase in the scores for question 8 (the necessity of IPE). Unlike the medical students, the relationships were not significant for questions 3 and 6. In contrast, satisfaction with the workshop was positively associated with an increase in the scores for questions 1 (able to explain the roles and professional skills of each of the different healthcare professions) and 2 (able to explain the views of each type of healthcare professional in addressing patients' needs).

When the odds ratios of questions for which the responses were "strongly agree" were compared between the dental students and medical students with an interaction term, the $P$ value for the interaction term was $<0.2$ for questions 1 ($P=0.073$), 2 ($P=0.023$), and 3 ($P=0.179$), suggesting that the odds ratio for questions 1 and 2 were higher and the odds ratio for question 3 was lower in the dental students than in the medical students.
Question 2 concerns whether students understood the differences in perspective among different professions in the context of patient care. Although both the medical students and dental students mentioned that it was a useful experience for them to realize the differences in perspective among different professions, the dental students tended to use expressions such as “really new to me” and “I have never thought about things in this way”. One dental student stated: "the ideas that popped up during the workshop would not emerge in a workshop that focused on a single discipline (dentistry)”. Similarly, another dental student wrote: "During the two-day workshop, I clearly realized the differences in perspective and knowledge among the specific fields”.

Question 3 concerns whether students understand the role of each profession in the context of interprofessional collaboration. The comments from students revealed that the dental students and the medical students thought that as a result of IPE, they were able to understand the roles of other professions in interprofessional collaboration and how other professions could contribute to the patients’ care. For example, a medical student noted: "By including a nursing student as a team member, we were able to consider the socio-economic status of the patient… By including dental students and students from the oral healthcare sciences, we were also able to discuss the choice of dental care by considering the prognosis of the patient and …”. Specifically, the medical students tended to mention their own role in interprofessional collaboration. For example, one medical student stated: "As a medical student,…I searched for scientific evidence about how to make a decision on treatment, and contributed to discussions”. Similarly, another medical student mentioned: "I shared medical knowledge and medical perspective with students from other disciplines”. A medical student wrote that by engaging in a discussion in an IPE workshop as a future physician, it led to the student feeling an increased motivation to study to meet the expectations of their future work: "During the group discussion, I shared medical information that students in other professions did not have, however, the medical information that I provided was not enough … I realized that it is important to gain more accurate knowledge”.

Students did not provide comments that were specific to question 1 (able to explain the roles and professional skills of each of the different healthcare professions).

Next, we examined whether the associations between changes in the students’ answers concerning various factors of IPE after the workshop and workshop satisfaction varied depending on the students’ gender among the medical students. S1 Table shows the associations between changes in the scores of the questions and the satisfaction with the workshop among the male and female medical students. Similar to the results of the analyses with all the medical students, among the male medical students, satisfaction with the workshop was positively associated with an increase in the scores for questions 3 (able to explain the roles of each profession in interprofessional collaboration), 6 (workshop participation can increase the understanding of the patient), and 8 (the necessity of the workshop). In addition, satisfaction was positively associated with an increase in the scores for question 7 (workshop participation can increase the students' understanding of their own roles and limitations). For the female medical students, questions 3, 6, and 8 were the top 3 questions for which the increase in scores was positively associated with satisfaction, although this result did not reach statistical significance.

When the odds ratios of the questions for the responses "strongly agree” were compared between the male and female medical students with an interaction term, question 7 (workshop participation can increase the students’ understanding of their own roles and limitations) had an interaction term $P$ value of $<0.2$ ($P=0.107$), suggesting that the odds ratio for question 7 was higher in the male medical students than in the female medical students.

Question 7 is about the students’ roles and limitations in the medical profession. The comments from the male students revealed that before the workshop they thought that when they encountered situations related to other disciplines, they could just refer patients to the specialists in that field. The students thought that they could manage the situation even if they did not understand the problem or did not have enough knowledge. However, after the
workshop they realized that they could understand things that are related to other disciplines and they could discuss their assessment and decide on an appropriate treatment as a team. One of the male students who responded to question 7 in the pre-survey with the lowest score and who showed the largest increase in score for this question after the workshop stated: "For patients with dental problems, we thought about just referring patients to the dentist. But, as a result of the IPE workshop, we were able to discuss how we could assess the patients with dental problems as a medical team utilizing each discipline's different point of view".

S2 Table shows the scores for the questions in the pre-survey for the medical and dental students. In questions 1 (able to explain the roles and professional skills of each of the different healthcare professions), 2 (able to explain the views of each type of healthcare professional in addressing patients' needs), 6 (workshop participation can increase the understanding of the patient), 7 (workshop participation can increase the students' understanding of the their own roles and limitations), and 8 (the necessity of IPE), the scores were higher in the medical students than in the dental students.

S3 Table shows the scores for the questions the pre-survey and the post-survey in the medical and dental students. In questions 1 (able to explain the roles and professional skills of each of the different healthcare professions), 3 (able to explain the roles of each profession in interprofessional collaboration), 4 (able to explain relationship between other professions and own profession in interprofessional work), and 5 (able to use one's own expertise to have discussions with other professionals), the increases in scores were higher in the medical students than in the dental students.

S4 Table shows the scores for the questions in the post-survey for the medical and dental students. For all the questions, the scores were higher in the medical students than in the dental students.

S5 Table shows the scores for the questions in the pre-survey for the male and female medical students. In all questions other than question 5 (able to use one's own expertise to have discussions with other professionals), the scores were higher in female students than in the male students.

S6 Table shows the scores for the questions in the pre-survey and post-survey in the male and female medical students. The average score changes were similar in both the male and female medical students.

S7 Table shows the scores for the questions in the post-survey in the male and female medical students. In all questions other than question 3 (able to explain the roles of each profession in interprofessional collaboration) and 8 (The necessity of IPE), the scores were higher in the female students than in the male students.

S8 Table shows the associations between changes in perspective in problem solving during clinical rounds and the scores for question 8 in pre-survey, post-survey, and the score changes for question 8 in the male medical students. These results show a significant positive association between changes in perspective in problem solving during clinical rounds and scores for question 8 in the pre-survey (OR 3.99, 95% CI: 1.18, 13.48). In addition, there was a significant negative association between changes in perspective in problem solving during clinical rounds and the score changes for question 8 between pre-survey and post-survey (OR 0.34, 95% CI: 0.12, 0.96). The association between changes in the students' perspective in problem solving during clinical rounds and the scores for question 8 post-survey were not significant. For the female medical students, there were no significant associations between changes in perspective in problem solving during clinical rounds and the scores for question 8 in pre-survey, post-survey, and the score change for question 8. When the odds ratios were compared between the male and female medical students with an interaction term, the P value for the interaction term was <0.2 for the score changes (P=0.152), suggesting that the odds ratios for the score changes were higher in the female medical students than in
the male medical students.

See the Appendix section for a summary of tables S1-S8 presented in the Supplementary File 1.

**Discussion**

In this study, we found that the associations between students' workshop satisfaction and the changes in their answers concerning various factors of IPE after the workshop varied depending on their discipline and gender. When the medical students and dental students were compared, in the dental students, the odds ratios for questions 1 and 2 were higher and the odds ratio for question 3 was lower than that of the medical students.

Question 1 concerns being able to explain the roles and professional skills of different healthcare professions. In both pre-survey and post-survey, the dental students had a lower score than the medical students. Although the students did not provide comments that were specific to question 1, for the dental students, the increase in scores for being able to explain the roles and professional skills of the different healthcare professions was associated with their satisfaction with the program. As part of our curriculum, the medical students are given the opportunity to observe the collaboration among various healthcare professions during their clinical clerkship. In contrast, the dental students had fewer chances to observe such collaboration as part of their curriculum. Since the medical students already understood the importance of the role of each profession, the increase in this score may not have been associated with satisfaction with the program. Because the dental students had less prior experience in interpersonal collaboration, the increase in this score may have been associated with a greater satisfaction with the program. After our study was conducted, our university has increased the number of programs offering IPE to these students.

Question 2 concerns whether the students understood the differences in perspective among the different professions in the context of patient care and this question was associated with satisfaction with the program in the dental students only. In both pre-survey and post-survey, the dental students had lower scores for question 2, although this difference was not significant. The analyses of the comments revealed that the dental students tended to use expressions such as "really new to me" and "I have never thought about things in this way". The dental students at the time of data collection had very few chances to interact with students of other disciplines. Thus, taking part in discussions with students of other disciplines as part of the IPE workshop was very stimulating for the dental students and led to increased satisfaction with the program. These results support the importance of offering IPE to these students.

Question 3 concerns whether the students understood the roles of the professions in the context of interprofessional collaboration. It was associated with satisfaction with the program in the medical students only. In the pre-survey, the medical students and dental students had similar scores; however, the score increased more in the medical students. In the post-survey, the scores for question 3 were higher in the medical students. The comments from students revealed that some of the medical and dental students thought that, as a result of IPE, they were able to understand the role of other professions in interprofessional collaboration and how other professions can contribute to patient care. In addition, the medical students specifically tended to mention their own role in interprofessional collaboration. For example, one medical student argued that: "As a medical student, I searched for scientific evidence about how to make a decision on treatment, and contributed to discussions". By experiencing IPE in this workshop, the medical students had a chance to self-reflect on their own profession. For some students, this has even led to an increased motivation to study more in order to meet the expectations of their future work. The difference between questions 1 and 3 was that question 3 focuses on the roles that the professions have in the context of interprofessional collaboration, and question 1 concerns the roles and skills irrespective of these skills being used in the context of team work. As part of our curriculum, the medical students have the opportunity to observe
collaboration among various healthcare professions in a ward. In this IPE workshop, the medical students were able to actively participate in interprofessional collaboration, which may have led to satisfaction. In contrast, the dental students had fewer chances to observe this type of interaction as part of their curriculum and may not have had a clear image about what interprofessional collaboration entails. This may explain why satisfaction with the program in these students was related to question 1, but not to question 3.

Japan’s society is rapidly aging, and the importance of homecare medicine and community healthcare is increasing. Since interprofessional collaboration including dentists is an important part of delivering high-quality homecare medicine and community healthcare, our study suggests that it is important for dental students to have more opportunity to learn IPE. Previous studies assessing the effects of IPE among different healthcare students have noted professional stereotypes and hierarchies, which may affect the effectiveness of IPE (Cooke et al., 2003; Carpenter et al., 2006; Bradley, Cooper and Duncan, 2009; Reeves et al., 2016). Our results focused more on the observed differences in the effects of IPE and how they are related to the students’ discipline, which also have practical implications for tailoring the workshop for maximum effectiveness. Further studies are needed to clarify the different effects of IPE and how they are related to the students’ disciplines.

We also compared the factors contributing to satisfaction with the program between the male and female medical students. We found that the odds ratio for question 7 (workshop participation can increase the students’ understanding of their own roles and limitations) was higher in the male medical students than in the female medical students. Question 7 concerns the students’ roles and limitations as medical professionals. The scores of the male and female students in the post-survey almost reached 4 (3.72 for male and 3.91 for female). This suggests that after the workshop most of the male and female students agreed with the statement that: “participation in the interprofessional workshop can increase understanding of my own roles and limitations”. However, the female students had higher scores than the male students in both the pre-survey and post-survey. The comments from the male students revealed that before the workshop they thought they could manage the situation even if they did not understand the problem or did not have enough knowledge because they could refer the patient to specialists. After the workshop, the male students realized that they could discuss their assessment of the patient and decide on a suitable treatment as a team. These results suggest that in male students, the importance of interprofessional collaboration was recognized less. However, male students not only realized their limitations during the workshop, but also learned how to manage patients’ problems as a team even if they have their own limitations, which may have led to their satisfaction with the program.

In this study, we also analyzed the association between the scores in the pre-survey as well as post-survey and the changes in perspective in problem solving during clinical rounds, which would correspond to Level 2a “Modification of attitudes/perceptions” based on the expanded Kirkpatrick model (Committee on Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes; Board on Global Health; Institute of Medicine, 2015). We found a significant positive association between changes in perspective in problem solving during clinical rounds and the scores for question 8 (the necessity of IPE) in the pre-survey, suggesting that the higher score in the pre-survey was related to changes in perspective in clinical problem solving. We also found a significant negative association between the score changes in question 8 and changes in perspective in clinical problem solving. The average score for question 8 in the pre-survey in the male students was 3.33 (0-4 range) and students with lower scores in the pre-survey had more potential for an increase in score. However, the increase in scores for the students who had lower scores in the pre-survey may not have affected their perspective in clinical problem solving after the workshop. This suggests the importance for male students to recognize the necessity of IPE before the workshop, possibly because the realization of the necessity of IPE could affect the students’ attitude during the workshop. For female medical students, there were no significant associations between changes in perspective in problem solving during clinical rounds and the scores for question 8 in the pre-survey, post-survey,
and the score changes. The scores in the pre-survey in the female students were high and the changes in scores as a result of the workshop was only 0.04, suggesting that most of the female students already recognized the necessity of interprofessional collaboration. Also, there may have been a ceiling effect.

Recently, it was reported that some medical schools in Japan limited the number of incoming female students by lowering the scores of their entrance exams (Lovett and Ross, 2018; Wheeler, 2018). Our study shows that Japanese female medical students realize the importance of interprofessional collaboration. Moreover, previous studies have even noted that female physicians have more communication skills (Roter, Hall and Aoki, 2002; Roter and Hall, 2004) and the clinical outcome of patients who were treated by female physicians was found to be better (Tsugawa et al., 2017). We believe that equal opportunity should be provided to both genders and they should be provided with opportunities to fulfill their own potential.

The model core curriculum for medical and dental education recommended by the government of Japan was revised in 2010 and 2016 (Ministry of Education Culture Sports Science and Technology, 2016). In the 2010 version, the importance of team-based healthcare education had been mentioned. In the current version revised in 2016, the importance was further underscored (e.g. team-based education in medical and dental students were explicitly noted), and since then medical and dental universities in Japan have reconstructed their own curriculums based on these recommendations. Although TMDU’s annual IPE workshops began in 2012 prior to the most recent revisions, they were already consistent with the current model core curriculum, and also have been annually updated since inception. Therefore, we believe that our results will provide insights into future multi-institutional studies that evaluate the impact of IPE workshops for medical and dental students under the current recommendations.

Our study has several limitations. Firstly, since the dependent variable (the workshop satisfaction) and independent variables were measured using the same questionnaire, this may result in a dependent measurement error, which may have biased the result away from the null. Secondly, since the responses were collected along with the students’ names at the time of the data collection, satisfaction with the workshop may be overreported due to the social desirability bias. Finally, in some responses, it is possible that a ceiling effect may have existed.

Conclusion

Factors contributing to workshop satisfaction varied according to the students’ discipline and gender. This suggests that understanding the differences in factors related to workshop satisfaction is important for tailoring the workshop for maximum effectiveness.

Take Home Messages

- Factors contributing to workshop satisfaction varied according to the students’ discipline and gender.
- Our study suggests that understanding the differences in factors related to workshop satisfaction is important for tailoring the workshop for maximum effect.
- In male medical students, the importance of recognizing the necessity of IPE before the workshop was suggested.

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Figure 1. Source: the authors.

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Appendices

S1 Table. Associations between changes in scores for questions and workshop satisfaction in male and female medical students. (N=43 for male, and N=23 for female).
S2 Table. Pre-survey scores for questions in medical and dental students.
S3 Table. Changes in scores for questions after the workshop in medical and dental students.
S4 Table. Post-survey scores for questions in medical and dental students.
S5 Table. Pre-survey scores for questions in male and female medical students.
S6 Table. Changes in the scores for questions after the workshop in male and female medical students.
S7 Table. Post-survey scores for questions in male and female medical students.
S8 Table. Associations between changes in perspective related to problem solving during clinical rounds and the scores for question 8 in the pre-survey, post-survey, and the score changes in the question 8 after the workshop in male and female medical students (N=43 for male and N=22 for female).

Declarations

The author has declared that there are no conflicts of interest.

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Ethics Statement

This study involved secondary analysis of data that was obtained for educational purposes. Students were informed of their right to refuse to allow researchers to conduct a secondary analysis of their data. This study did not include any minors. This study was approved by the Ethics Committee at Tokyo Medical and Dental University (M2000-1786) and the need for consent was waived by the ethics committee.

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