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Original article

Can applied improvisation exercises boost compassion in Japanese university students?

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Abstract

Applied improvisation (AI), an instructional strategy adapting the aims of improvisational theater to boost learners' communication skills, has gained attention among medical educators worldwide. Learners positively evaluate AI exercises, and these exercises may promote gains in empathy as well as patient interviewing skills. However, the value of AI in a Japanese university context has not been substantially investigated. This exploratory study examined the effect of AI exercises using the Compassion Scale, which calculates Compassion along four dimensions of Kindness, Common Humanity, Mindfulness, and Indifference. Participants (n = 70) were students in four general English courses at one national university in Japan, divided by major: Nursing/Psychology (n = 19); Medicine (n = 16); Education (n = 19); and Economics/Design (n = 16). The instructor spent 15-20 minutes in each class of the 15-week semester having students engage in AI exercises. Students completed the Compassion Scale in the first and last classes. Mean compassion scores were compared between surveys for each course and between courses using t-tests. All groups showed gains in overall Compassion means; these gains were significant for the Education and Economics/Design groups. Nursing/Psychology students showed significant gains in Kindness and Mindfulness; Economics/Design students also showed significant gains in Kindness. The medical students' Compassion scores were significantly higher than those of all other majors in the pre-course survey. This study found that AI exercises significantly boosted the compassion scores of the two groups with low initial levels of compassion, though further research is needed to confirm the value of AI to Japanese university learners.

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Keywords applied improvisation, compassion, empathy, medical improv, questionnaire

1. Background

1.1 Applied improv and empathy

Applied improvisation (AI) is an approach to communication skill development derived from improvisation (or "improv") theater.[1] AI employs various exercises, often referred to as "games" or "drills," which are meant to develop communication skills in learners in the same way that athletes and musicians employ drills to enhance their performance.[2] AI does not train participants to become actors. Rather, engagement in AI leads to the development of three core communication skills: flexibility and responsiveness to change; careful focus and attention to the present moment; and collaboration with others.[2] Watson was the first to describe the applications of AI in developing the communication skills of medical learners, noting that "physicians and improvisers are driven by the same paradox: the need to prepare for unpredictability".[3] In the medical field, AI is commonly referred to as "medical improv"[4]; several studies have examined the benefits of medical improv in boosting both empathy levels and patient interviewing skills of learners in healthcare-related fields.[5–7] There may also be an overlap between AI skills and the quality of resilience, an essential trait for those working in healthcare.[1] Medical improv or AI exercises are typically done in the presence of a trained facilitator (someone with improv experience or training). A "debriefing session," in which the facilitator explains the purpose of exercises, gives feedback to participants, and allows participants to reflect upon their experience with the exercises, is considered essential for these exercises to become *deliberate practice* (i.e., a systematic form of practice in which learners perform, gain feedback and reflect upon their performance, and then practice again, thereby leading to improvement).[1]

It should be noted that AI is used primarily in studies involving learners in North American contexts, whose first language is English. AI has not been extensively researched

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in learners whose first language is not English. We have used AI exercises in our own in-service English courses for medical staff and faculty at our university hospital in Japan, and these exercises were evaluated positively by the learners.[8] To the author's knowledge, however, no published studies have attempted to examine the effect of AI exercises on pre-service learners in healthcare-related fields at Japanese universities. The author thus launched a study to measure the impact of AI exercises on Japanese university students enrolled in general English classes at one national university. Initially, it was decided to use empathy as the item to be measured, as previous research has found AI exercises to boost learners' empathy scores using standardized surveys.[5, 9] However, empathy has come to be viewed critically by several scholars in medicine and psychology. It has been found that empathy tends to decline in medical students and residents as they spend more time with patients.[10] Moreover, nurses and teachers with high levels of empathy may be at greater risk of burnout than those with lower levels of empathy.[11, 12] An abundance of empathy may also lead to poor decision-making; those who empathize too much with the suffering of another may fail to act in the other's best interests.[13] These studies deal mainly with *affective* empathy, which is defined as a genuine sharing of emotions or pain, i.e., one person feels the same emotions or pain felt by another. This stands in contrast to *cognitive* empathy, in which a person recognizes how another person feels but does not feel the same emotion.[13]

1.2 Compassion as a measurement construct

The construct of *compassion* may be more useful than empathy to students in healthcare-related fields. Terregino et al. have defined compassion as *cognitive empathy combined with action*.[6] It involves recognition of the suffering of another as well as a desire to ease the other person's suffering.[14] Neuroscience research utilizing fMRI brain scans suggests that empathy and compassion occupy different pathways in the brain, with the former, but not the latter, often leading to distress when pain is witnessed.[15] This is because compassion leads to feeling *for* rather than *with* the suffering of another; in other words, one does not directly experience the other's suffering, as occurs with affective empathy. Consequently, it has been argued that feelings of compassion are less likely to lead to burnout than those of empathy[16] (though the concept of compassion fatigue also exists in the research literature[17]).

Empathy and compassion are abstract concepts and loaded with popular as well as religious connotations, and settling the debate between the meaning of these two constructs is beyond the scope of the present paper. However, the element of action involved in the definition of compassion used by Terregino et al. (as cognitive empathy combined with action) makes this construct more attractive than empathy as an assessment measure to a language teacher setting out to examine the effects of AI exercises on Japanese university learners. Communication also requires understanding as well as the desire and ability to respond—or speak up—in real-world situations; the link between communication and compassion, as defined by Terregino et al., is this real-world action. Moreover, since a connection between AI exercises and empathy gains has been established in previous studies,[5, 9] it seems reasonable to posit that AI exercises may also lead to gains in the related concept of compassion. The author decided to explore the effect of AI exercises on Japanese university students' compassion levels using pre-and post-course surveys. The null hypothesis that the author set out to disprove was that weekly practice in AI exercises would not boost the compassion levels of Japanese university students.

2. Method

2.1 Research Instrument

The questionnaire used to assess students' compassion levels pre-and post-course was the Compassion Scale presented by Pommier et al., a validated questionnaire consisting of 16 items on five-point Likert scales.[14] This survey is freely available on the Internet and its use in teaching and research has been granted by its authors. For this survey, Compassion is defined as a cognitive understanding and desire to ease the suffering of others; this definition is in line with a view of compassion as cognitive empathy combined with real-world action.[6] Items are grouped into four categories: Kindness; Common Humanity; Mindfulness; and Indifference; these items are randomly arranged on the survey. Pommier et al. define Kindness as concern for others' suffering and a desire to help those in need; Common Humanity as a sense of connection to those who are suffering and an objective understanding that all people suffer; Mindfulness as an awareness of others' suffering without "getting lost in it" (cognitive empathy); and Indifference as the opposite of the other three categories. Respondents are asked to indicate the extent to which they agree or disagree with 16 simply-worded statements, for example: "I notice when people are upset, even when they don't say anything." As a validated Japanese version of this survey was unavailable, the survey was used in its original English, with Japanese translations provided for words judged to be difficult for Japanese university students, i.e., those words not taught at the high school level or lower (for example, "unconcerned" = 無関心). Four items on the survey (Indifference items) are reverse-coded; the scores for these items must be reversed before analysis.

2.2 Participants

Participants were 70 first- and second-year students enrolled in four general English courses taught by the author in the autumn semester of 2020. These courses consisted

Table 1. Participant students

Group	Major	Year	Course theme	Female	Male	**Total**
1	Nursing/Psychology	2	Writing	17	2	**19**
2	Medicine	1	Reading & listening	9	7	**16**
3	Education	1	Writing	8	11	**19**
4	Economics/Design	2	Reading & listening	6	10	**16**
			Total	**40**	**30**	**70**

of students in different majors, with two first-year courses comprised of Medicine and Education majors, respectively, and two second-year courses comprised respectively of Nursing/Psychology and Economics/Design majors. The theme for the first-year courses was reading and listening; for second-year courses, the theme was academic writing. This information, as well as the gender and number of students, is shown in **Table 1.** Six third- and fourth-year students enrolled in the Education and Economics/Design courses as repeaters were excluded, as well as students who failed to attend three or more classes during the semester (a total of seven students). Initially, the Economics/Design course had been planned to be the control group, and the other groups would receive the AI intervention. However, it was felt that denying this group the potential learning benefits of AI violated the principle of equipoise[18]; all groups thus received the AI intervention.

2.3 Procedures

In each course, 15-20 minutes of class time in every class of the fifteen-week semester was allotted for AI exercises. These exercises were typically done at the beginning and the end of each class meeting. A new AI exercise was introduced in each class, and exercises done in previous classes were often repeated to give students additional practice. AI exercises were selected from online sites and YouTube videos as well as books presenting theater games.[19] As many of these exercises were designed for native-English speaking learners and involve an element of acting or drama, an attempt was made to select exercises that would be manageable to Japanese learners, and adapt or simplify them if necessary. In addition, it was decided that all exercises must address the three core communication skills developed by AI, as mentioned above: flexibility and responsiveness to change; focus and attention to the present moment; and collaboration with others.[2] After engaging in each exercise at the beginning of class, a brief debriefing session was held, in which the author explained the value of the exercises (for example, in promoting eye contact) and gave feedback on students' performance. Feedback was given mainly in English, though Japanese was also used to aid students' comprehension. Students were encouraged to express their thoughts about the exercises in either Japanese or English. At the end of each class, students typically engaged in the exercises again to apply what they learned from their first experience with each exercise.

Week	AI exercise introduced	Format
1	Mnemonic name game	FTF
2	Playing catch	FTF
3	Group count	FTF
4	Group sentence	FTF
5	Repeat the last word	FTF
6	Yes, and…	FTF
7	Guessing emotions	Zoom
8	Group story	FTF
9	But first…	FTF
10	What did I say?*	Zoom
11	Follow the leader	Zoom
12	Three-headed expert	FTF
13	Grab and share*	Zoom
14	When you say…I think of…	Zoom
15	Guess who said what*	Zoom

Note. FTF = face-to-face

Figure 1. AI exercise and class format by week

Apart from the AI exercises, courses were conducted as they normally would have been using the set course materials and following the course syllabus. The weekly breakdown of AI exercises and the format of classes (face-to-face or on Zoom) is shown in **Figure 1.** Due to influences from the COVID-19 pandemic, classes in each course shifted back and forth from a face-to-face format to online using Zoom in the latter half of the semester. A few exercises that made use of Zoom features, such as Chat or Mute, could only be done on Zoom; these exercises are indicated by asterisks. Descriptions of most of these exercises as well as videos can be found online; due to lack of space, they are not included in this paper. However, a brief description of three exercises and their debriefing value is provided in the Appendix.

The Compassion Scale was given to all students in the first and last class meetings of each course. Compassion scores were analyzed using SPSS 27 (IBM) to examine differences in mean Compassion scores for each course between the first and second survey, as well as differences between groups of students. Dependent and independent samples t-tests were the primary means of analysis.

3. Results

3.1 Within-group comparisons

First, mean Compassion scores for the pre-course survey (week 1) and post-course survey (week 15) within groups were compared using dependent samples t-tests. **Table 2** shows findings from these tests and accompanying means, standard deviations, *t* values, degree of freedom (*df*) values, and *p* values (significance at $p<0.05$). Three of the four groups showed gains in Compassion scores, while one group (Medicine) showed no change in mean scores. Gains were significant for the Education group and Economics/Design group, and not for Nursing/Psychology. The two groups in healthcare-related fields thus did not show significant gains in Compassion scores.

Table 2. Within-group comparisons

Group	N	Pre-course survey Mean (SD)	Post-course survey Mean (SD)	*t*	*df*	*p*
N/P	19	3.80 (0.44)	3.99 (0.33)	-1.70	18	0.11
Med	16	4.14 (0.47)	4.15 (0.43)	-0.04	15	0.97
Educ	19	3.53 (0.33)	3.69 (0.39)	-2.91	13	0.01*
E/D	16	3.64 (0.49)	3.85 (0.53)	-2.20	15	0.04*

Note. N/P=Nursing/Psychology; Med=Medicine; Educ=Education; E/D=Engineering/Design; N=Number; SD=Standard Deviation

Table 3. Between-group comparisons: Pre-course survey (significant findings only)

Group 1 (N)	Group 2 (N)	Group 1 Mean (SD)	Group 2 Mean (SD)	*t*	*df*	*P*
N/P (19)	Med (16)	3.80 (0.44)	4.14 (0.47)	-2.1	33	0.038*
Educ (19)	N/P (19)	3.53 (0.33)	3.80 (0.44)	2.2	36	0.035*
Educ (19)	Med (16)	3.53 (0.33)	4.14 (0.47)	-4.5	33	0.001*
E/D	Med (16)	3.64 (0.49)	4.14 (0.47)	3.0	30	0.005*

Note. N/P=Nursing/Psychology; Med=Medicine; Educ=Education; E/D=Engineering/Design; N=Number; SD=Standard Deviation

3.2 Group comparisons

Next, mean Compassion scores were compared between groups for the pre-course and post-course surveys using independent samples t-tests. Significant findings from the between-group comparison of pre-course survey means are shown in **Table 3**. It was found that the Medicine group had significantly higher Compassion scores than all three other groups. For the pre-course survey, the mean Compassion score for the medical students was strikingly high; Medicine was the only group with a mean score higher than 4.0. Nursing/Psychology had the second highest mean score (3.80); this score was significantly higher than that of Education, which had the lowest score overall.

For post-course Compassion surveys, fewer significant differences were identified (see **Table 4**). Medicine, with a mean Compassion score virtually the same as from the pre-course survey, was significantly more compassionate than the Education majors only. Nursing/Psychology also had a significantly higher mean Compassion score than Education. The Education group thus had a lower mean Compassion score than the other three groups in both surveys. However, as mentioned above, Education did show a significant gain from pre-course to post-course surveys.

3.3 The four categories of Compassion

As mentioned in the Methods section, question items in the Compassion Scale are divided into four categories of Kindness, Common Humanity, Mindfulness, and Indifference. These items are randomly arranged on the questionnaire. Changes in mean scores for items in these categories were calculated for both the pre-course and post-course surveys and these scores were then compared within groups using dependent samples t-tests. Three significant differences were found (**Table 5**). The Nursing/Psychology group showed significant gains in Kindness and Common Humanity, and the Economics/Design group showed significant gains in Kindness. Mean scores for each category for each group followed the same pattern for overall mean scores, with Medicine having the highest mean score, followed by Nursing/Psychology, Economics/Design, and Education, in that order. Due to this pattern, as well as an appraisal of mean scores for each category in each group, it was judged that statistical comparisons between groups were unnecessary and they were not conducted. The sole exception was Common Humanity for the Economics/Design group, which had higher pre-course and post-course survey means than the Nursing/Psychology group, though this difference was not found to be significant in an independent samples t-test.

Table 4. Between-group comparisons: Post-course survey (significant findings only)

Group 1 (N)	Group 2 (N)	Group 1 Mean (SD)	Group 2 Mean (SD)	*t*	*df*	*p*
Educ (19)	Med (16)	3.69 (0.39)	4.15 (0.43)	-3.23	33	0.003*
Educ (19)	N/P (19)	3.69 (0.39)	3.99 (0.33)	2.5	36	0.018*

Note. N/P=Nursing/Psychology; Med=Medicine; Educ=Education; E/D=Engineering/Design; N=Number; SD=Standard Deviation

Table 5. Significant findings within the four categories of Compassion

Group (N)	Category	Pre-survey Mean (SD)	Post-survey Mean (SD)	*t*	*df*	*p*
N/P (19)	Kindness	3.80 (0.84)	4.16 (0.70)	-3.91	73	0.001*
N/P (19)	Common Humanity	3.82 (0.78)	4.01 (0.81)	-1.99	75	0.05*
E/D (16)	Kindness	3.53 (0.89)	3.95 (0.97)	-3.04	67	0.03*

Note. N/P=Nursing/Psychology; E/D=Engineering/Design; N=Number; SD=Standard Deviation

3.4 Gender

As the proportion of female students was higher than males in the Medicine and Nursing/Psychology groups, and lower than that of males in the Education and Economics/Design groups (see **Table 1**), it was suspected that gender differences between groups may have influenced Compassion scores. It has been found that women have significantly higher Compassion scores than men.[14] In both pre-course and post-course surveys, the female students had slightly higher Compassion scores than the male students (pre-course: 3.78 for females and 3.77 for males; post-course: 3.93 for females and 3.89 for males); however, these differences were not found to be significant in independent samples t-tests.

4. Discussion

The four groups of students in this study showed gains in mean Compassion scores after 15 weeks of AI exercises;

for two groups (Education and Economics/Design) these gains were statistically significant. However, it is difficult to assert that the AI exercises were the source of these gains, for several reasons. First, this study did not employ a control group. It is thus impossible to know whether or not an English class without the use of AI exercises would have the same results. Other factors within the courses themselves, including the various class activities and themes, as well as factors outside of the courses, such as the students' learning to adapt to the ongoing pandemic, could have also influenced findings. In addition, conditions at the time of the study were sub-optimal for a trial of AI exercises. In face-to-face classes, students were required to wear masks and maintain a degree of social distance from other students, thus making it difficult for students to pick up on other students' non-verbal cues and voice inflections. These problems were exacerbated on Zoom; though students could see other students' faces, much expression was lost, and technical difficulties also hampered communication.

Furthermore, the author was not a trained improv facilitator and had only experienced using these exercises in in-services classes for medical staff and faculty. Some exercises may not have gone smoothly (for instance, when the instructor stumbled occasionally in giving initial instructions) and the debriefing sessions may not have been deep or productive enough to make these exercises a form of deliberate practice. Students tended to be quiet during the feedback sessions, and it was often unclear how deeply students were reflecting upon the exercises. However, students were able to engage in AI exercises in all 15 class meetings, and the fact that the author was an English teacher rather than a trained AI facilitator was not necessarily an obstacle. An understanding of the students' general abilities and characteristics helped the author to anticipate difficulties the students would face with the exercises and enabled the author to adjust so that students would be able to handle the exercises.

Moreover, it was interesting to observe the differences between groups of students' Compassion scores. That medical students' Compassion scores were the highest of all groups, even more so than the predominantly female Nursing/Psychology group, was unexpected. A lack of perceived compassion in medical doctors is a common patient complaint.[20] The high level of compassion in medical students found in this study may echo previous research which found that medical students begin their university studies with high levels of empathy which begins to decline in the later years of medical school or when they become residents.[10] Furthermore, in the several studies described in their seminal paper, Pommier et al. found that women had consistently and significantly higher Compassion scores than men.[14] This study found that the female students had slightly higher overall Compassion scores than the male students, though these differences were not significant. However, Pommier et al. surveyed women in North America, and it could be that cultural differences between Japan and North America affected the gender-related findings of this study. More extensive surveys will be required to examine the relationship between gender and Compassion in the Japanese university context.

The low Compassion scores of Education majors, who were studying to become future teachers, could be taken as a disturbing sign. It is possible that higher English proficiency, and perhaps academic achievement, had a role in the higher Compassion levels of the Medical and Nursing/Psychology students. Unfortunately, there was no means of objectively assessing the English proficiency of students participating in this study. At the university where this study took place, all first-year students are required to take the TOEIC at the end of each semester, but due to the pandemic, the TOEIC was canceled for that year. However, an assessment of scores from the same courses taught in the past ten years indicates that groups of Medical students had average TOEIC scores of around 600 while Nursing/Psychology had averages of around 500; Education, Economics, and Design majors tended to have averages of around 400. Thus, the Medical students almost certainly had significantly higher English proficiency than all other groups, and the Nursing/Psychology students were likely significantly higher in English proficiency than those in Education and Economics/Design. This pattern follows the overall decline in Compassion scores observed in the four groups, from Medicine to Education. However, a correlation cannot be confirmed in the present study. The effect of English proficiency and academic achievement on students' Compassion levels is an issue warranting further investigation. It could be that high initial Compassion levels may *lead to* high English proficiency or academic achievement, though again further research is required to examine this speculation. Interestingly, the two groups with the lowest Compassion scores overall, Economics/Design and Education, both showed significant gains in Compassion scores, suggesting that these groups may have benefited the most from the AI exercises.

Previous studies have found learners to evaluate AI positively.[3, 4] However, due to constraints imposed upon the class format by the pandemic, it was decided that feedback from students on AI activities in writing would not be collected from students. Collecting Compassion surveys from students was challenging enough, and it was judged that additional surveys might confuse or burden students. This was unfortunate, as such feedback would have helped to enable an assessment of the efficacy of these exercises. Many students seemed to enjoy the AI exercises and participated actively, while a few students looked uncomfortable during the exercises. Those students tended to be reluctant to speak or looked bored during the exercises. A small number of medical students in Watson's study found the AI exercises to

feel silly or awkward.[3] It is important to recognize that not all students will feel comfortable with these AI exercises—they are called "drills" for a reason.[1] The instructor must explain to students why they are engaging in these exercises and what they can gain from them. Future studies should gather feedback from students on individual exercises to identify which exercises are viewed most positively. However, Fu has voiced a need for AI-focused studies to move beyond self-assessments to "measurable and observable" outcomes.[1] For example, assessing speaking fluency in students before and after extensive practice in AI exercises would gather useful information on the efficacy of AI exercises for communication skill-building in an EFL context like Japan.

5. Conclusion

AI exercises significantly boosted the Compassion levels of groups of students with low initial Compassion levels, though further research is needed to confirm a relationship between AI exercises and Compassion, as well as the connection that English proficiency and gender have to Compassion scores. It was heartening to find that students in healthcare-related fields, especially first-year medical students, had high levels of Compassion overall. The question we may need to ask next is how EMP and medical instructors can help students to maintain or even increase their Compassion levels as they progress in their studies and enter medical occupations, and help them to avoid the fatigue or burnout that may come with their work. As Watson contends, healthcare work requires improvisation skills[3], and it is important for EMP educators to help prepare our students for the unpredictability awaiting them.

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Appendix: Three AI exercises

Exercise name	Description and value for debriefing
Playing catch	This is one of the simplest and most popular AI exercises, allowing for many variations. It can be done in pairs or groups of 3-5 students. One student pretends to throw an invisible ball to another student, and the other student pretends to catch it. Students should make eye contact before throwing to help their partner prepare to catch. After practicing the motions, language can be incorporated. Students can be given a theme (for instance, animals); one student then says the name of an animal before throwing the ball, and when the other throws it back he/she should say the name of a different animal, and so on. The instructor can change themes. As students become more comfortable coming up with words they can move on to simple sentences (e.g., "I can…" or "I am…"). This exercise should be kept fast-paced: 60 to 90 seconds of activity with brief breaks in between. (A timer is essential for this and all AI activities.) This exercise can be done in every class to help students develop their fast-response muscles. **Debriefing:** The value of this task is in its promotion of eye contact and getting students to say something when they receive the ball.
But first…	This exercise requires more language production than "playing catch" and is a good one to introduce later in the term. It works best in groups of 3-5 students. The instructor should give all students a sentence stating some kind of plan, for example, "We are going to have a party." In groups, one student should state a sentence beginning with "But first…": for example, "But first we need to clean the house." The next continues in the same pattern: "But first we need to buy some window cleaner," and so on. Students can be given 90 to 120 seconds to do this exercise; longer and it begins to fizzle. Then the instructor can give students a new statement to continue the exercise. The instructor should encourage students to keep going without thinking too much, even if their story becomes bizarre or illogical. **Debriefing:** The value of this task is in its promotion of listening, fast response, and collaboration.
What did I say?	This exercise can be done in a face-to-face situation but may work better on Zoom. Students are given a list of ten simple phrases through the Chat function, for instance, "What time is it?" and "I have to go now." The instructor should then demonstrate the exercise to students by turning the microphone on mute and stating one of the sentences with accompanying gestures. Students can use Chat to guess what the instructor said. Students can then be broken into breakout rooms to carry on the exercise, with each student taking turns to say one of the sentences with the mike off and the others having to guess what was said. In smaller classes, this can be done as a whole-class activity, and in higher-level classes, students can come up with their own statements or questions. The instructor should encourage students to enunciate clearly and use body language to help other students guess. **Debriefing:** The value of this task is in its promotion of paying attention to non-verbal cues.

Original article

医学英語のオンラインツール利用で英語発音は向上するのか：シャドーイング演習を含む教育介入の効果検証

Effectiveness of an online shadowing program for medical English pronunciation practice

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Abstract

Background/Objectives: Improving English proficiency is a critical issue that Japanese medical education must address to enhance communication with non-Japanese speaking patients. In this study, we developed online learning tools applying the shadowing technique and examined their effectiveness in improving pronunciation.

Methods: As practice materials for online shadowing, original texts documenting anatomical words and conversations between patients and medical professionals were used. The program consisted of 10 units (approximately 20 min/unit) with five tasks in each: S1, S2, S3 (only shadowing), SS (shadowing with script), and R (oral reading without model sounds). Students studying nursing, medicine, and medical translation were requested to complete ≥7 units, pretests, posttests, and questionnaires. We used an automatic speech recognition system to score their pronunciation in the recordings and examined changes in the scores before and after the intervention. Additionally, factors associated with the changes were explored with the use of multiple regression analysis.

Results: After the shadowing practice, the English pronunciation of 57 participants improved significantly. The average scores for the shadowing voice (S1) pretest and posttest were 45.0 and 55.0, and those for the oral reading voice (R) were 63.9 and 71.2, respectively (both $p < 0.001$). The multiple regression analysis showed that female sex was a factor associated with increased scores in shadowing pronunciation. Furthermore, using educational sites for anatomical words was associated with increased scores in oral reading.

Conclusion: The results indicate that online shadowing practice using texts from the medical field may be effective in improving English pronunciation of vocabulary, including medical terms.

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Keywords online shadowing practice, English pronunciation of medical terms, automatic speech recognition, intervention program

1. 緒　　言

日本における在留外国人数は，2021 年末で全人口の 2% を超える約 276 万人となり，医療現場でも英語によるコミュニケーションが必要になる場面が増加した。[1] 医療従事者と患者の間に発生する言語コミュニケーションの問題は，提供する医療の質の低下，患者の安全性の低下，医療コストの増加など深刻な影響をもたらす。[2-4] 将来の医学・医療を担う学生の英語力向上を促すことは，医学英語教育の大きな課題である。

医師国家試験改善検討部会報告書（2020）には，「実際の医療現場において医療従事者間でのコミュニケーションをとる際や，外国人患者への診察を行う際に必要な基礎的な英語の能力」は，医師として具有すべき能力であると言

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及されている。[5] また，薬剤師を対象とした調査や，看護系大学院生と看護専門職を対象とした英語講座の実施報告でも，研究遂行に必要な英語能力に加えて，外国人患者と意思疎通をはかる際に求められる英語コミュニケーション力を重視していることが分かる。[6, 7]

中学校や高等学校の英語授業，および大学や社会人を対象とした一般英語の教育現場では，英語コミュニケーション力育成のニーズに対応し，さまざまな指導法・学習法が実践されている。そのひとつであるシャドーイングは，学習者が外国語音声を聞きながら，ほぼ同時にその発話を復唱する行為である。「聞く」と「話す」を同時に進める認知負荷の高いタスクのため，学習者には集中力が求められるが，シャドーイング演習によるリスニング力やスピーキング力の向上を報告する研究成果は，英語学・英語教育学の分野で蓄積されている。[8-11] また，CALL（computer assisted language learning）と呼ばれる外国語学習を支援する技術開発も進んでおり，オンラインでのシャドーイング演習をセールスポイントとする英語教材も市販されている。

しかしながら，医療系の学生を対象とした専門英語教育において，オンラインでシャドーイング演習を実施し，学習者の発音を録音して評価した報告はまだない。そこで我々は，医学英語に特化したテキストをシャドーイング演習の提示音声とする教材や，解剖学用語の学習ならびに英語の発音練習を促すウェブサイトを作成した。本研究では，大学の授業や自己学習にこれらのオンライン学習支援ツールを使用した場合の教育効果の検証を目的に，シャドーイング時や英文音読時の発音について介入前後の変化を検討するとともに，それらの変化に寄与する因子について，質問紙調査で入手した情報も含めて，探索的検討を行った。

2. 方　　法

2.1　シャドーイング用の教材と音声提示方法

シャドーイング課題として，1 単元が 4 つのセクションからなるオリジナルテキスト 10 単元（unit 1 ～ 10）を作成した。4 つのセクションのテーマは次の通りとした：①解剖学用語を含む短文 10 個，②医療者と患者のダイアローグ，③医療者の自己紹介文，コロナ禍の日本の状況等のエッセイ，④英検 2 級相当のリスニング課題。テキストの可読性（Readability）を一定レベルに保つため，Flesh Reading Ease のスコアが 50 を下回らないようし，①の 1 つの短文に含まれる単語数は 6~10 語程度（全体で 80 語），②③④は全体で 60 語前後になるようにテキスト作成を行った。[12] ④の英検 2 級相当のリスニング課題については，実際の英検 2 級のリスニング課題から生物医学系の話題を選び，シャドーイングが困難と思われる固有名詞の削除や変更，長文をやや短くするなどして，60 語前後になるように編集した。

これらのテキストを TTS（text to speech）技術を用いて音声合成し，話者音声，話速，センテンス間のポーズの長さ等を設定した。東京大学大学院工学系研究科・峯松研究室が開発した Shadowing saver にそれらの音源を載せて，学習者がインターネット上の当該 URL にアクセスすれば，シャドーイング演習ができるようにした。テキストの音声合成には Amazon polly を利用し，①の読み上げ音声は米国人・英国人の英語音声，②③④は文章の設定に合わせてインドやオーストラリア英語の音声も採用し，学習者がさまざまな発音に触れられるようにした。

図 1（左）に示すように，セクションごとに S1 → S2 → S3 → SS → R の 5 段階ステップ（S1, S2, S3：音声のみ提示されてシャドーイング 1 ～ 3 回目，SS：スクリプトシャドーイング［音声とテキストが提示されてシャドーイング］，R：リーディング［音声提示なしでテキストを音読］）の順序で，シャドーイング 4 回とテキスト音読 1 回を行い，録音された学習者の音声を専用のクラウドサーバーに保存した。学習者は，イヤホンからモデル音声を聞き，画面に表示される音声波形を見ながら，パソコンのマイクに向かって発声した。S1, S2, S3 はやり直し不可，SS と R は再生・録音機能を有し，納得のいくまで再録可能とした。1 単元あたりの所要時間は，まったく再生せずに録音を続ける場合は約 15 分，SS と R でそれぞれ 1 回再生・録音すると約 20 分を要した。介入前後のプレテスト・ポストテストも上記と同じ要領で課題を提示し，学習者の録音音声の一部を分析に使用した。

2.2　解剖学用語学習サイトと発音チェックサイト

解剖学用語は，医療系の専門課程にて新規に学ぶ語が多いため，発音や綴りを習得していなかったり，その語との共起が多い単語を含む言い回しを知らなかったりする学生が多い。そこで上述のシャドーイング演習用のサイトに加えて，課題テキストの解剖学用語やそれらを含む文が視覚・聴覚的に学べるサイトを作成し，予習・復習に利用できるようにした（**図 2**）。さらに，自動音声認識技術を用いた発音チェックサイトを開発し，学習者が自由にアクセスできて，自らの英語発音がどのような単語列として認識されるかを確認できるようにした（**図 1 右**）。発音練習に用いるテキストは特に指定せず，学習者が当該サイトを実際に使用した時間の長さは，サイト管理者画面上に記録が残るようにして，分析に使用した。

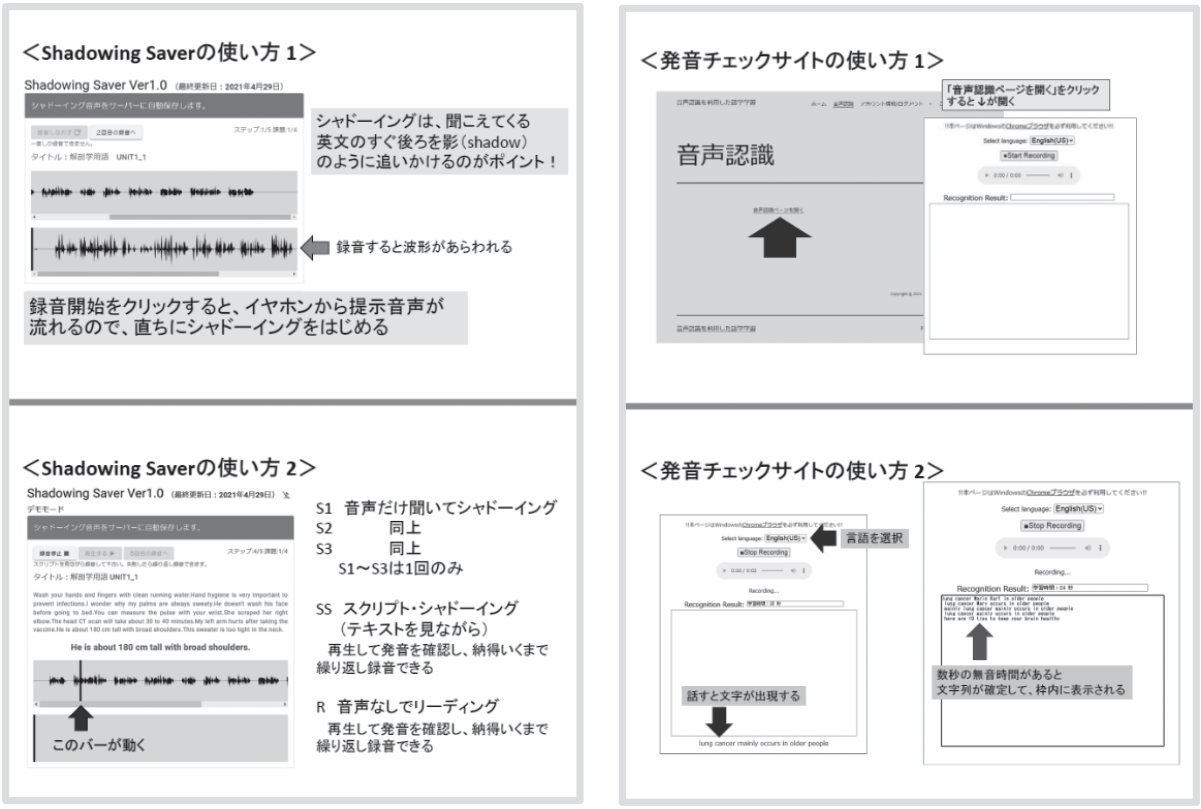

図 1. Shadowing saver（左）と発音チェックサイト（右）の使い方を説明したスライド

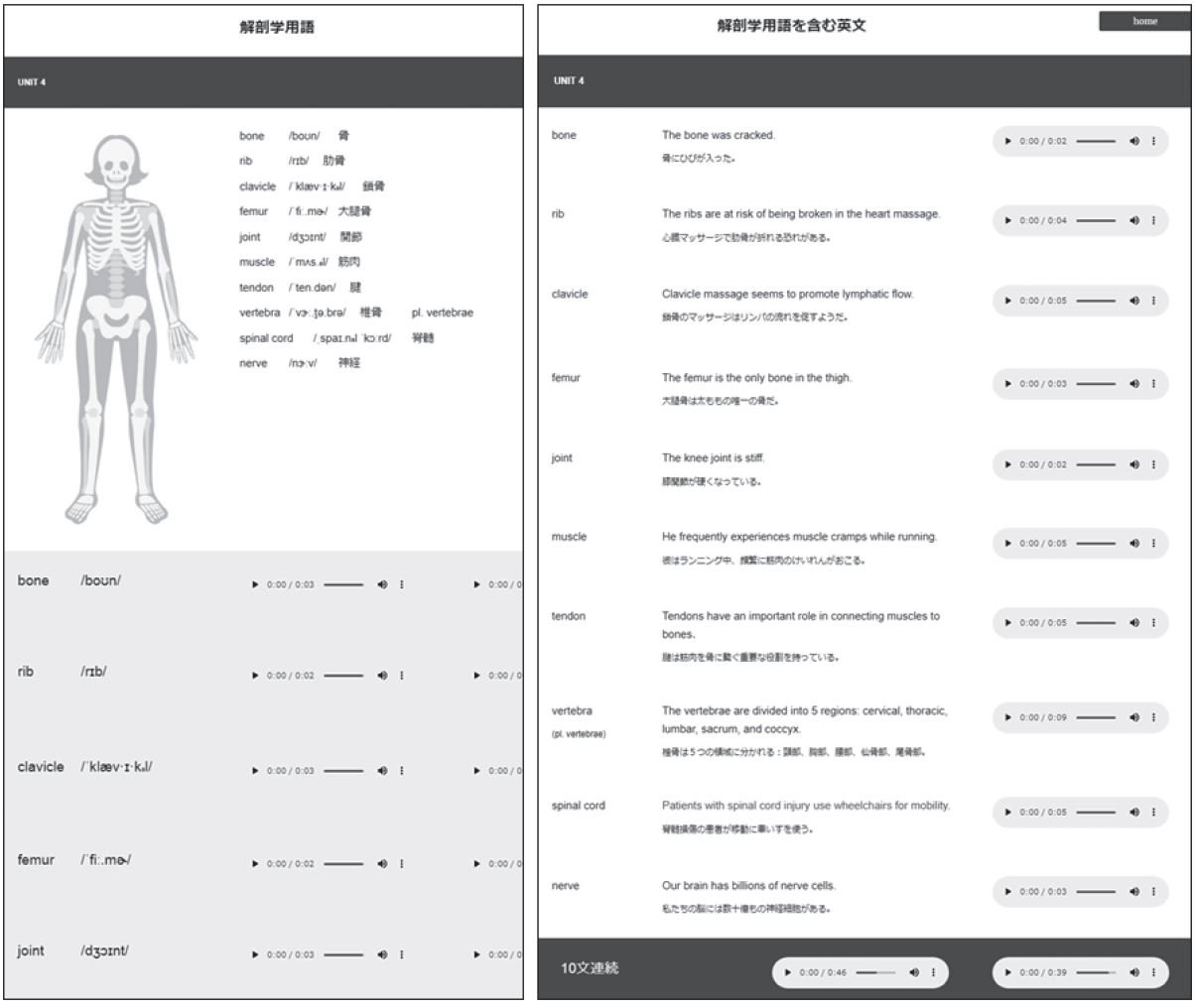

図 2. 解剖学用語とそれらを含む英文を学ぶサイト

2.3　研究期間と対象者

本研究は，2021 年 10 月から 2022 年 3 月に実施した。対象者は，医学英語に特化した教材を利用することが，基本的な医学英単語の習得や外国人患者への対応などに役立つ可能性が見込まれ，医学・医療に関わる専門校に在籍する者とし，以下の 3 つのグループから構成された：A 大学看護学部にて看護の臨床場面で使われる英語を学ぶ授業（選択科目）を受講した学部 4 年生，医学英語を学ぶ授業を選択した民間翻訳スクール（1 年通学制）の学生，SNS で周知した募集サイトより参加した全国の医学部医学科 3 ～ 6 年生。

A 大学では，1 回 90 分授業の 3 分の 1 程度を使い，解剖学用語サイトにある単語の発音指導ならびに英語構文の説明，シャドーイング演習（各授業につき 1 単元）を課した。翻訳スクールの学生は，医薬系翻訳会社や医療ドラマ等の映像を扱う会社への就職希望者が多く，英語力は高いが医学の基礎知識を有さない者が多いことを踏まえ，解剖学用語の解説は授業中に行い，シャドーイング演習は次回授業までに実施することを推奨した。医学生は，先の 2 グループと異なり，学習スケジュールを自己管理する自習型教材としてシャドーイング演習を行うこととした。ただし 1 回の学習につき 1 単元，多くても 2 単元の実施を推奨し，約 2 か月間に 10 単元を修了するように伝えた。いずれのグループにおいても，シャドーイングに先立ち，動画等を用いて録音方法を説明して実際に体験してもらい，サーバーに保存された録音音声に雑音の混入がなく，発音評価が可能かを確認した。

また，シャドーイング演習のプレテストとポストテストの時期に合わせて質問紙調査を行い，本教材の課題の難易度，1 か月間に英語で会話する時間，解剖学用語サイトの利用状況などを質問した。対象者には，録音音声の一部と質問紙調査の回答，ならびに発音チェックサイトの利用時間の長さを研究用データとして使用することを説明し同意を得た。また学生を対象とする研究であるため，倫理審査委員会の承認を得るなど，各教育機関の求める倫理的配慮を行った。

2.4　評価項目

主要評価項目は，介入前後の英語発音の変化とし，1）シャドーイング時，2）英文音読時の学習者の録音音声について「発音評価スコア」を算出した。このスコアは，学習者に発音変化をフィードバックする際の数値（点数）としても利用した。評価対象のテキストは，1）は英検 2 級相当のリスニング課題のシャドーイング 1 回目（S1），2）は解剖学用語を含む 10 文の音読課題（R：提示音声なしでテキスト音読）とした。

発音評価スコアの指標として，提示音声（正解テキスト）と学習者の録音音声が自動音声認識で認識された結果の一致度を用いた。両者の不一致には，以下の 3 つのケースが考えられた：①提示音声の単語が学習者の単語に含まれない，②提示音声の単語が学習者では別の単語に置き換わる，③提示音声にない単語が学習者の単語に加わる。そこで各ケースに該当する単語の数をカウントし，次の計算式を設定した。

score = 100 num(e) / (num(e) + num(d) + num(s) + num(i))

num(e)：提示音声（正解テキスト）と学習者音声の認識結果が一致した単語数

num(d)：提示音声に存在し学習者音声の認識結果に含まれなかった単語数

num(s)：学習者音声の認識結果では提示音声と違う単語に置き換わっていた単語数

num(i)：提示音声になく学習者音声の認識結果に加わっていた単語数

これは音声認識システムの性能を評価する指標として一般に用いられている WER（word error rate）をベースとする独自の計算式である。WER の計算式は，WER=（num（d）+ num(s) + num(i)）/ num(r) で，num(r) は正解とする参照テキスト（reference）に含まれる単語数である。しかし，システム性能評価に使う式をそのまま用いると，分母の単語数に比べて分子の単語数が多いと値が 1 を超える。また，学習者へのフィードバックには，0 ～ 100 点を範囲とし 100 点を満点とする方が，学習による変化量が見えやすい。そこで，num(r)ではなく提示音声と学習者音声の認識結果が一致した単語数 num(e)を分子と分母に置き，100 を掛けた上記の式を採用した。

副次評価項目は，文字表示なしでのシャドーイング（S2）と文字表示ありのシャドーイング（SS）の発音評価スコアの差（|S2-SS|）とし，自己紹介文を評価対象のテキストとした。S2 はシャドーイング 2 回目であり，テキスト表示なしで行われる 3 回のパフォーマンスの平均的な値とみなした。SS は 3 回のシャドーイングの後にテキストが提示されてシャドーイングを行うので，その時点での学習者の最高のパフォーマンスが得られやすい。このことから |S2-SS| の値は，介入前よりも介入後の方が小さくなり，概念図のような変化がみられると予想した（**図 3A**）。

2.5　関連因子の探索的検討

探索的検討として，主要・副次評価項目で用いたスコアの変化を目的変数とし，これに関連する可能性のある以下の 11 項目（ベースライン特性の 7 項目＋期間中に得られた情

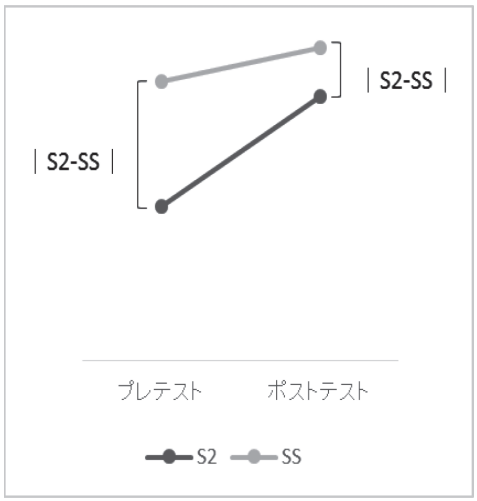

図 3A. 予想される発音評価スコアの変化（概念図）

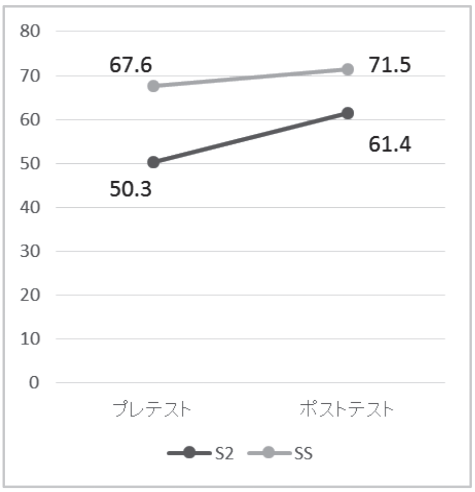

図 3B. 実際の発音評価スコアの介入前後の変化

報 4 項目）のそれぞれについて，まず単回帰分析を行い，P 値が 10% を下回る変数のみを選択し，重回帰分析に強制投入した。1. 年齢，2. 性別，3. グループ（看護学生，翻訳スクール生，医学生），4. 学年（医療系の専門教育を受けた年数の指標），5. 英語力（英検準 1 級以上か未満），6. 英語関係の課外活動の有無，7. 英会話時間（過去 1 か月間トータルの英語で話した時間），8. 発音チェックサイト利用時間，9. 解剖学用語サイト利用の有無，10. 推奨したシャドーイング演習の方法（1 回の学習で 1 単元）遵守の有無, 11. 発音指導の有無。

2.6　統計解析

ベースラインの特性について，カテゴリー変数は度数とパーセント，連続変数は平均 ± 標準偏差（SD）で示した。分析対象は，シャドーイング課題の修了要件（全 10 単元のうち最低 7 単元を実施）を満たし，質問紙調査に回答し，介入前後に行ったプレテスト・ポストテストにおける録音音声が評価可能であった者を完遂者とみなして，分析に組み入れた。主要評価項目と副次評価項目については，教育介入前後における発音評価スコアの変化について，対応のある t 検定を行い，有意水準を 5％とした。ただし多重性の問題を考慮し，主要評価項目の 2 項目を co-primary endpoint に設定し，閉手順に従い，2 項目とも有意な差が検出された場合に介入効果があると判断した。副次評価項目ならびに探索的検討は，主要評価項目の帰無仮説（介入前後で発音評価スコアに差がない）が棄却された場合に限って実施することとした。探索的検討に含まれる変数で名義尺度にあたるもの（性別，グループ等）は，ダミー変数として扱った。英会話時間は，質問紙に 5 段階の選択肢（1：0 ～ 15 分，2：15 ～ 30 分，3：30 分～ 1 時間，4：1 ～ 2 時間，5：2 時間以上）を用意した。解析には，EZR on R commander を使用した。[13]

表 1. ベースライン特性と探索的検討に用いた変数

変数	*n* = 57
年齢（SD）	25.0（6.6）
女性（%）	43（75.0）
学年（SD）	3.7（1.5）
英検準 1 級以上（%）	33（57.8）
英語関連の課外活動（%）	41（71.9）
1 か月の英会話時間（%）	
0 ～ 15 分	20（35.1）
15 ～ 30 分	7（12.2）
30 分～ 1 時間	11（19.3）
1 ～ 2 時間	5（8.7）
2 時間超	14（24.6）
発音チェックサイトの利用時間，分（SD）	157.3（392.4）
解剖学用語サイトの利用（%）	47（82.5）
推奨した学習方法の実施（%）	24（42.1）
発音指導あり（%）	33（57.8）

3. 結　　果

3.1　対象者の英語学習経験

分析対象となった完遂者は 57 名（看護学生 12 名［21%］，翻訳スクール生 10 名［18%］，医学生 35 名［61%］），女性が全体の 75％（43 名）を占め，年齢分布は 20 代が 49 名（86%），30 代は 6 名（11%），50 代は 2 名（4%）であった（**表 1**）。全体の 78％が「高校時代は，他の教科より英語が得意だった」と回答した。医学英語を学んだ経験に関する質問には，約 7 割がリーディングおよびライティングの学習経験ありと答えた一方，リスニングおよびスピーキングの学習経験者はおよそ半数に留まった。

3.2　主要・副次評価項目の結果

主要評価項目と副次評価項目の解析結果を**表 2** に示した。主要評価項目については，①シャドーイングと②英文音読のいずれも介入前より介入後の発音評価スコアが有意

表 2. 主要・副次評価項目の結果

評価項目（平均点± SD）	プレテスト	ポストテスト	*P* value
主要評価項目			
S1 シャドーイング	45.0 ± 18.1	55.0 ± 18.7	＜0.001
R　英文読み上げ	63.9 ± 15.7	71.2 ± 13.3	＜0.001
副次評価項目			
｜S2-SS｜シャドーイング	18.5 ± 12.3	14.6 ± 10.4	0.017

に上昇していた。①の英検 2 級相当のリスニング課題のシャドーイングについては，プレテスト時（45.0 ± 18.1）に比べてポストテスト時（55.0 ± 18.7）のスコアが高かった（p<0.001）。②の解剖学用語を含む英文音読も，プレテスト時（63.9 ± 15.7）よりポストテスト時（71.2 ± 13.2）のスコアが高かった（p<0.001）。

副次評価項目の S2 発声時の発音評価スコアと SS 発声時の発音評価スコアの差（|S2-SS|）は，介入前後（|S2-SS|［pre］vs. |S2-SS|［post］）で有意な差が認められた。S2 と SS の介入前後の各スコアの平均点を**図 3B** に示した。S2 と SS のいずれも介入後のスコアは上昇したが，S2 の上昇幅が大きいため，概念図（**図 3A**）で予想したとおり |S2-SS| の差が縮小していた（p<0.05）。つまり介入後はテキスト表示なしのシャドーイングでも，テキスト表示ありのシャドーイングに近いパフォーマンスが得られた。

3.3　シャドーイング時や英文音読時の発音向上に関連する因子

Shadowing saver で録音再生ができる課題（スクリプトシャドーイング［SS］と提示音声なしでテキスト音読［R］）の際に，再生機能を使って自らの発音を確認して再び録音した回数を介入後に質問したところ，SS は平均 1.6 回，R は 1.4 回であった。

探索的検討に用いた 11 個の説明変数の記述統計を**表 1** に示した。発音チェックサイトの利用時間は，10 時間を超える長時間利用者が 4 名（7%）と 5 分未満の短時間使用者が 23 名（40%）いたため，非対称性の分布となり，平均値は 9,439 秒（157.3 分），中央値は 899 秒（15.0 分）であった。対象者の約 7 割が英語に関する課外活動を行っていたが，過去 1 か月間トータルで 1 時間以上英語で会話したと回答したのは，3 人に 1 人であった。

主要および副次評価項目で用いた各スコアの変化を目的変数とし，11 の説明変数について，二変量間で有意（p<0.10）であった変数について，重回帰分析を行った。主要評価項目のシャドーイング力（S1 発声時の発音評価スコア）について，単回帰分析で有意であったのは，性別（女性），グループ，学年であった。これらを重回帰モデルに投入して P 値 5% を下回ったのは性別のみ，つまり女性は男性よりも発音評価スコアの変化（上昇）が大きかった（p = 0.014）。英文テキスト音読（R 発声時の発音評価スコア）については，解剖学用語サイトの利用有無のみが単回帰分析で有意となり，同サイトを利用するほうが良好な結果となった（p = 0.016）。副次評価項目のシャドーイング |S2-SS| について，単回帰分析では，年齢，グループ，英会話時間が有意となり，このうち重回帰モデルに投入後も有意だったのは，年齢（p = 0.026）と英会話時間（p = 0.024）であった。年齢は負の相関のため年齢が若い方が有利であり，1 か月間の英会話時間は長い方が発音評価スコア向上に関連していた。

4. 考　　察

4.1　学習者に発音向上の実感はあるか

本研究では，医療場面で使われることの多い単語や言い回しを多く含むオンライン教材を開発し，授業や自習を通して，英語 4 技能のうち「聞く」「話す」の実践を促す働きかけを行い，同教材を利用した学習者の英語発音について，介入前後での変化を検討した。

介入後に実施した質問紙調査の中で，「ステップが S1 → S2 → S3 → SS → R と進むにつれて，内容の理解は進んだか」という質問に対して，全員（57 名）が「はい（進んだ）」と答えた。また「ステップが進むにつれて，あなたの発音は向上したか」の質問には約 8 割（45 名）が「はい（向上した）」と回答した。

本研究では，発音評価スコアを用いて客観的な指標の変化を分析したが，学習者の主観的にも課題の内容理解や発音向上の実感を伴うことが分かった。以下に，翻訳スクール生から得た感想の一部を紹介する。この集団は，TOEIC スコアが 800 を超え，一般英語の翻訳スキルは他の 2 集団（看護学生と医学生）よりも高いとみられるが，シャドーイング演習について高く評価するコメントが多かった。

- 最初のシャドーイングでは，聞こえても発話することが難しかったが，数回繰り返すことで，口から発する単語やフレーズが増えていたことに驚いた。
- 解剖学用語の文のシャドーイングを繰り返すことで理解がすすみ，検査内容や疾患の説明をより理解できるようになったと感じている。
- 音声波形を見ながら発音練習をする機会はなかったので，とても有益だった。
- スクリプト提示なしのシャドーイングでは，聞き取れなかった部分や内容を頭の中で処理してから発音するため，モデル音声から遅れることがある。スクリプト提示ありのシャドーイングの方がきれいな発音にしようと心がける余裕があった。

4.2　シャドーイングと発音向上の関係

本研究では，シャドーイング演習の実施後に発音評価スコアの有意な上昇が認められたが，評価対象としたテキストの選択が結果に影響を与えた可能性は否定できない。主要評価項目 1）シャドーイング時の発音評価については英検 2 級相当のリスニング課題，主要評価項目 2）英文音読時の発音評価については解剖学用語を含む 10 個の短文を，それぞれ評価対象のテキストとした。また文字表示がある場合とない場合のシャドーイング（副次評価項目）の発音評価については，自己紹介文を対象とした（**表 3**）。

主要評価項目 1）については，英検 2 級相当のリスニング課題のうち最も医学に近いと思われた，医学系学会での会場アナウンスをテーマにした課題を選択した。主要評価項目 2）については，事前に準備した原稿を学術集会で読み上げる発表者もいることから，解剖学用語を含む英文の音読が発音評価に適していると考えた。副次評価項目については，文字に頼らずにシャドーイングを行う能力について介入前後での変化を見ていることから，正確な聞き取りと相手に伝わる発音が求められる場面として，自己紹介文が適切と考えた。

上記のような意図をもって評価項目と評価対象とする課題を組み合わせたが，可読性（Readability）のより高いテキストを用いたり，評価項目と課題の組み合わせを変えたりするなど，今回と異なる形で評価すれば，異なる結果が得られる可能性がある。

梱原らは，一般英語を学ぶ大学生を対象に，シャドーイング演習を継続的に実施することで，テキスト読み上げにおける発音（調音，大きさ，高さ，長さ）がどのように変わるかを検討したが，「適切な音声指導が与えられずに，ただ聞いたその場で真似ることを繰り返すだけでは，学習者の音声産出を改善する（モデル音声に近づける）ことは難しい」と結論している。[14] 一方，適切な発音指導には，経験を有する教師の存在が不可欠であるが，日本の外国語教育の実情を勘案し，教師のフィードバックに代わるものとして，自動音声認識システムやオンライン発音矯正システムの可能性に期待する意見もある。[15]

4.3　複数のツールで学生の自発的な学びを支援する

本研究においては，複数のオンライン学習支援ツールの提供が，一般英語より限定された医学英語のサンプル音声を頻繁に聞く機会や，自らの発音を意識的に聞いて矯正する機会を与えた可能性がある。

シャドーイング課題においては，1 セクションにつき最低 5 回（S1 ～ S3, SS, R）は同じ文の発音を行うが，結果で示したように SS で 1.6 回，R で 1.4 回の再生・再録をしたとすれば，合計 7 ～ 8 回は同じ文を繰り返し発音した学習者が多いことになる。前半の S1 ～ S3 は提示音声のテキストが画面表示されないので英語の聞き取りに注意を払うタスクとなるが，テキスト表示のある後半は自らの発音にも意識が向きやすい。また，発音チェックサイトの平均利用時間は 2 時間半を超えていた。同サイトの利用方法を説明する際は「日本人英語にあまり慣れていない“自動音声認識クン”があなたの発音を理解してくれるか試してみましょう」と伝えたが，自らの発音がどのような単語列として認識されるかが即時に分かるので，自らの発音を矯正する動機づけになった可能性がある。

主要評価項目 2）の英文音読（R 発声時の発音評価）の向上に関連する因子が解剖学用語サイトの利用有無であったのは，同サイトを活用して，特定の単語や言い回しの文字列と読み上げ音声を確認すれば，それらの発音の改善が得られやすいことの表れだと考えられる。学生からの要望に，学習期間終了後もこれら学習支援サイトの利用継続を望む声が複数あった。

Mansouri らは，画像やテキストを含むアプリ関連の学習教材を解剖学の授業に統合することによって，生徒の成績と出席にプラスの効果をもたらしたと報告している。[16] 解

表 3．発音評価に使用した提示音声のテキスト

①シャドーイング時の発音評価に用いたテキスト（英検 2 級相当のリスニング課題）
Welcome to our medical conference. We hope you are enjoying the speeches by leading doctors from around the world. We would like to let you know that Dr. Baker's speech has been delayed. It will start after the lunch break at 2 p.m. The speech will be about using robots in hospitals.
②英文音読時の発音評価に用いたテキスト（解剖学用語を含む 10 個の短文）
Patients with spinal cord injury use wheelchairs for mobility. The bone was cracked. He frequently experiences muscle cramps while running. The femur is the only bone in the thigh. Tendons have an important role in connecting muscles to bones. The vertebrae are divided into 5 regions: cervical, thoracic, lumbar, sacrum, and coccyx. Our brain has billions of nerve cells. Clavicle massage seems to promote lymphatic flow. The knee joint is stiff. The ribs are at risk of being broken in the heart massage.
③文字表示有無別シャドーイング時の発音評価に用いたテキスト（自己紹介文）
I am in my fourth year at a nursing college in Japan. I am most interested in disaster medical care. It provides treatments not only for acute conditions but also for infectious diseases and chronic conditions. It serves under very stressful situations with limited resources. I would like to participate in DMAT, Disaster Medical Assistance Team, in the future.

剖学は基本的に視覚的な学問であることから，学生の興味・関心をひく視覚特性を備えた教材は有用だが，日本人学生には，新規の専門用語の英語発音を提供するという聴覚特性も求められる。良質な教材を通して，学生たちが専門用語の正確な発音を身につければ，将来，英語で学会発表する際にも役立つであろう。

また，本研究を行ったA大学看護学部の授業では，担当講師がシャドーイング課題の単元の進捗状況に合わせて，母音表をみせながら発音の違いを意識させる指導を実施した。この看護学生のグループは，発音チェックサイトの平均利用時間が3グループ間で最長であった（看護学生：385.1分，翻訳スクール生：10.1分，医学生：121.3分）。このように適切な発音指導を行うことは，オンライン学習支援ツールのみを使用する以上に，学習者の発音への意識や学習意欲を高める可能性がある。

4.4　定量的・定性的データを収集して総合的な評価を行う

患者の言葉を聞きとって自ら英語で発言する力，それに対する自信の有無は，患者対応そのものに影響を与える可能性がある。

外国人患者への対応姿勢を予測するため，質問紙調査で次の質問を示し，回答欄に4つの選択肢を設けた：「研修先の病院で，足にケガをしている外国人の患者さんが待合室にいる場面を想像してください。日本語はわからず，英語を話すようです。あなたは外来担当です。どうしますか？」，［回答］1：患者さんに英語で声をかける，2：英語のわかるスタッフを探しにいく，3：患者さんに日本語で声をかける，4：何もせず様子をみる。本研究では，対象者の約9割がプレテストの時点で「患者さんに英語で声をかける」を選択し，介入による変化は認められなかったが，ベースラインの英語力や英語学習に対するモチベーションがあまり高くない集団であれば，回答の分布が異なるかもしれない。

質問紙調査においては，自由記述で学習者の主観的・定性的データを収集するとともに，既存の心理尺度や独自の質問を設定して定量的データを入手し，発音精度やサイト利用時間といったオンラインツールを通して収集できる数値データとの関連性を明らかにしていけば，より質の高い医学英語教育を提供するための貴重な情報になると考えられる。

4.5　研究の限界

本研究にはいくつか限界がある。本研究で得られた結果を，医療系の学生全般に一般化することは難しい。サンプルサイズが57名と小さかったことに加え，選択バイアスの大きいサンプルであった可能性がある。参加者は，選択科目/コースを自ら選択した看護学生と翻訳スクール生，SNSでの募集に応じた医学生から構成され，医学英語学習に対するモチベーションの高い集団であった。また修了要件を満たした完遂者のみを分析対象としたが，授業型の2集団は全員完遂したのに対し，自習型の医学生の完遂率は71％に留まったことも，分析結果に影響を与えた可能性がある。

シャドーイングや英文音読時の発音評価については，ネット上で汎用されている自動音声認識システムをベースとした発音評価指標を設定したが，音声認識技術を語学学習に応用し，より精度の高い発音評価を可能とする音声工学研究が進行中である。[14, 17, 18]

このような限界があるとはいえ，本研究の意義は大きいと考える。自由記述の感想において，今回提供した複数の学習支援ツールに好意的な意見を述べる学生が多く，これらのツールの組み合わせが，学生の自主的な学びを促すことが示唆された。また医学英語に特化したオリジナルの同一教材が，医療系の異なる専門職教育を受けている集団に，授業・自習といった異なる教育形態で使用できる可能性を示した。シャドーイング課題の教材の内容（テキストの難易度，提示音声の速度，ポーズの長さ等）は，学習者のベースラインの英語力や各専門領域のニーズに併せて，集団ごとの教材開発も可能であるが，専門職連携教育の一環として同一教材を用いれば，学生間・教員間のコミュニケーションを促すきっかけになる可能性がある。

5. 結　　論

医学英語学習者（看護学生，医学英語を学ぶ翻訳スクール生，医学生）に，シャドーイング演習を中心とした医学英語のオンライン学習支援ツールを提供し，教育効果検証を目的に，介入前後における英語発音の変化や，変化に関連する因子を検討した。その結果，シャドーイングや英文音読時の発音は向上し，同一教材で異なる医療系専門職の「聞く」「話す」トレーニングに役立つ可能性が示された。本研究は，オリジナルテキスト作成とテキストの音声合成，オンラインでのシャドーイング実施と録音音声の発音評価など，医療系では初めての複合的な取り組みのため，主要・副次評価項目に加えて探索的な検討を行ったが，さらなる情報収集と効果測定の精緻化が必要である。

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利益相反　発表内容に関連し，開示すべき利益相反はない。

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Original article

Use of authentic translation in helping students decipher English-language randomised control trial abstracts

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Abstract

This paper examined whether the use of the authentic translation of research article abstracts would help fourth-year medical students decipher the highly codified language used in randomised controlled trial (RCT) abstracts to understand the information. The students used our Medical English Education SUpport System (MEESUS) to read an RCT abstract. MEESUS incorporates parallel corpora of English abstracts and their Japanese translations with bilingual displays that students can use to look up words and sentences. The students used MEESUS to read an RCT abstract of their choosing and learned about the CONsolidated Standards Of Reporting Trials (CONSORT) criteria for reporting randomised trials in journal and conference abstracts. Students were asked to complete tasks including abstract information extraction following the CONSORT guideline and to write a summary. The analysis of the tasks showed that higher scores were obtained by users of the bilingual displays than non-users in all task items. The ratio of high scorers in the writing task was significantly greater in the bilingual display users than in the non-users (χ^2 = 3.878, *df* = 1, *p* = 0.0489). The presence of the authentic translation seems to have led to a better understanding of the discipline-specific, conventionally institutionalized type of abstracts in English.

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Keywords parallel corpora, research article abstracts, randomised controlled trials, ESP, concordancer, medical English education

1. Introduction

Students of English for specific purposes (ESP) need guidance on what to expect from their professional community.[1] Genre knowledge comprises four components: "formal, process, rhetorical, and subject-matter knowledge.[2]" The importance of teaching the research article abstract genre is discussed in the medical English education guidelines,[3] since an abstract text has the distilled quality as part of the research article as a whole.[4] A study examining the language used in the randomised controlled trial (RCT) papers has indicated the importance of the disciplinary dissemination of the information in the articles.[5]

The use of students' first language in English learning has been underscored, with translations contributing substantially to the development of English fluency.[6] A recent study describing the impact of neural machine translation on language learning suggests that neural machine translation would serve as a powerful tool for learners despite restrictions and limitations.[7]

The term translanguaging refers to bilingual behavior in classrooms and is deemed to help students develop literacy in their second language.[8] The idea of translanguaging stems from the 2007 challenge by Cummins on immersion bilingual education.[9] Translanguaging has been proposed to offer leverage over monolingual instructions, and the use of a translingual approach has been acknowledged in ESP pedagogy with controversial discussions.[10] Our study examined whether the authentic translation of international medical research article abstracts would help undergraduates better understand RCT abstracts as highly

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specialized genre texts.

In this study, students accessed our Medical English Education SUpport System (MEESUS) to read an RCT abstract. MEESUS consists of the titles and abstracts of articles from *the New England Journal of Medicine* and the authenticated translations in Japanese,[11] with a bilingual display function showing the aligned texts in English and Japanese.[12] Our study investigated whether the students would use the bilingual display functions of MEESUS to find an RCT abstract in their area of interest and accomplish the tasks of extracting required information according to the CONsolidated Standards Of Reporting Trials (CONSORT) guideline.[13] They were also asked to do a writing task, concisely communicating the study to a patient interested in the study treatment. We compared the task scores between users of the bilingual display functions in MEESUS and those who did not use these functions.

2. Methods

2.1 Objectives and research questions

This study used MEESUS, a bilingual concordance tool that also records its functions as users use them. We hypothesized that the bilingual displays of MEESUS would help students find an RCT abstract in their area of interest and complete tasks of extracting information from the abstract by referring to the CONSORT guideline and writing a summary of the research. Our study addressed the following research questions (RQs):

1. Did the students use the bilingual displays in MEESUS?
2. What were the differences in scores between users of the bilingual displays and non-users?

We also collected comments from the students responding to a rather general question, "What have you learned in this class"?

Fourth-year students were introduced to MEESUS on the study day of a three-day medical English reading course. We describe an outline of the MEESUS concordancer, the parallel corpora, and the additional function of recording user activities in Section 2.2. A more detailed description of MEESUS has been reported previously.[14]

2.2 The concordancer

MEESUS contains, at the time of this study, the titles and abstracts of 1,481 articles published over seven years in *the New England Journal of Medicine* and the authenticated translations.[11] The concordancer analyzes the search terms and settings entered by its user and searches the parallel corpora. The system processes the search results, displays the results in a Key Word in Context (KWIC) format, sorts according to the settings, and presents retrieved sentences to the user.[12]

MEESUS keeps a record of user activities. **Figure 1** is an example taken from a user (UserA).

1. Enters "influenza" in the search box.
2. Concordance line with the English node word "influenza" and the Japanese translation on the adjacent line appears in the bilingual popup display. This popup bilingual display function is called "PopUp."
3. Duplicates the concordance line with the copy function.
4. Accesses an abstract that includes the searched English sentence with the jump function.
5. Accesses the background section of the abstract with the jump function.
6. Enters the Japanese word "インフルエンザ" and uses the search function.
7. Accesses an abstract that includes the searched Japanese sentence with the jump function.
8. Toggles bilingual display to show the Japanese translation of a sentence in English. This toggling bilingual display function is called "Toggle."
9. Enters the Japanese words "インフルエンザ" and "予防" in the first and second search boxes, respectively. Having multiple search boxes (up to four) that could be used for search is one of the most outstanding features of MEESUS.

Our study focused on two bilingual display functions: PopUp and Toggle (**Figures 2 and 3**).

2.3 Participants

Participants were 119 fourth-year medical students at a university in Japan. They were in a series of three-day medical English reading classes as part of the required

Username	Time stamp	Activity	Remark			
ユーザ名	タイムスタンプ	操作	備考			
userA	2021/5/14 16:12:29	search-s	influenza	en		
userA	2021/5/14 16:12:36	popUp	201701641			
userA	2021/5/14 16:12:39	Copy	201701641			
userA	2021/5/14 16:12:54	jump	document_id	NEJMoa1700153		
userA	2021/5/14 16:13:02	jump	section	background		
userA	2021/5/14 16:13:16	search-s	インフルエンザ	jp		
userA	2021/5/14 16:13:20	jump	document_id	NEJMoa1700153		
userA	2021/5/14 16:13:22	toggle	201701631			
userA	2021/5/14 16:14:06	ANDsearch	インフルエンザ	jp	予防	jp

Figure 1. Example history of the MEESUS usage by a user (UserA)

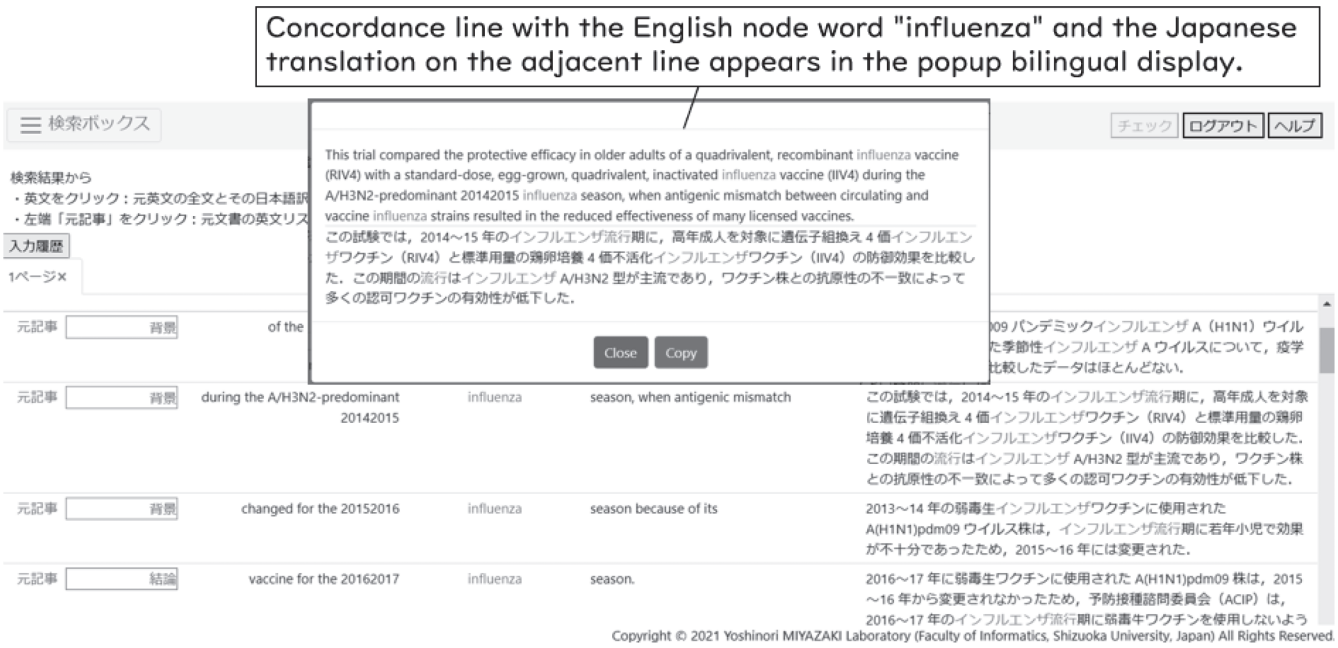

Figure 2. Example screen of the PopUp bilingual display function

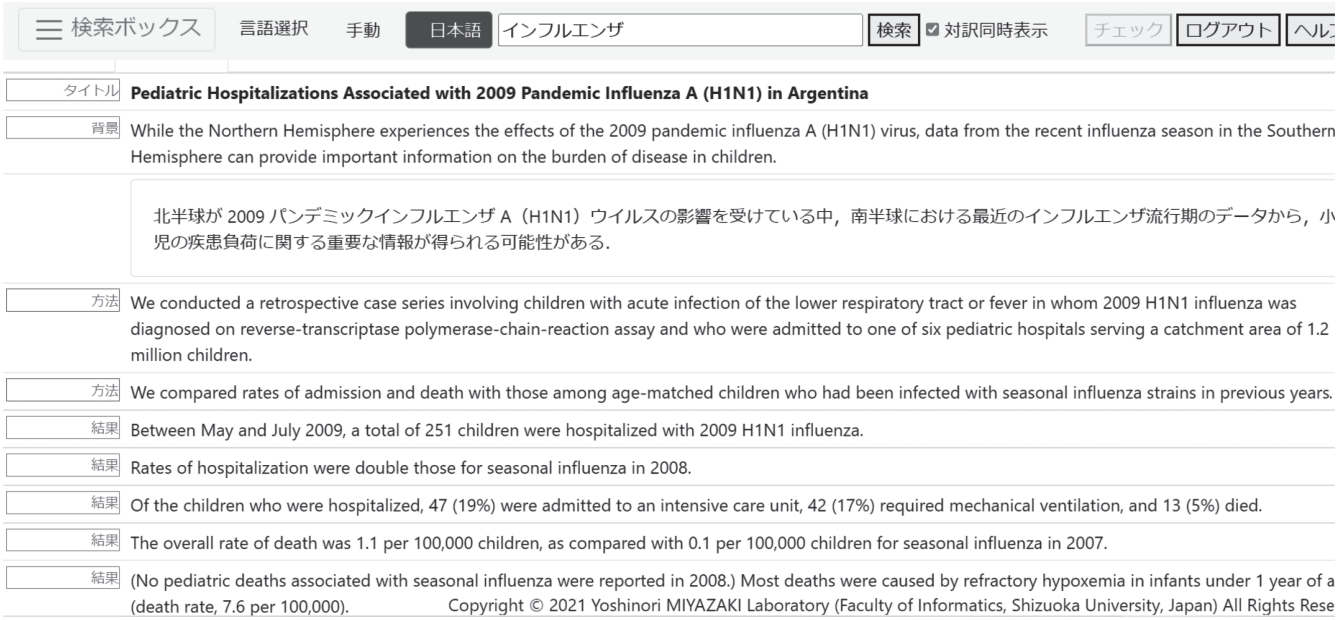

Figure 3. Example screen of the Toggle bilingual display function

medical English course. The classes were held online via Zoom due to the COVID-19 pandemic. Students attended one 90-minute class per week.

Ninety-six students (61 men and 35 women) provided written consent to participate. The participants' mean TOEFL ITP score was 455.9, with a standard deviation of 45.7 in the academic year in which they participated. The students were divided into three groups of approximately 40 learners each.

2.4 Reading the RCT abstracts

The participants were introduced to the CONSORT guideline[13] and their Japanese translation[15] in the class. They learned how to use MEESUS. The class read an RCT abstract[16] and reviewed how its information was presented. As an in-class assignment, each student was asked to choose an RCT abstract in their interest area and send its title to the instructor via chat on Zoom. The instructor entered the title into a spreadsheet that was shared on the screen with other students. If a chosen title did not represent an RCT article, the student was asked to choose a different one. The students then left the Zoom class, carefully read their abstract, and used MEESUS to complete the assigned tasks. The tasks were to extract information according to the CONSORT guideline and to write a summary for communicating the study to a patient interested in the research treatment in English or Japanese. The students reported: 1. the trial design, 2. participants, 3. intervention, 4. primary outcome, 5. numbers randomised, and 6. a summary writing. They were entered into the class learning management system (LMS). The

students were also asked to enter their comments on what they learned in the class.

2.5 Analysis

The students' reports were downloaded from the class LMS, entered into a spreadsheet, and analyzed by the three authors. Each part of the information extraction task was rated on a three-point scale (3 was high, 2 was middle, and 1 was low). A 3 was given when most of the information was extracted, 2 when some information was missing but still extracted, and 1 was given when the information extracted was inaccurate. The three-point scale was also applied to the writing task. The information extraction task was scored by two language teachers; the writing task was scored by a medical doctor and a language teacher. The ratio of students with high scores between the bilingual display users and non-users was assessed using a chi-square test.[17]

The MEESUS history was entered into a spreadsheet, and the use of PopUp and Toggle bilingual displays (**Figures 2 and 3**) were analyzed.

3. Results

3.1 Participants

Of the 96 participants, 78 (47 men and 31 women) who provided answers to all the tasks were included in the analysis. The remaining 18 students were excluded because no input was observed in some of the task items.

3.2 The use of the bilingual display functions

MEESUS recorded 2,811 activity instances by the 78 students. Fifty-one of the 78 students (65%) used the bilingual displays. Twenty-one students used both the PopUp and Toggle functions, and the remaining 30 used either PopUp or Toggle. Forty-one students used PopUp at least once, totaling 686 instances, and 31 students used Toggle at least once, totaling 458 instances. The sum of the PopUp and Toggle instances yields 1,144 instances of bilingual display usage. The data indicate that approximately 40% of the MEESUS use was of the bilingual displays (**Table 1**). Class 1 had the highest use of the PopUp and Toggle functions (**Table 2**). This finding led the authors to suspect that the students in the first class may have shared their task products with those in the other classes. However, a total of 58 RCT article titles were chosen by the 78 students, one per student, with only a small number of students choosing the same title as other students. Also, the bilingual display function users accounted for 61% of the participants who chose different RCT article titles from others and 70% of the participants whose RCT article titles were the same as more than one different student, indicating no marked differences.

3.3 Task scores

The inter-rater agreement was assessed by the percent agreement proposed for qualitative examination of genre analysis.[18] The percent agreements between the analysts were 79.5%, 89.7%, 83.3%, 56.4%, 64.1%, and 60.3%, respectively, for task items 1, 2, 3, 4, 5, and 6. The evaluation for several task items showed varied scores between the analysts because of the different criteria applied. The analysts finalized the scores through discussion over Zoom, where the spreadsheet was shared on screen. An example of the writing task that got a high score is as follows: "The study was to determine the effectiveness of a multi-item family support intervention provided by a multidisciplinary ICU team to patients at high risk of death who lacked decision-making capacity and their proxies. The family support interventions provided by the multidisciplinary ICU team did not affect the proxy's anxiety about the hospital environment and depression scale. However, the quality of communication between the doctor and the family and the proxy's assessment of the relationship with the doctor improved. The length of stay in the ICU for patients was also shortened."[19]

In all task items, ratios of students with high scores were higher for users of the bilingual display functions than for non-users (**Figure 4**). The ratio of high scorers in the writing task was significantly greater in the bilingual display users than in the non-users ($\chi^2 = 3.878$, $df = 1$, $p = 0.0489$, **Table 3**).

Most participants, both users and non-users of bilingual display functions, got high scores in most task items (**Figure 5**). However, high scores were achieved by only about half of the students for extracting the primary outcome information and writing a summary.

3.4 The participants' comments

The participants provided 75 comments on what they learned in the class in Japanese; 25 were about research articles and abstracts, 17 about RCTs, and 12 about the CONSORT. These comments have expressed the students'

Table 1. Use of PopUp and Toggle bilingual displays in all instances

	Instance	% of the total number of instances	N†	% of the total number of participants
Use records (Total)	2,811	-	78	-
PopUp	686	26.0	41	53.2
Toggle	458	17.3	31	40.3
PopUp or Toggle	1,144	40.7	51	65.4

†N indicates the total number of participants.

Table 2. Use of bilingual displays by class

	Class 1 (N = 28)		Class 2 (N = 25)		Class 3 (N = 25)	
	N†	%	N†	%	N†	%
PopUp	18	64.3	11	44.0	12	48.0
Toggle	16	57.1	10	40.0	5	20.0
PopUp or Toggle	22	78.6	16	64.0	13	52.0

†N indicates the total number of participants.

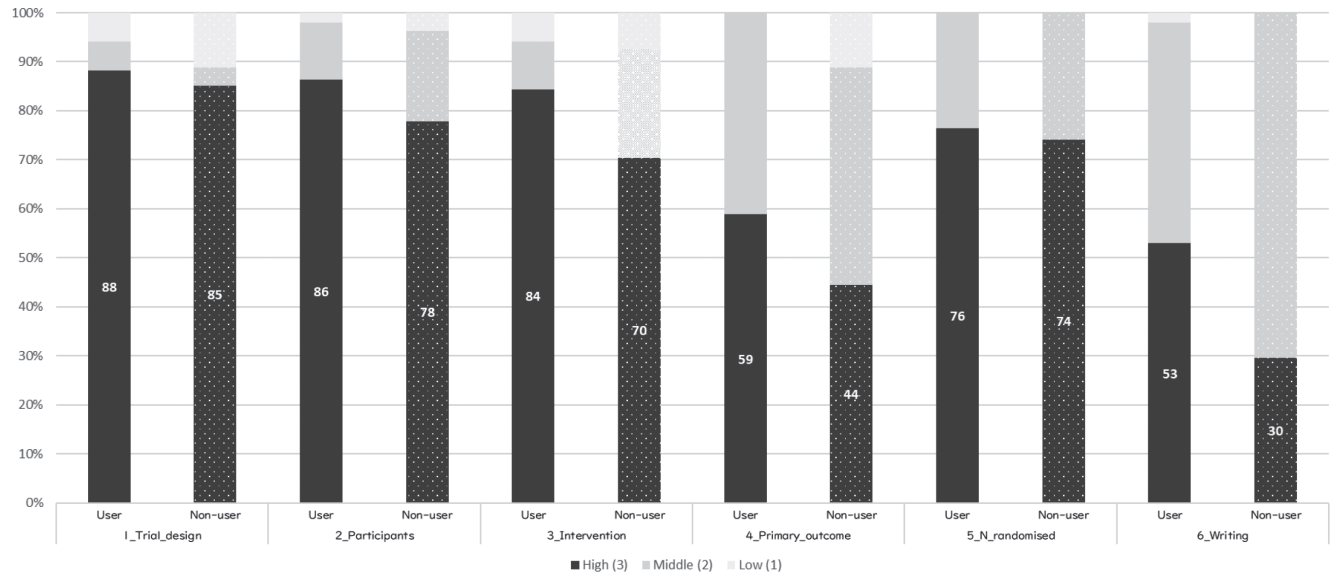

Figure 4. Three-point scale task scores by users and non-users of bilingual display functions. The number of students who received each score is expressed in percentages.

Table 3. Contingency table showing the relationship between the number of students with high scores (High) and the use of bilingual display functions

		High	Middle & low	Total
1. Trial design	User	45	6	51
	Non-user	23	4	27
	Total	68	10	78
		High	Middle & low	Total
2. Participants	User	44	7	51
	Non-user	21	6	27
	Total	65	13	78
		High	Middle & low	Total
3. Intervention	User	43	8	51
	Non-user	19	8	27
	Total	62	16	78
		High	Middle & low	Total
4. Primary outcome	User	30	21	51
	Non-user	12	15	27
	Total	42	36	78
		High	Middle & low	Total
5. N† randomised	User	39	12	51
	Non-user	20	7	27
	Total	59	19	78
		High	Middle & low	Total
6. Writing	User	27	24	51
	Non-user	8	19	27
	Total	35	43	78

†N indicates the number of subjects

discoveries about how information is systematically presented in abstracts, the CONSORT guideline's impact on the abstracts, and the importance of RCTs.

Some comments in Japanese are translated below:

"I have learned that the format and logic of English abstracts are systematic."

"[The abstracts are] written in a sophisticated manner, divided into background, methods, results, and conclusions."

"It is indeed important to read papers."

Fourteen comments were about MEESUS: for example;

"I had no idea there was a site that makes it so easy to access papers; therefore, I would like to use it again to broaden my knowledge."

"I have been looking up articles using websites such as Pubmed,[20] but I found it more convenient to use this site where I could read in my native language and in English at the same time."

"I have learned how I could find articles for randomised controlled trials on the internet."

Three comments were on subject-matter knowledge, and four were concerned with difficulties completing the tasks or reading article abstracts. Many students seemed aware of the conventions applied to RCT abstracts, which can be classified as "rhetorical" knowledge of the genre.[2] Some students also took note of the "subject-matter" knowledge of the genre.[2] The task scores and comments indicated that using MEESUS made them aware of the genre-specific features of RCT abstracts.

4. Discussion

This study hypothesized that MEESUS would help fourth-year students decipher the highly codified language used in RCT abstracts to obtain contextualized information. The students had experienced learning about drug development and intervention studies in disciplinary classes such as pharmacology and public health. Still, they seemed to be scarce in having an in-depth familiarity with RCT abstracts. In our study, we found in response to our RQs:

1. Did the students use the bilingual displays in MEESUS?

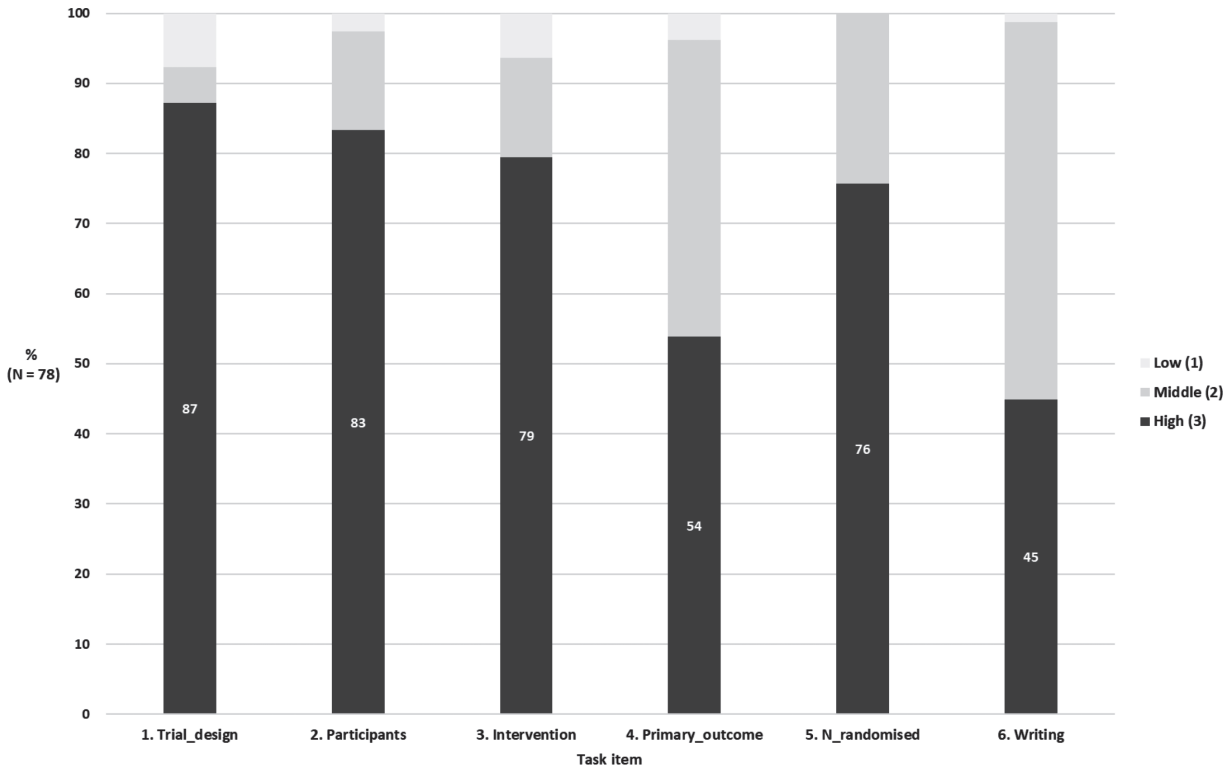

Figure 5. Three-point scale task scores for all participants. The number of students who received each score is expressed in percentages.

Fifty-one of the 78 students (65%) used bilingual display functions in MEESUS.

2. What were the differences in scores between users of the bilingual displays and non-users?

The ratio of high scorers in the writing task was significantly greater in the bilingual display users than in the non-users (χ^2 = 3.878, *df* = 1, *p* = 0.0489, **Table 3**). In all task items, ratios of high scorers were greater for users of the bilingual display functions than for non-users (**Figure 4**).

Many participants commented that they learned about the features and importance of research articles and abstracts, RCTs, and the CONSORT guideline. Fourteen participants provided positive comments on using MEESUS.

In the online class, the students were introduced to the CONSORT guideline and read an RCT abstract. Medical undergraduates have packed required learning schedules, and we were not surprised to find they had not had opportunities to study the CONSORT guideline for abstracts in depth or read RCT abstracts thoroughly. However, most students were able to complete the tasks using MEESUS.

The task scores were higher in users of the bilingual display functions than non-users. Many participants commented on the importance of research articles, RCTs, and the CONSORT guideline. These findings suggest that the bilingual display functions of MEESUS may have increased students' interest in the abstracts and helped them comprehend information written in the highly codified language.

The limitations of the study include the differences between the medical expert and the language teacher in their evaluation criteria of the short writing task. From the disciplinary viewpoint, the information provided in an RCT abstract, such as the study size, demographic characteristics, inclusion criteria, and intervention, should be identified to see if the RCT information applies to Japanese settings. Extracting all the information may have been on the marginal scope as it was not explicitly instructed in this online genre-based class. Upon discussion, the raters agreed to finalize the scores by prioritizing the medical expert's input as much as possible. Similar difficulties have been reported in collaboration between the science and English for academic purposes instructors.[21] In the future, instructions to the students should address the type of information to be extracted from RCT abstracts more concisely. Another limitation of this study is the corpus size. MEESUS contains the titles and abstracts of only 1,481 articles at the time of this study. In the future, more text should be compiled in the parallel corpora for MEESUS to be used by the same students successively.

A fourth-year Japanese medical student should be able to read an abstract in English; however, RCT abstracts are highly specific texts from the learners' perspectives, and the importance of RCTs is widely recognized among medical community members. Our previous study underscored medical students' difficulties in elucidating the design of RCT abstracts when they encountered them in a medical English class.[22] Recent studies have indicated the benefits of the translanguaging approach, in which language learning can be attained while utilizing every resource of the students, including their first language.[23] In the present study, most students accessed the information in their native language.

We believe that using MEESUS helped them understand the formal and structural conventions of RCT abstracts, which would be essential for strategic reading of discipline-specific research article abstracts.

5. Conclusion

Our concordancing tool incorporating the authentic research article abstract texts in English and Japanese helped medical students extract information from an RCT abstract following the CONSORT guideline. The bilingual display functions allowed learners to positively engage in their tasks. MEESUS appears to offer medical students the opportunity to actively learn the discipline-specific conventions of highly conventionalized trial abstracts by decoding authentic texts.

Declaration of competing interests

The authors declare that they have no competing interests.

Authors' contributions

M.A. developed the study idea. T.W. provided expert advice. M.A. did the classes while M.N. monitored the system and retrieved the usage history with Y.M. who also supervised the system operation. M.A., M.F., and T.W. analyzed the data. M.A. drafted the manuscript. All authors contributed to the interpretation and revised the manuscript for each detail of the content.

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Original article

Medical students' English needs and curricular developments

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Abstract

This study will show the English needs of 1st- and 2nd-year medical students in the author's rural Japanese university's faculty of medicine in order to develop effective courses and curricula for these students. A survey of 132 1st- and 2nd-year medical students was conducted. Three teachers and 2 in-service doctors were interviewed. The teachers had different approaches to teaching English for Medical Purposes, prioritizing aspects such as terminology, medical discourse, and medical humanities. However, the students and doctors had both professional and personal motivations for developing their language abilities. These results showed that curricula should contain English for general communication, medical purposes, and for cognitive, motivational, and identity formation.

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Keywords English for Medical Purposes, needs analysis, curriculum development

1. Introduction

One hundred and ten medical students are admitted into the University of Miyazaki's Faculty of Medicine each year. In the 1st year, they study 135 hours of English including 4 mandatory general English courses, an English for Medical Purposes (EMP) course, and an optional Medical Humanities course. In their 2nd year, there are 45 hours of 'general English' courses (which usually have EMP content). Then in the 4th and 5th years, about 10 to 15% of the students take elective EMP courses with up to 30 hours of content, focusing on things like taking a patient's medical history, giving medical advice, and problem-solving.[1] In the 5th year the intensive EMP courses involve guest workshops such as how to write a statement of purpose for study abroad or job applications and clinical poster presentations.[2] The EMP students tend to be highly motivated because they aim to gain clinical experience by studying and working abroad for 2 to 6 weeks in their 6th year.[1]

There are various medical English guidelines and curricula in Japan which encourage students to be able to read and understand textbooks,[3, 4] case reports,[5] and articles,[6] and also write papers in English (for study, research, lifelong learning, and the development of the medical field).[3] They also recommend that students should be able to conduct medical interviews and medical examinations in English,[3] helped by training with Simulated Patients,[4] understanding the patient's social and cultural background and presenting in English at scientific meetings.[3, 7] Furthermore, several studies used or recommended integrating medical studies with English for linguistic and cognitive development.[4, 7]

Medical English education overlaps with medical education recommendations such as patient-centered views, evidence-based medical knowledge, and problem-solving ability.[8] Medical humanity materials may provide a framework to help students critically consider the social determinants of health (SDH). This cultural background is important when providing patient-centered care and can develop both linguistic and cognitive flexibility.[7]

However, what is lacking in these recommendations is more general, natural, friendly, and informal conversational ability in English.[9, 10] In a motivational study of 88 medical students in Miyazaki, Brown found that reading, vocabulary, and EMP were extrinsic motivational factors because they were part of the taught courses. However, travel, study, and overseas work/research could be combined into integrative motivation, whereas an intrinsic value was being able to communicate confidently in English.[11]

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2. Methods

The aim of the research was to discover student, teacher, and doctor perspectives about 1) the reasons for medical students to study English, 2) their prioritization of English skill development, and 3) any other opinions about medical doctors learning and using English. To triangulate findings both quantitative and qualitative data were gathered from both domain insiders (doctors), and domain outsiders (teachers and pre-service medical students),[6] at the University of Miyazaki. One hundred and thirty-two 1st- and 2nd-year students were surveyed with voluntary responses using Google Form. The students were chosen because of ease of access as they were taught by the author. At the same time, 3 English teachers in the Faculty of Medicine's Department of Social Medicine and 2 experienced medical doctors were interviewed, as described in **Table 1**.

The interviews lasted from 30 to 60 minutes and were semi-structured with open-ended questions, following the framework suggested by Richards.[12] This meant that the interviewer asked the interviewees the same initial questions but then asked personalized follow-up questions to elicit deeper explanations and examples of their experiences and beliefs. Informed consent was gained and surveys and interviews were conducted in English. Thematic analysis was used to analyze the data, using the phases of 1) becoming familiar with the data; 2) generating initial coding; 3) searching for themes; 4) reviewing the themes; 5) defining and naming the themes; and 6) producing a report.[13]

When the survey data were reviewed, there were many combinations of answers. For example, in response to the question, 'what are your reasons and aims for studying English?' a student wrote, "to understand English and interact with foreign people". This was codified as 'understanding English' and 'communicating with foreign people'. Analyzing the interview data was a cyclical process involving transcribing, highlighting themes, rewriting, and synthesizing.

Finally, to interpret, discuss, and use these findings, it was important to analyze where any gaps in the curriculum were and where these perspectives aligned and differed so that pedagogical areas could be identified.

3. Results

The thematic analysis revealed the broad categories of English for medical purposes and English for more general purposes. However, the teachers, students, and doctors had different perspectives on English needs.

3.1 Teacher Perspectives

The themes which the teachers discussed are shown below.

- Moving from English for General Purposes (EGP) to EMP
- Reading and Writing
- Presenting
- Medical Vocabulary
- Critical Thinking
- Study Abroad
- Motivation
- Medical Humanities

After several years of EMP teaching experience, all 3 teachers changed their pedagogical approach from EGP towards EMP. T1 thought that many students do not need English because their final goal is just to get a medical license. Therefore, he changed his focus from teaching introductory medical topics in English to the medical humanities. T3 said that some students know that they need medical English after they become doctors but many 1st- and 2nd-year students cannot visualize themselves becoming doctors who need English so they do not study hard. Therefore, her teaching style evolved over 6 or 7 years from EGP, including movies and videos, which seemed to be popular among students, to medical English terminology because the students need it for their 1st-year anatomy and physiology courses. T2 on the other hand used to think that doctors would be talking to foreign patients in English but realized that is actually quite rare for most doctors. As a result, he refocused his taking a patient history and case presentation practice towards the development of critical thinking skills. He thought that general cognitive development is important for students to learn how to organize, prioritize and distinguish information so that they can ask questions about the correct areas regardless of whether they are using English or Japanese.

In T3's opinion, doctors need to read case studies or medical articles. She continued that understanding the

Table 1. Interviewee descriptions

Code	Position	Description
D1	Pancreatic Surgeon, Head of Department	Japanese, male, learned English in school with a focus on reading. Worked and studied in New York and Sydney.
D2	Obstetrician, Head of Department	Japanese, female, learned English in school with a focus on reading. Worked and studied in California.
T1	EMP Professor, Head of Department	Japanese, male, Medical Humanities research, 20 years of EMP teaching experience
T2	EMP Associate Professor	Non-Japanese, male, English as a first language, EMP Spoken Discourse research, over 25 years of EMP teaching experience
T3	EMP Associate Professor	Japanese, female, EMP terminology research, 16 years of EMP teaching experience

structure of a medical article is very beneficial, but most medical students might not be motivated to read medical articles in their 1st and 2nd years. T1 and T2 agreed that most students will need to be able to read research and pharmaceutical knowledge in English, but T1 thought that they will not need any conversational ability, or even writing skills. However, T2 said that if they write research papers it would boost credibility for themselves and their department.

Sometimes researchers go to conferences to showcase the department's research achievements, with a follow-up paper. T2 thought that maybe 50% of the doctors at the hospital have presented once or twice abroad in English, but some might have done it 10 or 20 times. Similarly, T3 thought that when the EMP students study abroad, they sometimes make presentations about the Japanese medical system or Japanese culture. Then when they become young doctors they could be asked to present in English domestically, and internationally. T2 thought that there is a greater chance for young doctors to communicate in English with foreign healthcare professionals than with foreign patients who cannot speak Japanese. Therefore, the 4th- and 5th-year EMP program is tailored toward the critical thinking aspects of taking a history, case presentations in English to other healthcare professionals, and preparing to study at a medical university abroad. However, T1 and T3 thought that some students just want to improve their general English for traveling abroad, so it is difficult for them to keep their motivation to study EMP, and they often drop out of the course.

The teachers' skill development priorities for students were shown through their syllabi goals. T1's 1st-year syllabi aimed at enabling students to appreciate diverse perspectives, demonstrate logical self-expression, reflect on medical and social interaction and start to develop personal and professional identities. T2's 1st-year syllabi involved taking a patient history, writing medical charts and referral letters, and thinking critically about symptoms. Then his 2nd-year course strengthened knowledge about the history of the present illness, family history, social history, past medical history, and diagnosis. T3's syllabi focused on discussing, presenting, and remembering terminology related to anatomy, physiology, and body systems. Furthermore, the 1st-year elective Medical Humanities course syllabus, which was partly taught by all teachers, was based on learning about medicine through literature, movies, religion, empathetic and intercultural communication, and views on life and death.

3.2 Student perspectives

Fifty-nine students completed the survey (response rate 45%), and they were able to give more than one answer to the question, 'What are your reasons and aims for studying English?' which resulted in the 80 responses represented in **Figure 1**.

Forty-five percent of the responses could be identified as English for Medical Purposes, and 55% percent were more generic English aims. The gaining knowledge category included "reading English books", and "high-level study", and the cognitive development category included "English helps other skills" and "brain usage".

The second question was, 'How would you prioritize and rank the development of English skills?' There was a total of 129 reasons because students gave many answers. These responses were then collated as percentages of the total number of responses, as shown in **Figure 2**.

Finally, the students were asked, 'Do you have other comments about what you think is important for medical doctors learning and using English?' There were various comments such as "doctors are too busy, students should study more" and "learning medical English is important but do not know if use in the future". Two students said that doctors should only use "perfect English" and they should "communicate correctly". Where this seems to focus on accuracy, another student said that they should "not be intimidated to speak English". Other students' focus was on the patients. For example, how to interpret foreign

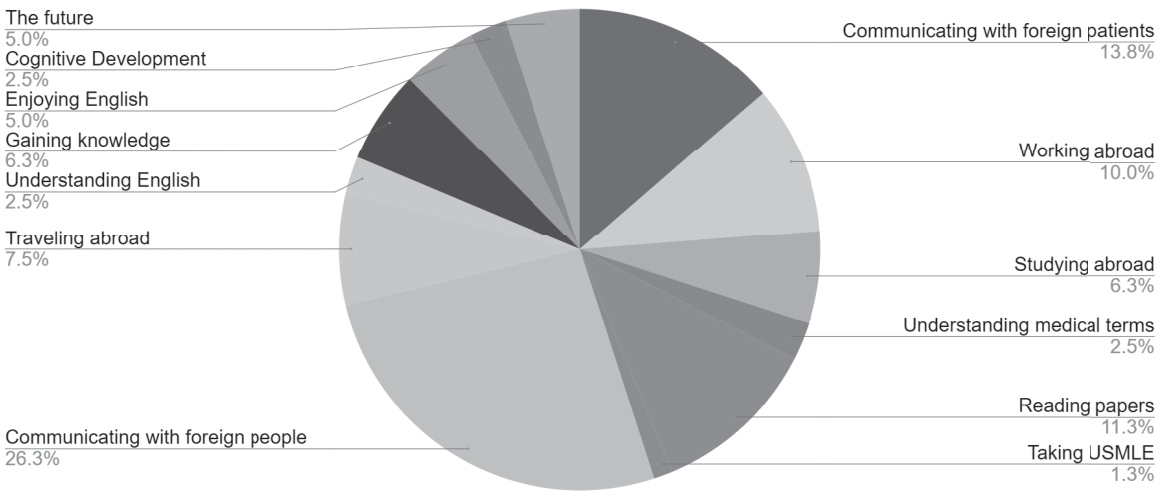

Figure 1. Students' reasons and aims for studying English

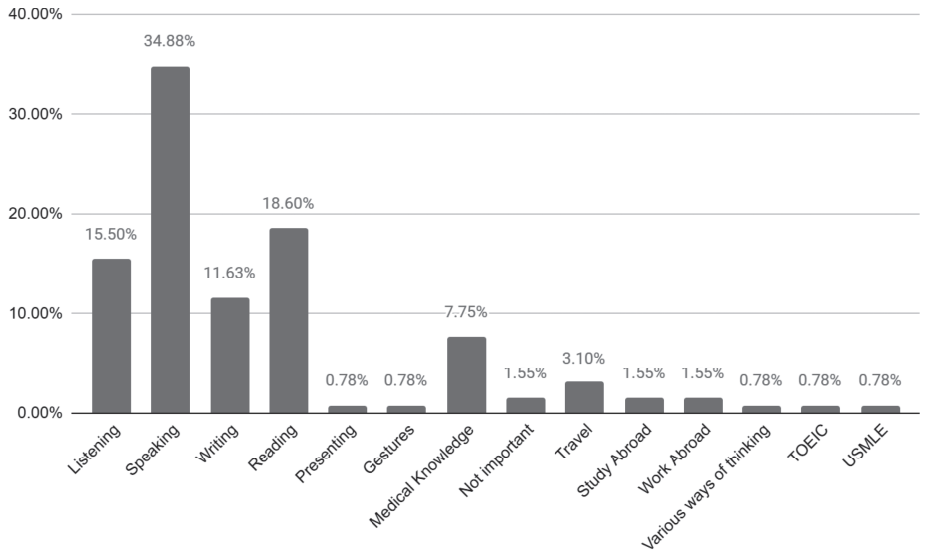

Figure 2. Students' priorities for English skills development

patients' words, show compassion, use small talk, and be able to paraphrase medical ideas into easy-to-understand words. They thought that this would help to build trust. One student mentioned the ability to "communicate with foreign doctors", and another comment was about studying abroad and using English as a lingua franca for EMP. Many students focused on English for various medical purposes, such as "reading papers quickly and closely", "medical vocabulary" and "understanding global medical research developments". Another theme was how to develop English skills, for example, by "spending more time learning English", or "actively speaking more frequently without a fear of making mistakes", so that "a speaking feedback loop" could be developed.

3.3 Doctor perspectives

The themes which the doctors discussed are shown below.

- Professional English Need
- Medical Knowledge/Vocabulary
- Reading & Listening
- Speaking & Writing
- Cognitive Development
- Motivation
- Study Abroad

D2 often meets foreign patients because any foreign pregnant women who want to speak English or those who have complications come to the university hospital. However, there is little need for D1 to use spoken English in his job, but the Japanese Society of Hepatology (diseases affecting the liver) conferences require English-only presentations, and D1 has published 176 articles in English. When he writes these articles, he imagines speaking to the audience in English. Over time, this has changed his perspective about English, by combining images and English descriptions, has altered the way his brain functions, and he now thinks about concepts and considerations of medicine differently. He explained that he feels constricted by a focus on grammar and prefers the flexibility of English to express himself according to his intuition.

Both doctors thought that many doctors were motivated to read English research papers to get opinions from around the world about how to manage and treat patients. However, D2 cautioned that if the students do not have a research interest, it would be difficult and they might become demotivated. She explained that the students first need medical knowledge and medical terms to be able to understand symptoms during their clinical rotation. Developing listening ability was also prioritized because listening to the patient enables them to speak more about their symptoms or situation.

The doctors also emphasized the need for students to develop their general English communication skills. D1 thought that junior high school students should learn to use English to express their ideas about interesting topics, such as movies and music. Then they could continue to develop their general English communication skills as they start university so that they can become more comfortable communicating with people from around the world. D1 thought that all students should study abroad for both professional and personal development. Then they could understand and engage with real-world issues, find the good points of internationalization and global medical care, and apply them locally. In addition, the experience of living and working abroad and making friends would enrich their lives. He stressed that this would also give them the motivation to maintain and develop their English abilities and as their expertise grows they will have the ability to write in English and help their career development.

4. Discussion

Students identified communicating in English as their most important need. In contrast, T1 thought that most

doctors are not interested in communicating or writing English in the future, but the doctors who were interviewed showed that they need to present or communicate with patients in English. However, the teachers and Willey[6] thought that it is rare for doctors in rural Japanese cities to communicate with patients in English. Having said that, this does not remove the desire for doctors *to be able to* communicate in English both professionally and personally.[9] This was an obvious gap between the student, doctor, and teacher priorities, and the doctors stressed that students should learn English communication before they devote their time to developing medical skills and knowledge. Therefore, higher priority should be given to informal, English fluency-building activities which also help to build social interaction in the 1st and 2nd year. A "speaking-feedback-loop" could be achieved through more English interaction with peers.

This leads to listening skill development. The students and doctors considered listening skills as important, and even though the teachers did not explicitly mention them, they were included in their syllabi activities. Having said that, it is not clear whether this refers to passive one-way listening comprehension or more interactive two-way listening and responding. There should be explicit teaching and practice of showing interest, giving responses, repeating keywords, paraphrasing, and asking questions to clarify. Furthermore, the students should be taught about conversational turns and how to give and take them. D2 emphasized that listening to the patient empowers them to speak more about their symptoms and situation, and T2 thought that 5th-year students should be able to show empathy, but even 1st-year students mentioned compassion, using small talk, and building trust with patients. Therefore, interactive listening skills should be emphasized more to help to build this trust and develop a genuine interest through caring conversations.

Sometimes it is difficult for students to learn the appropriate phrases to explain things to patients at the same time as learning medical vocabulary. Some students wanted to focus on building their medical knowledge and terminology rather than English skills, so T3 has been helping them to learn anatomy and physiology terminology (in English), in line with D2's beliefs that students need more specific medical vocabulary. As for reading, T3 thought that students may lack an awareness of the need to read articles in the future, and D2 said that 1st- and 2nd-year students might be demotivated by reading research material. However, students showed an awareness of the need to read research articles, so more exposure to in-context textbook vocabulary and small research tasks could help 2nd years to read medical texts,[4, 7, 9] and bridge towards reading research articles in their more advanced undergraduate and graduate studies.[3]

Presentation practice is being used by the teachers to build confidence in speaking in front of others, with 5th-year EMP students presenting cases and medical content. However, more impromptu questions and answers are not being taught (as far as the author is aware). This is also an opportunity to learn and practice clarifying, pausing, and reasoning with justifications (while under pressure). The students were more aware of the need to develop their writing skills than presentation skills. T2 has been teaching medical note-taking and referral letter writing, whereas T1 is using reflective journals and self-expression essays to develop the content of the students' writing. Therefore, essays could be a useful way for students to demonstrate and develop their written reasoning skills. With the aim of writing papers to fit the IMRAD format (Introduction, Methods, Results, and Discussion), like D1 does, developing a journal club for more advanced 4th or 5th-year students would help them to find research abstracts and research papers, study the descriptions, take notes, make summaries, and then present and discuss them with their peers.

Another example of building knowledge through English which can then be applied to Japanese medical studies is T2's 1st- and 2nd-year teaching of how to think clearly and construct appropriate questions depending on the patient's symptoms. T1 also wants students to think deeply, reflect on the patients' hardships, become more empathetic, and develop their identities as doctors. The fact that it is in English is almost incidental. A few students mentioned that English helps "brain usage" or "exercise for the mind", which was similar to D1's view that describing things in English over a number of years has altered his perceptions of medicine. This suggests that they have the view that English usage is not just a vehicle to learn or transfer knowledge. It can also develop the capability or plasticity of the brain if students are trained to understand and explain things in English.

There are many tests and examinations available to demonstrate the students' skills and abilities. Two students talked about TOEFL (Test of English as a foreign language) and the USMLE (the United States Medical Licensing Examination), and there are OSCE (Objective Structured Clinical Examination) role plays in Japanese at the end of the students' 6th year, as well as the EPEMP (Examination of Proficiency in English for Medical Purposes) and OET (Occupational/Healthcare English Test). For study abroad, some universities require a TOEFL or IELTS (International English Language Testing System) score. However, teachers did not mention standardized tests, yet there is a demand from a few more advanced students, so training support could be provided.

Traveling abroad could have a profound impact on students' development and lives. Students have integrated motivations for traveling abroad, for general life experience, for medical practice, and to study.[11] The 4th- and 5th-year EMP courses are funnels towards 2-6 week overseas clinical clerkship programs in the 6th year. The current university

student exchange partnerships can handle about 20% of students travelling abroad, but usually only 10-15% of students choose to participate. However, it is an excellent opportunity (for personal and professional growth) if the students can commit time from their schedule. Currently 27% of 4th-year students express a desire to study abroad. As a result, and as D1 encouraged, more study abroad capacity will need to be developed in order for more students to take this opportunity. However, 2 teachers cautioned that students should first be committed to developing specialized EMP skills and knowledge, before they go abroad and apply it. Some students who have returned from studying abroad have said that they wished they had more skills for clinical reasoning, were better at giving concise case presentations, had taken the TOEFL test, and had improved their daily English conversation skills when they were younger.[14]

As the students grow and their identities as doctors develop, their motivations for studying English may evolve. Some 1st-year students said that doctors should speak perfect English, similar to a native speaker role model, whereas a few others mentioned being able to use English as a lingua franca to negotiate meaning in medical contexts. As a follow-up to this study, it was discovered that there is a mentoring system, with 5 students and 4 doctors per group. One 5th-year student said that they used to believe that doctors should use perfect English, but now they believe that being understood and understanding is more important. The 3 5th-year students who were asked, do not really think of most doctors as advisors or role models because they do not usually have any contact with their mentors. They seemed to think that they were there in name only. Even if they fail a class they would be more likely to meet the head teacher of academic affairs. Therefore, the students slowly build their own image of what kind of doctors they would like to become.

5. Conclusion

Students had a greater awareness of their future EMP needs than anticipated, and the English department is more than just the sum of its parts. The teachers' approaches complement, unite and support the differences in educational goals. Most of the programs in Japan which the author studied integrate medical terminology, reading, writing, communication, and presenting, with variations in how general and specialized communication is taught and how the programs are structured. It must be said that it was crucial to learn more about the students' clinical rotation and English test goals in 4th, 5th, and 6th grade to be able to support their English development and aspirations. **Table 2** shows the outcomes and courses of action as a result of this study with justifications and areas for further development.

History Taking is being taught extensively at the University of Miyazaki, but there are opportunities to develop it through the use of more graded cases for case presentations, OET training, and the use of Simulated Patients. The development of medical humanity values, problem-solving ability, and patient-centered care are part of the medical education core curriculum[8] and even though they are not 'English skills' they are fundamental educational goals. Therefore, the E in EMP not only represents the English used by medical professionals, but also represents

Table 2. Curricular developments

Grade	Course of action	Justification	Further Development
1st	Building interaction and fluency skills through easy discussions	Wanted by doctors and students	Create Action Research Cycles to target level-appropriate interaction skills
1st	Explicitly teach interactive listening skills	Prioritized by doctors and students. Helps to build empathetic listeners	Short student-generated texts to practice note-taking. Keep a teaching journal.
1st	Develop a medical ethics course	Medical ethics education is recommended by MEXT[8]	To understand how clinical ethics are taught in Japanese. Study how medical ethics relates to medical humanities
1st	Prepare some medical humanities content	Necessary for a 2023 course	Study about Professional Identity Formation from 1st grade through to 6th grade on study abroad, and if possible into graduate studies
1st & 2nd	History Taking (Patient Information, History, Physical Exam, Assessment, Plan)	Problem-solving ability and patient-centered views are qualities required by MEXT[8]	Develop and teach the courses using tasks from the English in Medicine textbook[15]
2nd	Explaining research	Small research and explanation tasks	Expand tasks in English in Medicine[15]
4th	Reading, writing and presenting cases	Study abroad students said that they lacked practice in case studies[14]	Study graded cases,[5] such as [16-18]
4th	OET Training	Students need qualifications to study & work abroad. OET seems like a good educational & assessable framework	Learn how to teach OET, and research more about the test
5th	Simulated Patient Role plays	Preparation for OSCE Davies & Fraser[5]	Research about funding and training of actors
5th	Journal Club	Developing reading, research & discussion skills important for the transition to graduate studies	Trialed with 4th grade. More appropriate for 5th grade.
6th	Support study abroad opportunities	It enhances students' personal and professional development	Learn more about the UoM and other university study abroad programs

the development of individual medical student's cognition, motivation, identity, and behaviors, which will educate and empower them to be able to reach their potential.

Acknowledgments

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シンポジウム 1「英語論文作成の分業化：多職種連携の現状」オーガナイザーによる序

津谷喜一郎,[1] 元雄　良治[2]

[1] 東京有明医療大学，[2] 金沢医科大学

Kiichiro Tsutani[1] and Yoshiharu Motoo[2]

[1] Tokyo Ariake University of Medical and Health Sciences, [2] Kanazawa Medical University

医学研究者にとって英文医学雑誌に研究成果を公表することの重要性は高い。だが質の高い英語論文作成には，英語能力以外のさまざまな障壁も存在する。これを解決するものとして 2 つの動きがある。

第 1 に，1996 年のランダム化比較試験（randomized controlled trial：RCT）に対する CONSORT（Consolidated Standards of Reporting Trials）声明に始まり，多様な Reporting guidelines（RGs）が開発されたことである。

RCT 報告の質を改善しようとする取り組みは 1990 年代半ばに加速し，方法論学的研究により促進された。研究者らは，不十分に実施されたり不十分に報告された試験にはバイアスが認められる，という経験的（empirical）なエビデンスが蓄積されていることを示した。そこで報告のためのガイドラインを開発することを目的とした取り組みがなされ，1996 年に初版の CONSORT 声明を発表するに至った。2001 年の改訂，ついで 2010 年の改訂で全 25 項目となり各国語に訳され世界的に使われている。

この間多くの，CONSORT 拡張版（extension）声明などが作成された。大きく 3 つの方向に分けられる。第 1 に，RCT そのものについて，クラスター割付け，非劣性・同等性，害の報告などについての声明，第 2 に，非薬物，鍼，ハーブなどの特異的な介入についての声明，第 3 に，診断，観察研究，さらにはシステマティック・レビューなどの 2 次研究など，RCT とは異なる研究デザインに関する声明，である。全体の数は 400 件を超え，EQUATOR Network を形成し，その website からは日本語を含め各国版がアクセス可能である。

第 2 に，論文作成や公表を支援し質の高い論文をタイムリーに公表するためのプロフェッショナルや組織が発展し分業システムが確立されつつあることである。日本ではこれまで言語と論文作成技術の自己研鑽によって英語論文作成の障壁をクリアしてきた。だが，日本の医療文化での分業の実態と課題とが議論されることはなかった。

医師のライセンスを持った者には行う作業の分岐点がいくつかある。まず診療を行うか研究を行うか，研究の場合，臨床研究か基礎研究か，臨床研究の場合，臨床試験か疫学研究か，臨床試験の場合，RCT かそうではないか，RCT の場合，企業 fund による治験などか公的 fund によるものか－などである。そこで使える時間は限られている。また臨床研究のサイズも大きくなりつつある。ここに分業化の背景の一つがある。

分業の歴史を振り返ってみよう。1998 年 4 月に全面施行となった新 GCP（Good Clinical Practice）は，日米欧 3 極の行政と医薬品産業界とによって構成された The International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use（ICH，医薬品規制調和国際会議）によって作成された ICH-GCP の日本版であった。そこで Contract Research Organization（CRO，医薬品開発業務受託機関）が明文化され，治験の一定部分を外部の独立した企業が担当するというものである。いわば組織として治験の分業化が制度化されたのである。これが医学研究における分業の元祖でである。

その後，2010 年代となり，臨床試験のみならず医学研究全般について，翻訳に始まり，medical writer，medical publication manager などの publication professional が独立し企業化されて存在するようになった。フリーランスとして個人経営のものも存在する。**図 1** に分業の関係者をマッピングした。

そこで今回，英語論文の分業作成に関する現状をシンポジウムの形で提供し，多職種連携の現状の報告と討論・整理を行い，今後の可能性や課題を考える機会とした。

シンポジウム「英語論文作成の分業化：多職種連携の現状」

日時：2021 年 7 月 17 日（土）（学会 1 日目）
14：10 ～ 16：10（120 分）

場所：金沢（Web 会議）

座長：元雄良治　金沢医科大学
ラウール・ブルーヘルマンス（Raoul Breugelmans）
関西医科大学

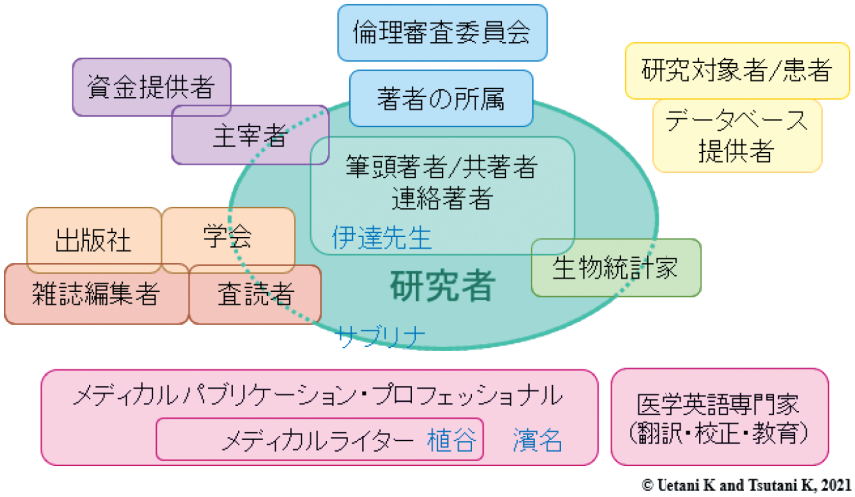

図 1. 論文の執筆～公表の関係者（臨床研究の場合）

プログラム

1. 14：10 ～ 14：20（10 分）
   津谷喜一郎　東京有明医療大学
   元雄　良治　金沢医科大学
   「オーガナイザーによる序」
2. 14：20 ～ 14：40（20 分）
   伊達　　勲　岡山大学脳神経外科
   「医学英語論文執筆のための 10 箇条：データがあるなら論文にしよう」
3. 14：40 ～ 15：00（20 分）
   サブリナ・ジェスミン（Subrina Jesmin，MD, PhD.）
   メドプロ クリニカル・リサーチ，東邦大学医学部
   「Role of Supervisors to Help Students with Scientific Medical Writing」
4. 15：20 ～ 15：40（20 分）
   植谷　可恵
   スタットコム株式会社，京都大学大学院医学研究科
   「良い論文を日本から発表するために―メディカルライターにできること―」
5. 15：40 ～ 16：00（20 分）
   濵名美恵子
   国立国際医療研究センター・臨床研究センター・インターナショナルトライアル
   「日本の論文公表の現状と課題―パブリケーション・プロフェッショナルの視点から―」
6. 16：00 ～ 16：10（10 分）
   Panel Discussion
   ラウール・ブルーヘルマンス（Raoul Breugelmans）
   関西医科大学
   「シンポジウムとパネルディスカッションのまとめ」

関連講演

上記のシンポジウムのトピックに関連し，別途，シンポジウム外の位置づけで下記の 2 人による講演が行われた。講演内容は Journal of Medical English Education 2022; 21(1): 27–40，53–64 に掲載された。website からアクセス可能。

7 月 17 日（土）13：00 ～ 14：00　特別講演

有田　正規　国立遺伝学研究所 生命情報・DDBJ センター
「学術雑誌の発祥からオープンアクセス誌まで」

17 世期に始まる世界で最初の学術雑誌から，今日，世界的な出版社として知られるエルセビアとシュプリンガーの歴史，1970 年代の学術誌ランキングの登場，塩基配列データベースの登場，PLoS と商業オープンアクセス誌まで，が下記の図書には含まれない豊富な歴史的資料も用いて講演された。

参考文献：有田正規．学術出版の来た道．岩波科学ライブラリー．2021

7 月 18 日（日）10：30 ～ 11：00　特別セッション 2

橘　　尚子　株式会社アスカコーポレーション営業制作部
メディカルライティング・論文課
「論文ライティング分業化は論文発表促進の切り札になりうるか」

世界的にみた時の 2000 年代から始まる日本の臨床医学論文の少なさ，Authorship に関連したライターと著者の違い，著者たちが直面している負担，臨床試験登録，論文ライティング分業化のメリットと限界などの現状を講演された。

Summary

シンポジウム 1「英語論文作成の分業化：多職種連携の現状」シンポジウムとパネルディスカッションのまとめ

Symposium 1 “Work sharing in medical English writing for inter-professional collaboration” Symposium and panel discussion summary

ブルーヘルマンス　ラウール
関西医科大学英語教室

Raoul Breugelmans
Kansai Medical University

第 24 回日本医学英語教育学会学術集会におけるシンポジウム 1「英語論文作成の分業化：多職種連携の現状」では，オーガナイザーの津谷喜一郎先生（東京有明医療大学）および元雄良治先生（金沢医科大学）による序に続き，伊達 勲先生（岡山大学），サブリナ ジェスミン先生（東邦大学医学部），植谷可恵先生（スタットコム株式会社），濵名美恵子先生（国立国際医療研究センター）による講演が行われた。シンポジウムに引き続き，上記 4 名のシンポジストに加え，特別講演演者の有田正規先生（国立遺伝学研究所）をパネリストに迎え 30 分のパネルディスカッションが行われた。

ここに，第 24 回学術集会のテーマ「医学英語への多職種連携」の観点から，シンポジウム 1 およびパネルディスカッションを振り返り，いくつかの共通テーマについて考察する。

英語論文作成において研究者が全てを一人で行うべきではなく，多職種連携や専門家との連携に基づく分業システムの確立が必要であるということは，全パネリストの共通認識であった。伊達先生は，医学英語論文執筆のための 10 箇条の中，論文ははじめから英語で執筆することが望ましく，その上で原稿の英文校閲が必要不可欠であることを提言した。ジェスミン先生は，研究者・指導者の立場から，scientific medical writing の経験者による指導の必要性を強調した。植谷先生は，メディカルライターの立場から，専門家との連携が必須であると論じ，濵名先生は，メディカル・パブリケーション・プロフェッショナルの視点から，論文執筆・公表に関する環境整備が重要であると主張した。

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企業主宰の研究では，Good Publication Practice for Communicating Company-Sponsored Medical Research（GPP3）に示されるように，分業システムが確立されているが，診療科や個人研究者による，アカデミアにおける研究では，その全てが個々の研究者に委ねられ，支援のシステムが十分とは言えない。個人の研究者に対する英語論文作成支援が今後の重要な課題であり，文部科学省の私立大学等改革総合支援事業（タイプ 2）においては「英語等の外国語による学術論文作成支援の実施」が求められており，評価条件として具体的に英語等による学術論文作成の相談体制，翻訳または校閲体制あるいは費用助成等を組織的に整備していることと定められている。

J.P. バロン先生が 1986 年に東京医科大学に設けた国際医学情報センターが学内論文校閲サービスの先駆けと言えるが，学内論文校閲サービスを組織的に提供する医学部は依然として少ない。論文校閲サービスを提供する業者は多数あるが，学内専用の論文作成支援サービスを持つことには多大なメリットがある。具体的には，著者と校閲者が直接打合せでき，より著者の意図に沿った校閲ができる。校閲者が各々の講座の論文校閲を重ねることにより，次第にその専門性を高め，より適切な校閲が可能になる。論文投稿までの校閲に引き続き，査読以降アクセプトされるまで同じ校閲者による一貫したサポートが可能となる。繰り返し行われるこのプロセスを通して，著者と校閲者の双方向の学びがレベルアップし，結果として大学から発表される論文の質・数ともに上がり，最終的には大学の知名度アップにもつながる。米国の Mayo Clinic がまさに好例である。その名が世界中に知られるようになった要因の一つは，100 年以上も前に論文作成支援の重要性に着目し，院内専用の論文校閲サービスである Editorial Services Division を設置したことにあると言っても過言ではなかろう。

シンポジスト全員のもう一つの共通テーマとして，論文

作成やメディカルライティングに関する教育の必要性が挙げられる。植谷先生と濵名先生は，英文論文執筆に関する包括的な教育が求められていることを強調した。パネルディスカッションでは，論文執筆教育はだれが，どこで，どの段階で行うべきかというディスカッションポイントが挙げられた。

「だれが」を考える上で，英文論文執筆の教育とは語学としての英語教育とは異なることをまず特記すべきである。論文作成支援および教育を行うのは，必ずしも英語のネイティブスピーカーである必要はなく，むしろメディカルライティングに関する専門知識を有する人であることが必要不可欠である。メディカルライティング特有の決まりごとを知らないネイティブスピーカーに“native check”の依頼をすると，折角 AMA Manual of Style に正しく沿った“A 34-year-old man presented with …”が“A 34-year-old male presented with …”に誤って「直される」ことがしばしばある。

「どこで」「どの段階で」に関して，ジェスミン先生は大学院コースの必要性を強く主張した。大学院における教育は，医学のプロフェッショナルとして国際的に活躍しキャリアを形成するために必要な医学英語およびメディカルコミュニケーションに関する基礎知識を身につけることが目的になる。具体的には，論文執筆における ICMJE Recommendations，原著論文の IMRAD セクションの書き方，スタイルマニュアルの活用，カバーレターの書き方，査読者のコメントへの返答の仕方等などである。

日本医学英語教育学会が 2015 年に策定した「医学教育分野別評価基準日本版（グローバルスタンダード）に対応するための医学英語教育ガイドライン」において，医学部卒業時に全員が習得すべき内容とされている Minimum Requirements に，「医学論文に必要な要素を理解している」や「英文 abstract を自分で書ける」などのアウトカムが定められている。つまり，医学部においても医学英語教育の一環として英文論文に関する基礎教育が必要とされている。

そこで，英文論文作成支援における日本医学英語教育学会の役割が最後のディスカッションポイントとして挙げられた。学会の役割として，将来の論文著者になる医学部学生や初めて論文を執筆する大学院学生を指導する立場にある学会会員を対象に，年次学術集会の実施，医学英語教育ガイドラインの作成とそれに沿った教科書の刊行，学術誌 Journal of Medical English Education の発行等を行っている。そして，医学英語の学習者を対象に，学会のコア事業の一つである日本医学英語検定試験（医英検）の普及と実施を行っている。また，研究者等を対象に，英文論文執筆や口頭発表等に関する医学英語セミナーを実施している。これらの事業を通じて，日本の医学英語教育を推進することにより英文論文作成支援にもつながる貢献をしている。

日本医学英語教育学会の最大の特徴は，その会員の構成にある。会員の約半数が医学英語に関心のある医師をはじめとする医療関係者からなる「医学・医療領域会員」，もう半数が医学に関心のある語学が専門の「英語領域会員」である。そしてほとんどの会員が医学英語教育と何らかの関連を持つ職に着いている。この会員構成を活かし，日本医学英語教育学会が，医学英語教育，ひいては英文論文作成支援における多職種連携，専門家連携を今後さらに促進していくことが期待される。

Conference proceedings

医学英語論文執筆のための 10 箇条：データがあるなら論文にしよう

Ten important points for writing medical English papers: From data to publication

伊達　勲

日本医学英語教育学会理事長，岡山大学学術研究院医歯薬学域脳神経外科

Isao Date

President, Japan Society for Medical English Education
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Abstract

In this global age, it is essential for researchers and physicians to carry out research, obtain data, and write papers in English. However, every researcher, physician, and supervisor has experienced the reality that data is available but has not been translated into English. I have authored, supervised, and published about 430 papers in English. However, many other potential papers remain unpublished. In this lecture, I would like to propose and explain 10 points for writing papers in English, and encourage young researchers to use the data they have to write papers in English:

1. Why should you write papers in English?
2. Is it better to translate a Japanese paper into English or write it in English from the start?
3. Have your English checked by a native speaker?
4. Conference presentations are a great opportunity to write papers in English: structured abstracts are mini papers
5. What are the basic skills and knowledge required for writing papers?
6. Make the title of your paper attractive: it should be informative
7. Start with the Materials and Methods and Results: including References, this will make up more than 50% of the paper
8. Gather and organize related papers on a regular basis
9. Revise articles promptly and faithfully in accordance with the reviewers' comments
10. Practicing English presentation by yourself: site translation, shadowing, Siri

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1. はじめに

研究しデータを得たら英語論文を書く，は医師・研究者にとって必須のことである。しかし，現実には「データはあるのに英語論文にならないまま」になっている研究や症例報告がたくさん存在する。筆者はこれまで約 430 の英語論文を筆頭著者としてあるいは共同著者として執筆してきた。これまでどのように若手医師を励まして，英語で発表し，論文に仕上げるように指導してきたか，について解説し，読者の皆様の論文執筆のヒントになれば幸いである。

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本論文は，第 24 回日本医学英語教育学会学術集会（2021 年 7 月 17・18 日，オンライン開催）における口頭発表を一部改変したものである。

2. 医学英語論文執筆のための 10 箇条

2.1 なぜ英語論文を書くべきなのか

研究を行いデータを得ると，まずは学会発表を行うが，学会発表だけでは学会のプログラムに抄録が残るだけである。論文化しないと，その研究の成果は後世に残っていかない。日本語論文とするか英語論文とするかであるが，scientist であればその成果をより多くの読者に読んでもらいたいのが当然の心理である。日本語論文に比べて英語論文の読者の数は数百倍，数千倍であり，英語論文として発表することを心がけたい。

英語論文の一文一文は短くて書きやすく，構文も中学校・高等学校で学習するレベルであり高度なものではない。ただ，医学英語独特の用語は沢山あるのでそれを学習する必要はある。

Publish or perish という言葉がある。アメリカのアカデミアでの格言であるが，論文を書かないのなら scientist としての意味がないことを韻を踏んで表したフレーズである。英語で論文を発表することで世界に認められることを再認識したい。

2.2 日本語の論文を英語に訳すのか，はじめから英語で書くのか

よくある質問である。初めて論文を書くときは日本語論文からスタートして良いと考える。論文の構成や書き方自体は日本語も英語も違いはないからである。日本語での論文執筆に慣れたら，はじめから英語で書くようになるべきであろう。特に国際学会で英語発表するような立場になってくると，英語で直接論文を書く習慣をつけていれば，プレゼンテーションの場での質疑応答でその習慣が生きてくる。

英語論文を執筆する環境作りも大切である。具体的には，データを得たら国際学会で発表する，そしてそれを論文化する，という流れを各施設内の雰囲気として普通の流れにしていくのが理想である。論文執筆のためには机の上のパソコンに拡張画面用のモニターを接続し，拡張画面を文献 PDF 用に，第 1 画面を文章執筆に使うと効率が良い（**図 1**）。

上司の心がけとしては，教室によく論文を書く人を一人作ることである。それによって，同僚も自然に論文を書くようになるものである。

2.3 英語の native check は必要か

どれだけ英語論文が書けるようになっても native check は必要である。論文の筆頭著者が日本人である場合，reviewer は論文の内容を最も重視して査読を行うのは当然だが，加えて英語自体にも厳しめのチェックをすることが多いことを知っておくべきである。共同著者に native speaker がいる場合は当然その人に英語自体の問題も含めてチェックをしてもらう。留学経験があり，米国人や英国人の友人や知り合いがいれば native check をお願いできる場合が多い。そのような状況にないときは，翻訳業者に native check を依頼することになる。私の施設の若手に対しては，日本語をそのまま翻訳業者に英訳してもらうことは禁止しており，自分で英文を作成し，それを校正してもらう場合は医局で一定の経済的援助を行うようにしている。

2.4 学会発表は英語論文執筆の大きなチャンス

最近の学会抄録ではいわゆる structured abstract を提出することが多い。Introduction（Objective），Materials and Methods（M&M），Results（plus Discussion），Conclusion で構成された形の抄録である。文字数の制限があるので discussion については論文のように項目としては入れられないことが多いとはいえ，structured abstract はミニ論文という認識を持つことが大切である。抄録提出の段階で，この抄録のそれぞれのパートに肉付けをしていくと，あと

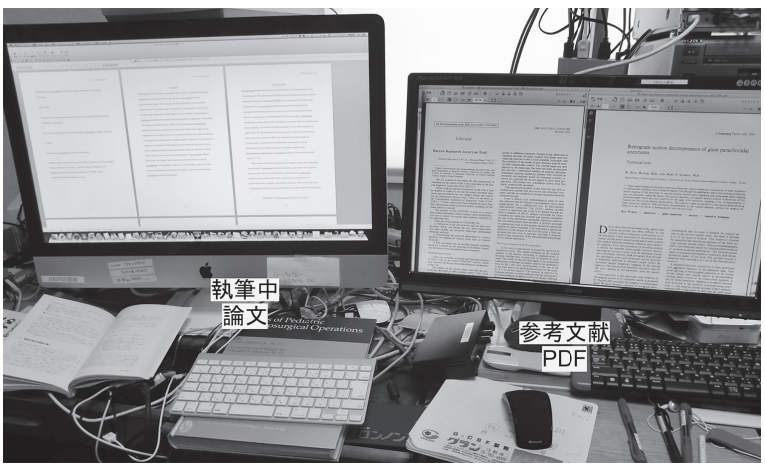

図 1．論文執筆にはパソコンの拡張画面が有用

2	**OBJECTIVE** Data evaluating the long-term outcomes, particularly with regard to treatment modality, of aneurysmal subarachnoid hemorrhage (SAH) in octogenarians are limited. The primary objectives were to evaluate the disposition (living at home vs institutional settings) and analyze the predictors of long-term survival and return to home for octogenarians after SAH.
3	**METHODS** Data pertaining to patients age 80 and older who underwent microsurgical clipping or endovascular coiling for SAH were extracted from 100% nationwide Medicare inpatient claims and linked with the Minimum Data Set (2008–2011). Patient disposition was tracked for 2 years after index SAH admission. Multivariable logistic regression stratified by aneurysm treatment modality, and adjusted for patient factors including SAH severity, evaluated predictors of return to home at 60 and 365 days after SAH. Survival 365 days after SAH was analyzed with a multivariable Cox proportional hazards model.
4	**RESULTS** A total of 1298 cases were included in the analysis. One year following SAH, 56% of the patients had died or were in hospice care, 8% were in an institutional post–acute care setting, and 36% had returned home. Open microsurgical clipping (adjusted hazard ratio [aHR] 0.67, 95% confidence interval [CI] 0.54–0.81), male sex (aHR 0.70, 95% CI 0.57–0.87), tracheostomy (aHR 0.63, 95% CI 0.47–0.85), gastrostomy (aHR 0.60, 95% CI 0.48–0.76), and worse SAH severity (aHR 0.94, 95% CI 0.92–0.97) were associated with reduced likelihood of patients ever returning home. Older age (aHR 1.09, 95% CI 1.05–1.13), tracheostomy (aHR 2.06, 95% CI 1.46–2.91), gastrostomy (aHR 1.55, 95% CI 1.14–2.10), male sex (aHR 1.66, 95% CI 1.20–2.23), and worse SAH severity 1.51 (95% CI 1.04–2.18) were associated with reduced survival.
1	**CONCLUSIONS** In this national analysis, 56% of octogenarians with SAH died, and 36% returned home within 1 year of SAH. Coil embolization predicted returning to home, which may suggest a benefit to endovascular treatment in this patient population.

図 2. 抄録における各部門の理想的割合

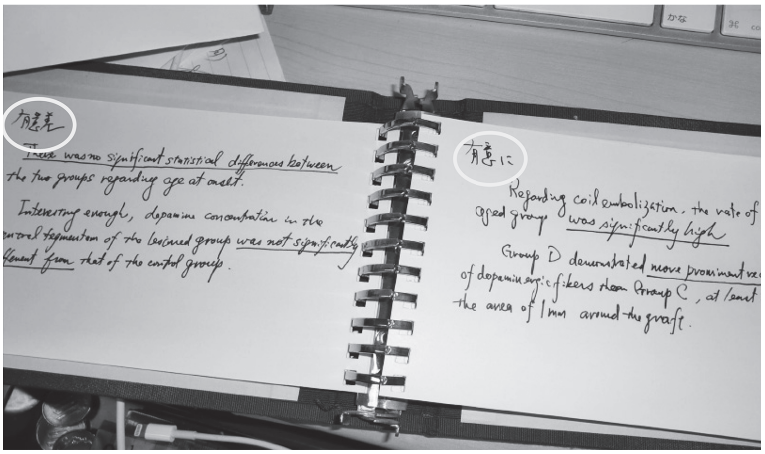

図 3. 有用な表現を日本語のあいうえお順に整理

一息のところで論文ができあがる，という気持ちになることが望まれる。

理想的な structured abstract の structure 配分量としては，Objective 2：M&M 3：Results 4：Conclusion 1 の割合が理想的である（**図 2**）。

2.5　論文執筆に必要な基礎能力・知識とは

英語自体については，中学校・高等学校で学ぶレベルの構文であり，比較的容易である。しかしながら医学英語特有の表現が多くあり，それを学ぶには日頃から自分の研究に関する論文を読む際に，論文執筆で使えそうなフレーズを自分なりに集めて分類・整理しておくのがよい。その整理の仕方としてはいろいろあるが，私はキーワードとなる単語あるいは短文のあいうえお順に整理している。その整理には A5 版程度の小さなバインダーを用いている（**図 3**）。これまで論文執筆に使いやすい表現を集めたシリーズを医学英語フレーズ辞典として発刊した。[1]

上記のようにルーズリーフ形式で手書きで集めるのではなく，自身のコンピュータ内にファイルを作り表現を集めておくのもソートなどがしやすく，いい方法であるとは思う。しかしながら，コンピュータに表現をいれるやり方だとそれだけで「後で必要に応じてソートするなりサーチするなりすれば良い」という気持ちになって，表現を覚えるのがおろそかになることが多いのも事実である。デジタル時代にアナログ的ではあるが，手で書いたものの方が記憶の中に残りやすいという印象はもっており，その認識はデジタル時代になっても変わらないように感じる。

論文執筆に必要な基礎能力としては，医学における基礎研究の経験で培われる能力と同様であることを，「脳神経外科医教育における基礎研究の意義」の中で筆者は述べてきた。[2] 具体的には，能動的な研究計画の作成能力，科学的・論理的な思考力，問題解決能力，英語論文読解力，統計処理能力などである。基礎研究を経験すると英語論文執筆能力も同時に備えることができる。

2.6　論文のタイトルを魅力あるものにしよう

世の中には論文が溢れている。特にオンラインジャーナルが増え，ネット上で渉猟できる自らの研究に関係した論文の数は非常に多い。そんな中で自らの論文を読んでもらうためには，論文のタイトルが魅力的であることが重要である。従来より，日本語の論文では，…に関する研究，とか，…について，などのタイトルがつけられていることが

よくある。本学会の初代理事長の植村研一先生によればこのようなタイトルを Indicative title（表示的タイトル）とよぶ。[3] 例えば，「運動野付近の髄膜腫手術の経験」のようなタイトルが該当する。タイトルを見ただけではどのような結論の論文かが分からず，多くの関連論文の中からピックアップされ読んでもらえる論文とはなりにくい。投稿に関していえば，編集委員長がタイトルを見ただけで reject する可能性すらある。

論文のタイトルは informative title（内容的タイトル）にすべきである。具体的に何がその研究で得られたのかをタイトルに入れ込むことである。場合によっては副題をつけるのもよいだろう。例えば，Surgical treatment of meningiomas located in the motor area：the role of navigated transcranial magnetic stimulation for preoperative planning, surgical strategy, and prediction of arachnoidal cleavage and motor outcome とすれば，運動野の髄膜腫に対してどのような術前予測をした論文なのかがタイトルを見ただけで分かり，読者に読んでもらえる確率は高くなる。

2.7 Materials and Methods と Results から書き始めよう

論文の構成は通常，Introduction, Materials and Methods, Results, Discussion, Conclusion, References である。本稿はデータがあることを前提にしているので，Materials and Methods と Results は必ず書けるはずである。加えて，引用すべき論文については研究のスタート時点から集めている前提なので，References の部分も記載のスタイルさえ確認すれば執筆できる。以上を考えると，論文の構成の 6 部門のうち，データが得られた時点で 3 部門（Materials and Methods, Results, References）については書くことが可能である。実際に私たちの教室から publish した最近の 1 論文について，この 3 部門の要素を薄い色で塗ったのが**図 4** である。これを見ると，この時点でできあがった論文の 50％以上の容量を締めているのが分かる。すなわち，データが得られたら，論文の 50% 以上ができあがって

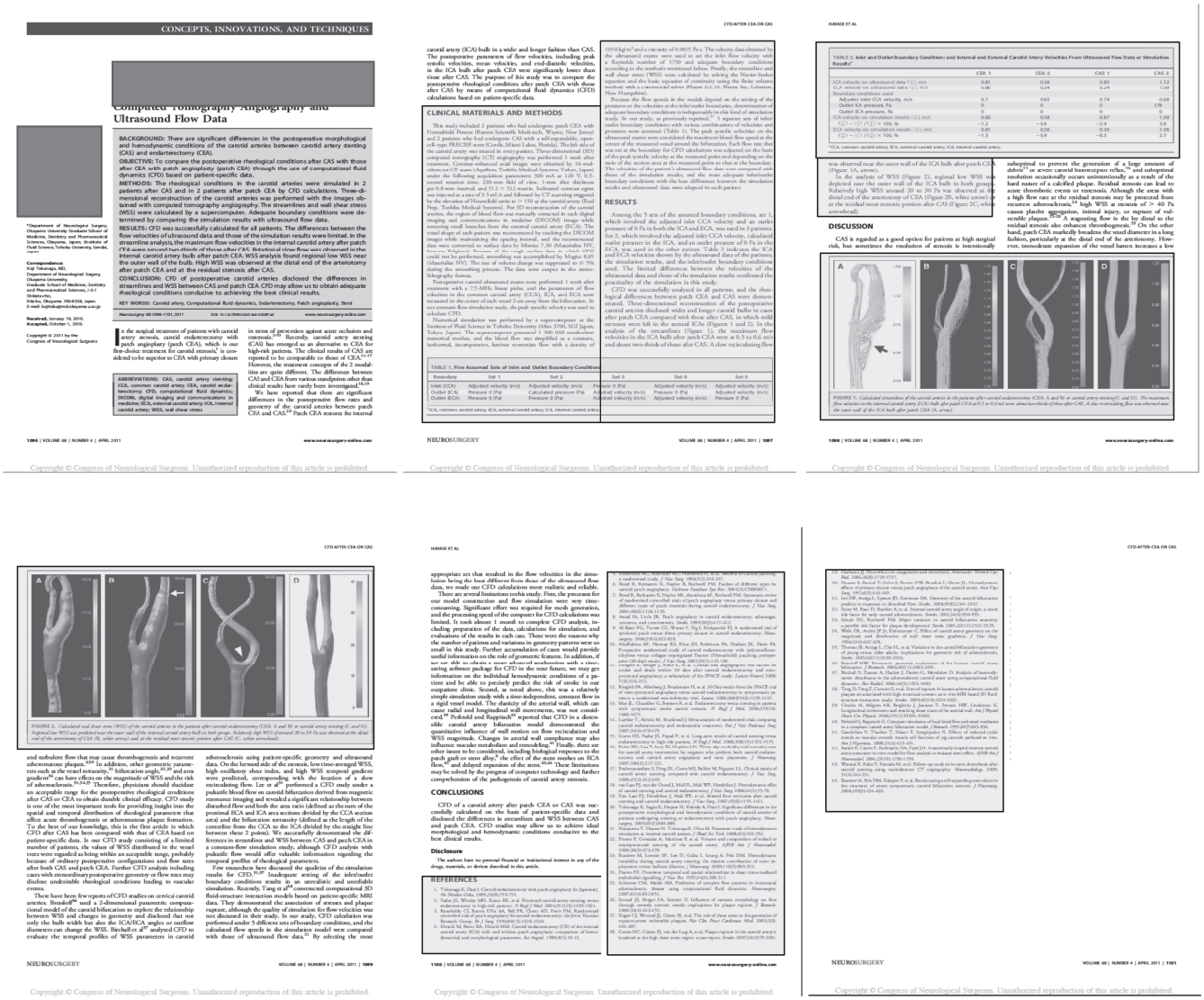

図 4. M&M, Results, References で 50%越え

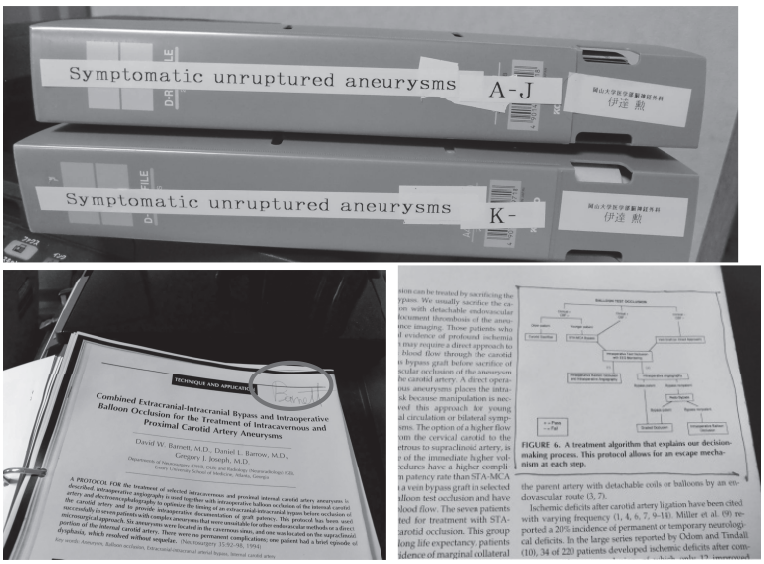

図 5．印刷した PDF は筆頭著者の ABC 順で整理

いる，と考える発想が大切である。そのためには，論文執筆の際必ずしも 6 つの部門を順番に書いていくのではなく，場合によっては，Materials and Methods, Results をまず書き，論文ができあがっていくことを感じながらその他の部分を書いていく，という方法は論文執筆のモチベーションを高めるためにも有用である。

2.8　普段から関連論文を集めて整理しよう

関連論文の収集は，研究をスタートさせるときから始まっている。最近は関連論文を PDF で収集するのが一般的で，コンピュータ内に蓄えておき，必要に応じてファイルを開けて見るということが多いと思われる。しかしながら，引用すべき論文数が多数であることも多く，その場合は，やはり PDF を一旦印刷して整理しておき，すぐに引用すべき箇所を取り出せるようにするのが効率がよい。**図 5** に私が行っている方法をまとめた。すなわち，論文の最初のページの右上に筆頭著者の名前を書いておく（**図 5 左下**）。そして必要な図などがあれば，それにマークをしておく（**図 5 右下**）。そして PDF を印刷した論文は 2 穴のファイルに筆頭著者の ABC 順に並べて整理しておき，いつでも参照できるようにしておく（**図 5 上**）。ある一つの論文だけを PDF で読むときはコンピュータ上で問題ないが，5 個，10 個の論文を参考にしながら執筆するときはやはり印刷したものを見ながらの方が効率良く仕事が進む。

2.9　論文改訂は reviewers' comment に忠実に，迅速に

論文を投稿して 1 回で accept されることはまずない。通常投稿して 1 ～ 2 か月すると，2 名ないし 3 名の reviewer から改訂すべき major point, minor point を記載した査読結果が送られてくる。これに対して応えた文章を添えて改訂論文を送り返すことになるが，いくつか心がけるべき点がある。まず，基本的に reviewer のコメントには素直に応じるべきである。一見，無理な要求をされているように感じられるコメントもしばしば見受けるが，実は reviewer は，著者がどのように回答してくるかの反応をみていることもよくある。そのため，決してコメントに対してスルーすることなく可能な限り回答すべきである。追加実験と追加データを求められることもよくある。可能ならもちろん追加データを得た上で返答すべきであるが，もし追加のデータを得ることが何らかの事情で無理であるなら，なぜ無理かを述べることが大切である。

また，コメントへの返答の仕方であるが，reviewer が 1・・2・・のように箇条書きでコメントしてきている場合は，その番号に合わせて回答すべきである。そうではなく，reviewer のコメントが文章の羅列であることもよくあるが，その場合でも回答は，読みやすいように，1・・2・・の書き方が望ましい。また，改訂論文では，どこを改訂したかがすぐ分かるように，下線，ハイライトを使用するべきである。Reviewer の査読時間をできるだけ短くするような配慮は，良い心証を与える。また，改訂論文の提出はできるだけ迅速に行うべきである。

2.10　1 人で英語プレゼンテーションを練習するには [4]

英語論文を書く前に国際学会でプレゼンテーションを行い，その準備の段階で英語論文の骨子を作っていくというのがモチベーションを高める上でもよい方法である。1 人で英語プレゼンテーションの練習をする方法はいくつかあるが，ここでは 3 つの方法を紹介する。

2.10.1　サイトトランスレーション

日本語のジャーナルを読む際，どこかの 1 区画をターゲットに日本語を読みながら英語に訳す練習である。例えば，「内頚動脈海綿静脈洞部の巨大動脈瘤に対しては，以前から IC ligation と high flow bypass が主として行われてきた。最近になって，血管内手術の発達により，術前に balloon test occlusion などを用いた脳血流予備能の評価が可能になったこと…」の文章を読みながら，**図 6** のように英語に「頭から」訳していく方法である。文章が完成してから訳すのではなく，頭から訳していくことが大切で，この方法では文法的には完全に正しい英語にならない場合もあるが，同時通訳などには非常に役に立つ方法である。[5]

2.10.2　シャドウイング

Native speaker の話しているビデオをヘッドホンで聞きながら，0.5 秒遅れでついていく練習方法で，できるだけスピードも抑揚もマネをするのが望ましい。できれば，実際の学会発表をフリーハンドで行っているビデオを用いると，多くの native speaker のプレゼンテーションは原稿なしのスライドに従ったプレゼンテーションなので，ついていきやすい。テレビのニュースのように原稿を読むタイプのもので練習すると英語が速すぎてついていけないので，スライドを使ったフリーハンドのプレゼンテーションで練習することをお勧めする。医学の内容の英語のプレゼンテーションは YouTube にもたくさん発表されている。

内頚動脈海綿静脈洞部の巨大動脈瘤に	Regarding IC cavernous
対しては、	giant aneurysms,
以前から	so far
IC ligationと	IC ligation and
high flow bypassが	high flow bypass have been
主として行なわれてきた。	mainly performed.
最近になって、	Recently,
血管内手術の発達により	due to development of
ーーーーーーーー	endovascular surgery,

図 6. サイトトランスレーションでは頭からフレーズ毎に訳す

2.10.3　Siri をつかって iPhone, iPad で発音チェック

iPhone や iPad に附属している Siri という音声認識機能を使って自分の英語を Siri が正確に聞き取ってくれるかを試す方法である。Siri の日本語の認識機能が優れていることを認識している読者の方は多いと思われるが，設定を英語認識にすると，日本語の場合と同様に発音した英語を表示してくれるので，自分の発音をチェックすることができる（**図 7**）。

2.11　10 箇条番外編

これまで書いてきた 10 箇条以外にもいくつか論文作成のためのヒントがあるので，それについて述べる。

2.11.1　目指す論文の形態

若手の臨床医にとっては，まず症例報告からスタートするのがよい。症例報告の論文をいくつか書いたら次のステップとして基礎研究，臨床研究で十分なデータを得て，原著論文に向かう。そして，原著論文を publish できるようになったら，5 年を目途に総説を書くレベルに到達したい。一般的に同じ分野で 5 つの原著論文を筆頭著者で書くことができれば，総説執筆依頼の声がかかる期待がもてる。

一流ジャーナルではインパクトファクターを向上させたい，ということも理由の一つで，症例報告の掲載数が減る傾向にある。しかしながら，一方でオンラインジャーナル（いわゆるハゲタカジャーナルと呼ばれるものではなく，pubmed にも掲載され，インパクトファクターもそれなりの数字をあげているもの）に症例報告投稿の機会は十分あるので，若手臨床医は是非症例報告から積極的に英語論文投稿をスタートさせていただきたい。

2.11.2　投稿先をどう選ぶか

インパクトファクターの高いジャーナルを一般的には投稿の対象として希望することが多い。アカデミアでは個人

図 7. Siri と iPad を使って自分の発音をチェック

の業績の評価にインパクトファクターの合計点がしばしば用いられることも理由の一つである。論文を執筆する前に，自分の研究の関連領域の論文を誰しも集めるが，その数が多いジャーナルに投稿する方がよく読まれるだけではなく，よく引用されることにもなるのでその点も参考にするのがよい。もし，すでに関連論文を publish したことがあるのであれば，自分の論文がどのようなジャーナルに引用されているかを調べて，よく引用されているジャーナルに投稿するのも 1 つのアイデアである。自分の論文がどのジャーナルに引用されているかは，Web of Science などを調べると分かる

2.11.3　どんなソフトを使うか

文章は word，図は powerpoint や photoshop，グラフは excel，という組み合わせがほとんどの研究者が使っているパターンであろう。研究の，あるいは論文のアイデアはどこにいてもうかぶことがある。また論文執筆に関する情報をどこにいてもメモしたいことがあるであろう。Evernote や Dropbox はオンラインでどこでもデータが共有できるので重宝する。また，引用論文の整理について，EndNote のような文献整理ソフトを使うと，投稿したジャーナルに reject された場合も，比較的時間をかけずに引用論文形式の異なる他のジャーナルの投稿規定に沿う変換が可能なので時間がかなり節約される。

3. おわりに

データがあるのに英語論文にならないままになっている研究は，どの施設にも多数存在すると思われる。本稿で提案した 10 箇条を参考に是非得られたデータを英語論文にされることを期待する。

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Conference proceedings

Role of supervisors in helping students with scientific medical writing

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Abstract

From my 25 years of experience working with Japanese graduate students, my central understanding is that the students know a lot of English as they can read English articles, have good knowledge of English, and do their experiments well. They can also solve problems. First of all, I feel the most critical difficulty in writing any papers for Japanese students is the difficulty in deciding where they need to stop experiments, whether the produced data is enough for a publication, and how to prepare a research manuscript. Therefore, the help of someone who has both research supervision capability and English proficiency is essential for research publication in Japan. In that case, it is easy to handle the English manuscript of graduate students in Japan; I have been working hand in hand with graduate and postgraduate students.

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Keywords scientific writing, medical writing

1. Introduction

Scientists can be writers as well because there lies scientific writing at the very core of the scientific process. While it is common for there to be some tinkering purely out of curiosity, there is a major difference between that and actual science. This difference lies in sharing the results. In order to write and be good at it, the writer has to ensure that the content is precise and also engages the reader. There is no shortcut in this road whether a person is in the field of academia or government or industry. If the content a person writes is able to compel others then it has the potential to assist that person in different stages of their career.

2. What is scientific writing?

Scientific writing is not so different from other forms of formal writing, as it is requires a strong command of English sentence construction, usage and punctuation. In the case of any discipline, writing consists of a cycle, if not multiple cycles, of planning, writing the draft version and lastly editing and proofreading. For the planning section, the writer usually has to find and read the source material.

Every writer has to strive for continuity as well as the logical flow of their ideas. When it comes to scientific writing, the ideas should be backed up by evidence alongside proper citations to link the idea to the source material. If there is no evidence for the idea, it is bound to lose credibility.

For the majority of people across the globe, it is never easy to successfully communicate their findings in English. This is because the writer has to select the right set of words as well as correct grammar. The use of right words and grammar has to be considered a skill on its own and that is hardly taught by the schools. As a result, a high number of university students face some sort of disadvantage.

No matter how well a writer conducts his/her research, it will have no credibility if the writer fails to communicate the findings in a manner that is concise while also managing to keep it engaging for the reader. At one point, scientific papers were considered to be works of literature by many. With that said, it is still possible in the modern day to make the writing as informative as possible while still maintaining the readability aspect for the manuscript.

What is the true purpose of writing a scientific discourse? Is it just the presentation of information only? No, the actual purpose is to communicate it. The author may work hard to convert the right data in the form of paragraphs and that may lead to his satisfaction. However, it will not amount to

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much if the majority of the paragraphs cannot be understood by the reader. A gap will then remain between what the author wanted to convey and what the reader understood.

The author has to maintain a logical order when it comes to writing the sentences and creating paragraphs. All good journal articles maintain it so that the reader faces no such difficulty with following the argument being presented in the paper. As a result, the reader will then reach the same conclusion as the author. All of the paragraphs must have the ability to stand on their own while also having the ability to cohesive on an internal basis.

Usually, some paragraphs are longer than others in the long pieces of writing. In that case, authors use a number of subheadings that result in the sections becoming organized. The trick is to write multiple drafts whether it's for a report or for an essay.

Scientific papers cannot be written out of thin air. Any author who has written a scientific paper in recent years has had to build on previous research and then extend the concept, while also sharing his/her own ideas. In order to write a scientific paper, the author has to familiarize themselves with the scientific literature that already exists on his/her topic of interest. This is considered to be the first step in planning for a paper.

In this case, opting for peer-reviewed journal articles is the best choice. The reason for that being the careful assessment made by professionals regarding the article. A peer-reviewed article will have no problem with the methodology, analysis and interpretation of the outcome. In order to write a literature review that has cohesiveness, it is crucial to carefully select the articles. Once the sources have been identified properly, it is time for gathering the full text of the source material.

The process of choosing and gathering the sources can take up a lot of time. After that, the author usually has to extract the right kind of material from all of the sources. If someone is writing a scientific article for the first time, then it will not be easy for them to go through professional articles and comprehend every part of the message that has been delivered. This is why it is always a good idea to give the abstract a read. Abstracts will give the readers a fair idea regarding what they can or cannot expect from the paper. In addition, it is vital to get accustomed with the structure of an article before one decides to read the piece in a thorough manner.

Even though the abstract is displayed at the start of the paper, it is actually the last piece to be written in the article. The whole point of writing the abstract is to prepare a summary of everything that the author has written inside the manuscript. Hence, the abstract should never include any information that cannot be found later in the paper. This means that there is no place for unnecessary information in an abstract. As such, the abstract has to be made clear, direct and if it is self-explanatory then the reader will understand the message even better.[1]

3. Parts of a scientific paper

In every review article, the introduction has to start from the third page. The introduction is placed after the Title Page and Abstract. As there is an issue being investigated, the first few paragraphs have to put the spotlight on the generalized information about that. The objective should also be to set up the readers for the literature review that comes right after.

In these paragraphs, the author has to provide certain statements and support them with the help of citations. Without the use of citations, those same paragraphs are going to appear as broad generalities. In most cases, the first few paragraphs it is advised to include a statement which represents the main goal or the reason for conducting the research in the first place.[2]

Literature review has so much importance in the paper as it conveys the knowledge as well as idea that has been built on from the topic. The purpose of the literature review is also to focus on the strength and weakness of the topic. If the author simply makes a summary of the many articles that he/she has gone through in a sequence then it will not be acceptable. The author should amalgamate the materials from various articles into the paragraphs that focus on certain subtopics. These materials must have a connection with the research's main purpose. If the author creates an outline then it becomes easier for them to amalgamate the information from all of the articles in a series of paragraphs under one topic. The final version is going to look much better than making summaries of one article after the other.

After reading an article, it is not uncommon to have contrasting findings. If such is the case, authors will normally compare and contrast the findings in one paragraph. In

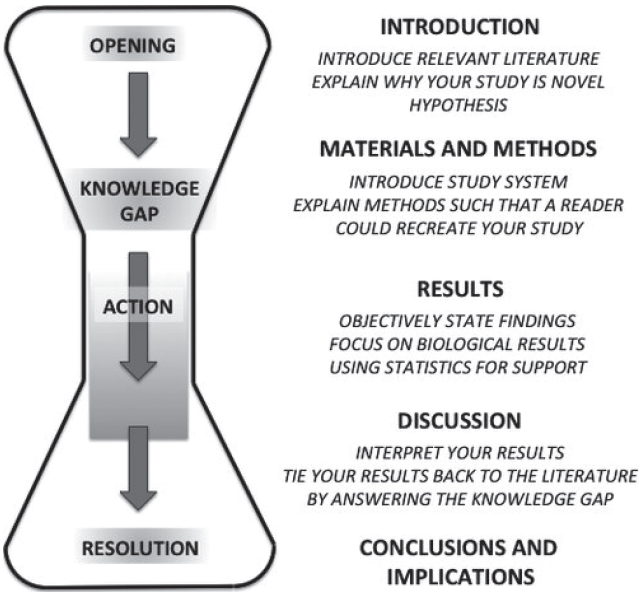

Figure 1: Framing of a scientific paper sourced from esajournals.com

addition, the author can add comments that state probable reasons for the contrasting findings. There is hardly any need for the report to include thorough information regarding the sample size in the literature review section. The same can be said for methodology which can be stated in a separate section. There are some cases that include methodology along with the literature review only because the methodology is connected to a particular point regarding a specific finding.

The hallmark of a good scientific paper is the emphasis given on the findings from the research along with the theoretical underpinnings. If the author is writing an empirical report, then their literature review must include information that will make it easier to account for the hypothesis. The objective changes if the author is writing a review article. In it, the author has to deliver evidence in the literature review section that supports the conclusion reached by the author themselves.

Evidence means everything in scientific writing. Each scientific writing has to depend on existing pieces of research work done as well as theoretical viewpoints that either directly match or have high similarity with the idea introduced by the author. When the author starts writing the paper, he/she has to cite the source point, it is an absolute necessity of writing the scientific paper.

If ideas are not cited properly then it is considered to be plagiarized. Oftentimes, papers include quotes. Quotes are directly copied from the source and thus maintain the same language. When a quote from the original source is used, it is encompassed by quotation marks along with the citation of the source and also mention the page number as well. With that said, the use of quotes is rare in scientific writings. If quotations are used a lot of times in the same writing then it is going to detract the reader from the paper itself due to the style as well as the content.

There are different methods of referencing, out of all those APA style consists of author-date referencing in the case of each of the citations that are a part of the report. The use of this method of referencing has certain differences with the citations that have been added to the body of a narrative. This can also be done in the case of a parenthesis. In the cases where a source consists of six authors or even more, there is provision for using only the surname of only the first author and then is followed up with et al. When the article is written by just one author, then that author's name is going to be a part of the citation.

In the case of parenthetical citation, the year has to be mentioned in each of the citations. When the author includes multiple citations in one parenthesis, they have to arrange the citations in an alphabetical order. The citations are then separated with the help of semicolons.

Methodology is a crucial part of the writing as it can provide the reader with sufficient information for them to recreate that same research at their own expense. This gives the reader a chance to figure out on their own whether the findings have validity and if they can be trusted. There are multiple subsections of methodology, namely empirical models, variable constructions, estimation methods, and lastly data and sample. The rule for writing empirical models is to include appropriate citation and also the addition of the error term.

As for the estimation method, it is thoroughly detailed so that the reader can comprehend the methodology along with the steps taken. With any activity comes the merits and demerits, which is also a fixture of the estimation method and has to be discussed. A good scientific writing consists of an explanation from the author's part about their selection of the estimation method.

Data that is used to showcase a point in the writing has to be explained to the reader as well as providing an explanation for the source of the data. The author also needs to mention the type of data they are using for the paper. There are several types, namely, cross sectional, time series, and pooled data. A good scientific paper usually includes the period of study while also providing thorough detail related to the sample. In addition, there is mention of the population along with the sample size in this section to go with the sampling technique that the researcher used.

The origin point of any data has to be trustworthy. Some data can be unique and it is possible that the researcher may have collected that data first-hand in which case, they have to include a few primary features related to the data. The research paper is bound to have variables and to make it easy for the reader to understand that, the author normally includes a detailed description about the construction of those variables.

In the result section of the research paper, the reader will come across the verbal as well as statistical information that describes the author's findings. This section is organized differently for each author since the organization depends on the type of analysis that the author has chosen. In addition, the organization of this section is also impacted by the research hypotheses. The first paragraph of this section is filled with information related to the type of analysis the researcher uses. In addition, the researcher provides a clarification for the variables he/she has analyzed.

Tables are a necessity of the research paper. The best research papers contain tables that look professional at first glance and are self-explanatory. These tables consist of proper titles and numbers as well as footnotes. There is going to be a mention of the information that the author presents in the columns. After that comes the discussion section in which the author presents the interpretation of the outcome. As such, the section is started with a statement or even statements if needed to let the audience know whether the outcome supports the hypotheses or not. In a good research paper, there will be a high number of economic interpretations of the outcome because it is insufficient

to state the positive or negative impact regarding those variables. There needs to be justification of all the findings on the basis of logical as well as theoretical underpinnings.

It is the responsibility of the researcher to present any alternate explanation of their findings and even assess it. If done, it will allow other researchers a chance to carry on the research in the near future. It is never good to assume that a research might have been near perfect. So, the author acknowledges the drawbacks in his/her research. With that said, it is imperative for the author to end on a high note. This is why the concluding sentences once again highlight the accomplishments of the study while also mentioning the broader implication.

The basis of scientific writing is to communicate the scientific concepts and many concepts fall under science. It is a style of writing that has some similarity to other writing methods as well. After all, the writer must make the content inside as entertaining as well while also managing to persuade the reader about his own thought process. A lot is dependent on the core of the scientific genre. For journal articles, scientific posters and also research proposals there are some variations which is to say that certain aspects of the writings will be subject to change. To be precise, the purpose and audience can be subject to change. With that said, a major part of scientific writings remain the same across the genres.

At the professional level, the target audience of scientific writings are other scientists. So, those writings have no reason to constitute general-audience details or even provide definitions. In the case of lab manuals as well as reports, these little definitions are included for the better understanding of the reader. If the general knowledge concept is explained in a professional scientific writing, then it can be a hindrance to the clarity of the writing. The same effect will also happen if the routine processes are explained which in turn makes the paper wordy while also deviating from a professional tone. The main purpose of scientific writings is never to be wordy or flowery nor should it maintain ambiguity.

Science has to build on and also correct itself with each passing moment. As such, scientific writings have to be situated in and need to contain references of the findings from the previous work. This will serve as the context which will provide motivation to propose the new work.

4. Types of scientific writing

In the category of scientific writing, the most talked about one is a research article as it is considered to be a workhorse.[3] There are more types of scientific writing as well:

- **Primary research article:** This is the conventional type of scientific writing that is mostly published in a peer reviewed journal. The foundation of this writing is laid by the discoveries made by a scientist. In the article, there will be a vivid description of the way the scientist conducted their research as well as the outcome of it.
- **Review article:** Oftentimes, review articles have been confused with the primary research articles as they are also published in the same peer reviewed journals. The difference lies in the fact that the job of a review article is to make a summary of the works done in a specific sub category instead of reporting the latest discoveries. As such, there is no "Methodology" section in it.
- **Editorial:** This an article that the author writes to express his/her opinion regarding any issue in particular. Authors of the editorials may want to take a side on any particular scientific dispute and will use this as an opportunity to express it. In addition, when someone wishes to urge others in the community to research a particular area, they may express it through the editorial. In order to write an article of such kind, the author has to do a lot of research and can cite a high number of peer reviewed literature.
- **News:** A lot of times, widely popular newspapers and magazines will publish science news articles. Most of these articles will consist of a reference to the latest studies related to primary research articles.
- **Article comment:** By conventional means, if an individual wants to make criticisms about a journal article, then the comment they submit is going to be a formal comment. If the comment catches the eyes of the editors, it will get published in the very next journal issue. With everything becoming online, journals can be found on the internet and it is easy to leave constructive criticism on the website.
- **Trade publication article:** The place of trade publications is right between the regular scholarly journals and the popularized publications with the main target being medical professionals. Oftentimes, trade publications also aim at particular disciplines. An article in one of these publications is going to span multiple pages while including a handful of references. With that said, these articles are in no way primary research articles. These articles will instead summarize the research work published in a different publication and help medical scientists to stay updated about latest research work.
- **Technical report:** Some NGOs as well as government agencies conduct research on their own and their final work will not be peer reviewed. However, the final report can still be considered as an integral part contributing to scientific literature. The technical reports are usually obtained from scholarly databases and are also available on the internet.
- **Conference proceeding:** Scientists are known to interact through journal articles but they may

also make formal communication with the help of conference proceedings. In a conference, scientists normally discuss broad topics and display findings from the latest research work. The scientists either use PowerPoint presentations or posters to give a solid description of their findings and endeavors. Afterwards, they can write down what they have discussed at the conference in an official form in a paper, publishing them in book form. These books can be found with the name: "Proceeding of Conference X".

- **Dissertation:** It is the final version of the research that has been conducted to earn a Masters or a PhD degree. The dissertation tends to be lengthy with thorough detailing of the method used by the author and includes a number of appendices of data. In recent years, it has become easy to find thesis and dissertation on the internet as many libraries are uploading them online.

5. What is scientific medical writing?

A high number of research studies have been developed in the medical field with the number of new drug discoveries also keeping up. The pharmaceutical companies are doing their best with the invention of medical devices. In this regard, a lot of scientific documents need to be formulated and then submitted to the proper authority figure. Furthermore, the information gathered has to be published in scientific articles.

The medical information obtained here has to be arranged in the proper way to be provided to medical professionals along with the scientific targeted audience.[4]

At the moment, there is an ever growing need to deliver marketable content concerned with the latest drugs as well as clinical trials. In order to do so, there has to be strategic planning and must include a thoroughly defined strategy to ensure success of the product. Nowadays, pharmaceutical companies have decided to take up strategic publications because it ensures better collaboration while also helping to understand the regional needs.[5]

The scope of scientific medical writing is considered as an interdisciplinary field. This allows the writer to communicate with clinicians, scientists, regulators and much more. Writers also have the opportunity to collaborate with biostatistics and legal departments. With that said, the writers must have a good understanding of the complicated scientific information as well as theories.

With each passing year, new knowledge is being contributed towards improving the field of medicine. This is made possible by the amount of research as well as the growth in clinical experience to go with new ideas. The information obtained from the research has to be communicated effectively to several people. For instance, this information can come in handy for physicians, healthcare professionals, drug regulators and last but not least, the patients themselves.

The proper way to describe medical writing is as an area of writing scientific documents. It is done by writers working actively in the field of medicine. These individuals are termed as "medical writers". A medical writer is not necessarily the actual scientist to have conducted the primary research. However, the writer can collaborate with the actual scientist and go on to help with the publication of their work.

6. Perspectives of non-English-speaking countries on scientific medical writing

The extent to which information gets disseminated in a specific language helps it to become recognized as the "language of science". In that regard, the way in which the English language is used for publishing scientific articles has helped it rise to prominence. With that said, if life science journals that have been peer-reviewed were taken into consideration, it would reveal surprising information. Of all the scientific publications, half of them have been contributed by non-native English speakers. With time, the percentage is bound to increase. There is a huge challenge for the non-native speakers when it comes to publishing journal articles in the English language.

When it comes to scientific medical writing, the non-native speakers not only have to deal with a second language in English but also a third one which happens to be the biomedical language. This predicament raises the difficulty level of the task itself.

There are several other challenges coming along the way for Non-Native speakers in their efforts of publishing their work. For instance, the acceptance rate for all the manuscripts by the Non-Native English speakers is nowhere near the level of acceptance rate of the Native speakers. With that said, there is a chance of the acceptance rate increasing on the basis of the topic itself.

Oftentimes, the biggest issue identified in the papers of the Non-Native speakers is the way it is structured as well as a few grammatical and cultural eros. On top of that, the difference in style between American and British English leads to some confusion and difficult times for the NNE's (Non-Native English speakers). This has been well documented in case of NNEs submitting their manuscript to either a British or an American journal. There is no simple way to describe the "grammatical error" aspect since there is the issue of using tense in the discussion part of the writer's primary article.

The process of extracting and disseminating all of the necessary scientific information takes a lot of work for NNEs. This is due to the fact that, NNEs often have to extract information from other published articles in their mother

tongue and then translate it to English. Due to this issue being faced by so many NNEs, the idea of using a bilingual online publication system is being proposed. If this idea is utilized then that will be the initial step taken for overcoming language barriers. Since there needs to be more clarity in the global scientific communication, it will be an ideal first step.

On paper, it sounds like a solid idea to run with, however, setting up a bilingual society even inside European countries is going to take up a lot of time. All of the medical writers do not share the same good luck of being in contact with an English professional or an individual who is willing to revise the manuscript they worked so hard on. However, if society became bilingual, the majority of the NNEs would feel okay with relying on themselves.

In order to publish any manuscript, there is a need for developing organizational strategy. This can be seen as a huge chance to make positive changes to the writings in any of the native languages. For clear communication to be maintained, scientific medical writers are required to follow the proper structure due to the fact that the correct structure is going to bring positive changes to the readability of their manuscripts. The proper way to start any sentence is to create the perspective after which there should be an opportunity to provide new information in the next stress position.

With that said, the linguistic researchers have stated time and again that there is a difference between the cultural groups on the basis of their organizational capabilities as well as practices. This difference is created due to a contrast in the way the patterns or approaching modalities have been presented so far. What we can derive from this is that the difference in writing patterns is due largely to the difference in thought patterns. The best way to describe the English pattern is to draw comparisons with the straight line of sequence which starts from introduction and continues all the way to the conclusion. However, to Asian people, the pattern appears to be circular. This underlines the indirectness of style when Asian people present their ideas. On the other hand, Latin people are known for their zigzag trajectory related to the arrangement and their intention is to cover every aspect of the topic at hand.

A case can be made that NNEs have a spontaneous aptitude, but that needs to be changed when it comes to the English pattern in hopes of adapting the manuscript that suits the academic audience. If the sequence of ideas are categorized properly, it would ensure a control for the writer over the logical links between the arguments. In addition, it will maintain the conciseness of the texts with the information being properly conveyed to the academic audience.

If the structure for the manuscript is non-linear or if it consists of discourses then it will lead to cultural errors. This has been pointed out many times by the linguistic researchers.[6] The themes in an English linear structure have been presented by the succession of deductions and in that, one idea has been properly linked to the next one. All of the paragraphs are started with some general knowledge or even the text before. After that, a new idea is introduced and then is developed and it will be finished when another new paragraph has to be introduced along with another new idea. How should a text be structured? For that, a plan has to be developed by keeping the hierarchy of importance in mind for spelling out the main idea along with the subtopic as well as any other idea that may be intended to be introduced in that paragraph.

The problem for NNEs shows itself when they lack in the department of subordinate sentences. This is what leads to an undifferentiated structure of the text. In addition, NNEs are known for facing grammar errors which means the frequent use of long and complicated sentences. Sometimes, they will use unnecessary words and opt for verbs in place of corresponding nouns and make way for passive voice whenever they can instead of using active voice. Another problematic feature of NNEs writing is their low capacity when it comes to vocabulary. The task of wording in English also proves to be difficult for NNEs due to the richness of synonyms.[7]

Perspective of Native Countries Towards Medical Scientific Writing:

7. Approach of undergraduates to scientific writing

Students are likely to feel anxious when they are required to write their first literature review paper. Literature reviews have been an integral part of science education. Students are required to conduct literature search, think critically, read published journal articles and develop the ability of writing original research papers. Jonathan Cisco who is a coordinator of Campus Writing Program at the University of Missouri developed an interesting approach to instill in students the way to write literature review. According to a study Cisco conducted, students revealed that they would start off with the introduction and then proceed to make summaries of the papers in one paragraph and end the paper with a conclusion. The problem faced by students is their inability to connect the ideas in any form. As a result, the final paper is not only difficult for the reader to understand but is also difficult for the student to write.[8]

8. Approach of postgraduate students to scientific writing

Writers with little to no experience belonging to any discourse community are bound to have a hard time with their academic performance as well as trying to manage authorial strategies for meeting the presumed level of expertise of experienced members within the academic

community. In order for writers at the postgraduate level to meet the expectations of their examiners, there is a need to instruct and guide them regarding the management of authorial strategies related to specific contexts. Even at the postgraduate level, it can be seen that writers fail to correspond to academic practices.

Writers at this level are aware of the variations in academic practices on the basis of genres as well as norms of any discourse group. As such, the authors have to meet the expectations of following a variety of accepted practices with regards to presenting their knowledge in the form of scholarly work. The writers have to make linguistic alongside rhetorical choices during the writing part. If they can manage the expectation of the discourse group in this regard then they will be able to make their targeted audience fully understand the content.[9]

9. Approach of doctoral students to scientific writing

Doctoral students have to create a balance between writing their thesis and doing the research work. For NNEs, this means added pressure which results from language drawbacks since they need to present their work to a global audience. The purpose of scientific writing at the postgraduate level is not to make earth-shattering discoveries. In fact, the main purpose is to train the students so that they get better at methodical investigation. If the focus of these scientific writings was to make new discoveries then students would never learn the ways of conducting systematic investigation. The supervisor has to be present to teach the graduate students about the importance of further developing the previous work of either their peers or someone who researched about the same topic. Graduate students can pursue a job in the realm of academia on the basis of the research degree as it signifies vast study conducted in a specific field.

At the postgraduate level, scientific writing seems complicated to the students since they have to incorporate accurate details along with the principles from a specific discipline. On top of that, PhD students are mostly leading an unhealthy life. It is never easy for doctoral students to receive the level of support they seek from the wider community of practice. So, students are bound to be at odds with the learning environment that negatively impacts their mindset. No matter how well the student is doing, there is always a chance of them experiencing psychological anguish that eventually leads to withdrawal.[10]

10. Contributions by and approach of medical students to medical scientific writing

The number of research projects from the side of medical students have been increasing by the minute. Research has now become one of the key pillars of contemporary medical practice. These studies can help medical students to widen their knowledge. The levels that a medical student can reach with their medical scientific writing is mostly dependent on doctoral supervision. There are supervisors in the department who can play their role well in order to train the students with efficiency. In fact, supervisors can do a lot more such as, training the students effectively, emancipating and enabling the medical students to become self-governed researchers.[11]

The key selling point of modern medical practices is medical education. As such, there is a strong need for researching the teaching procedures as well as approaches taken by the supervisors. Students in medical colleges have varying expectations from each of their lectures as well as the way professors conduct them. When professors challenge the students on an intellectual level, the students are likely to favor them. In addition, students will favor the professors who are adept at explaining the lecture materials while keeping it engaging.[12]

With that said, learning about research writing is dissimilar to the conventional lectures that students listen to. Research process differs from learning activities due to the fact that it depends on the usage of research questions as well as the development of it and hypotheses. There are other parts of conducting research too. For instance, the researcher needs to collect data to analyze them so that they may reflect on the topic. While this set of actions is unique, they contribute to the efforts of gaining new scientific knowledge. A part of the research work requires the researcher to locate scientific data before he/she starts analyzing. There is a certain degree to which students can anticipate assistance from the designated supervisor if they properly follow the process.

Supervisors are likely to inspire the students to get started on their research topic and offer priceless comments to guide them along the way whenever necessary. They are also going to help the students with analyzing and interpreting the data collected.

11. Responsibilities of a research supervisor

The quality of research work done by the students is influenced largely by the activeness of the supervisor to maintain contact with them. A medical supervisor's role is vital to help make the student's medical paper what it is.

When students have the opportunity to maintain contact with their supervisor, they will be able to produce quality dissertations or theses while also improving their quality of educational experience.

Any good supervisor is willing to help the students at any given stage of the research project. It can range from developing the research concept to developing the methodology. If the students need it, they can ask the supervisor for help regarding the discussion of findings. More importantly, as per the duties of a supervisor, they should make sure that a student's research work is in compliance with the necessities of the department and the university as well.

Students may not have a lot of ideas about which topic to choose to work on. The supervisor can help students with selecting a topic and managing it. When the students are done working on their research topic, they send it to the supervisor for feedback. Any good supervisor is going to go through the research work in a thorough manner so that they can provide feedback and point out any change if necessary. Even if the supervisor takes a leave of absence for a certain period of time, they make sure to supervise the students in some capacity.

Supervisors are also known to help their students to have a proper idea about the program criteria and the necessity of following the deadline. In addition, they are also available to help the students to make the revisions and also to comply with the rules set by the department.

12. Discussion

There are many books available that define the ways of doing supervision and concentrating on writing the medical article.[13] In each of the books, the role of supervisors is discussed as a non-judgmental figure who provides necessary advice. Through it all, one point becomes clear and that is: supervisors are tasked with leading and managing projects in its entirety instead of looking over certain parts of the project to help students out.

The role of a supervisor also entails the systematic monitoring of a student's purchase of research tools. In addition, they need to remind students about the importance of completing the research work on time while also motivating the students to gather the right kind of information which helps to finish their research.

As for the medical students facing a difficulty due to language as well as graduate students, the necessity to observe work timeliness is reduced. On the other hand, the necessity of seeking scientific assistance keeps growing. The students having troubles with dual language are going to be needing systematic feedback. It is the job of their supervisors to provide the feedback. When the students receive systematic feedback, they are able to deliver proper work. Moreover, they can fix any mistake that might previously occurred on the research manuscript.

13. The role of a supervisor

According to Wisker, there are many important statistics that were found by creating a highlight and also dividing the medical supervisor's responsibilities into three stages.[14] In the first stage, the main responsibility of the medical supervisor is to help the students how to make proposals. When the supervisor is done with teaching the students about making proposals, they will ask the students to develop a proposal.

In the second stage, the supervisor has to monitor as well as maintain the ongoing work of students. There is a set of activities that take part in the third stage. These activities are preparation of paper, improving self-esteem and to build confidence in the students. It will lead the students to achieve an improved state of thinking and all of it is made possible during stage 3.

When Wisker asked students about their thought process regarding the role of supervisors in the research paper, many things were brought to light. Students held the belief that the duty of selecting the research topic was primarily the duty of the medical supervisor instead of the students themselves. In addition, students opined that they believe the relationship of the supervisors with their students has to be professional. Except for these aspects, they considered other parts of conducting the research were parts of the student's responsibility.

Wisker conducted yet another study and his colleagues argued with him while exploring the necessities of emotional intelligence. It is important to adapt with changing times. In addition, the medical supervisor has to maintain contact with his/her students for the period so that the students' endeavors become fruitful. Problems are bound to arise when there is poor emotional intelligence from the part of the supervisor. If the student has to rely on the supervisor at any stage to complete the manuscript but does not receive proper guidance from the supervisor at that given moment, the end result will be a poor research paper.

14. Communication is the key

Whether the field is scientific or non-scientific, a supervisor has to ensure proper communication with the students. When the supervisors lead the discussions regarding the supervision procedure, it allows students to understand the entire process thoroughly. As a result, the final paper they produce is going to be in line with the structure set by the department.

According to Vilkinas, a high number of supervisors were available to help the PhD students on an academic as well as emotional and structural level (15). A number of academics have also considered the students as colleagues when they

assessed the research during the supervision procedure for the PhD students' thesis preparation. According to the supervisors, they enjoyed the process most when they witnessed the students have growth and develop into a professional capable of performing the research with them as colleagues. As such, it can be said that, supervisors value the capacity of students to conduct research and execute it properly.

15. Conclusion

On the basis of the 25 years of experience I have gathered while working with Japanese graduate students, I firmly believe that supervisors and their students have contrasting views regarding their roles and responsibilities in conducting and writing the research paper. In the case of Japan, it is vital to have an individual who can not only provide research supervision but also have English fluency that can help to publish research work.

With regards to cases like these, it is possible to overview and manage the English language manuscripts of graduate students in Japan and to provide assistance at all the levels starting with the conception of the research topic to the development of methodology and discussion of findings to the presentation and potential publishing of dissertations.

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Conference proceedings

良い論文を日本から発表するために：メディカルライターにできること

Publishing good research papers from Japan: What can medical writers do?

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Abstract

In order to publish good research papers from Japan, it is necessary to conduct good (i.e., meaningful) research, obtain good (i.e., meaningful) results, and write good manuscripts that convey the significance of research. In particular, when aiming for publication in an English medical journal, the manuscript should be written in correct and accurate English, which is a major challenge for authors who are non-native speakers of English, such as those from Japan. At the same time, to ensure that the manuscript is a "good paper," attention should also be paid to elements other than language. To write a paper that will be accepted by reliable medical journals, including top-ranked ones, the content should be appropriately written according to the requirements based on international standards, such as the reporting guidelines endorsed by the EQUATOR Network and the recommendations of the International Committee of Medical Journal Editors; this is a common challenge not only for Japanese authors but for authors around the world. Medical writers are professionals who improve the quality of manuscripts and facilitate the publication of research. Based on my own expertise and experience as a medical writer for 20 years in supporting clinical research, I would like to describe the steps I think should be followed to produce good manuscripts. I would also like to focus on the importance of education and of collaboration with professionals in writing and publishing research papers.

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Keywords medical writing, scientific writing, publication, education

1. はじめに

1.1　メディカルライターの立場から

メディカルライターは医学・薬学をはじめとする健康情報の文書を作成する専門職である。メディカルライターの活動の場は広く，医学論文の執筆・公表，製薬企業等で承認申請資料などを作成するレギュラトリー・サイエンス，医療系の記事を発信するメディアなど多岐にわたる。筆者の場合は，臨床研究に関するさまざまな文書を作成するメディカルライターであり，スタットコム株式会社での勤務を中心に 20 年近い実績がある。スタットコムは，生物統計家の故 大橋靖雄先生により臨床研究の統計解析とメディカルライティングを受託する企業として 2004 年に設立され，[1] 設立当初からアカデミアによる研究と企業による研究の両方を支援している。筆者は，医学論文のライティングから投稿，査読対応，採択を経て公表されるまでのプロセス全体に関わる業務をはじめ，研究実施計画書，学会発表資料，各種報告書などのライティングに携わってきた。特に医学論文では，執筆・投稿の要件を満たすためのコンサルテーションや，原稿の論理構成を構築する段階からのライティングに関与することが多い。2014 年からは京都大学の非常勤講師を兼任し，論文や報告書の書き方を指導している。

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本論文は，第 24 回日本医学英語教育学会学術集会（2021 年 7 月 17・18 日，オンライン開催）における口頭発表を一部改変したものである。

自身の役割を一言でまとめると，論文ライティングの専門家[2]であり，研究活動を支援するパートナーといえる。

このようなメディカルライターの立場から，2021年7月の本講演では日本から良い論文を発表するために必要と考える事項を示すとともに，シンポジウム「英語論文作成の分業化：多職種連携の現状」のディスカッションを通して論文執筆・公表に関する教育や専門家との連携の意義を考える機会となった。本稿執筆に際しては，論文を含むメディカルライティングの教育機会について加筆することとした。国内の教育では，2021年から筆者が評議員を務めている特定非営利活動法人 日本メディカルライター協会（Japan Medical and Scientific Communicators Association, JMCA）[3]を紹介する。

1.2　良い論文を発表するには？

論文を発表するには，研究を行い，結果が出て，論文を書くことが必要だが，「良い論文を発表するには？」となると，良い研究を行い，良い結果が出て，良い論文を書くことが必要と考える（**図1**）。この3段階のどこかが良くない場合，良い論文を発表するのは難しいように思う。研究計画書やその実施に不備があるなど研究が良くない場合，その欠点を覆す良い論文にはならないし，良くない結果から良い論文にするのも難しい。ここで，良い研究というのは「意味のある研究」，良い結果というのは「意味のある結果」と言い換えることができると考える。意味のある研究にするには，重要なリサーチクエスチョンに対して，科学的・倫理的な研究計画に従って研究を実施しなければならない。意味のある結果として，研究の仮説を支持するデータはその一つといえるが，予想に反するデータや否定的な結果（negative results）から重要な意味を見出せる場合もある。そして，最後の「良い論文を書く」というのは，研究および結果の意味が読者に伝わるような“良い論文”を書くことであると考えており，ここに論文ライティングの重要性がある。研究活動は，研究を実施して得られた結果を公表するところまでを含むことから，良い論文を書くための論文ライティングは研究者に必要な技能の一つである。

次に，良い論文に必要な要素を考えてみた（**図2**）。ヘルスサイエンスの観点からは，良い論文というと医学，医療を進歩させるような意義のある研究成果の論文が思い浮かぶ。一方，ライティングの観点からは，良い論文とは書き方が優れた論文ともいえる。書き方が優れた論文が備えるべき要素としてまず挙げられるのは，文章そのものの正確さ，つまり「論文として正しい言語で書かれていること」であり，文法に誤りがない，用語や表現が適切である，明確な文章である，などが含まれる。英文誌への掲載を目指す場合，投稿する論文が正確な英語で書かれていることが必須である。ここに英語が母語でない日本人の著者にとっての言語による障壁が存在する。この障壁を乗り越えるためには，医学英語の教育や専門家との連携が欠かせない。もう一つの要素として，「論文として必要な内容が適切な形で書かれていること」を挙げたい。こちらは，日本人だけでなく世界中の全ての著者にある障壁である。英語が母語の研究者であっても最初から容易に論文を執筆できるとは限らず，論文を書くための知識とスキルを要する。この障壁を乗り越えるためには，論文に求められる国際標準の規定，形式，作法の理解と実践が必要であり，これはメディカルライティングの基本である。

2. 国際標準の規定，形式，作法の理解と実践

2.1　論理的なコミュニケーションとパラグラフ・ライティング

国際標準の規定，形式，作法を理解して実践するにあたり，1つ目の要点として，論理的なコミュニケーションとパラグラフ・ライティングの重要性を確認したい（**図3**）。論文で

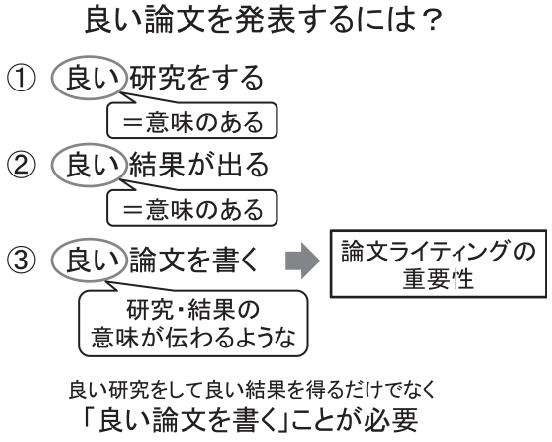

図1．良い論文を発表するには？

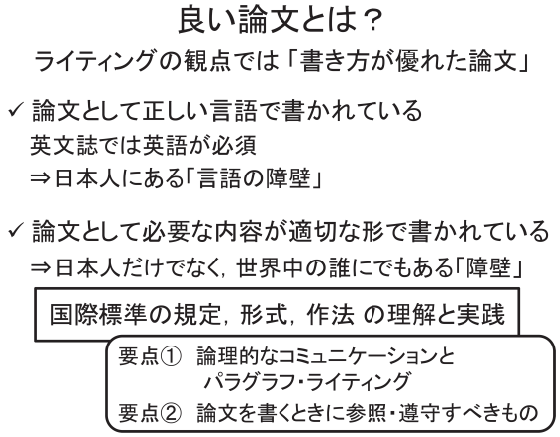

図2．書き方が優れた論文に必要な要素

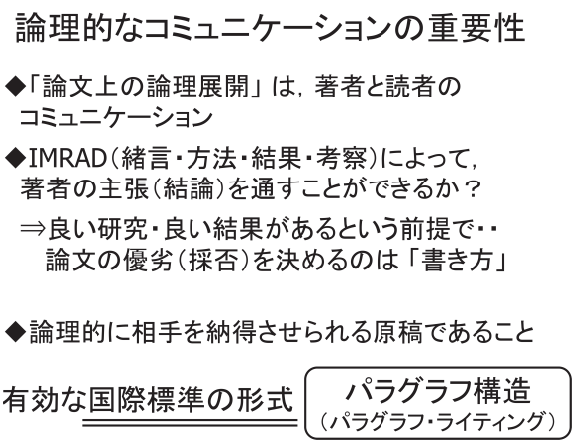

図 3. 論理的なコミュニケーションの重要性

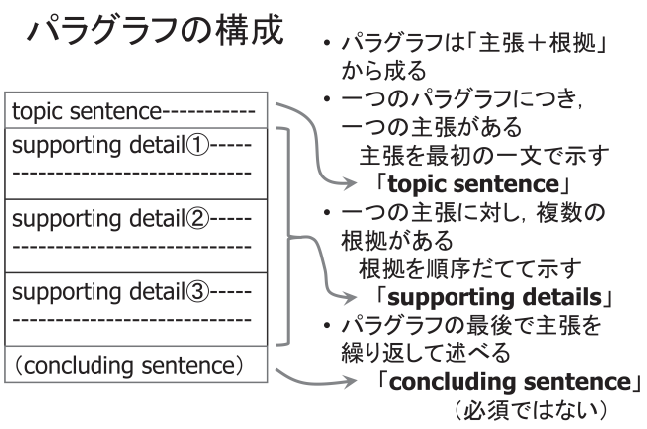

図 4. パラグラフの構成

は，繰り広げられる論理展開によって原稿を介した著者と読者とのコミュニケーションが行われる。その読者は誰かというと，論文が投稿された段階では雑誌の編集者，査読される場合は数名の査読者，公表されると実際に論文を入手して読む読者であり，そのうち編集者と査読者は論文の採否に関与する。論文ライティングでは，基本構成であるIMRAD（introduction［緒言］，methods［方法］，results［結果］，and discussion［考察］）によって，著者の主張である conclusion（結論）をいかに説得力をもって通すことができるかが一つの鍵となり，読者を論理的に納得させられる原稿が求められる。このことから，前項で述べたように良い（意味のある）研究，良い（意味のある）結果があるという前提で，それらが記載された論文としての優劣，つまり投稿先の採否の判断には書き方の質が関わってくる。これは単に言語（英語論文では英語）としての質にとどまらないため，英文作成スキルの向上や英語が母語の担当者による校正（いわゆる“ネイティブチェック”）では改善できないことも多い。

それでは，読者を論理的に納得させられる原稿を書くにはどうすればよいのか？　そのために有効な国際標準の形式として，パラグラフ構造の大切さを強調したい。パラグラフは，topic sentence と concluding sentence の間に複数の根拠（supporting details）が論理的な順序で並べられたものである（**図 4**）。そして，個々のパラグラフが論理的な順序で並べられることで文書全体の論理構成が提示される。パラグラフ構造は単なる形式というだけでなく思考の整理法であり，伝える内容を論理的に表現する枠組みである。論文では，論理構成が重要となる緒言と考察を中心に，パラグラフ構造を踏まえて執筆することが有効である。反対に，論文上の論理構成が不明であれば，校正や査読の段階で適切なパラグラフに直すのは困難である。

パラグラフは，その外観は日本語の段落と似ているが概念は異なる。日本人の著者は，従来からの「国語」で学んだ段落による文章構成法とは別に，パラグラフ構造によるライティング（パラグラフ・ライティング）を身に付ける必要がある。欧米では，パラグラフ構造は医学だけでなくあらゆるライティングやリーディングの基本であり，パラグラフ・ライティングは義務教育や一般教養のような機会に学ぶため，科学者による論文執筆の段階でわざわざ言うまでもない前提として周知されている。一方，日本では最近までパラグラフ構造を学ぶ機会が英語の試験勉強などに限られており，世代や受けた教育によっては一度も学んでいないということが少なくない。

2.2　パラグラフ・ライティングの教育の実例

医学系の専攻でのパラグラフ・ライティングの教育の例として，毎年行っている講義の経験を紹介したい。京都大学大学院医学研究科 社会健康医学系専攻の中山健夫先生・宮崎貴久子先生による「ヘルスサイエンス研究の進め方」という 2014 年から始まった科目の中で，筆者は「論理的な文章作成法」という 90 分の講義を担当しており，パラグラフ・ライティングの基本を教えている。対象は学部卒後の進学者だけでなく医師・研究者を含む社会人学生も多く，年齢や受けてきた教育，経験，専門性などはさまざまである。講義内容は，前半にパラグラフ構造を解説し，後半は和訳された原著論文を用いてパラグラフを確認する実習を行っている。講義全体では，パラグラフ構造の特徴や重要性を認識し，自分の目で確かめることで論文上の論理構成やパラグラフの効果を実感してもらうことを目標としている。パラグラフ・ライティングの講義は他の勉強会等でも実施しており，後述する JMCA のセミナーでも開催する予定である。

受講後の主な感想を要約すると，『パラグラフについて初めて学んだが，論文を書くときに必要な内容と感じた』『パラグラフと段落は異なることが分かった（同じだと誤解していた）』というものをはじめ，過去にパラグラフを学んだ

ことがある場合も『医学論文では意識していなかった・忘れていた・分かっていたが実践できていなかった』や『一貫性をもった論理展開の重要性を再認識した』というものもある。また，実習で実際に論文を読むことで『説明だけではイメージしにくい部分まで理解できた』『論文上の論理の流れがよく分かった』や『これからも論文の読み書きに活用したい』というものも多い。このような経験から，パラグラフ・ライティングを医学系の領域で教えることや医学論文の観点から教えることの意義を感じている。

2.3 論文を書くときに参照するもの

国際標準の規定，形式，作法を理解して実践するための2つ目の要点として，論文を執筆し公表を目指す際に参照する主なものを紹介する。これらを適切に遵守することが論文ライティングに求められる技術であり，論文ライティングを担当するメディカルライターの専門性にもつながる。

（1）International Committee of Medical Journal Editors（ICMJE）recommendations：医学論文の著者が守るべき事項をまとめた「推奨」である。[4] かつては“Uniform Requirements（統一投稿規定）”と呼ばれたが，改訂を重ねる段階で2013年に改名された。ほぼ毎年改訂され，論文や出版に関わる変化に合わせて内容が更新されている。

（2）投稿を予定する雑誌の投稿規定：論文ライティングで最も重要な規定の一つである。基本姿勢はICMJE recommendationsの流れを汲むものが多いが，ライティングに関わる方針や投稿時に提出する情報など，雑誌ごとに要求が異なるため注意が必要である。原稿の形式的な事項から，方法論・統計学的事項に基づく留意点，公表倫理に関する事項まで細かく規定する雑誌もあるため，投稿規定を的確に理解して遵守するだけで豊富な知識や経験を要する場合もある。

（3）報告ガイドライン：研究のデザインや領域ごとに論文等の報告書の質向上のための推奨事項をまとめたものであり，チェックリスト，flow diagram，または構造化された文章（structured text）から成る。[5] 報告ガイドラインは医学雑誌で投稿規定に採用されていることも多く，論文を執筆する際に遵守すべきものの一つである。代表的な報告ガイドラインには，ランダム化比較試験のCONSORT（発表は1996年，2001年･2010年改訂），観察研究のSTROBE（2007年），システマティック・レビューのPRISMA（2009年発表，2020年改訂），症例報告のCARE（2013年）などがある。Enhancing the QUAlity and Transparency Of health Research（EQUATOR）Network[5] が報告ガイドラインの情報を集約しており，適切な活用を目指した啓発を続けている。

（4）スタイルマニュアル：医学領域ではAmerican Medical Association（AMA）のスタイルマニュアル[6] が代表的であり，AMAの系列雑誌に投稿する場合を中心に論文の形式的な規則を調べるのに役立つ。ただし，参考文献のVancouver styleのように異なるスタイルを採用する雑誌も多い点に注意を要する。

（5）メディカルライティングの書籍，他：論文の書き方を教える書籍は国内外で多数出版されており，中にはメディカルライターによる著書もある。[7-10] 書籍は，論文執筆に関する普遍的な内容や長年かけて培われた工夫や作法と呼べるようなものまで体系的に集約された情報源として有用である。加えて，タイムリーな情報源としてはICMJE,[4] EQUATOR[5] や後ほど紹介する論文の執筆・公表に関わる職能団体による発信などが役立つ。

2.4 日本から発表された論文の質；CONSORTによる評価の結果

古い成果であるが，日本の論文の書き方の質を評価した結果を紹介する。筆者らは2004年に研究を実施し，同年1月～3月に日本から発表されPubMedに収載されたランダム化比較試験の英語論文に対して，CONSORT（2001年版）の推奨22項目とflow diagramの記載状況を評価した。本研究は，指導教官であった中山健夫先生をはじめ，CONSORTの発表者の一人であるDavid Moher先生らとの論文[11] として公表している。**図5** に対象論文98報に対してCONSORTの各項目が記載されていた論文の割合を示した。研究の目的，介入，解析方法といった論文の基本項目はおおむね記載されていたが，CONSORTで重視される項目のうち，特にランダム化，割付，盲検化，サンプルサイズの設定方法に触れられていた論文はいずれも半数未満であった。また，CONSORTが1996年の初版から推奨するflow diagramが記載されていた論文はわずか6報であった。この研究から，2004年初頭に日本から公表されたランダム化比較試験の論文は，それ以前に発表されていたCONSORTの要求する内容が書かれていないものが多く，書き方の質の改善が必要であったことが結論づけられた。この結果は20年近く前の状況であるが，論文の書き方に関する推奨はガイドラインの発表・改訂等により更新されており，変化するルールを適切に把握して論文を書くことが求められる状況は今も変わっていない。

3. 良い論文を日本から発表するために―メディカルライターとして考えること

良い論文を日本から発表するためには，教育により論文執筆に必要な知識・スキルを研究者（著者）が身に付ける

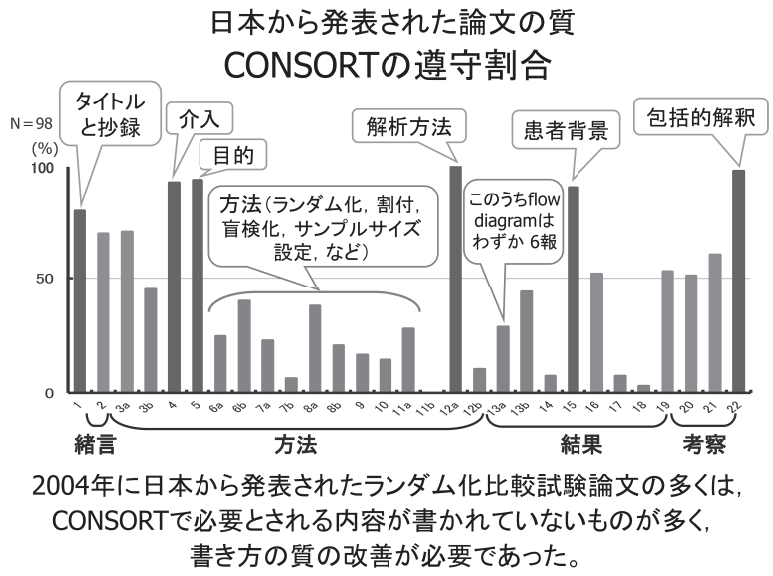

図 5. 日本から発表されたランダム化比較試験の論文の質 [11]

ことが役立つ。**図 6** は筆者が「臨床研究のメディカルライターに必要な知識とスキル」を 6 項目にまとめたもので，社内研修に長年使っている資料である。メディカルライターでなくとも必要なことは同じであるため，この図は「臨床研究の論文ライティングに必要な知識とスキル」として用いることができる。本稿ではこの中から，まず言語（英語）としての文章作成スキルについて触れ，次に論理的なコミュニケーションスキルとしてパラグラフ・ライティングとその基盤になる論理的思考の大切さを述べた。さらに，論文の執筆と公表に関する国際標準のガイドライン等を紹介した。本稿で論じていない項目として，研究領域に応じた医学・薬学の知識，疫学・統計学など研究方法論の知識，および文献の検索や批判的吟味などの情報収集・管理・評価スキルも必要であることを申し添えたい。

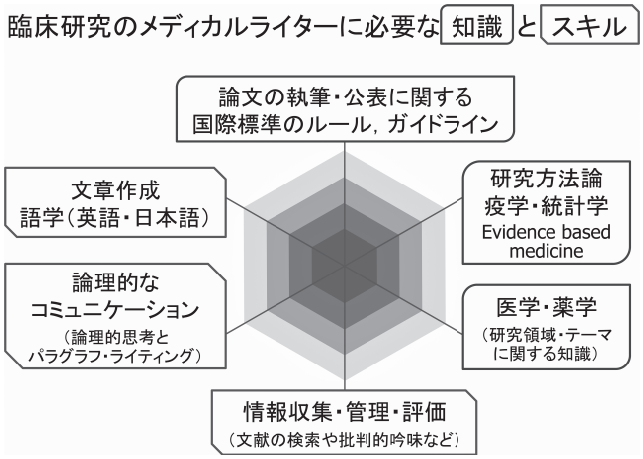

図 6. 臨床研究のメディカルライターに必要な知識とスキル

また，これらの知識・スキルに習熟したメディカルライターと連携することも，良い論文の発表を手助けする。**図 7** は臨床研究論文の執筆と公表に関係する個人および団体を表す概念図であり，メディカルライターを含む専門家が下段に位置する。論文執筆の分業化におけるメディカルライターの役割や立場は，既公表の資料を参照されたい。[2, 12-14] 日本でも，研究者がこれらの専門家と効果的に連携することで，質の高い論文の発表が促進されるのではないかと考える。

分業化には克服すべき課題もある。適切な知識・スキルを有する人材は限られており，国内外のリソースともに職能や所属先に応じて費用がかかり，高額になる場合もある。それらの制限もあり，専門職による効果的な支援が，本当に必要とされる研究に届いていない印象もある。また，期待されたスケジュールや役割とのミスマッチにより，ライティングの専門性を十分に発揮できなかった経験もある。メディカルライターの関与する論文公表では，企業がスポンサーとなる研究に偏る傾向や，貢献内容の開示不足なども指摘されている。[15, 16]

最後に，論文の書き方に対する査読者の評価について紹介したい。論文の査読結果に，“This is a well written paper” “The study methods and results are well described” “The manuscript is well written and clearly presented” といったコメントがあった場合，これらは書き方に対する称賛であり，研究そのものや得られた結果に対する称賛とは区別できることに注目したい。実際に，論文の書き方が評価された場合，例えば The New England Journal of Medicine のような超一流誌からであってもこのようなコメントを受け取ることは可能である。評価を得るためには論文として正しい言語で書かれていることが欠かせず，英語による文章力も重要である。同時に，「論文として必要な内容が適切な形で書かれている」という要求を満たしていなければ，

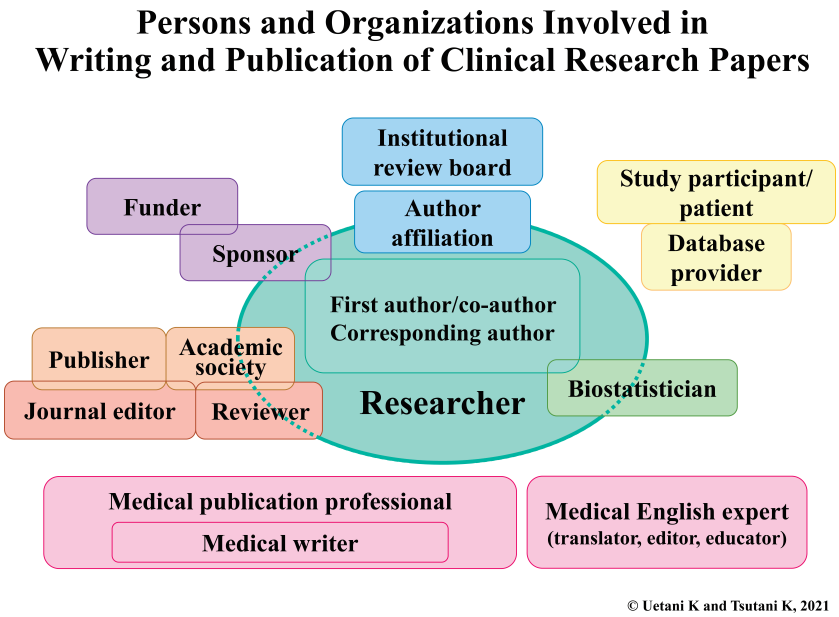

図 7．論文の執筆～公表の関係者（臨床研究の場合）

論文の書き方に精通した査読者から高い評価を得るのは難しい。このため，書き方の質の向上に貢献する立場として論文ライティングを担当するメディカルライターの責任は重く，知識の更新やスキルの研鑽を続けることが不可欠である。

4. メディカルライティングの教育機会

以上が講演に基づく内容である。本項では論文を含むメディカルライティングの教育について補足し，国内外の主な機会を紹介する。

4.1 欧米の教育機会

EQUATOR[5] は，その中心的メンバーである Douglas Altman 先生，メディカルライターの Elizabeth Wager 先生，統計家の Gary Collins 先生などを講師陣に迎え，2015 年に英国オックスフォードで 5 日間の第 1 回 EQUATOR publication school を開講した。[17,18] 論文ライティングを中心に，報告ガイドラインの使い方や統計学的な留意点，公表倫理などから構成された実践的なプログラムである。毎年，現地開催されていたが，Altman 先生のご逝去，Wager 先生のリタイアなどがあり，現在は Collins 先生を中心に若干短縮したプログラムを開催している（オンライン開催あり）。David Moher 先生の在籍するカナダなど EQUATOR の他の拠点のプログラムもある。[5]

American Medical Writers Association（AMWA）[19] は，米国で 1940 年に設立されたメディカルライターの職能団体であり，長年にわたり現地開催のセミナーを中心とした教育と資格認定の機会を提供してきた。近年はオンライン開催のセミナーや通信教育，computer-based testing による資格認定も行っている。論文ライティングをはじめレギュラトリー・サイエンスのライティングから一般の方向けのライティングまで幅広く，製薬企業等に勤務するメディカルライターからフリーランスのメディカルライターまでさまざまなニーズに応じたプログラムを用意している。同様に，メディカルライターの職能団体として欧州には European Medical Writers Association（EMWA） がある。[20] ライティング以外では，International Society for Medical Publication Professionals（ISMPP）[21] が医学論文の公表に関する教育を提供している。

4.2 国内の教育機会；日本メディカルライター協会（JMCA）

JMCA[3] は，健康・医療情報伝達における一般市民の啓発とメディカルライターやヘルスコミュニケーターの育成を主な目標に，2006 年 5 月に大橋靖雄先生を初代理事長として設立された（母体の任意団体は 2002 年 4 月設立）。2021 年より理事長 中山健夫先生のもと新体制で運営されている。会員はヘルスケア関連企業やアカデミアに所属する方からフリーランスのメディカルコミュニケーターまで多岐にわたる。JMCA は設立以来，時代ごとに変遷する多様なニーズに応じたメディカルコミュニケーションの教育機会を提供し続けている。その内容は，医学論文の執筆や公表だけでなく，製薬企業等から関心の高いレギュラトリー・サイエンスのコミュニケーション，ウェブや一般の方向けのコミュニケーションなど幅広い。[3] 2020 年以降，セミナーが現地開催からオンライン開催に変更されたことや，開催当日だけでなく録画による数日間の視聴可能期間が設けられたこと

で，より多くの方が受講しやすい形式となった。また，今年度からはセミナー受講によりシニア会員の認定を受けられる制度が始まっている。JMCA のウェブサイト[3]では公表に関する事例検討の情報を公開し，論文の執筆・公表に携わる方の知識の習得やスキルの向上を図っている。

5. おわりに

本稿では，良い論文を日本から発表するためにはどうすればよいか？　という問いに対して，メディカルライターの立場から考える回答を示してきた。まず，良い研究を行い，良い結果を得るだけでなく，それらの意味が伝わるような良い論文を書くことが必要である。良い論文には，正しい言語によって，必要な内容が適切な形で書かれていることが要求される。これを満たすための方策として論文ライティングの教育があり，JMCA など国内外の教育機会を紹介した。研究者が自己研鑽により論文ライティングの技術を身に付けることもできるが，適切な知識とスキルを有した専門職を活用するという方策もある。論文ライティングを専門とするメディカルライターとして，今後も日本からの論文発表に貢献できる可能性に期待したい。

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Conference proceedings

日本の論文公表の現状と課題：メディカル・パブリケーション・プロフェッショナルの視点から

The current status of and challenges facing medical publication in Japan: From the medical publication professional's perspective

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Abstract

Publication is a means of communicating one's research. The word publication is derived from the Latin, "publicare," meaning "to make public". Articles reporting clinical research/trials are used as evidence to make treatment decisions to improve patient health. Therefore, it is imperative that such publications adhere to publication ethics.

Major biomedical journals are tightening their submission rules to ensure the transparency of clinical research/trials and associated articles. Of the scientific publications covered by Medline, 95% are in English. Thus, it is essential to comply with the ever-changing international standards for publication, including clinical trial disclosures.

When preparing to submit a medical research manuscript, the authors encounter various practical issues requiring ethically correct decisions and timely responses. Therefore, pharmaceutical companies assign a person with expertise in ethics, publication management and planning to ensure ethical practice. Some hire medical writers to assist authors. However, although publication is vital in academia, as represented by the words "Publish or perish", manuscript preparation is often left to individual busy researchers without sufficient support. Employing publication specialists could be an option to increase the number of clinical research papers in English by Japanese researchers while ensuring adherence to publication ethics. However, comprehensive ethical training and resource allocation are prerequisites for creating an environment conducive to success in academia.

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Keywords publication ethics, publication specialists, outsourcing, academia

1. はじめに

本シンポジウムのテーマである「英語論文作成の分業化」とはアカデミアにおける公表作成時のアウトソーシングの活用の是非，あるいは可能性についての議論に他ならない。すでに大手の製薬企業では，専門性を軸に効果・効率性を求め業務を進める手段であるアウトソーシングを一部の論文や学会発表作成過程でおいて取り入れ，国際的に実施している。しかし，そこには公表倫理に関するさまざまな問題とその解決を経て出来上がった組織体制を含め実施できる仕組みづくりがある。したがって，アウトソーシングという形態をアカデミアで実装するにはさまざまな条件を整える必要がある。

医薬品の開発や医療に関する研究は一般商品のそれらとは性質が異なる。臨床研究・臨床試験を論文化するためには，執筆技術と倫理の両面の充足が必要となる。前者は投稿者である研究者の大きな関心事であり情報に触れることも多

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本論文は，第 24 回日本医学英語教育学会学術集会（2021 年 7 月 17・18 日，オンライン開催）における口頭発表を一部改変したものである。

い。そこで，前者は他に譲り，本著では，特に，医学論文作成時の倫理的側面に焦点を置き，本主題を論考する。先行の企業主導の論文作成体制を参照し，アカデミアの公表作成の現況を鑑みるとともに，今後を展望する。

また，本著でパブリケーション・プロフェッショナルとは，倫理や公表作成に関する専門知識を持ち，実践で論文作成活動に能動的に関わっている人たちを指す。[1] 公表作成に関しては企業内で公表戦略・計画を策定，著者を支援しながら公表作成の推進，管理，教育を主導する公表担当者と，コミュニケーション・エージェンシーなどでメディカルライターとして実際に著者の論文作成を補助する 2 種類がある。本著でもこれに準じて記載する。

2. 公　　表

本著では“Publication”の日本語訳として「公表」を充てる。査読のある学術誌での論文発表，および学術会議での抄録および口頭 / ポスターの発表を指す。“Disclosure”は「開示」として表した。

2.1　公表の意義

Publication とは派生語辞典によると publicacioun「公に知らせる行為」，古フランス語の publicacion，ラテン語 *publicationem*（名詞形 *publicatio*）を語源とする。[2] すなわち，どんなに優れた，またはリソースを費やした研究であったとしても，公に知らせる行為，つまり公表し世の中に伝えなければ，医科学の進歩に役立てることができない。この語源に従えば，論文化するということは，自らの疑問（Research Question）を具現化し顕在化させた研究とその結果について広く知らせ伝えることであり，著作を通じ，広く意見交換することである。

公表された論文により科学的議論が深まり，研究の発展につながる。特に臨床研究・臨床試験では EBM（evidenced based medicine）として治療における意思決定に用いられ，患者さんの健康改善に役立てられる。したがって，当該研究 / 試験，結果およびデータの解釈をどのように，またいつ伝えるかは極めて重要である。公表倫理を確保して発表することが求められる所以はこうした理由にある。各医学誌は理念やポリシーに同様の趣旨を挙げる中，“Lancet”は，その理念として「医学は社会に貢献しなければならない，知識は社会を変えなければならない，最高の科学はより良い生活につながらなければならないという考えを自らの信念とし，また，これに努めている」と言及している。[3] 臨床研究・臨床試験を論文として公表する意義はこれに集約されると考える。

2.2　公表倫理およびその実践

公表倫理の本質は，研究の質向上および公表における公明性および透明性確保を推進することにあると考える。学術誌をはじめ，ICMJE（International Committee of Medical Journal Editors, 医学雑誌編集者国際委員会）等の公表に関わるさまざまなステークホルダーからガイドラインや規範が各種出されている。しかし，DeTora らはこれらから一歩踏み込み，日常の公表活動での言行一致の重要性に触れ，活動の各プロセスでの倫理の実践に焦点を当てることを提唱している。[1] またパブリケーション・プロフェッショナルはこれらに貢献できるとも言及している。[1]

例えば ICMJE の“Recommendations”は，著者や学術誌編集者にとって最も重要なガイドラインの一つである。投稿時の注意点の他，著者要件が規定されており，約 5,500 の学術誌が本ガイドライン遵守を支持している。しかし，研究や手元のデータを論文公表しようとする場合，実際には作成や投稿に関し，その扱いにさまざまな疑問や問題に遭遇し，コンプライアンス遵守の為の正しい判断と適時の対応が必要となる。その解決の一助となるのが，COPE（committee on publication Ethics）や“Good Publication Practice（GPP）Guidelines for Company-Sponsored Biomedical Research: 2022 Update”[4] である。前者は「査読誌の編集者・出版者から構成されており，発表倫理についての 意見交換をすることを目的とした団体（日本医学会医学雑誌編集ガイドラインによる説明 [5]）」であり，後者　は The International Society for Medical Publication Professionals（ISMPP）が主宰し，作成されたものである。

2.3　英語での公表

言語に関わらず論文を「書く」ことに求められる技術，例えば簡潔明瞭な記載による明確な論理展開は同じである。また，Hick らが指摘するように，研究を伝える手段としての論文上の言語は目的によるべきである。[6] しかし，Medline が網羅する公表は，95% が英語での発表であり，その割合は増加しつつある。[7] すなわち，英語での公表は地球規模での意見交換を可能とし，公表の意義を一層強化することになる。

しかし一方で，このことは自らの研究と著作内容について国籍に関係なく評価を受けることでもある。学術誌の査読対応に始まり，公表後も世界中の研究者からの“Comments”や“Letters to the editor”を受けることもある。これらが論文疑義の調査のきっかけとなる場合もある。公表の向こうには世界中の読者がいるということであり，研究の内容もそれを体現する公表も世界基準で判断される。

3. 現　　況

3.1 環　　境

“Publication ethics always seems to be somebody else’s problem. 公表倫理はいつも他人事のようである。” Wager の著にある言葉である。[8] 多くの人が公表倫理は遵守されていると思っている。ところが，実際には日本では世界最大数の論文捏造があり［1993 ～ 2011 年に 178 報 / 調査対象 212 報が捏造（128 報は無作為二重盲検試験）］[9]，2012 年にはバルサルタンや STAP 細胞の論文不正事件が起きている。米国でも製薬企業とアカデミアが関係する恣意的な論文等の問題が 1980 年代から起こっていた。

対処として，日本では研究の公明性確保や不正行為抑止に焦点がおかれた。2014 年，「研究活動における不正行為への対応等に関するガイドライン（文部科学大臣決定）」が出された。また，同年「日本学術会議 科学研究における健全性の向上に関する検討委員会 研究健全性問題検討分科会」が設定され，報告書が出されている。[10] さらに 2015 年に「人を対象とする医学系研究に関する倫理指針ガイダンス」は，試験登録の義務付けと可能な限りの公表を規定し，[11] ヘルシンキ宣言（2013 年版，35，36 条）と同等の内容となっている。

一方，米国では対策としてさまざまな法的機能整備や公表ガイドラインが強化され，研究者はシステマティックレビュー等で公表バイアスを指摘した。[12, 13] 注目すべきは，本邦に論文疑惑問題が起こった頃には，欧米ではその関心はデータの開示，すなわち「透明性の強化」に移っていたことであり，特に 2013 年頃から速いテンポでさまざまな改革が起こった。例えば，2013 年 3 月のヘルシンキ宣言改訂，2014 年 8 月の ICMJE の著者要件の厳格化，さらに 2016 年 1 月には，同委員会がメンバー誌に 2018 年 7 月 1 日以降の臨床試験結果を報告する投稿に際し要請した Data Sharing Statement（2018 年義務化）などがあり，これらは投稿規定に反映された。加えて，2014 年 1 月には米国研究製薬工業協会および欧州製薬団体連合会が「責任ある臨床試験データ共有の原則」を発効し，臨床試験や患者レベルのデータの開示や，試験へ参加した患者との結果共有の動きも始動した。このように透明性が強化されながら今に至っており，医師の臨床研究や公表作成に影響している。

3.2 公表原稿作成

3.2.1 企業での作成

査読誌での公表は製薬企業にとっても重要な活動である。グローバル化した内資製薬企業では，外資系企業と同じく，最も厳しい倫理基準に対応し活動している。公表活動へのアウトソーシングの活用は製品のライフサイクルや試験内容に依る。Publication Policy を制定後，それを実装する SOP（standard operating procedures, 標準作業手順書）を設定し，マニュアルやチェックリストも用いながら公表作成を行っているが，その最初の一歩は教育である。

各公表は医薬品の価値最大化を目指すメディカル戦略を基に，公表計画を策定し，実施される。このときハブとなってチームをまとめていくのが公表担当者である。本邦においては，その多くが ISMPP が設定する国際的資格 Certified Medical Publication Professional™（CMPP™）を持っているか，日本メディカルライター協会の会員である。

掲載までの各プロセスは専用のアプリケーションを用いグローバルに IT 管理される。原稿レビューをはじめ，全ては記録で可視化され，監査も入る。

以上の進め方は，企業により多少の違いがあるものの，おおむね世界共通と言えよう。また，ISMPP CMPP も然りである。世界共通の試験を受け資格者となるが，日本のそれは 46 人であり，US，UK に続き，世界で 3 番目に多い（2022 年 3 月，26 カ国から 1,580 名）。メディカルライター協会は米国，EU および日本にあり，欧米では研修受講による certificate を発行している。

3.2.2 アカデミアでの公表作成

3.2.2.1 医師の状況

企業と異なり，医師主導研究等の医師の論文作成は医師の主体性に委ねられている。それ故，執筆は質的にも量的にも時間を要する作業であるにもかかわらず，各医師は長い労働時間から限られた時間を充てて進めることになる。研究プロトコールの設計から結果を論文として公表するまで，互いに多忙な研究者間で進める状況にある。特に COVID-19 下では医療者の過重労働や心労はさらに増した状況にあったことは内外で多く報告されている。[14]

医師の長時間労働問題の背景には，医療の需給の不均衡や，日本の医療制度の特性，ならびに老齢化偏向の人口動態問題等がある。状況改善のため，医療法が改正され，2024 年 4 月発効となる。公開されているさまざまな実態調査結果のうち，懸念されるのは，医師の勤務時間は短くなりつつあるが診療時間は長くなり，その割合が増え，診療以外の時間が短縮する傾向にあるという報告である。[15] このことは研究や論文作成の時間の確保に影響しかねないことを意味する。しかも医師の診療外時間がすべてに研究に費やせるわけではない。原稿作成上，日本の医師は英語というハンディもある上に，池上によると「医師には権限はあるが管理責任はない体制にある欧米と異なる病院管理運営

下にあり，医療安全や情報など病院の管理業務にも責任者として携わっており」,[16] 一層多忙となる。

3.2.2.2 論文数

文部科学省資料によると世界的に見て日本の論文数の伸びが鈍化している中，臨床医学論文は論文関与度（論文を生み出すプロセスにどれだけ関与したか）および貢献度（論文 1 件に対しどれだけ貢献をしたか）ともに増加している。[17] しかし，世界から日本を見ると，例えば米国の著者の臨床論文共著相手国で日本は，2007 ～ 2009 年時は 5 番目，増加率 7.7% であったが，2017 ～ 2019 年には 10 番目，増加率は 6.6% であった。一方，日本の著者のそれは米国が両時期ともに 1 位を占めたが，2019 年の増加率は微増で 56.5% であった。同著は「主要国の共著相手における日本の存在感は低下傾向にある」と報告している。[17]

4. 考察：今後に向けて

公表作成は研究の最後の重要なプロセスであるが，その作業環境にアカデミアと企業で大きく異なる。その違いはパブリケーション・プロフェッショナルを中心とした分業を支える体制・インフラの有無にある。しかし，現況を鑑みると，アカデミアでそのリソースを「分業」に求め，実装し成果を上げるには，事前の教育または啓発とリソースの確保が必須となろう。

4.1 分業 / アウトソーシング実装の成功要因

4.1.1 研修の実施

アカデミアにおいて，アウトソーシング導入に万全を期すため，事前準備として 3 時間程度の研修を実施し開始することが薦められる。ルールの解説だけでなく，背景も加え，研修を総合的にかつ継続的に行うことがより効果的である。公表や開示に関する要件は進化し続けており，新ルールが投稿時の要件となる場合もある。さらに，公表倫理では役割と責任の明確化が基本にあり，透明性の観点から，遵守の徹底には書面に残すなどさまざまな手続きと書類が必要になる。しかし，受け止め方には文化的違いもある。研修の実施により，互いへの間違った期待や不均衡な負担が起こる事態を避けることができ，アウトソーシングの円滑な実践につながり，引いては生産性向上に貢献すると期待できる。

また，研修時には公表アウトソーシングの長所短所についてもしっかり伝えるべきである。外注先のメディカルライターは，書くことの専門家であるが，領域の専門家ではなく，その研究領域の理解や知識に差があることは否めない。研究に真の思い入れがあるのは研究者である。打ち合わせを行っても，期待と異なることもある。辛抱強くやり取りが必要な場合もあることを予め認識しておくことが肝要である。

補足すると，メディカルライターを使用して公表を作成した場合，必ず謝辞に挙げ，誰が費用を負担し，ライターがどう貢献したかを明確に記載する必要がある。また，メディカルライターは当該研究に直接関わらない限り，著者にはなれない上に，費用を支払っている為，利益相反を起こすことにもなる。執筆にあたり支援を受けているので貢献者として適切に謝辞に記載する。[4]

4.1.2 大学教育カリキュラムへの導入

日本の学生や研究者は公表倫理について見聞きする機会が多くはないと言えよう。シラバスを見ると，大学での英語力育成授業は，「英語での患者とのやり取り」，「読解力や作文力」，「発表」に焦点が置かれ，「公表倫理」についての授業はほとんどない。書籍についても，受理される論文を書く技術，あるいは症例数設定や検定法を解説した生物統計解析関連のものが主流を占める。

共著者がいながら 1993 年から 2011 年まで 19 年間捏造論文を発表し続けた藤井論文事件や 2012 年のバルサルタン事件の背景に，このようにこれまで公表倫理についての教育機会の設定があまりなかったことも少なからず起因していると推察される。

公表倫理への関心は一般に低い。特にアカデミアでは慣行により処理されている可能性がある。 Good Publication Practice は未だ市民権を得ていない。研究者は “Publish or Perish” の世界におり，発表の “多さ “と “早さ “に関心が行く。[18, 19]

バルサルタン事件後の日本学術会議 「科学研究における健全性の向上に関する検討委員会」議事録（2015 年）に次の記述がある。「著者要件を満たさずとも，研究設備や施設の提供，資金提供，周知の理論の教示や示唆・助言をしただけのものを著者に加えることが分野によっては慣行として行われてきた。日本では「謝辞（Acknowledgement）」が形式的なものと考えられがちであったためである。今後は欧米のように謝辞での言及に大きな意味を認めて，当該研究成果に責任を持つ著者と謝辞に記載されるものを分けることが求められる」。[10]

組織に人員の新陳代謝がないと物事が「慣行」として，疑いを持つことなく処理される傾向となりかねない。一般的に，日本は単一民族であり表立った争いを好まない傾向にあると言われ，以心伝心の文化でもある。事細かに記載している契約書にも海外との違いを見て取れる。また組織文化や組織構造もある。ヒエラルキーとなる医局制度によ

る密接かつ恒久的関係がある。[16] しかし，組織に入る前，つまり大学において，公表コンプライアンスを教育カリキュラムに組み込むことで，確実に学ぶ機会が誕生し素地ができる。学生のこれからの長い将来に向け，有効なリスクヘッジにもなる。学会のセッションや CME（生涯教育）への取り入れも有用である。

折しも，文科省から，2022 年 5 月 9 日付で，「研究活動における不正行為等の防止の徹底について（通知）」が出されている。現行ガイドライン施行後のオーサーシップや二重投稿等の不適切な行為についての調査（2015 年 4 月～2022 年 3 月）に基づいたものである。

公表に限らないことではあるが，コンプライアンス研修実施の意義は，各自の意識を育てる事であり，疑問を持つことである。啓発されていなければアンテナは作動しない。

例えば，米国では「サイエンスと利益追求の切り離しは絶対」の条件である。本著で“Publication”を「公表」とした理由はこの背景にある。「出版」には 「販売」という商業的ニュアンスが入ると考える。「広辞苑第 6 版　新村出　編」では,「出版」を「文書･図書を印刷してこれを発売･領布すること」と記載されており，「公表」は「表向きにすること。世間に発表すること」とある論文は著作物であるが，著者は投稿を販売目的とはしてはいない。出版と訳せばそれは，Publishing との英訳になる。本の出版と医学誌の刊行は，金銭的要素に加え，その目的，出版社や編集者の関与などさまざまな点で異なると考える。

4.1.3　リソースの配分

公表をアウトソーシングするには，結構な費用が掛かる。日本の価格は欧米のそれに比べて低いが，それでも相当な金額である。公的機関にはなおさらである。したがって事前の予算取りが必要である。しかし，公表作成にアウトソーシングを使うという業務運営上の慣習がほとんどなく，また，年度で区切られる場合には，助成金の期間は研究成果を確認し公表を完了するまでに至らないこともある。オープンアクセス（OA：open access）誌掲載も増えている。Elsevier の公開資料によると　2019 ～ 2021 年で同社の OA 誌の伸びは年平均成長率（CAGR：compound annual growth rate）で 56% であるという。より多くの人に読んでもらうにはよい選択肢であり，無料で入手できる利用者側の恩恵が大きいが，著者側に費用の用意が要る。科研費は学会誌投稿も OA 化のための投稿料・掲載料は直接経費から支出可能である。また，医学誌はマルチメディアを採用しつつある。公表時にこれを選択するとさらに費用が掛かる。研究計画時から，投稿を視野に入れ，タイムラインや費用をプロジェクトに組み込んで進めることが重要である。しかし原資調達の課題は残る。研修用の人的リソースも必要となる。

4.2　身近な改善

次の事柄はさまざまな臨床研究者とともに進める企業主導試験の論文化の際によく経験する事柄からの学びである。論文作成の分業化の実現の如何に関わらず，まずは身近にできることとして，アカデミアにおいても改善に向けられると考える。

1. 著者選択：ICMJE や多くのガイドラインは著者の責任について力点を置いているが，現実には先述のように慣行に流れやすい部分でもある。研究には多くの人が関わるが，全員を著者にはできない。著者要件を満たすことが基本である。解決には継続的教育の実施はもちろんのこと，研究計画策定時等の早期に公表戦略や計画の中で考えることが有用である。
2. 公表計画：公表は研究の過程の最終段階にある。その研究の概略を考える段階から，公表の計画は，遅くとも研究プロトコール完成までに策定するとよい。公表について前もって考えることで，よりよいプロトコール作成にもつながる。どのようなデータを集め，最終的にどのように論文上に示していくか，つまりはデータの構成要素や優先順位を総合的に考えることが可能となる。データ収集を複雑にすればするほど，研究・試験としても実施し難く，まとめ方も難しくなる。また，試験の透明性を担保するため，インパクトファクターの高い医学誌は臨床試験を報告する論文について，公表時に WHO の International Clinical Trials Registry Platform（ICTRP）への試験登録識別番号だけでなく，プロトコールや解析計画などを補足資料として公開する場合もある。また，ICMJE が要求する Data Sharing Statement に加え，Patient Empowerment（患者力）の動きを考えると，臨床研究・臨床試験の透明化に伴う情報開示はこの先も後退するとは考え難い。また，今後は臨床試験に患者が定期的に医療機関に来院せずに臨床試験を行う分散化（Decentralized）方式も取り入れられていくであろう。眼前の試験の実施に目が行きやすいが，早くに公表計画を策定することでさまざまな視点の研究と論文化が可能となる。
3. 利益相反（conflict of interest：COI）の開示：COI の理解が不十分と見受けられる場合がある。COI の定義としては，米国医学研究所（Institute of Medicine）が提示している次の定義がわかりやすい。“Conflicts of interest are defined as circumstances that create a risk that professional judgments or actions regarding

a primary interest will be unduly influenced by a secondary interest."[20] 同定義を参考に，日本医学教育学会は，「医療専門職教育における利益相反についての考え方」の中で「利益相反とは，主要な利益（primary interest）に関する専門職としての動機・判断・行為が，副次的な利益（secondary interest）によって不当に影響を受ける可能性が発生する一連の状況」と記載している。[21] また，一般に日本を含めてアジアの医師は，COI を開示したがらない傾向にあるが，COI は研究者の自己申告に委ねられ，バイアスがかっているかの判断は読者にある。よって公表後に問題となる事態を避けるためにも COI は公明性を以て開示することが適切である。

6. おわりに

「分業」は「生産の過程を分割し，分担した工程を専門的に作業する労働形態」（大辞林　第 3 版　松村明　2006 年）である。公表物作成という知的生産において，それぞれに専門知識を持つ。責任には最終的な責任と説明する責務を負う説明責任と，課された任務を実行する実行責任があり，関与者各自が役割と実行責任を果し相乗効果が生まれる。しかし，究極的には著者が著者としての説明責任を果たすことでこのサイクルは成り立つ。

患者さんの Unmet Needs を真に理解しているのは，臨床を担当する医師である。日常診療からのリサーチクエッションに対して行った研究を論文で報告し，意見を述べ，著者と読者がともに議論することで，研究は発展し深くなる。論文が時宜を得て公表されることで研究が加速され，実臨床に役立てられる日が早まる可能性も高まる。よって，論文公表の社会的意義と医師の貢献，ならびに日本の論文作成の状況を鑑みると，新たにアウトソーシングという仕組みを試験的にも試してみる価値はあると考える。

論文作成は時間が掛かる。良い論文とするためにさまざまな関係者のレビューが要り，掲載までには人手がかかる。分業は多忙な状況にある臨床研究者を論文作成において助ける仕組みとなり得るかもしれない。リソースを確保し，分業のパイロット的導入が質を伴う論文数増加の一手であり，一歩前に踏み出すことになり得る。

以上，本著で述べた意見は個人的見解を示すものであり，以前および現在の雇用者あるいは所属する団体の意見・意向を反映または主張するものではない。

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Presidential talk

COVID-19 fundamentals: What determines how it spreads?

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Abstract

This article is a transcript of the presidential talk given at the 25th JASMEE meeting held in July 2022 at Nihon Kyouiku Kaikan, Hitotsubashi, Tokyo. Several aspects of COVID-19 that I did not mention at the meeting have been added to this article to help readers better comprehend the essentials of the coronaviruses and effective prevention measures. I hope this will help alleviate the stress caused by this long-lasting infection that has hindered the lives of so many.

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1. Pandemic

In December 2019, a novel coronavirus suddenly emerged out of Wuhan, China, which contrary to our expectations brought about immense challenges on a global scale. Humanity was now faced with a severe acute respiratory syndrome (SARS) known worldwide as COVID-19 (coronavirus-induced disease 2019).

This ominous event immediately reminded the WHO and experts around the world working on infectious diseases (health care providers, epidemiologists, virologists, public health officers, etc.) of the first SARS that broke out in Hong Kong, China in 2002, and MERS (middle east respiratory syndrome) in Saudi Arabia in 2012, with a mortality rate of 10% and 35%, respectively.

In the beginning, this coronavirus infection was expected to be localized in the region where it had emerged (central China) and with a timeline like the first SARS and MERS outbreaks. This forecast seemed natural given the general principle that the more severely a given droplet-scattered viral infection behaves, the smaller the number of infected people moving around, thus protecting the general population from contracting the disease through close contact with those who get infected.

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A summary of this paper was presented at the 25th JASMEE Academic Meeting.

In contrast to this initial assumption, COVID-19 soon began spreading globally in January the following year, resulting in a pandemic declaration by the WHO on March 11, 2020.[1] COVID-19 has since been self-sustaining, causing human-to-human transmission in multiple regions of the globe. COVID-19 has brought immense stress today, given that human beings had been overdue for a global epidemic (pandemic) for more than a century since the Spanish flu in 1918. As of September 15, 2022, more than 600 million people worldwide have contracted COVID-19, with its crude mortality being one percent.

2. What are coronaviruses?

Coronaviruses have coexisted with humankind and other animals for almost 10,000 years as common-cold viruses causing bronchitis or gastroenteritis in mammals. There were four types of human common-cold coronaviruses (community coronavirus) before the emergence of SARS-CoV-1, the 5th coronavirus, and MERS CoV, the 6th virus. Including the current CoV-2, three SARS-causing coronaviruses are considered to have come from bats by way of genetic mutation or reassortment that randomly happens in nature. This genetic characteristic is unique to RNA viruses, including coronavirus, influenza virus, and human immunodeficiency virus, which helps the transmission of coronavirus from non-human origin to humans. Maybe the preceding four types of coronaviruses originally came from other mammals in the ancient past when Homo sapiens gradually transitioned over time from hunter-gatherer to agricultural societies.[2] It is scientifically assumed that the ancient coronaviruses were fatal to humans when they first appeared. Since then, the viruses have constantly evolved to biologically adapt to their host for the sake of their survival,

genetically attenuating their virulence and toxicity thanks to their capacity for frequent genetic mutation.

Thus, COVID-19 is expected to become a community (common cold) coronavirus in the same way as preceding coronaviruses. For example, during the last three years, SARS-CoV-2 has seen a gradual diminishment of fatalities: 1.48% in the year 2020, 1.06% in 2021, and 0.19% or less in 2022 (up to April).

3. What determines how SARS-CoV-2 spreads?

Regardless of the type and characteristics of a pandemic respiratory virus, whether the infection is to spread or to be contained is primarily dependent on "R" (the reproduction number), which represents the number of new infections a typical infectious person generates. Numerically, R ranges from 0 to infinity, but in the real world, the highest number is nearly 20: for example, the R for influenza is 2-4, for mumps it is 4-7, and for measles and pertussis it is 12-18.[3] If R is below one, each infectious person will on average generate less than one additional infection. Therefore, we would expect the number of cases to decline over time. If R is above one, however, the level of infection will rise on average, creating the potential for a large pandemic. The R for SARS-CoV-2 would be 2 to 3 without any measures to control infection.

But the advancement of science in the field of infection prevention and control enables us at least to try to reduce R by a combination of pharmaceutical and non-pharmaceutical interventions. These measures can be represented by DOTS, which stands for the duration, opportunity, transmission probability, and susceptibility, as detailed below.[4]

3.1 Duration (D)

The length of time a person contracting the disease remains infectious can be reduced by medical treatments with antiviral drugs. There have been three kinds of antiviral agents, two orally administered and one intravenously. Currently, in Japan, the clinical use of these drugs is restricted to those over the age of 60 or patients at risk of developing severe diseases, such as hypertension, diabetes, other comorbidities that suppress the immune status, obesity, and expecting mothers. When antiviral drugs become widely available, we should expect to reduce the number of new infections by reducing both the amount and duration of viral shedding from the infected and treated patients.

3.2 Opportunity (O)

The more often people come into close contact with one another by, for example, riding crowded trains, attending large, crowded parties, or any kind of mass gathering, the more opportunities viruses are given to easily spread among people. Infecting many people and keeping their sickness mild enough so that they can move around among crowds is how a virus succeeds in spreading throughout populations.

To counteract this, people are encouraged to stay home so as not to get exposed to other people who may carry the virus asymptomatically. The banning of mass gatherings or school closures is a social or behavioral intervention that interrupts the chain of viral transmission effectively. Lockdowns are the ultimate measure to keep people at home with the intention of eliminating the virus.

3.3 Transmission probability (T)

Even if social intervention is not implemented (i.e., failing to keep people away from one another), the transmission of a virus can be decreased by wearing masks that block the droplet-containing virus coming out of the windpipe of infected people, or by hand-washing to sweep the virus off of our hands. Frequent ventilation of a room to disperse the virus particles by keeping the doors and windows open is also encouraged even for short periods of time. Social distancing is a well-known intervention that keeps individuals outside the range of airborne droplets. Despite its familiarity, it is not well known that the term "social distancing" was coined by a group of U.S. physicians in 2005, long before COVID-19, who were instructed by the then presidential administration to devise a strategy to prepare for pandemics. They compared the historical records of the social and behavioral interventions implemented in two US cities, Philadelphia, and St. Louis, which differed significantly in their handling of the Spanish flu in 1918: St. Louis mandated school closures and banned public gatherings, thereby avoiding the steep mass infections seen in Philadelphia.[5]

3.4 Susceptibility (S)

People who are not immune to a given virus are considered "susceptible". The larger the proportion of susceptible people in the general population, the greater the percentage of newly infected people will be, increasing the magnitude of the social damage enormously. Therefore, the priority is to change the status of individuals from non-immune to non-susceptible by vaccinating a large proportion of the global population. The vaccine then competes with virus the virus for susceptible human populations in a race to prevent the virus from prevailing.

4. Conclusion

Now that we have been living through the COVID-19 pandemic for almost three years, we should be sufficiently accustomed to this plague to recognize the significance of behavioral and social intervention, such as mask-wearing, hand-washing, and social distancing. Even though anti-viral drugs have yet to be made more widely available, we

should be aware that the non-pharmaceutical interventions described above can be applied not only to COVID-19 but also to future pandemics, which are deemed inevitable.

To conclude this talk, I strongly recommend that you be mindful of news reports about COVID-19. Much of the news (particularly that on SNS) tends towards sensationalism and hyperbole, resulting in anxiety, uncertainty, and confusion. The relentless barrage of doom-laden headlines gives people no time to process events and digest new and often important information. Therefore, even though the probability that you will fall victim to incidents of the kind reported in the media is quite low, the reporting of such events gives you the impression they are happening to a neighbor.

The media never report what does not happen. The vast majority of those who contract COVID-19, a statistical majority, return to their normal lives without sequelae. The statistical majority that will never be paid attention to is silent, whereas an anecdote is salient. Therefore, do not pay too much attention to anecdotes, or your peace of mind will be lost. Please remember that the news lurking under stones will rarely bring you any hardship if you leave the stones unturned. Let me finish by recommending Rolf Dobelli's book "Stop reading the news", which details many advantages of not reading the news.[6]

I hope this talk has helped you understand the fundamentals of what COVID-19 is, and that knowledge of how social and behavioral interventions work against the spread of the virus will support you in your daily lives by preventing you from being needlessly stressed. Remember that humans have so far adapted to coronaviruses without suffering overwhelming morbidity and mortality.

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Conference proceedings

Clinical case presentations: The confusing bits

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Abstract

Clinical case presentations are standardized clinical speech events carried out worldwide and having medical students learn these skills in English holds both great clinical and linguistic value. There are, however, several sections and categories in managing this speech event that consistently create difficulties for Japanese medical students. In this article, which is based on a presentation given at the 25th JASMEE Academic Meeting on July 16-17, 2022, the author outlines several of these difficulties and offers solutions for EMP teachers to manage them.

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Keywords clinical case presentations, EMP, clinical speech, case reports, classroom activities, medical speech events

1. Introduction and background

Clinical case presentations (CCPs) are standardized, codified clinical speech events which take place at medical institutions all over the world, often in English. CCPs are oral case reports, generally presented within a single clinical department at a hospital or medical school. They are usually carried out in departmental morning meetings for the purpose of the edification of one's clinical peers, to educate and enlighten the audience regarding interesting or challenging cases, or to train and/or evaluate novice physicians. Often, even in non-English speaking milieus, CCPs are carried out in English.

I have been teaching CCP skills and performance to my second-year medical students for 12 years. The reasons are manifold:

1. English CCPs require thoughtful combinations and applications of clinical and linguistic knowledge.
2. CCPs demand critical thinking in terms of understanding and conveying pertinence, organization, and order of data.
3. CCPs are formulaic speech events but also demand flexibility and creativity, challenging and raising learner cognition.
4. CCPs encourage the use of a narrative framework that allows listeners to connect and comprehend the data as a cohesive whole.

My students are taught CCPs on a scaffold basis corresponding to the following clinical categories:

ID (basic patient data)

Chief Complaint

HPI (OPQRST: onset, provoking factors, quality, region + radiation, severity, time), and associated symptoms

Physical Examinations (including ROS, vital signs, HEENT, palpation, visible symptoms)

Current medications/Immediate past history (IPH)

Family History (FH)/Social History (SH)/Past Medical History (*PMH, including surgeries, hospitalizations, underlying conditions, trauma/injuries, allergies)*

Investigations (labs/imaging/biopsy etc.)

Summary (list of problems and pertinent findings); Risk factors/Complications

Initial/Provisional diagnoses (IDx/PDx)

Differential Diagnosis (Dx)

Assessment (operative approaches)

Management/Treatment plan

Students generate self-made content for each section and then expand and modify these as their CCP increases in complexity. Once the final section has been completed, students are required to compile a complete written CCP and also to perform it as speech for two peers. These are graded by the teacher. The entire process takes about six 90-minte classes.

Over my 12 years of teaching, certain clinical and

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linguistic features have appeared as consistently problematic for my students. Some of these issue are not only applicable to CCPs but may be applicable to the English medical discourse of Japanese medical students as a whole.

2. Common problematic areas noted in student CCPs

2.1 Onset

Onset a basic category in the History of Present Illness (HPI) section of a CCP. There is, however, a tendency for students to render the onset data in a way that does not indicate some trigger or causal relationship ('Onset was while sitting in the park'), although onset data usually should. Moreover, in reality, onset is often gradual, with no identifiable or remembered causal scenario.

2.2 Provoking factors

Student-created provoking factors (PFs) are often far too specific, such as, 'PFs include playing badminton.' This would imply that very similar activities, such as tennis, would not provoke, which seems highly unlikely. The full range of provoking activities should be identified instead (i.e., 'exertion' or 'rotation of right arm'). Students also display a tendency to render every patient as a chain-smoking, junk-food binging, alcoholic, making the identification of PFs perhaps a little too simplistic.

2.3 Risk factors vs. complications

Students are often unable to distinguish between these two categories. A few enabling explanations may help: First risk factors refer to the possible future ('if you do X, Y will happen'), whereas complications refer to the recent past ('because of X, symptom/disease Y has also appeared'). Students should also be aware that habits such as smoking are not really risk factors if the patient has no habit of smoking.

2.4 Irrelevant data

Attempts to be too comprehensive in terms of following a CCP script mean that students often list unnecessary data. For example, a patient who has a suspected fracture in his collarbone due to a recent rugby tackle need not have a Family History listed, nor would a pollen allergy be relevant to the diagnosis and/or treatment/management of such a patient.

2.5 Omission of pertinent data

This tends to occur in particular in the Family History and Past Medical History sections. For example, for family history: 'Her FH is significant for her father's death from a malignant tumor' would require the age of death as well as some description of the tumor type.

2.6 Chief complaint confused with diagnosis

A fundamental problem for some students was conflating symptoms (or chief complaint) with a diagnosis: 'Our diagnosis was severe frontal headaches.'

2.7 Lack of specific treatment/management details

A number of students have written, 'He is currently taking medicine' or 'She underwent surgery' without informing the reader/listener of the exact type of medication or surgery (which will often require some student research).

2.8 Incongruent or unrealistic HPI data

Consistency is often an issue in HPI. Students may give the frequency of an intermittent pain as '5 times per week' while rendering the duration as only 5 days in total. Moreover, the notion that a symptom would be so precise as to appear '4 times a day, 3 times a week' as a detectable and regular pattern seems highly unlikely. In reality, most patients are much less precise with duration and frequency.

2.9 Chronic/acute false binary

Students are apt to assign one of the two binary categories of chronic/acute to every condition. In fact, there are intermediate categories such as intermittent/episodic which indicate a more flexible spectrum. This has further implications regarding student difficulty in using plurals ('headache' vs. 'headaches') in order to discuss repeated or recurring symptoms.

2.10 Confusion of duration categories

Many students confuse the duration from onset (requiring the use of the perfect tense 'She has had it for...') with the duration of each pain event ('They last about one hour.'). Teachers should clearly separate the two.

2.11 Inappropriate register

Students are encouraged to use a more suitably professional, academic register. This refers not to the use of specialist terminology but to more general constructions. To wit: 'If his disease gets bad we will think about surgery' vs. 'If his condition deteriorates we will have to consider surgery.'

2.12 Word choice

As Japanese and English word meaning ranges do not always converge, a lack of precision in the terms used can become an issue. Foremost among these are, 'vomiting blood' vs. 'coughing up blood', 'nausea vs. vomiting', and 'numbness vs. paralysis vs. tingling.' There is also a tendency for students to render every clinical condition as a 'disease' in English. Knowing the range of terms such as syndrome/condition/disorder/injury/wound is paramount. Teachers need to be careful in noting student usage of such terms.

2.13 Incorrect employment of the copula

A fundamental problem that many students seem to fail to overcome is the habit of attributing conditions using the 'be' verb: 'The patient is cancer' (vs. 'has'), or 'He was diagnosed as asthma' (vs. 'with'). This often embarrassingly simple error needs constant correction and reinforcement.

3. Conclusion

I hope that this listing of problematic features of student-generated CCPs may not only be of value to those EMP instructors who teach this valuable and productive speech event but that the pedagogical value may also be extended to other forms of English medical discourse.

Conference proceedings

General English vs English for Medical Purposes: A comparative analysis of medical school students' performance in general English assessments vs English for Medical Purposes assessments

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Abstract

This study analysed the English language test performance of medical students on an Occupational English Test (OET) before and after a semester-long compulsory course of Medical English. A test based on the Common European Framework of Reference for Languages (CEFR) was administered to evaluate the relative performance between an English for Medical Purposes assessments (OET) and a general English assessment (CEFR). The paired sample test indicates that there was a statistically significant increase in the pre- and post-OET test scores. There was a weak correlation between the OET and CEFR results.

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Keywords OET, CEFR, Medical English/English for Medical Purposes, SPSS

1. Introduction

This language assessment study statistically analysed the English language test performance of medical students using two different tests. An Occupational English Test (OET)-based test was administered at the start and end of a semester long compulsory course of Medical English. Also, a Common European Framework of Reference for Languages (CEFR)-based test was administered at the end of the semester to evaluate the relative performance between an English for Medical Purposes assessments (OET) and a general English assessment (CEFR).

The introduction includes some background information about OET and CEFR. The methodology section details the tests that were used, the subjects that the tests were administered to, and some complications with the research. The test score data that was acquired was subject to statistical analysis as outlined in the results section. The discussion section considers some possible explanations that may be draw from the statistics generated by the study.

The OET was created in the 1990s as a tool to aid the Australian government in assessing the English proficiency of medical practitioners intending to migrate to Australia. Since then, it has been continually developed and revised. It currently features many variants, including nursing, dentistry, medicine, and veterinary science, and has become recognized as a qualification equivalent to IELTS in over ten countries, including Britain, Canada, and Spain.[1,2] The OET was deemed the most suitable test for use in this study due to its substantial relevance to both medical fields and English language learning.

CEFR originates from 2001 and is an extensive framework for language teaching, testing, materials development, and course design, for English and other European languages.[3] Scores based on CEFR frameworks are commonly used as part of screening candidates for both university places and company positions in Europe. Asia is now following suit, with CEFR-based tests being used either as entrance or exit exams in an increasing number of institutions in Asia.[4] In Japan, The Ministry of Education, Culture, Sports, Science and Technology (MEXT) has been steadily integrating CEFR into its English language educational policies and practices.

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2. Methodology

In spring 2021 ethical clearance was granted which enabled the gathering of data from the subjects. Next, two tests were created using a variety of questions taken from three different official sample OET test reading sections. The questions from those three tests were combined to form a pool of questions, and from there split into two tests taking care that each of these two tests included questions from all three variants, with additional consideration given to similar topics being separated so that both tests were equally varied.

In April 2021, the first test was administered to two groups of students at Hamamatsu University School of Medicine (HUSM). Both groups were given identical instructions and a time limit of 10 minutes to complete as many of the eight questions as possible. The control group consisted of 30 2nd-year students studying compulsory Medical English once per week for 90 minutes, and the experimental group of 12 3rd- to 5th-year students whose long-term aim is to pass the United States Medical Licensing Examination (USMLE) test and practice medicine in America. The experimental group were not attending any formally taught English courses during the course of the research but had been regularly studying in their own study group. All the students involved in both groups are studying a 6-year medical course with the intention of becoming medical doctors.

However, over the summer nine students from the experimental group withdrew from the study, and thus the only workable sample remaining was the control group. The study thus pivoted to be about comparing the before & after scores of the control groups' two OET tests, as well as comparing their OET & CEFR performance.

In autumn 2021 the second OET test was scheduled to be administered to the control group under the same conditions as the previous test, during the final lesson of the course. However, due to a Covid surge the final two lessons were suddenly switched to online lessons. The two tests were also both administered online during the final lesson. The second OET was administered via the Manaba LMS and was an online version of the paper test that had already been prepared. The CEFR-based test was always going to be conducted online, but due to pandemic considerations it was administered remotely, rather than on campus. The CEFR-based test was a free online CEFR course placement test (https://www.eurocentres.com/free-language-test).

Both tests were completed within the 90 minutes of the final lesson: 10 minutes were granted for the eight-question OET multiple choice reading comprehension test, 20 minutes for a one hundred-question CEFR-based multiple choice vocabulary and grammar questions. Despite the complications, the end result was that information had been gathered, and data did exist for statistical analysis.

3. Results

The gathered raw data was subjected to statistical analysis using the software SPSS (Statistical Package for the Social Sciences) to compare the before and after test scores, and to check for correlations between the OET- and CEFR-based test scores. Among the tests conducted, there were two that offered potentially relevant findings.

A Paired Samples test may be used to assess the significance of a change in a variable, such as a before and after test score. This was ideal to evaluate the extent to which the initial and final OET-based test scores had increased, and whether that increase was statistically significant.

The t is an expression of the difference between the two variables being compared (1st and 2nd OET-based test scores). The t score is -7.517, and that is less than $p < .001$, which indicates that there was a significant difference between the test scores, with scores increasing between the 1st and 2nd test.

The Pearson correlation coefficient is the most common way of measuring a linear correlation. It is a number between –1 and 1 that indicates the strength and direction of the relationship between two variables, in this case the OET-based test scores total (of both tests combined) and the CEFR-based test scores.

This Pearson Correlation indicates that, within the study

Correlations

		OET Total score (pre + post)	CEFR placement test score
OET total score (pre + post)	Pearson Correlation	1	.079
	Sig. (1-tailed)		.344
	N	28	28
CEFR placement test score	Pearson Correlation	.079	1
	Sig. (1-tailed)	.344	
	N	28	28

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence interval of the Difference				
				Lower	Upper			
Pair 1 (Start of semester) OET Score - (End of semester) OET score	-2.321	1.634	.309	-2.955	-1.688	-7.517	27	.000

sample, there is a positive correlation between OET- & CEFR-based test scores. However, the correlation is weak, being less than 0.3 in strength. The significance rating is greater than 0.05, demonstrating a substantial lack of significance.

4. Discussion

The paired sample test indicates that there was a statistically significant increase in the pre and post OET test scores. Possible explanations for this increase include:

- The subjects' knowledge of English and medicine was improved by the courses that they studied, and this made them better able to handle OET content.
- The initial test was conducted during the first lesson of the semester with a teacher the students were meeting for the first time. This could have caused more nervousness.
- The initial test was conducted face to face in a classroom. The final test was conducted online with the subjects self-selecting their study environment and perhaps employing resources that may not have been available to them during the initial test.
- Despite the attempts to make two balanced tests, the second test may just have been easier.

Overall, it is not surprising that scores went up. When looking at the raw data the researchers did not anticipate that the increases were significant because although the increases were apparent, they were not dramatic.

More surprising was the weakness of the correlation between the OET and CEFR results. A stronger correlation would have been anticipated. Possible inferences to be drawn from the modesty of the correlation include:

- The tests were sufficiently different in nature and structure and thus not particularly suitable for comparison.
- General English competence (CEFR) is not significantly correlated with competence in English for Medical Purposes (OET).
- Competence in English grammar & vocabulary (CEFR) is not significantly correlated with competence in English reading comprehension skills (OET).

5. Conclusion

This research was designed to compare English assessment performance of a group of self-selected students studying independently, and a group comprised of a standard 2nd-year class. The assessments were: an OET-based reading test was chosen to gauge EMP, and a CEFR-based grammar and vocab test to gauge general English. With the withdrawal of most of the self-selected group the study was recalibrated to look only at the relative test performance of the 2nd-year subjects. The raw data were statistically analysed, showing that scores on the OET-based tests increased significantly between the initial and final test, and that there was no significant correlation between performance on the OET-based test and the CEFR-based test.

Were this research to be attempted again, a secure and reliable subject sample would be a key consideration. Within that, a (much) larger sample for both groups would be optimal. Additionally, the test selection was far too compromised: the convenience of being able to quickly give OET-/CEFR-"based" tests without excessively interrupting the flow of the normal lessons was prioritized over administering assessments with contents that accurately reflected OET and CEFR contents and standards. At a minimum, a test that includes content from all sections of each standard should be used, perhaps stopping short of administering a full OET test, because it would be unreasonable to expect the subjects to undertake that having not engaged in a full OET preparation course (or CEFR equivalent). Were these criteria met, it would be interesting to reassess the lack of significant correlation between CEFR performance and OET performance.

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Conference proceedings

How to improve real-world speaking ability within conference and clinical settings

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Abstract

Most undergraduate and graduate students at medical schools have a high level of reading and writing skills in English; however, they have little confidence in speaking freely with patients and colleagues. Even though Japanese students are required to study English as a second language for longer than students in other countries, their conversational ability is often limited. Therefore, it is important to learn real-world English to be able to better communicate with patients, fellow health care workers, and colleagues. In their Academic Writing courses at Saga University, graduate students learn how to prepare for conference presentations and practice their delivery methods, often by memorization through repeated rehearsals. In general, they present their studies thoroughly; however, when native English speakers ask questions during the Q&A sessions, they tend to draw blank as this takes them off script. Learning to engage with questions without a script is a valuable skill for graduate students; furthermore, they will inevitably be interacting with a diverse audience and can build the confidence to communicate effectively. The course evaluation revealed that the graduate students enjoyed the exercises and experience and were inspired to improve their conversational skills. It is essential not only to teach medical English in reading and writing, but also to provide opportunities to explain research topics as well as symptoms and prognoses of patients in plain English. Given that more medical students are interested in practicing medicine abroad, and that increasing numbers of foreign patients are coming to Japanese hospitals for treatment, even in rural areas, the necessity of obtaining real-world English skills is more essential now than ever.

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Keywords Medical English, real-world speaking ability, presentation skills

1. Introduction

The need for medical students and medical doctors to study English is increasing; however, the purposes may vary depending on their work environments. It is challenging to teach English to those who have different levels of motivation, future directions, and medical and English proficiency. In the present study, we will discuss how to improve the English proficiency of medical students and medical doctors so they can engage with confidence and clarity in various settings.

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1.1 English courses at Saga University Faculty of Medicine

At the undergraduate level, the first-year medical students are required to take a General English course, twice a week for a year, taught by Japanese teachers. Additionally, they can take an English Communication course as an elective, twice a week for a year, taught by a native English teacher. The English Communication course is more focused on conversation, and approximately one fifth of the first-year medical students choose this elective course every year.

During the third and fourth years, students are required to take a Medical English course in which students read scientific medical papers in English to become familiarized with medical terminology and pronunciation.

At the graduate level, there are two courses where graduate students can learn English. An Academic Speaking course is recommended for master's students and an Academic Writing course is designed for doctoral students. A Japanese English teacher who has experience living abroad teaches Academic Speaking, and students are encouraged to have discussions based on given topics entirely in

English. Given the style of the lectures, a minimum of five students are required to open the course, and as a result, the Academic Speaking course is often not offered. Academic Writing is taught by another teacher who has a doctoral degree and has worked at hospitals in the U.S. This course mainly focuses on developing writing English manuscripts and conference presentation materials; however, students are provided opportunities to orally present their studies. The details of the course will be discussed later in this paper. Both courses are elective, and classes are held once a week for six months.

1.2 The purposes of studying English at medical schools

It seems that there are two purposes for having medical students and graduate students study English. The first is to give them reading and writing skills in English. Researchers publish their own studies, and most scientific papers are written in English. Researchers must become comfortable with reading and writing in English. For those who are clinicians, they may not need to write as many English manuscripts as researchers; however, they need to read and understand research papers to maintain their expertise by staying updated with changes in medical knowledge.

The second purpose of learning English is to be able to effectively communicate. There are three possible scenarios where we need to communicate in English. First, individuals who want to go abroad as a researcher or a clinician must become fluent in English. English courses offered by medical schools are not enough, and therefore, they need additional practice. As a second scenario, we have seen a steady increase in foreign patients whose first language is English at local clinics and hospitals. Even though clinicians may not need to be fluent, they need to at least have sufficient comprehension in order accurately assess, diagnose, treat and follow up. As a third scenario, both undergraduate and graduate students will present their studies at international conferences. They are going to prepare for not only their speech, but also potential questions about their studies. The question-and-answer (Q&A) time seems most challenging for Japanese presenters.

1.3 The consequences of the Japanese educational system and challenges for medical students

Based on my experience teaching English to our medical students, their reading and writing skills are better than their listening and speaking skills because they have more than 8 years of experience learning English. However, English curriculums in the Japanese educational system heavily focus on reading and writing to prepare for high school and university entrance examinations. Many students see English as one of the necessary subjects to enter universities rather than as a useful tool to communicate with people all around the world. Our medical students are no exception, and they have little exposure to real-world conversational English.

It is important to note that many students are interested in English and have a desire to become fluent; however, when I initiate talking in English, they become hesitant to speak up. They do not want to make mistakes because they see the errors not as a part of improvement, but as a type of embarrassment. Their desire for perfection prevents them from improving their speaking skills. Also, the students use phrases that they learned at school; however, some of those phrases are in formal English and used to pass entrance exams and less useful in real-world settings. Additionally, the sudden introduction of new vocabulary can cause anxiety. For instance, one of my graduate students presented her study at a conference and received an award. This indicates she performed well; however, during the Q&A time, she did not understand some of the words in the questions, and as a result, she froze up. Even though she was well prepared for the presentation, she did not answer the questions only because she faced a few unknown words. One of the medical doctors whom I was helping to take the step 2 Clinical Skills (CS) of the United States Medical Licensing Examination (USMLE) believed that he had failed the CS because he did not maintain the conversation with the mock patient. His intake went well – covered all important clinical questions and came up with a proper diagnosis; however, at the end of the session, the mock patient began casual conversation and asked him "what baseball team he liked" and if he had "watched a baseball game last night." The doctor froze up and did not know how to answer. He believes that he failed the Step2 CS due to the lack of smooth conversation with the mock patient. These experiences indicate that the medical students and doctors need more exposure to real-world conversational English. It is important to provide them with a safe place where they can make mistakes and improve their speaking skills without any judgment. The first step would be to get rid of the idea of perfection.

2. Methods

To improve students' comprehensive and speaking ability, I would like to introduce our exercises within the Academic Writing course. In this course, graduate students are required to orally present their studies in English. A native English teacher who is not a medical doctor is invited and asks questions to the students. The graduate students can help each other to answer questions but are allowed to speak only in English. The native teacher then provides suggestions on how to better convey their ideas. We repeat this exercise three times (three weeks) to help students become more confident about their presentations as well as to improve their pronunciations, pace of speech, and postures including eye contact.

3. Results

The course evaluation of Academic Writing revealed that the graduate students enjoyed the exercises and experience and were inspired to improve their conversational skills. They reported that the exercise was the most valuable because they rarely had opportunities to practice their presentations with native English speakers. Learning to engage with questions without a script is a valuable skill for the graduate students; furthermore, they will inevitably be interacting with a diverse audience and can build the confidence to communicate effectively.

4. Discussion

Based on my experience, it is essential to clarify regarding what communication skills the students need to obtain. As I mentioned three scenarios earlier, those who want to develop their career in English speaking countries will need to brush up their pronunciation and familiarize themselves with different expressions and nuances. However, it is important to note that there are only a handful of students and medical doctors who want to go abroad within many rural medical schools (although the number has been increasing). Given that there is limited time to study English at medical schools, teaching "perfect pronunciation" may not be a priority. English is a global language and spoken all over the world. It is common to hear different accents even amongst medical English teachers. Native speakers are aware that the Japanese students and doctors are using English as a second language. Having said that, they must learn basic pronunciation differences, such as "R" & "L", since the meaning of words can change drastically, and mispronunciation could lead to misunderstanding.

Rather than "perfect pronunciation", obtaining the ability to effectively use basic phrases and expressions appear more important, especially for those who will see English speaking patients at local clinics. Foreigners living in Japan report that they have the most difficulty not being able to communicate with medical doctors or to have a translator at hospital. Given that we have been asked to translate for foreign patients at our university hospital more frequently than before, it is urgent to help medical doctors learn effective phrasing that can be used during intake. For instance, "What brought you here today?", and "What's the problem today?" are very useful phrases for doctors who are not familiar with using them. Additionally, the doctors need to know the different expressions of symptoms. One of the chief complaints is pain, but it could be sharp, dull, splitting, pounding, aching, cramping, burning or squeezing pain. While it would be ideal to practice these expressions with a mock patient, it is challenging for medical doctors and English teachers to make the time. At least they can start studying the textbook for Examination of Proficiency in English for Medical Purposes (EPEMP), because it introduces a lot of helpful technical terms that are often used within clinical settings.

5. Conclusion

It is important for medical English teachers to understand what situations medical students and doctors are going to face and to change the tactics based on their needs. Regardless of the students' motivations and English level, it seems unavoidable to improve real-world speaking ability. Those who are going to work in Japanese clinical settings, learning English by using the EPEMP textbook and having a native teacher to practice intake situations may be ideal. For those who conduct research studies, practicing their presentations repeatedly with native speakers will help them build their confidence as well as develop and obtain presentation skills.

Conference proceedings

Developing English-language video materials at a university hospital

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Abstract
With the rapid development of online learning, there are now many opportunities for producing easily accessible learning and instructional materials. The project described here is oriented towards producing accurate, high-quality videos, with the research being focused on processes and procedures at our university hospital. In the first part of the article, we describe the construction of a portable studio that is designed to produce quality images and sound. We then consider how sites such as YouTube can help us identify important features in video creation and how video can be organized through a learning management system such as Moodle. In the second part of the article, we take the field of gastroenterology as an example, and use the processes and procedures involved in colonoscopy to examine how video and other materials could be used both for pedagogic purposes as well as for aiding communication between medical staff and patients.

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Keywords English for medical purposes, portable recording studio, instructional video, learning management system, gastroenterology, colonoscopy

1. Introduction

The project described here is designed as an extension to past medical English research oriented towards providing a curriculum for students who are transitioning from general English study to English for Medical Purposes.[1,2] That curriculum has been designed around body systems and their related medical problems, covering both doctor–doctor and doctor–patient registers. While this acts as a good grounding for medical students in their second and third years of study, from the perspective of staff–patient interactions in English, our research team has become much more sensitive to the challenges of communication in our university hospital. Although we are involved in teaching students who will become doctors, the English that is needed in hospitals is bound up with the teams and groups of medical staff who are responsible for the treatment of patients. For example, many medical professionals are nurses, who have taken basic courses in English during their studies, but may find it difficult to communicate in English when giving explanations or instructing patients during their treatment. The new research is oriented towards addressing such problems. The aim of our team is to research hospital situations and develop materials that can be used for both pedagogical purposes and, where possible, as aids to staff at the hospital. To achieve this, a major focus is on technology. This is partly because the main university responsibilities of our team members concern the provision of general English courses to first-year students, and it is difficult for us to provide in-class medical English courses. However, it has become much easier to provide materials that can act as resources for students, either for self-study or online flipped learning (combining self-study with some taught sessions). At our university, learning management systems have become increasingly important during the COVID-19 years, resulting in them becoming increasingly familiar to students and staff. These can be used as vehicles to provide materials online. A further issue is the separation of our university campuses between two cities, with the members of our research group having offices, along with access to recording equipment, in a different city from our university hospital.

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2. Technology for developing materials

A major concern of this project is on materials development, producing video that is aimed at teaching English to both medical students and professionals. Learning management systems have become ubiquitous in higher education, and with the challenges of holding in-person classes due to the COVID-19 pandemic, video instruction is a practical way to provide audio instruction with the added benefit of visual aids. In a field such as medicine, this can be particularly beneficial because medical equipment and processes can be illustrated. To achieve our aim, a portable, mobile filming studio, in the form of a trolley, has been created.

2.1 Conceptualization and construction of a mobile filming studio

One of the aims in the construction of the portable studio is to create engaging, high-quality videos that can match the quality and aesthetic of popular online videos. With YouTube now a mainstream platform for media, producers can gain insights into what constitutes an engaging video. Viewers and creators alike have access to certain metrics that provide some insight on the viewership of a particular video, such as the number of comments, number of views, and the number of times it has been shared through social media.[3] The easiest way to check the popularity of a video is by noting the number of views the video has, as well as the degree of engagement in a video through comments and "likes" or "dislikes" for that video.

Our videos are designed to be integrated into a learning management system, which can now provide on-demand lessons with more ease than ever before. However, the use of technology becomes a moot point if viewers do not engage with the materials. In most situations where learning management systems are used, students are required to study by themselves. Consequently, it is vital for us that the trolley and its equipment are capable of reproducing the aesthetic quality of videos often seen on YouTube with regard to audio and picture quality. We have paid careful attention to these features, particularly the lighting. Professional-grade video lights have been mounted to aluminum extrusions (**Figure 1**), and an audio compressor/limiter has been used to filter out unwanted noise and frequencies. We constructed the portable studio while considering the following three features: ease of use, portability, and accuracy through the use of a teleprompter.

Firstly, our experience as educators has made us keenly aware that unless video materials can be produced quickly and efficiently, it is unlikely that they will be produced with any consistency. In explaining why educational videos are an underutilized resource, Maynard[4] laments:

> Sadly, effective public communication as a social good remains under resourced in many academic institutions, and one consequence of this is that academics who take such a role seriously often need to resort to modes of communication that they can squeeze between the cracks in a profession that is extremely demanding of their time and attention (p. 2).

Thus, although we were forced to make some concessions in terms of features, our equipment is set up so that filming can be achieved by taking the least number of steps possible. Ideally, we would like to be able to simply turn on the system, and press the record button, although it is rarely so straightforward.

Additionally, the studio takes the form of a trolley, facilitating maneuverability throughout a hospital and between campuses. The trolley is adjustable due to the use of the aluminium extrusions, which enable equipment to be mounted in different arrangements, depending on the situation. The base is electronically height adjustable,

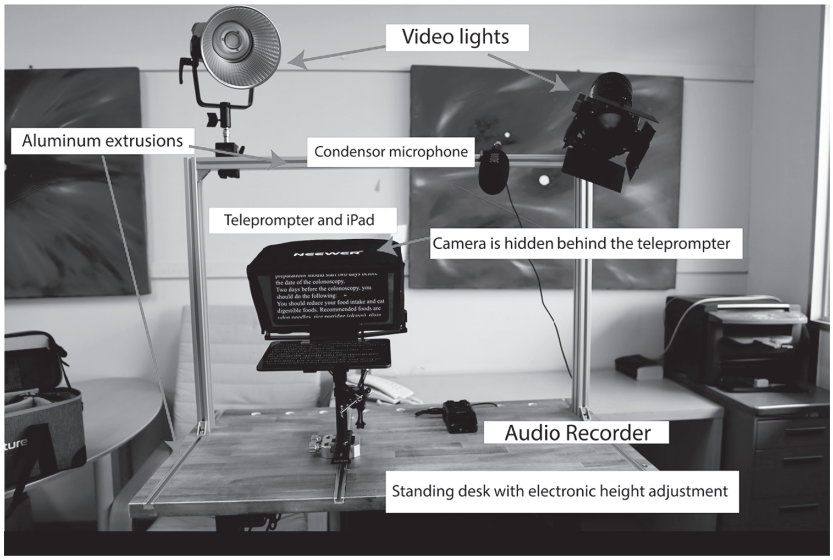

Figure 1. Filming trolley

allowing us to record from different angles, especially when filming specialized rooms and equipment.

Finally, the most important feature integrated into the trolley is a teleprompter, situated in front of the camera to allow the user to read from a script. In a medical context, the accuracy of language is very important. Our research team is comprised of applied linguists, not medical specialists, so the use of a script, displayed in the teleprompter, allows for confirmation of the language prior to filming materials.

2.2 Videos for teaching English for Medical Purposes

Video materials can serve as pedagogical aids for both English classes and practitioners who may be interested in reviewing video contents for their specific needs in the profession. For the actual production of video materials, we consider several factors. As mentioned in the previous section with respect to the teleprompter, scripts must be accurate. It is essential that the rendering of a message or instruction in the source language does not deviate when translated into the second language.[5] Creation of a script prior to filming can greatly reduce the possibility of error as the script can be verified by an expert in the medical field. Furthermore, a script can aid the speaker in delivering a message clearly and concisely, reducing the overall time of the video. From a pedagogical point of view, we consider that for ease of viewing, videos of less than five minutes in length are desirable. This is also consistent with most listening and video activities designed for pedagogic purposes in English language teaching.

In the development of video materials for hand surgery, Rahman et al.[3] chose to develop their materials using the *microlearning* approach – short, focused segments of materials designed to meet a specific learning outcome. In describing their rationale for choosing this method, they cite the benefits of microlearning from Jomah et al.'s[6] list, which is summarized in **Table 1**.

Most items in the list are consistent with our experience, except for those relating to simple, casual, and informal aspects. The attention span of students must also be taken into consideration during the production of an instructional video, though specific data about an ideal video duration are not readily available.

2.3 Integration of videos into a learning management system

In the COVID years, in addition to self-study options, the flipped learning model has become popular in higher education in Japan. Learning management systems such as Moodle have made flipped learning environments easily accessible to students. Video materials provide an excellent aid to instruction done in the flipped learning style. Shyr and Chen[7] describe flipped learning, also known as a flipped classroom:

> Broadly, a flipped classroom can be defined as a pedagogical approach that requires students to self-study or preview learning materials out of class in order to acquire new knowledge and to participate in a variety of in-class activities in order to put the newly learned knowledge into practice (p. 54).

It is important to allow ample time during class for students to focus on their speaking skills in English. By providing videos to be watched prior to a class, the receptive skills of listening and English comprehension can be developed outside of the classroom, which can then be dedicated to the learning of productive skills. Alternatively, when it is not possible to provide classes, video can also be used for self-study.

Table 1. Advantages of microlearning

1. Microlearning is performed in short bursts.
2. Microlearning requires little effort from individual sessions.
3. Microlearning involves simple and/or narrow topics.
4. It is fun and engaging. It makes the user always feel updated.
5. It is casual and informal.
6. It is a way to solve the problems that current educators and trainers deal with.

3. Using video for colonoscopy

As an illustration of how research at the university hospital can be used to develop video materials, we consider a particular hospital department, gastroenterology, and the communication involved in one procedure: colonoscopy. We explore staff–patient interactions relating to the procedure, and how materials could be created, both pedagogically and as a support for actual communication in the hospital. The aim is the use of English as a Lingua Franca, in which English is used as a medium between speakers whose first language is not English. Consequently, a simpler English is required than might be expected in countries where the official language is English.

3.1 Gastroenterology

Gastroenterology has been selected opportunistically due to contact with the department, but it is also a specialism that involves procedures where a patient is conscious, and where preparation for some procedures such as colonoscopy take place before entering the hospital. **Table 2** documents the stages in the process of a colonoscopy in which a doctor recommends a polypectomy. What becomes clear from analysing the process is the importance of nurse–patient communication. Nurses' responsibilities include explaining how to use laxatives and what to eat, looking after the patient when preparing for the colonoscopy, and explaining what is needed for a hospital stay. In contrast, doctors are involved in key stages of the process: recommending a colonoscopy, organizing the day, doing the procedure, and discussing the results.

Table 2. Stages in colonoscopy in which a polypectomy is recommended

1. A patient visits the hospital with a concern about her/his bowels. As a precaution the doctor suggests a colonoscopy (visual inspection of the bowel), and the patient agrees to one. A day is arranged.
2. The patient is sent for a blood test, provision of laxatives, and instruction on when to take them and what to eat the day before the colonoscopy.
3. On the day of the colonoscopy, the patient fills out a medical questionnaire, and is instructed by nurses on the procedure for taking a laxative solution and for checking the clearness of her/his evacuations. The patient then takes the laxatives and evacuates her/his bowels several times during the process.
4. The patient changes into special clothing for the colonoscopy.
5. The patient is given the colonoscopy by a doctor and a nurse.
6. After the colonoscopy, a doctor discusses the results with a patient. If polyps of a certain size are found, the doctor recommends a polypectomy. If so, a day is arranged involving an overnight stay at the hospital.
7. The patient is instructed by a nurse on what to bring to the hospital on the day of the procedure and issued with laxatives and instructions on how to take them.

3.2 Communication between patients and medical staff

From the perspective of the nurses, preparing patients for a colonoscopy in Japanese involves the use of written instructions supported by spoken explanations to ensure that the patient understands what to do. One of the challenges of doing this in English is the small number of patients that Japanese nurses encounter for whom English rather than Japanese is required as the medium of communication. This requires a switch of language in a busy day for professionals who may have only taken courses in general English. Given that several responsibilities involve instructing the patient, linguistic support for nurses could be built up through a number of stages. In Japanese, nurses usually talk patients through a document. By ensuring that there are clear translations of the key documents, at minimum, a nurse could read through a document with the patient. At the next stage, our portable studio can be used to create video, which would serve several purposes. Nurses would be able to practice their pronunciation and presenting skills by shadowing the video. Where possible, the videos could be used in workshops which would allow a flipped learning approach. Another possibility is to actually use the video with the patient: The nurse could sit with the patient and play the video, taking some of the pressure off the nurse. Also, the link to the video could be added to the translated document, so that a patient can watch it again outside the hospital.

Regarding doctors, there are also areas where materials could be useful. Videos that explain the colon and polyps could be created, to be used by medical students and doctors to practice explanations. They could also be used as general explanatory videos for patients. In addition, instructional video could be provided for the actual process of a colonoscopy.

4. Conclusion

In this article, we have described the creation of a portable recording studio, and how it can be used to develop materials that aid staff and patients at our university hospital. This can be linked to our curriculum for second- and third-year students, but the main aim is to offer learning opportunities for medical staff. Practicing professionals may not have time to undertake taught courses, but well-organized self-study materials can provide them with the opportunity to build some of the English skills that they need. These materials could also be combined with workshops to help staff improve their communication skills.

We should note that our example has been taken from one department, gastroenterology. While it is not possible to cover everything that goes on in a hospital, by working with a few departments, some of the shared procedures and processes will emerge. For example, an overnight stay in hospital requires instruction on what to do and what to bring, and applies to most in-patients. In addition, tracing the path of a patient within a particular department includes the general administrative procedures involved.

It should also be noted that, in contrast to doctor–doctor communication, which requires the use of a great deal of terminology, the English generally involved in staff–patient communication is not complex. This means that it is reasonably easy to comprehend, but it may be much harder to produce without practice. For example, instructions such as “Eat food that is easy to digest” or “Don’t eat fruit containing seeds” are easy to understand. However, if a nurse is trying to explain a sheet written in Japanese, she/he may find it difficult; key words such as “digest” and “seed” may not occur very often in general English study. Similarly, “Roll onto your back and put your right ankle on your left knee” is not difficult to understand, but it is difficult to produce spontaneously. However, it may only require a small amount of practice to develop the skill to instruct a patient during a colonoscopy.

Basing research at the university hospital itself brings the applied linguistics team very close to the treatment of patients. By mapping the processes and procedures involved in several departments, and building video materials on the basis of this, our hope is that it will aid practicing professionals develop English skills that help them to work in the instances where they need to use English as the medium of communication. It is towards this end that the research is oriented.

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Conference proceedings

Learning from one another: Comparing basic nursing and midwifery skills in Japan and Germany

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Abstract

Due to the complete academization of midwifery education in Germany and the wish to foster partnerships for student encounters among international nursing and midwifery students in Germany and Japan, a longitudinal EMP (English for Midwifery Purposes) curriculum is being implemented for midwifery students at the Medical Faculty of Leipzig, Germany. As part of this curriculum an international, interprofessional learning project between Leipzig and Chiba nursing and midwifery students was implemented, focusing on basic nursing skills in both countries. 26 midwifery students form Leipzig and 5 nursing students from Chiba worked together via virtual conference meetings to prepare presentations on one of the following themes: hygiene on the wards, patient positioning and linen change, venipuncturing and placement of venous lines, taking vital signs, and transurethral catheterization techniques. Similarities and differences in the practical handling of these skills were discussed in small groups and prepared for presentation in the plenary. In this paper, these similarities and differences are presented and paedagogical implications for further projects are discussed.

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Keywords midwifery, nursing skills, cultural encounter, internationalization, curriculum

1. Introduction

In January 2020, the new Midwifery Act (Hebammengesetz – HebG) came into force in Germany, leading midwifery training from primarily vocational school-oriented education to complete academization, according to the EU Directive 2005/36/EC.[1] Complete transfer of midwifery qualification to higher education institutions was necessary, as was the case in all other EU states already.[2] Unlike Japan, where future midwives train in a nursing curriculum for 2-3 years before specializing in midwifery, vocational school and now academic midwifery training separates nursing and midwifery education in Germany from the very beginning. Meanwhile, fully academized, specialized curricula for midwifery have been implemented in all federal states in Germany, partly under the roof of medical faculties at universities, as is the case in Leipzig. Since curricular development is in the hands of these institutions themselves, interprofessional and intercultural competency acquisition can be operationalized independently and in accordance with existing national and international partnerships. Due to a long-standing university partnership between the Universities of Leipzig in Germany and Chiba, the Skills and Simulation Centre LernKlinik Leipzig and the Interprofessional Education Research Center IPERC in Chiba joined up to conceptualize a longitudinal intercultural exchange curriculum between students of midwifery and nursing from both institutions. As a basis for the longitudinal intercultural exchange curriculum, the recently published World Health Organization (WHO) framework was chosen.[3] In this framework, Domain IV (Collaboration) defines as behavioral competency 14.1 the "engagement with others across cultural, geographical, organizational and sectoral boundaries, with individuals, caregivers, families and communities, as partners". The project presented at the 25th JASMEE Academic Meeting in July 2022, is part of this competency-based curriculum. The aim of this online exchange project, being part of the 3-year longitudinal intercultural midwifery curriculum in Leipzig, was to stimulate students of both institutions to compare basic nursing and midwifery skills commonly needed in healthcare practice in Japan and Germany.

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A summary of this paper was presented at the 25th JASMEE Academic Meeting.

2. Methods

2.1 Participants

Twenty-six midwifery students in their 1st year of training at the Medical Faculty of Leipzig University, Germany, and 5 students in the nursing program at Chiba University in their 1st to 3rd year of training participated in the encounter. All participants were female. For Leipzig midwifery students, this project is part of their obligatory curriculum, while Chiba students can opt between different intercultural activities with other countries such as the US or India. Three of the Chiba students had already participated in a prior project with Leipzig midwifery students. All Leipzig students had seven English for Midwifery (EMP) sessions in their first academic term focusing on speaking and listening skills (topics included "experiencing foreign cultures", "thinking critically about healthcare issues in a cross-cultural context" and "cultural bias", as well as sessions on how to prepare a presentation using ppt slides), in preparation of the intercultural exchange project with Chiba. In their 2nd academic term, of which the project described was a major part, Leipzig students had sessions on "reflecting on communication skills in midwifery" and "reflecting on feedback skills" as part of their EMP curriculum, before focusing on the virtual encounters with Chiba students.

2.2 Learning objectives

For the international sessions between the two institutions, learning objectives were as follows:

1) Getting to know students from midwifery and nursing with different cultural backgrounds.
2) Reflecting on how different (or similar?) teaching and learning of basic nursing skills in Japan and Germany can be.
3) Using previously acquired presentation skills to prepare 7 slides for discussion in the plenary, and
4) Finding old (and new!) friend in the international healthcare world.

2.3 Online small group work

The first of the three 90-minute sessions of the project was used for self-introduction and updates on topics concerning daily life, study life at university and exchange of in-hospital training experiences in the student groups. Five breakout rooms were accessible via Zoom® (Zoom Video Communications Inc., San José, CA, USA) to get to know each other (one Japanese student with 5-6 German students per group). Back in the plenary, the respective groups chose a nursing skill from the following: hygiene on the wards, patient positioning and linen change, venipuncturing and placement of venous lines, taking vital signs, or transurethral catheterization techniques. Two groups opted for hygiene on the wards, one group for venipuncturing and placement of venous lines, one group for determination of vital signs, and one group for transurethral catheterization techniques. All groups had four weeks in which they could get together in breakout room sessions as often and as long as they liked, in preparation of the final plenary session. For each presentation, one Japanese and one German student joined as tandem presenters, while the other German students prepared discussion topics on the nursing skill chosen by the respective group. For each procedural nursing skill, students were asked to describe similarities and differences they came across.

3. Results

While all students concluded that similarities in nursing skill procedures were by far more common than differences, there were some practical remarkable differences that the students came across (**Table 1**).

4. Discussion

In Germany, the need to develop new curricula in midwifery is imminent due to the complete academization of this healthcare profession education. At the same time, the impact of globalization on healthcare creates a need to develop curricula which focus on internationalization and competencies associated herewith, such as cultural skills acquisition.[4] An international experience can expand students' perspectives, enhance learning capabilities and solidify the student's position as a global citizen.[5] A strategy to develop cultural awareness in healthcare students can be to enable international encounters longitudinally during the overall curriculum and to incorporate interactive learning opportunities into the respective educational programmes. In times of COVID-19, international mobility programmes have come to an abrupt halt, but nonetheless, new ways to engage students in intercultural experiences is possible. The international learning project described here enabled students from nursing and midwifery from Germany and Japan to elaborate on nursing skills commonly implemented in their respective countries, and focused on very specific, everyday manoeuvres practiced by the two healthcare professions. While actually identifying similarities and differences in the respective nursing skills, a hidden curriculum was also present: students from both German and Japanese cohorts communicated via a foreign language for all (English), had to learn to adapt their verbal communication and debate to the language level of the other group members and had to paraphrase when medical terminology was not clear to students with a different cultural background or language proficiency level. Depending on their motivation and group dynamics, group meetings via Zoom® were repeated as much as desired, making room for the development of international, personal relationships.[6]

Table 1

Nursing skill	Similarities	Differences
Hygiene on the wards	Hand disinfection; cleaning and disinfecting surfaces and objects; aseptic procedures; regular window opening for aerosol dilution; 5 moments of hand hygiene (WHO)	**Chiba:** no hair dye permitted for nursing students; hair tied to a knot or bun; no jewellery whatsoever! Use of foamy soap **Leipzig:** no hair dye rules; small jewellery allowed. Use of liquid soap
Venipuncturing	Materials prepared on a venipuncture preparation tablet	**Chiba:** alcohol swabs for skin disinfection; loosening of the tourniquet after drawing blood; diverse colours for needle bins **Leipzig:** disinfection spray for skin disinfection; loosening of the tourniquet after needle placement; needle bins colour-coded for correct disposal
Transurethral catheterization	Devices and patient placement; disinfection procedures	**Chiba:** patient covered with a blanket during the procedure; curtain use possible **Leipzig:** direct complete patient exposure during procedure
Vital signs	Measurement of pulse, blood pressure (RR), body temperature, oxygen saturation, respiratory rate, consciousness	**Chiba:** manual RR measurement preferred; wrist or forehead temperature measurement; Japan Coma Scale **Leipzig:** electronic RR measurement preferred; axillary or sublingual temperature measurement; Glasgow Coma Scale

4.1 Limitations

The project introduced here was implemented for a complete annual cohort of midwifery students in Leipzig, Germany, while only a small number of Chiba nursing students participated in the project. Originally, the idea was to actually form tandem partnerships between one Leipzig and Chiba student each, who would re-meet over their entire 3-year educational curriculum at the respective universities. While for Leipzig students, the encounter is part of the obligatory EMP curriculum, Chiba students can choose between different international encounters, which all belong to established university electives. Organizing the curriculum in such a way as to involve more Japanese students in the curriculum will be a major issue for future cooperation.

4. Conclusion

In summary, our project enabled students from nursing and midwifery at the universities of Leipzig and Chiba to work on student group presentations together, focusing on basic nursing skills in both professions, and learning about similarities and differences in these skills in both countries. While similarities were by far more frequently pinned down than differences, there were several specific differences, making these cultural encounters all the more rewarding for the students involved.

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Conference proceedings

Researching and teaching word parts in a medical English curriculum

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Abstract

Although the medical field contains a daunting number of specialized terms, the process of learning them can be greatly aided by organizing materials and courses that introduce new terms and illustrate how they can be broken down into their component parts. In this article we extend our existing materials for third-year medical students, which cover body systems, medical conditions, and treatment, by considering word parts and how they can be presented in our units. We discuss the issues of morphology and pedagogy in relation to an initial list of approximately 200 word parts. Although the final list will be in alphabetical order, we consider some of the categories that are emerging from our analysis of the parts, which will help us to edit the list.

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Keywords undergraduate medical English education, pedagogical materials, medical terminology, word parts

1. Introduction

In this article, we explore how word parts can be incorporated into a medical English curriculum designed for completion by the end of students' third year of study. At the core of the project is the development of 14 units of teaching material, taught over two courses, one by members of Hiroshima University's Institute for Foreign Language Research and Education (**Figure 1**), and the other by the medical school's English instructor. The curriculum is content based, being strongly oriented towards body systems, covering anatomy, physiology, medical problems, and treatments.[1, 2] There is also a strong lexical sub-syllabus, with corpus analysis being used to identify important terms within the fields covered by the materials in order to incorporate as many useful terms as possible in context.[3, 4] While the materials cover both doctor–doctor and doctor–patient registers, the analysis in this article is primarily concerned with the former, which is more technical in nature. (See Higa et al.[5] for an account of research we are now undertaking to address the problems that medical professionals encounter when giving explanations or instructing patients during their treatment.)

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A summary of this paper was presented at the 25th JASMEE Academic Meeting.

2. Word parts

In this section, we first describe development of the curriculum in relation to discourse, medical terms, and word parts, before considering issues relating to morphology and pedagogy. A key reference text that has strongly influenced our approach is Chabner's *Medical Terminology*,[6] which is a very clear and thorough self-study course textbook, breaking terms down into their components for easy understanding. Through an analysis of Chabner's approach, we outline some of the challenges involved in categorizing and presenting medical word parts.

2.1 Discourse and lexis

Regarding the doctor–doctor register, our strategy has been to ensure that key words are contextualized in stretches of discourse. These are in the form of short essays, which are designed to provide content roughly equivalent to that of the students' actual medical study; the term we use for our syllabus is 'quasi-parallel', meaning that the content of the materials can extend slightly beyond what the students have learned if it can be understood from the English discourse. The essays are supported by vocabulary tasks that involve matching terms to medical diagrams or to definitions, and the content is then used for a variety of

communicative tasks. The interplay between corpus analysis and materials design and development has resulted in a course that incorporates approximately 2,000 key technical terms, ranging from single words (e.g., *diaphoresis*) to multiword terms (e.g., *subdural hematoma, gastroesophageal reflux disease*).

2.2 Lexis and word parts

While the materials are designed to allow important terms to be learned in context, a final stage of each unit involves a focus on word parts. This serves two purposes: (1) to facilitate memorization of complex terms; (2) to aid students in understanding new terms that they may encounter in the future. As Chabner[6] notes:

> Medical words are like individual jigsaw puzzles. Once you divide the words into their component parts and learn the meaning of the individual parts, you can use that knowledge to understand many other new terms. (p. 2)

The process of opportunistically illustrating word parts has been used for the units of material taught by the research team for their course (**Figure 1**). Other units of material have also been analyzed. An initial list of word parts has been created, not designed to be exhaustive, but to cover useful terms and sensitize students to their components, making them aware of how the meaning of a term can be discovered through an analysis of its constituent parts.

2.3 Morphology and pedagogy

The main aim of our research is pedagogical: to create a curriculum for students that gives them the best opportunities to build their medical English skills in tandem with their medical skills development taking place in Japanese. This raises technical challenges of how to present word parts. Chabner, in her analysis of basic word structure, divides a word into a root (the essential meaning of the term), a combining vowel (a connector), a prefix (a small part added to the beginning of the word that modifies the meaning), and a suffix (a word ending). There is also a combining form (a combination of a root and a combining vowel). However, one issue with this analysis is that it is sometimes difficult to distinguish roots from prefixes and suffixes. For example, *erythr/o* is labeled as a combining form, with the example being *erythro/cyte*. In contrast, *aut-* is listed as a prefix, but is found as a combining form in a word like *auto/immune*. However we label them, though, both *erythro-* (red) and *auto-* (self) serve, respectively, to modify the roots *cyte* and *immune*.

Another problem is that word parts can appear in different positions. For example, the word part *globin*, meaning 'protein', is listed as a suffix by Chabner, appearing at the end of words such as *hemo/**globin*** and *myo/**globin***. The question arises, though, of how it should be categorized in *hemo/**globin**/uria.* A further complexity becomes apparent in relation to multiword terms. For example, *subdural* can be divided into *sub/dur/al*, but in a multiword term such as *subdural hematoma*, from a meaning-based pedagogic perspective, there are four key parts: *sub/dural hemat/oma* (a mass of blood beneath the dura mater).

There is also the issue of word parts such as *-algia*. This is also listed as a suffix, with an example being *arthr/algia*. However, *alg-* can be considered a root, meaning 'pain', and is seen in a term such as *an**alg**esic*; its combining form is found in the term *alg/o/phobia.* Consequently, *my/alg/ia* might be considered as consisting of two roots and a suffix, meaning a condition of muscle pain. Nevertheless, from a pedagogic perspective, it is extremely valuable to list *-algia* as a word part because it is easily identifiable in the following conditions: *neuralgia*, *arthralgia*, and *myalgia*. Similarly *-emia*, meaning 'abnormal blood condition', can be broken down into *-em/ia*, but it is much easier to teach *-emia* as a single word part. This raises the issue of what are good, learnable chunks within words. An important consideration here is that of *productivity*,[7] which refers to the likelihood of particular word formation patterns giving rise to new words.

Chabner's[6] book focuses squarely on terminology: "My goal was to present a comprehensive introduction and overview of medical terminology in a straightforward and easy manner for students who had no previous background in biology or medicine." (p. vii). In contrast, our course units have vocabulary as a syllabus strand supporting a main syllabus organized around body systems. Our main aim is to show students how complicated terms can be cut into useful chunks of meaning, and does not require the more complex analysis that Chabner uses. Consequently, for simplicity, we use the term 'word part' in our materials. To indicate a word part, we add a hyphen either at the beginning or end of the part, and where it tends to be seen with a combining vowel, we add this with a slash (e.g., *my/o-).*

3. Teaching and materials development

Our list of word parts has evolved through the teaching of an eight-week course (**Figure 1**) and from a review and analysis of the materials we have developed. Accordingly, we describe our approach to word parts in teaching our course, and then consider word parts through a more rigorous analysis of new sections that we have developed in the materials, drawing from the terms that occur in each unit.

3.1 Presenting word parts in class

In the classroom situation, which has been online via Zoom during the Covid period, the highlighting of word parts has been opportunistic, based on the important terms within the units of material. To highlight the part, it has been shown within its term on a presentation slide, and if it links to other units, further examples have been given. For example, during the eight-week course (**Figure 1**), the prefix *peri-* was

Anatomy: planes, terms of location, and views 解剖学 : 平面，位置を現わす用語，概観
Central nervous system: brain 中枢神経系 : 脳
Circulatory system: heart 循環器系 : 心臓
Pulmonary system: respiratory tract 呼吸器系 : 気道
Skeletal system: knee joint 骨格系 : 膝関節
Digestive system: alimentary canal 消化器系 : 消化管
Endocrine system: pancreas and thyroid gland 内分泌系：膵臓・甲状腺 Word test 単語テスト
Written evaluation tasks 筆記試験

Figure 1. Syllabus taught by the Institute for Foreign Language Research and Education

identified in the term *pericranium* in the 'Central Nervous System: Brain' unit, and introduced through this term by the use of a slash (*peri/cranium*). We find *peri-* in other units, too: *pericardium* (Circulatory System: Heart); *periosteum* (Skeletal System: Knee Joint); *peritonitis* (Digestive System: Alimentary Canal). Consequently, these other words were also used to illustrate the part, so that students would be sensitized to them when they studied later units. However, it was not always possible to link to specific terms within the material, so that while the key term was drawn from the unit, other examples were shown. For example, the part *tri-* occurs in the terms *tricuspid valve* (Circulatory System: Heart). A further useful example to give is the *triceps muscle*. Although this does not feature in our 'Skeletal System: Knee Joint' unit, the term *quadriceps muscle* does occur. In that unit, *-ceps* is highlighted and illustrated with *quadriceps*, *triceps,* and *biceps,* and so *triceps* is used as a second example alongside *tricuspid valve* in the earlier unit.

3.2 Building word parts into the materials

While the component parts of medical terms have been presented opportunistically for several years to aid students in their learning of medical English, we are now at the stage of integrating the word parts into written materials. For each of the 14 units of material, a reference page has been added illustrating key word parts encountered in that unit, with the final list being built up primarily from the parts listed on these pages. This brings a greater rigor to the analysis of word parts, and allows students to check the parts by themselves. It is important that the students have opportunities for self-study, as there is only limited time for the presentation of parts in class. Within each unit of material, we present between 12 and 16 word parts. Emphasis is placed on what is a useful word chunk to learn. For example, in a similar way to Chabner, we list both *-algia* and *-ia*. For reference, the word parts have been collated and ordered alphabetically, producing a preliminary list of approximately 200 parts. In most cases, the word parts are matched with terms within the units of material.

3.3 Emerging categories and pedagogical issues

Throughout our research, a key aim has been pedagogical: how to maximize the learning opportunities for our students. As with medical terms, a major consideration with word parts concerns the best approach to teaching and presenting them, particularly in the context of our materials. Our approach is body-systems based, meaning that terms are introduced which connect to a particular unit of material, with the vocabulary syllabus strand wrapping around the dominant body-systems content. This means that the order in which the word parts are presented and taught is already set. Also, any list of lexical items is likely to be organized alphabetically. However, in terms of refining the list, and making it more concise, some establishment of categories can help.

Anatomical word parts form a sizeable proportion of our list. For example, in our eye unit, we currently have word parts for the specific anatomy of the eye, such as *retin/o-* (retina) and *conjunctiv/o-* (conjunctiva). However, across the units, there are some very general anatomical terms, including *aden/o-* (gland), *neur/o-* (nerve), *hem/o-* (blood), *hemat/o-* (blood), *fibr/o-* (fiber), *oste/o-* (bone), *chondr/o-* (cartilage), and *my/o-* (muscle). In our initial analysis, we labeled the remaining anatomical terms as 'specific'. However, this category is in some senses too broad; an intermediate category could relate to the body systems approach on which our materials are built and involve the vital organs: *cerebr/o-* (cerebrum), *cardi/o-* (heart), *pulmon/o-* (lung), *hepat/o-* (liver), *nephr/o-* (kidney), and *ocul/o-* (eye). A third tier would include the more specific parts that make up the body systems such as *esophag/o-* (esophagus), *pharyng/o-* (pharynx), and *urethr/o-* (urethra).

Several other categories emerge from our analysis: 'general' prefixes of negation, location, quantity, etc. (e.g., *a-*, *an-*, *ad-*, *anti-*, *bi-*, *contra-*, *de-*, *dia-*, *dys-*, *endo-*, *epi-*,); conditions and problems (*-algia, -capnia, -emia, -itis, -oma, -oxia, -phasia, -phoresis, -rrhea,* etc.); and medical procedures (*-ectomy, -tomy, -plasty, -scopy,* etc.). An area which we have not yet investigated is pharmacology and the names of medications. For example, a knowledge of word parts such as *-caine*, *-cillin, -dazole, -mycin, -pril, -statin*, and *-cycline* will help learners to identify the class of drug to which a particular medication belongs.

4. Conclusion

This article has described the final stage of a project

that started in 2012, when we set out to develop a set of materials and an embedded word list, with materials development and corpus analysis working in parallel, and the list itself evolving through this process. By organizing the materials on a content basis of body systems, with units that run from anatomy and physiology, through medical problems to treatment, the materials offer many opportunities for identifying meaning through word parts, particularly with long and complex terms such as *subdural hematoma, pyelonephritis,* or *hypercalciuria*. By adding word-part sections to our units, we hope that we can help students to both remember terms that they study and analyze new terms that they encounter in their future medical careers.

It should be noted that the curriculum we have worked on serves to help students build from their general English skills and abilities to those required for English for Medical Purposes (EMP). The courses, the 2,000 terms, and the 200 word parts provide an entry into EMP, but students themselves will develop their own linguistic resources depending on their careers and specialist interests. One area of further research will be oriented towards aiding students in autonomous study through, for example, the provision of software designed to build a personalized database of medical English terms, which can then be reviewed in the form of digital flashcards.

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Conference proceedings

The Medical Rally: A training event for residents of Tsukuba Medical Center

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Abstract

Tsukuba Medical Center's Medical Rally is an annual training event for first- and second-year residents. This day-long event has various "stations" representing different hospital departments, in which participating residents, working in pairs, rotate and enact medical scenarios. Located in the heart of Tsukuba City, this hospital sees hundreds of non-Japanese patients each year; therefore, strong emphasis has been put on developing residents' medical English skills. To this end, over the past 6 years, the Medical Rally has included an English station, in which the residents perform a medical history-taking simulation in English with an English-speaking simulated patient. Residents are given 20 minutes in which to carry out a comprehensive verbal medical examination to the point where they can make a diagnosis. Following the medical interview, feedback is given from the doctor in charge and the simulated patient. In this presentation we will describe the Medical Rally, with particular focus on the English station and its educational merits.

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Keywords resident training, medical simulation, medical history taking, medical English, simulated patient

1. Introduction

Tsukuba Medical Center Hospital, a hospital of 453 beds, is situated in the heart of Tsukuba Science City, Ibaraki. The hospital offers comprehensive medical care, and about 500 patients come through its doors every day. Being a hub for science and technology research and home to the very international University of Tsukuba, the city has a large population of foreign researchers, students, and workers from overseas. Before the COVID-19 pandemic, the hospital cared for 5 to 10 foreign patients in the Emergency Room daily. Therefore, providing culturally sensitive care for the foreign community in Tsukuba is a concern for the hospital. The hospital also provides medical training for young residents, and about 10 residents join the hospital every year. The Medical Rally, which will be discussed here, is a training event designed for the hospital's residents, which over recent years has included an element to test the residents' ability to communicate with patients in English.

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2. The medical rally

The Medical Rally, which began in 2014, is a day-long training and evaluation exercise for first- and second-year residents. The event is organized by two of the authors of this paper (A.A. and M.M.) but, importantly, is supported by doctors, nurses, paramedics, and staff of the hospital. The Medical Rally involves a series of realistic medical simulations held in different rooms, departments, or areas of the hospital. Residents work in pairs to navigate these different medical scenarios, referred to as "stations," in which they have to demonstrate a variety of medical skills, communication skills, quick thinking, and resourcefulness. Each station, staffed by a different group of doctors, nurses, paramedics, and staff, involves a 20-minute medical simulation followed by five minutes of feedback. In 2021, the Medical Rally had eight stations: Pre-hospital, a medical situation outside of the hospital; Nursing experience, working as an emergency room nurse; Initial trauma care, treating an emergency trauma patient; In-hospital emergency response, providing basic life support or advanced cardiac life support; Internal medicine care; Explaining a diagnosis, (to a patient's family); Pediatric care;

and English. At the end of the rally, the pair of residents who score the highest overall are awarded a trophy, and one resident is nominated as the Most Valuable Doctor (MVD).

3. The English station

The English station, held biennially as part of the Medical Rally, was included in the program to promote the residents' ability to communicate with patients in English. As mentioned earlier, the hospital sees a lot of foreign patients, particularly in the emergency room; thus, the English station reflects the needs of the doctors working in the hospital. The English station is organized and supervised by one doctor (Y.H.) and supported by a medical English professional (T.M.), who also plays the role of a simulated patient. A new scenario is prepared (by Y.H.) for each English station (Appendix 1). Residents are given the typical patient information they would receive before a consultation and a prompt and instructions about the procedure of the station (Appendix 2). In 2021, the patient's chief concern was fever and sore throat. In addition, because this was held during the pandemic, the prompt included the duty of informing the patient of a negative antigen test for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

In the English station, residents have 20 minutes to take a medical history entirely in English; the pair take it in turns to interview the simulated patient, take notes, and try to come to a diagnosis. They can ask the supervising doctor about the results of any diagnostic tests that they would want to perform. Within the time limit, the residents also have to inform the patient about his/her diagnosis and decide on a treatment course. In 2021, there were a number of teaching points that it was hoped would be reinforced by the scenario:

1) Can the residents confirm the patient's details? In the scenario for 2021, the wrong patient, who had a similar sounding name, entered the room. The residents were expected to realize that they were speaking to the wrong patient and adjust the history-taking accordingly.
2) Can the residents take a routine medical history in English and obtain detailed, important, and relevant information about the patient? This is the main focus of this station.
3) Do the residents understand the Centor Score (assessment criteria for bacterial sore throat)? During the COVID-19 pandemic, residents have had less chance to see cases of sore throat. Therefore, could the residents diagnose bacterial (*Streptococcus pyogenes*) tonsillitis correctly?
4) Finally, do the residents understand that paracetamol is acetaminophen? The supervising doctor noticed that many of the young residents were not aware that acetaminophen, which is often prescribed in Japan, is also commonly known as paracetamol. Therefore, in the 2021 scenario, the patient was allergic to paracetamol, and the residents were evaluated on whether they could avoid its prescription.

After the 20-minute consultation, feedback is provided as follows: first, from the supervising doctor about the medical components of the medical interview; second, from the simulated patient about their medical English communication and their care for the patient; and third, the residents are given a chance to reflect on their performance. Finally, the supervising doctor and simulated patient evaluate the residents' performance.

4. Preparation class

Before the Medical Rally, the residents are invited to join the Medical English Training (MET) class. This class (taught by T.M.) is a weekly Medical English class held at Tsukuba Medical Center Hospital for interested doctors, nurses, and staff. The four weeks running up to the Medical Rally are devoted to preparation for the English station with training and practice exercises to familiarize the residents with useful phrases, techniques, and procedures of basic medical history-taking in English.

5. Survey results

Following each station, the residents complete a quick survey to evaluate their experience at the station as well as their performance, and to make comments. **Figure 1** shows the results of the 2021 survey of the 18 participating residents regarding the English station.

The survey results show that the residents found the English station difficult (mean score: 4.6, on a 5-point Likert-like scale), whilst their assessment of their achievement was average (mean: 2.8). Encouragingly, from the standpoint of the educational value of this exercise, the score for the "Reality" of the simulation was high (4.2), as was the score indicating the residents' perception that their experience of the English station would be useful for their future (4.4). The residents' before and after self-evaluations of their ability to carry out a medical history in English were low and showed

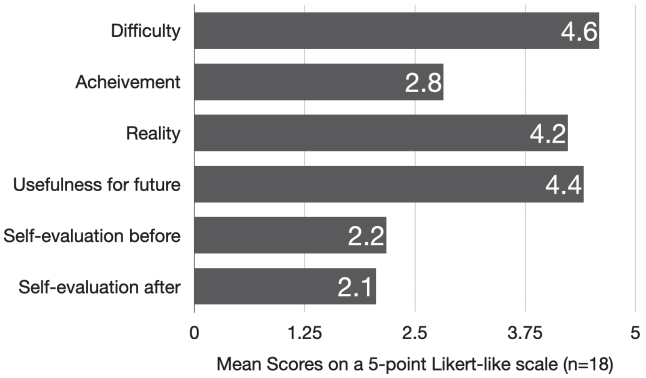

Figure 1. Mean scores from the post English station survey

a slight downward trend. This low self-perception of ability reflects a typical cultural tendency of Japanese learners to exhibit negative self-evaluation.[1] In reality, most residents were able to reach a diagnosis and communicate effectively with the simulated patient. Looking at the comments from the residents, a number of them commented about negative aspects, such as not being able to speak English, formulate questions in English, or realize that they were addressing the wrong patient. However, the difficulty of the experience seems to have motivated the residents to improve their English, as indicated in the following comments:

"I thought I really need to have at least some English skills to avoid annoying patients."

"I am not good at English and get confused when foreign patients come to see me, but I wanted to learn English so that I can deal with any patient."

"It was difficult because I couldn't speak English, but I managed to rephrase it and was able to get to the diagnosis. I would like to do my best to speak English a little more."

6. Discussion

Language differences between patient and health care professionals is described as being a major barrier to providing care that is safe and of high quality.[2] The need for second language training for residents is highlighted in the United States, which has a large Spanish-speaking population. In 2010, the Joint Commission published their report *Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care: A Roadmap for Hospitals*, in which "cultural competence" is defined as "the ability of health care providers and health care organizations to understand and respond effectively to the cultural and language needs brought by the patient to the health care encounter."[3] Results of a study that surveyed 772 resident physicians in the United States revealed that 55% of the respondents felt comfortable providing patient care in a language other than English (Spanish 77%, Chinese 5.7%, Korean 3.9%, other 8.9%).[4] The situation in the United States, which is a melting pot of diverse people and cultures, is vastly different from the situation in the largely homogenous society of Japan; however, despite many years of formal language training, studies indicate that many Japanese doctors are unwilling to see foreign patients.[5, 6] There is, therefore, a need to offer ongoing clinical communication training not only to medical students in university but also to residents. Indeed, for residents who encounter foreign patients in the hospital, which would invariably be the case at Tsukuba Medical Center Hospital or the University of Tsukuba Hospital, the need for medical English training might be even greater and more urgent than for medical students.

Simulation training is a way for medical students, residents, or even established doctors and other health care professionals to acquire or practice new clinical skills and techniques without any risk to patients. The efficacy of medical simulation training programs, like those experienced in the Medical Rally, have been reported for pediatrics,[7, 8] microsurgery,[9] oncology announcement consultation,[10] orthopedics,[11] emergency medicine,[12] and anesthesiology,[13] to name but a few. The Medical Rally, which combines a variety of diverse medical simulations across a day-long activity, with residents moving from station to station throughout the day, adds to the intensity of the program. Furthermore, the inclusion of the English station alongside the other simulations makes the experience more realistic than just doing medical English simulations in isolation.

In summary, the Medical Rally is a practical, useful training exercise for residents. It gives them the opportunity to experience a variety of realistic medical situations. Its intensive schedule and competitive elements add to the excitement of the program. The English station is designed to prepare the residents for encountering an English-speaking patient in the hospital, and the survey results suggest that through this station, residents were reminded of both the difficulty and the importance of communicating with patients in English, which appears to have motivated them to keep studying medical English in the future.

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Appendix 1: 2021 English station patient information

- Patient：MICHAEL JOHNSON、38 歳、男性、1982 年 9 月 14 日生まれ
- CC: Fever
- HPI:

3 日前から発熱と咽頭痛が出現。体温計故障しており測定できず。

自宅で安静・クーリングして様子をみていた。

翌日になっても持続しており、ベンザブロック L を買ってきて内服し始めた。体温計も購入して測定したら 38.8℃あった。

その後も 38 度台が持続、症状改善しないため、本日受診した。

(-)：嘔気嘔吐、腹痛、咳、鼻汁、悪寒戦慄、頭痛

咽頭痛はあるが飲水・食事摂取はできる

ハニーレモンをなめるとちょっと楽。ベンザブロックも痛みや熱に効くけど 5 ～ 6 時間すると切れてくる。

ワクチン接種：10 日前に 1 回目を接種（Pfizer/BioNTech）

海外渡航：コロナ禍前が最後（2019 年 11 月：エジプト（観光旅行））

Job：英会話学校教師（そのため不特定多数との接触あり、中学生～社会人・高齢者まで。毎回生徒の検温はしている。1 か月前に生徒の 1 人が家庭内感染したというのは聞いているが最近は感染者や濃厚接触者の報告はない。）

Family：妻（Supermarket 勤務、ワクチン 2 回接種済み（8 月中旬に 2 回目））、小学校 2 年生の娘、2 歳の息子の 4 人暮らし。2 歳の息子は鼻水を出していることが多いが元気で普段と変わりない。小 2 の娘が 5 日前に熱と咽頭痛が出て耳鼻科で薬（フロモックス）をもらってすぐに解熱した。検査は特にしていない。診断名は言われていない。

Sexual partner は妻のみ。

- Past Medical History：21 歳：Appendicitis（Appendectomy）
- Medication：ベンザブロック L、 肩こりに良いと妻から勧められ 10 日前から葛根湯（OTC、効果は実感せず購入したものがなくなったらやめようと思っている）
- Social History：

喫煙：1 年前まで 20 本 /day → 1 年前にコロナで不安になりやめた

飲酒：週に 1 ～ 2 回、妻と 2 人でワインボトル 1 本あける

Allergy: Hay fever (cedar pollen), Paracetamol でひどい薬疹（25 歳時：以降使用せず：今回のベンザブロックは妻が薬剤師に聞いて購入してきてくれた）

運動習慣：月 2 ～ 3 回ゴルフに行っていたが緊急事態宣言が出た 4 月から行っていない。体重は 75 から 80 kg に増加した。

- Family History: father diabetes, mother hypertension

心配：コロナにかかったか心配。

9 月 12 日（日）に子どもたちが Birthday party をしてくれるのでそれまでに治る？

半年前に子どもが扁桃炎になって咽頭痛が辛そうだったが、抗生物質をもらったらすぐに良くなっていた。抗生物質はもらえるか？

Point

- 定型的な病歴聴取ができるか
- 患者誤認を防げるか：1 回目の呼び出しは 18 歳男性（Mark Jackson、2003 年 6 月 3 日生まれ）のカルテを渡す（離席しており呼んでも来ないが名前が似ているので入ってきてしまう）、主訴も違うので気づいて欲しい。→ 気づいたところでアシスタント役が今席を外しているのでこっちを先に見てくださいと声をかける。
- 患者背景を聴取できるか
- Centor score を理解しているか
- Paracetamol ＝アセトアミノフェン を確認し、処方にあたり配慮できるか

身体所見

BP 118/76 mmHg, PR 90 bpm, BT 38.7℃, SpO_2 98% (room), RR 16 bpm

Eyes: not anemic, not icteric

（咽頭発赤軽度、後鼻漏なし、扁桃は腫大し白苔付着）

頚部リンパ節：両側浅頚リンパ節が腫大し圧痛軽度 可動性良

後頚リンパ節は触れず

Lungs: clear, Heart: no murmurs

Abd: soft & flat, normal B/S, no tenderness, 肝脾腫なし

四肢：edema(-)、発赤なし、関節腫脹なし

診断：溶連菌性扁桃炎

処方：AMPC、NSAIDs　他

準備

問診表 2 枚：18 歳男性の方は健康診断の尿検査で再検査を指示された

採点表

ベンザブロック

お勉強プリント

扁桃腫大の画像

Appendix 2: 2021 English station scenario prompt

今日は外国人さんの多い地域のクリニックで外来診療をしています。

今日も待合室には複数の外国人さんが来院されています。外国語が得意な院長は不在です。2 人で協力して頑張って診察しましょう。

説明を含めて 20 分:1 人ずつでまずは 6 分ずつ問診を行ってください（こちらで時間になったらお声がけします)。12 分過ぎたらお 2 人で問診・診察・説明をしていただいて構いません。

できる検査は：インフルエンザ抗原・コロナ抗原・溶連菌･アデノの迅速検査、レントゲン、血液検査は血算、血糖、CRP のみ（他は外注)。

普段の ER と同様、問診・診察（所見は神の声）・診断して説明まで行ってください。

既往歴などの背景は必ず聞くこと（プリントの空欄は必ず埋めること)。

発熱患者は来院してすぐにコロナの抗原検査を行っており陰性でした（本人はまだ知りません)。陰性だったことも伝えてください。

Conference proceedings

Twenty years before and twenty years after: A clinician's dream and vision of medical English education

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The Honolulu Academy of Medicine (Tokyo, Japan)

Abstract

For health care professionals to develop a successful career, keeping the "three Es" in mind is important. These are **E**nthusiasm with a clear goal, **E**xpertise, and **E**nglish in this order. Important though it is, English does not come first. The introduction of questions in English to the Japanese National Medical Licensing Examination in 2009 represented a great advance in medical English education. However, there is great room for improvement: the weight of English questions should be increased to at least 20 percent, the use of Japanese in the English questions should be avoided, as should that of abbreviations, the universal rules of scientific writing should be followed, and the clinical vignettes should always be realistic and practical. The author started his career as a physician educator by working on international exchange programs for students in East Asia at the John A. Burns School of Medicine, University of Hawai'i at Mānoa. Later, at the Honolulu Academy of Medicine, the author has been involved in international exchange programs for health care professionals. When teaching medical English, the author stresses the importance of the three Es. During the next two decades, the author will kick off a new series of international exchange programs for health care professionals.

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1. Introduction

"Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover." This quotation is often credited to Mark Twain (1835-1910). But actually, no one has been able to locate this passage in his works. Nevertheless, I love this "twenty years from now" quotation very much. Today, I would like to give you a 90-minute lecture titled "Twenty years before and twenty years after: A clinician's dream and vision of medical English education", in which I look back over the past two decades and look into the future for the next two decades.

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A summary of this paper was presented at the 25th JASMEE Academic Meeting.

Before proceeding to the main items, let me introduce myself very briefly. I was born in Hitachi (Ibaraki, Japan). It was the era when Japan experienced the highest economic growth. I was a child of an era of booming and spectacular economic growth. I encountered the English language at twelve years of age in junior high school for the first time, which means that I am not a native English speaker. A native speaker learns the language from his parents. I only learned Japanese from my parents, so no matter how strategically and efficiently I study English, I cannot be a native English speaker. I earned a master's degree in Engineering from Kyoto University (Kyoto, Japan) and then a bachelor's degree in Medicine from Osaka University (Osaka, Japan). I am an internist, specializing in kidney diseases and renal replacement therapy (hemodialysis, peritoneal dialysis, and the medical management of kidney transplantation). I love teaching medicine and English as a practicing physician, and in the past I had enjoyed teaching in two Japanese medical schools, as a visiting professor at Jichi Medical School (Tochigi, Japan) for 8 years, and as an adjunct professor at Tokyo Medical University (Tokyo, Japan) for 6 years.

2. Why I am here today

You may wonder why I am here today. There are two reasons. The first is that I once delivered a Special Lecture at the 8th Academic Meeting of the Japan Society for Medical English Education on July 9, 2005.[1] The transcript of the lecture was published the next year.[2] I put emphasis on three points as a conclusion in the lecture:

(1) We need to encourage not only students but also health care professionals to use English as communication and investigative tools more often and more casually in their practice.

(2) Keeping the "three Es" (**e**nthusiasm with a clear goal, **e**xpertise, and **E**nglish) in mind is essential for a successful career.

(3) As a possible example of curriculum reform, I proposed the introduction of "course thesis (research project) written in English" as part of undergraduate medical education.

I would like to touch on the subsequent progress during the past two decades. The learning environment has been dramatically changed by the advancement of information and communication technology. But what has and has not changed in medical English education?

The second reason: in 2004, one year before I attended the 8th Academic Meeting of the Japan Society for Medical English Education in July, 2005, I completed a medical education fellowship in the Office of Medical Education at the John A. Burns School of Medicine, University of Hawai'i at Mānoa. I was the first Japanese physician who completed the program. After that, I started to serve as a curriculum developer, a workshop faculty member and lecturer, and a correspondent of Japanese affairs at the Program for Medical Education in East Asia in the Office of Medical Education, John A. Burns School of Medicine. My first mission was assisting a medical student international exchange program with medical schools in Japan. Among these schools, the faculty of Saga Medical School, Faculty of Medicine, Saga University (Saga, Japan) was active and enthusiastic about student-centered learning. I met with a corresponding doctor of the school who was in charge of medical education and international affairs. This was Dr. Yosuke Aoki, the Chair of this session and the President of this 25th Academic Meeting. By way of the international relationship between Saga Medical School and John A. Burns School of Medicine, I became an adjunct lecturer for Saga Medical School in 2005. Since then, every year I have visited the school for one or two days to give second- or fourth-year medical students an intensive lecture as part of the English for Medical Purposes course. I am not an authentic English teacher, but I have been teaching students from a clinician's point of view and by offering practical and real contents in medicine.

In summary, I am here today because twenty years ago, I presented a special lecture at this conference, and since then, I have been teaching Japanese medical students English for Medical Purposes at Saga Medical School.

The main theme of the Academic Meeting this year is "the Role of The Japan Society for Medical English Education in Healthcare Education". And to define today's role of English teachers and health care professionals in health care education, we must answer two questions. First, why do we teach medical English? Second, what is the goal of medical English education? I am posing these questions because Japanese health care has the highest quality in the world. According to the World Health Statistics this year,[3] Japan has the highest life expectancy at birth (average 84.3 years old), followed by Switzerland, Korea, Singapore, and Spain. As for healthy life expectancy at birth, again Japan is number one in the world (average 74.1 years old), followed by Singapore, Korea, Switzerland, and Cyprus. In Japan, the universal health insurance system has been covering all the people since 1961. Everyone can access necessary health care services relatively inexpensively. In contrast, in the United States of America, medical bills contribute to a large and increasing share of personal expenses. Generally speaking, Japan has achieved the best outcomes of health care services and the highest standards of safety and well-being in the world. Japanese health care students have nothing to learn from the rest of the world, because Japan is the heathiest country in the world. Rather, all other countries should learn about the Japanese health care system. All foreign health care students should learn Japanese first, and then work and study in Japan to learn about Japanese medicine and healthcare. I know this is a rough and tricky question, but if we do not answer the question fairly and sincerely, not only Japanese students but also Japanese health care professionals will never be motivated to learn English as a communication and investigative tool for their profession.

3. Dr. Toshihide Maskawa: The "three Es" for a successful career

If you asked me what the most striking event was that affected my thinking and activities regarding medical English education during the past twenty years, I would tell you without hesitation an anecdote about Dr. Maskawa, a Japanese theoretical physicist. He was born in Nagoya in 1940, graduated from Nagoya University in 1962, and received a Ph.D. in particle physics from the same university in 1967. He became a professor of Kyoto University in 1980 and won the Nobel Prize in Physics in 2008 for his work on "Charge Conjugation and Parity (CP) Violation in the Renormalizable Theory of Weak Interaction". He died last year (2021) in Kyoto, Japan, at the age of 81. Dr. Maskawa's Nobel Lecture was entitled "What Does CP Violation Tell Us?" and was delivered on December 8, 2008 at Stockholm University. After a brief introduction by the Chairman of the Nobel Committee for Physics, he began his lecture with

"I am sorry. I cannot speak English." The audience was buzzing for a moment. He then delivered his lecture all in Japanese. I recognized that it was unprecedented and epoch-making. Dr. Maskawa had never gone abroad before he was awarded a Nobel Prize. He had never attended any overseas conferences. He obtained a passport for the first time when he visited Stockholm to attend the Nobel Prize Ceremony.

In my previous Special Lecture,[1,2] I introduced the idea of the three Es for a successful career. When I first came to Honolulu, Hawai'i, USA, a senior physician–one of the directors of the John A. Burns School of Medicine international exchange programs–told me in his office that if I (or foreigners in general) wanted to be successful in the United States, English would be the most important thing. He also told me that the three most important things for studying abroad are first English, second English, and third English, too. "English, English, and English." At first, I believed that this interpretation of the three Es was right. But I soon realized that while the three Es were useful in the short term, they would eventually lead a motivated young fellow to a poor career. It is easy to say English as a language is important. But from a clinician's point of view, dividing people by language proficiency is another form of discrimination, just like racial, sexual, physical, mental, and religious discrimination. And the true nature of a successful career in life does not necessarily depend on or is not restricted solely by language ability itself.

The true three Es for studying abroad, working abroad, and living abroad are different. They are, enthusiasm, expertise, and English in this order. First comes enthusiasm with a clear goal. Then, expertise as a health care professional. Expertise does not mean mere knowledge or a set of skills based on immature experiences. Expertise should be of the highest standard. Then comes English. Young fellows tend to focus on medical English only. But general and conversational English is much more important to survive in the real world. Therefore, medical English comes last, but I never say it is not important. It is important, but still I would like to remind young fellows not to forget the hierarchy of the three Es.

I know that Dr. Maskawa's career might not be one that everyone can follow. He had an enthusiasm to study particle theory in physics. He evolved his own theory and became an expert. Later, the Nobel Foundation acknowledged him. He published an autobiography in Japanese in 2016.[4] In his book, he stated that he did not like to study English and was not good at it. He then avoided English consciously for his entire life and career. He looked back on his career and said that if he had been distracted by studying English, he might not have been a successful researcher. At the end of the book, however, Dr. Maskawa made an honest confession: おしまいにもう一度。若い人は憧れとロマンを持って進んでほしい。それから英語は重要。ありがとう。[4] I guess he wanted to say, "Finally, the main points once again, young fellows: be proactive with your own dream and vision. And studying English is of course important. Thank you."

4. Critical review of English questions in the Japanese National Medical Licensing Examination

4.1 General Issue

The guidelines for the Japanese National Medical Licensing Examination (Kokushi) first referred to general medical English necessary for medical care when they were revised in 2009.[5] Since then, each Kokushi has contained some English questions. This is both good and bad. Kokushi consists of 400 multiple choice questions, but since English questions were introduced, no more than five have been included in each exam. This is only one percent of the total. Is this a sufficient number of questions to measure examinees' ability to use English in providing health care? In your classroom, do you use only five questions to assess your students' English proficiency? If I were a Kokushi examinee, I would totally ignore the English questions, because getting five of 400 questions right or wrong would be very unlikely to determine success or failure in the exam. Rather, I would focus on the other 395 questions in Japanese, because I am a native speaker of Japanese anyway.

The required score to pass Kokushi is usually around 70%. The average score of successful applicants is in the 80s, and the average score of those who fail is in the 60s. The difference between passing and the threshold is 10%, and between passing and failing it is 20%. Based on this, if we were to increase the weight of English questions in Kokushi to put a clear emphasis on the importance of medical English, 40 questions (i.e., 10% of the total) would be the minimum requirement. A more realistic requirement would be 80 questions (20%).

However, I would suggest that the number of English questions should be increased to half of the examination. This means 200 questions in Japanese and another 200 questions in English. This would force medical students to study medical English without any prompting from their English teachers.

4.2 Analysis of specific issues

Let us look at three English questions from Kokushi as examples of specific issues:

(1) Question 15 in Section E (116th Kokushi in 2022)

I will not quote it, but it is not actually an English question. Rather, it is a medical question with the partial use of medical jargon in English. I believe that there is no reason to use Japanese and English concomitantly in one question and that the use of Japanese in English questions should be avoided.

(2) Question 5 in Section E (107th Kokushi in 2013)

In this question, we read "ILO", "JICA", "UN", "UNICEF", and "WHO", but who knows what they all mean. The Japanese National Medical Licensing Examination is a national examination, and its contents and format are totally public. Anything in English should be understandable worldwide. According to one international manual of style for medical and scientific writing,[6] "The spelled-out abbreviation followed by the abbreviation in parenthesis should be used on first mention unless the abbreviation is a standard unit of measurement." Kokushi needs to avoid abbreviations and, in general, follow the universal rules of scientific writing.

(3) Question 31 in Section A (114th Kokushi in 2020)

This question includes the sentence, "At presentation, she was slightly hypotensive with a blood pressure of 96/68 mmHg." Clinicians never present in this way. Clinicians would say, "At presentation, her blood pressure was 96/68 mmHg," because a blood pressure of 96/68 mmHg is, needless to say, hypotensive.

Another sentence says, "Her ECG on admission showed a narrow QRS-complex tachycardia at a rate of 180/min." Here we find the term "tachycardia". And when we take a look at the five answer choices (a. Sinus tachycardia, b. Sick sinus syndrome, c. Ventricular tachycardia, d. Supraventricular tachycardia, e. Complete atrioventricular block), we can immediately eliminate b. and e., because they are not tachycardia. I must say that this question is careless and thoughtless.

The sentence "Her ECG on admission showed a narrow QRS-complex tachycardia at a rate of 180/min," is redundant, because any heart rate faster that 100 beats per minute in adults is called "tachycardia". Clinicians would simply say, "Her ECG on admission showed a narrow QRS-complex with a heart rate of 180/min."

Back to the question itself as a whole, I must say that any redundancies in a clinical vignette are not realistic. When a resident or medical student gives a patient presentation, after presenting the chief complaints, brief history, and vital signs, the attending physician will interrupt him or her to take a brief look at the electrocardiogram. However, there is no figure of an electrocardiogram in the question.

Since the Japanese National Medical Licensing Examination is a licensing examination to become a physician, all the questions, terms and items must be realistic and practical.

5. Showcase international exchange programs in Honolulu

5.1 Workshops for medical students

Since 2003, I had worked as a curriculum developer in the Program for Medical Education in East Asia (PMEAA) at the John A. Burns School of Medicine, University of Hawai'i at Mānoa. The first program I developed was "Learning Clinical Reasoning" with the support of the PMEEA director Gordon M. Greene, Ph.D., Seiji Yamada, M.D., M.P.H. and the educational program specialist Raymond S. Tabata, M.A. It was a two-week-long program in English held at the John A. Burns School of Medicine for medical students from Japan. Hawai'i University faculty members, staff and six volunteer medical students had several on-site meetings to discuss the schedule, event management, human resources, logistics, and budget. The program was first held in 2004. Seventeen medical students from four medical schools (including Saga Medical School) were invited to join the program. We set clear endpoints for the program. Five instruction methods (problem-based learning in small groups, one-on-one case simulations, practice in physical examination, standardized-patient encounters, and group discussions for reflection and feedback) were woven strategically to accomplish the goal. On day one we had an orientation, followed by four days of clinical reasoning sessions for the symptom of chest pain. The first week ended with a mid-term evaluation. The second week had the same structure as the first week, but the reasoning agenda shifted from chest pain to abdominal pain. The last day of the program was devoted to an end-of-program evaluation and farewell aloha dinner, along with a program completion ceremony.

The program was a great success. When we took a fresh look at all the educational resources and facilities available at the John A. Burns School of Medicine, we rediscovered the strength of them to create a brand-new curriculum.

5.2 Workshops for health care professionals

I soon realized that collaboration between Honolulu and Japan would be productive. East meets West in Honolulu, and the relationship is synergistic and resonant, allowing the search for new methods of health care education to be more experimental and challenging.

I would like to showcase another successful international exchange program, not for students and trainees, but for health care professionals in every field. Thus, it is in the realm of adult, lifelong, and continuing education.

There are many international exchange programs for Japanese health care professionals in Honolulu, but most of them simply involve site-visiting and sightseeing, at most offering small lectures by local speakers. In general, they are passive programs. The worst thing is that Japanese are generally passive, and when they attend these programs, few say even one or two words in English. The first thing I did was to shift the emphasis from passive attendance to proactive attendance.

I had one more strong complaint about the existing programs. When you apply for places on international exchange programs, you must usually satisfy some prerequisites and go through a selection process involving tests or interviews. But the truth is that when Japanese healthcare professionals are faced with tests of English

proficiency, most of them hesitate to join such programs. So what I did was to abolish all the prerequisites, including English proficiency, number of years of experience, and types and categories of profession. Anyone can participate, there is no selection process, and applicants are accepted on a first come, first served basis. And lastly, I organized all the contents and activities in the program to empower the participants and to avoid making them feel powerless, afraid, or guilty.

The name of the program I am showcasing today is the Honolulu Cardiac Rehabilitation Workshop. This was a one-week program for Japanese health care professionals who specialize in cardiac rehabilitation. It was first held in 2006 in Honolulu, and it continued annually until 2017. The co-director of the program, Dr. Shinji Sato (Professor, Teikyo University, Tokyo, Japan as of 2022), worked with two specified non-profit corporations, Japan Heart Club (Tokyo, Japan) and the Japanese Association of Cardiac Rehabilitation (Tokyo, Japan), from the beginning to recruit participants, raise funding, and provide opportunities for academic presentation and publication.

The program has three distinctive features:

(1) The program is open to anyone, and the participants are multidisciplinary: we have welcomed a nutritionist, a psychologist, a student doing a master's course in sports medicine, a post-graduate cardiology nurse, a professor of public health, and a hospital executive. Some could have been English teachers, and others could not speak English at all.

(2) As for the contents and instruction methods, we invented and introduced a gradual and protected transition from passive attendance to proactive attendance. For example, when we practice the learning principle of "see one, do one, teach one", we break it down into a week-long period, with day one for seeing one, day two for doing one, and then day three for teaching one. We start from one-way listening to a lecture in English, move slowly to two-way presentation in English, and then free discussion in English.

(3) You might ask whether it is really possible to accept people on the program who cannot speak English at all. The answer is yes, because in the workshop, those who speak English fluently and those who cannot speak it at all have time to talk together in their mother language. They help each other to interpret, to understand, to express their questions, and present their opinions. This process itself helps to establish bonding, mutual reliance, respect, and cohesiveness in the group. After completing all the educational events of the workshop, every participant emerges with a great sense of confidence and accomplishment. And they all vow to keep in touch with each other and come to another Honolulu workshop in the future.

Several years later after the first session, the participants who joined the Honolulu Cardiac Rehabilitation Workshop established their own network and community. They worked together to organize and manage workshops, symposiums, and panel discussions at the annual academic meetings of The Japanese Association of Cardiac Rehabilitation.[7] These activities are still continuing today.

6. Conclusion

Why do we teach medical English? Even though the Japanese health care system is number one in the world, Japanese health care professionals have to use English to communicate globally. Studying English opens the door to studying, working, and living abroad, and doing these things broadens our minds and contributes to the advancement not only of our personal careers but also to that of our country.

What is the goal of medical English education? For me, teaching medical English is a magic wand. With the aid of this wand, I can teach the importance of the three Es for successful career advancement.

For the next two decades, I will continue to devote myself to adult and lifelong continuing education for Japanese health care professionals. I have already established the protocol and structure of the Honolulu Healthcare Workshop, which focuses on medical English, career development, renal replacement therapy, and complementary and integrative medicine. Honolulu, Hawai'i, USA is one of the best places to study these subjects, because eastern culture and western culture meet in the original Hawaiian culture. I will continue to research, develop, and renew the contents of those four fields. I invite any members of the Japan Society for Medical English Education who are interested in these projects to join us.

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