The Effectiveness of Peer-assisted Learning for Medical Students in Pediatric Bedside Learning

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Objective: Through a peer-assisted learning conference in pediatric bedside learning (BSL), we investigated how providing lectures to and receiving lectures from colleagues affects learning in medical students.

Design: Ninety medical students were asked to participate in a pediatric BSL course at Juntendo University.

Methods: A “medical student peer-assisted learning conference” was held, and medical students were given the opportunity to present lectures. One student played the role of a lecturer, and the other students acted as students. All the students took turns playing the role of the lecturer. A questionnaire survey was conducted on the participants to allow them to reflect on their own presentations.

Results: Many students who played lecturers provided lively presentations. For them, listening to the excellent presentations of their colleagues was a stimulus for learning. Altogether, 25.6% students realized that their own lectures should be improved, and this awareness may have made them more interested in their colleagues’ lectures. Many students had positive opinions about the choice of themes. The Department of Pediatrics, with its wide variety of fields, also seemed to contribute to the students’ active choice of themes.

Conclusions: The conference was very effective as an educational opportunity that not only piqued the interest of students but also provided a good opportunity for them to reflect on and recognize deficiencies in their own presentations. However, this study did not obtain sufficient evidence that demonstrated a continuous increase in the motivation to learn among students. Continuously increasing such opportunities is essential in medical education.

Key words: peer-assisted learning, peer-to-peer learning, bedside learning, medical students, lecture

Introduction

Education for medical students is mostly still provided in the form of lectures by teachers. In the classic style of medical education, students are immersed in completing assigned tasks and have few opportunities to learn independently or present their findings to others. Presentations involve preparation and output, which can facilitate learning in students. Presentation skills are also essential for medical doctors. Unfortunately, medical students in Japan have few opportunities to present what they have learned during their pre-graduate education, particularly during bedside learning (BSL).

The international standards published by the World Federation for Medical Education require medical school graduates to acquire independent learning skills and participate in educational activities1. Topping et al.2 reported that peer-assisted learning contributes to the improvement of learning effectiveness, autonomy, and proactivity. It is one of the educational methods adopted in various fields. One student takes the role of an educator, and...
another student plays the role of a learner. Students take turns in playing the roles of teacher and learner.

We hypothesized that providing opportunities for peer-assisted learning during BSL would have a positive learning effect on medical students. As a result, we investigated how providing lectures to and receiving lectures from colleagues affects learning in medical students.

Materials and Methods

Design: Ninety medical students were asked to participate in a pediatric BSL course at Juntendo University.

Period: From April 01, 2015 to March 31, 2016.

Methods: BSL at Juntendo University is a 4-week pediatric course (phase 1) with eight students. During this period, medical students are assigned to a different case each week and give a long presentation of the case at some point in the week. The remaining time is spent participating in ward conferences, writing in patients’ charts, and receiving mini-lectures from the supervising physician. Only one opportunity is given to conduct the long presentation during the 4-week period, and considering the percentage of the total learning time, the opportunities for presentations are few. Therefore, a "medical student peer-assisted learning conference" was held to provide medical students with an opportunity to conduct a lecture. The members of the conference were seven or eight medical students who did pediatric rounds at the same time, and a pediatric advisor participated as a facilitator. The medical students prepared a topic of their interest during the 4-week pediatric BSL and presented a 5-minute lecture. One student acted as a lecturer, and the other students acted as students. The students were asked to assess the content of the lecture (Figure 1). The assessment items were voice clarity, speaking speed, time allocation, content, and response to questions. In addition, the students were asked to write a one-line summary of what they understood after listening to the lecture so that they could provide feedback to the student lecturer on whether they understood the content of the lecture. The student lecturer was given time to provide feedback on their colleagues’ assessments. In addition, a questionnaire survey was conducted on the participants to provide them an opportunity to reflect on their own presentations.

This study was conducted under the application and approval of the Juntendo University President’s Education Improvement Project (KY25-3), and written consent was obtained from the students for the use of their data.

Results

Lecture topics (Table 1)

Many of the medical students who acted as lecturers provided lively presentations, and the students participated in the lectures attentively. One student presented a detailed lecture on developmental milestones in children, and another lectured on pathological findings from a pediatric kidney biopsy. As is typical in pediatrics, a lecture also examined psychologically why famous animated characters are so popular among children. Another lecture was presented by a student who had a part-time job as a staff member at an amusement park, and she described what she had been trained to do at the facility (e.g., how to treat children and people with physical disabilities). All the participants showed a deep understanding of the company’s approach such as how to treat people who are oppressive or uncomfortable. The students were very enthusiastic about making lecture materials, which they elaborately prepared, to stimulate the interest of their colleagues. Some students researched the positive effects of exercise and dance on children, while others lectured on the negative effects of video games. Some students investigated social factors such as “learning” and “play” for hospitalized children. The field was much more diverse than we had thought beforehand, and the students showed a lot of curiosity during the pediatric BSL.

Questionnaire survey and reflections on the peer-assisted learning conference (Tables 2 and Table 3)

A questionnaire was administered to the participating medical students to provide them an opportunity to reflect upon what they had presented to their colleagues and what their colleagues had presented to them in their respective lectures.

For the first question, “Q1: Did your lecture go well?,” 8 (8.9%) of the students answered “Excellent,” and 18 (20%) answered “Good.” On the other hand, 41 (25.6%) answered “Poor” and recognized
Figure 1  Peer-assisted learning conference for medical students
Medical students prepared and gave a 5-minute lecture on a topic that was of interest to them during the 4-week pediatric BSL. One student played the role of lecturer, and the other students acted as students. The lecturer presented a 5-minute lecture, and the students assessed the lecture. The lecturer was given time to provide feedback on their colleagues’ assessments.

Table 1  Lecture themes by medical students

| Medical students | Comments |
|------------------|----------|
| Education for hospitalized children | Chromosomal abnormality |
| Attention Deficit Hyperactivity Disorder (ADHD) and intelligence | Playing in the hospital |
| Intelligence Quotient (IQ) | About vaccines |
| Children & dancing | How to put your baby to sleep |
| Beautiful children’s hospitals around the world | Frequent recurrent nephrotic syndrome |
| Mass screening test for newborns | Jaundice |
| Sudden Infant Death Syndrome (SIDS) | Pediatric intensive care unit |
| Beware of rickets! | The impact of heading on children |
| Game disorders in children | Why babies are so cute |
| What is naming? | About twins |
| About popular characters | Music therapy and children |
| Children and folktales | About injections |
| About palivizumab | Short stature |
| Marfan syndrome | Child development |
| What I learned as a staff member at an amusement park | Opening a pediatric clinic! |
| ...etc | ...etc |
their own lectures as needing improvement and found some issues for better lectures. Comments from the reflections included “My presentation time was greatly exceeded”; “I was too nervous to do well, and my lecture was not coherent”; and “The response from my colleagues was good, and it went well.”

The next response to the question, “Q2: How effective was your lecture in terms of your learning?”, 14 (15.6%) of the respondents answered “Excellent,” and 48 (53.3%) answered “Good.” Many students felt that their own lectures had a high learning effect. Comments from the reflections included “I was able to retain knowledge better by giving my own presentation”; “It was a great opportunity to practice my presentation”; “I put a lot of effort into preparing lectures for my colleagues.”

In response to the question, “Q3: How effective was your colleague’s lecture in terms of your learning?”, 31 (34.4%) of the respondents answered “Excellent,” and 37 (42.2%) answered “Good.” Many students also found that their colleague’s lectures had a high learning effect. Comments from the reflections included “The lectures from my colleagues were very interesting, and I was able to concentrate very well”; “I am not good at giving presentations, so watching my colleague’s lecture was very helpful for my presentation”; and “I was able to listen with interest without falling asleep.”

In response to the question, “Q4: Was your choice of theme successful?”, 55 (61.1%) of the respondents answered “Excellent,” and 29 (32.2%) answered “Good.” Many students felt that their choice of theme was successful. Comments from their reflections included “I enjoyed learning because the themes were free, and there was a wide range of choices”; “I was able to conduct in-depth research on the topics I was interested in during pediatric BSL.”

In response to the question, “Q5: What is your overall evaluation of this conference?”, 52 (57.8%) of the respondents answered “Excellent,” and 30 (33.3%) answered “Good.” Many students thought the conference was successful. Comments from their reflections included “I enjoyed learning because the themes were free, and there was a wide range of choices”; “I was able to conduct in-depth research on the topics I was interested in during pediatric BSL.”

| Q1. Did your lecture go well? | Excellent | Good  | Fair  | Poor  | Unevaluable |
|------------------------------|-----------|-------|-------|-------|-------------|
| (n=90)                       | 8 (8.9%)  | 18 (20.0%) | 41 (45.6%) | 23 (25.6%) | 0 (0.0%)    |
| Q2. How effective was your lecture in terms of your learning? | 14 (15.6%) | 48 (53.3%) | 23 (25.6%) | 2 (2.2%) | 3 (3.3%) |
| Q3. How effective was your colleague’s lecture in terms of your learning? | 31 (34.4%) | 37 (42.2%) | 20 (22.2%) | 2 (2.2%) | 0 (0.0%) |
| Q4. Was your choice of theme successful? | 55 (61.1%) | 29 (32.2%) | 6 (6.7%) | 0 (0.0%) | 0 (0.0%) |
| Q5. What is your overall evaluation of this conference? | 52 (57.8%) | 30 (33.3%) | 8 (8.9%) | 0 (0.0%) | 0 (0.0%) |

Table 3  Reflections on the peer-assisted learning conference by medical students

“My presentation time was greatly exceeded.”
“I was too nervous to do well, and my lecture was not coherent.”
“The response from my colleagues was good, and it went well.”
“I was able to retain knowledge better by giving my own presentation.”
“It was a great opportunity to practice my presentation.”
“I put a lot of effort into preparing lectures for my colleagues.”
“The lectures from my colleagues were very interesting, and I was able to concentrate very well.”
“I am not good at giving presentations, so watching my colleague’s lecture was very helpful for my presentation.”
“I was able to listen with interest without falling asleep.”
“I enjoyed learning because the themes were free, and there was a wide range of choices.”
“I was able to conduct in-depth research on the topics I was interested in during pediatric BSL.”
“I tried to choose a topic that would be interesting to my colleagues.”
“For me, it was easier to ask questions to my colleagues than to teachers, and asking questions was a learning experience in itself.”
“I was able to participate in the conference on my own initiative.”
“If there are two opportunities for presentations, I think I can make use of my reflection.”

…etc
during pediatric BSL"; and "I tried to choose a topic that would be interesting to my colleagues."

In response to the question, "Q5: What is your overall evaluation of this conference?" 52 (57.8%) of the respondents answered "Excellent," and 30 (33.3%) answered "Good." Many students had a positive view of the conference. Comments from their reflections included "For me, it was easier to ask questions to my colleagues than teachers, and asking questions was a learning experience in itself"; "I was able to participate in the conference on my own initiative"; and "If there are two opportunities for presentations, I think I can make use of my reflection."

**Discussion**

According to the conventional educational theory, educating others has the highest learning effect on oneself. However, the results within the scope of this study showed that colleague's lecture had the same positive learning effect as their own lectures. Zaidi et al.\(^3\) reported that peer-assisted learning and peer group interventions contribute to students' motivation to learn, and students who are successful in presentations contribute to improved group performance. In our study, lectures from colleagues, particularly well-presented ones, were considered more stimulating for medical students than those from the faculty. The students talked a lot about the excellent content of their colleagues' lectures, which suggests its contribution to improving motivation too. In this conference, 25.6% of the students realized that their own lectures needed improvement, and this awareness may have increased their interest in their colleagues' lectures. For another perspective, regrettably, our students learn better when taught by others and are not accustomed to active learning on their own.

Parish et al.\(^4\) reported that students unexpectedly accepted the group assessment of their colleagues positively and that assessment and feedback led to a better understanding of "quality". Our study results suggest that the medical students may have deepened their understanding of the quality of learning by becoming an assessor of their colleagues. In addition, Burgess et al.\(^5\) reported that students who participated in the assessment of their colleagues tended to feel responsible for the development and progress of their colleagues and to have a sense of ownership. In our study, many students participated in the assessment of their colleagues, listened intently to their colleagues' lectures, and actively asked questions.

In this conference, many students expressed positive opinions about the choice of themes. The fact that they were free to choose the theme may have piqued their interest and curiosity. The Department of Pediatrics, with its wide variety of fields, also seemed to contribute to the students' active choice of themes.

These are all learning outcomes that are difficult to obtain in the classic medical education, indicating that this study has a useful learning effect. This conference was very effective as an educational opportunity to draw out the interest of medical students and also provided a good opportunity for them to reflect upon and recognize deficiencies in their own presentations.

On the other hand, however, while peer-assisted learning is effective in increasing the motivation to learn, the effect tends to be temporary and difficult to sustain, and repeated learning opportunities are recommended. In this study, considering the time available for this conference during the 4-week BSL, it was held once but should be held twice a month. Continuously increasing such opportunities is vital in medical education.

In addition, this study did not evaluate the effects of the remote period on motivation, so it has limitations in proving the true learning effect. Because the study was conducted at a single institution over a certain period and in a limited environment, the extent at which bias can be eliminated was limited. Conducting surveys in multiple departments and at various grade levels in the future is recommended. Furthermore, investigating the effects of learning after a few years is an issue that should be addressed in the future.

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Authors' contributions

Substantial contributions to the study conception or design and acquisition, analysis, or interpretation of data: AE and HH. Drafting the manuscript or revising it critically for important intellectual content: AE, NT and TS. All the authors read and approved the manuscript.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

Reference

1) Karle H: Global standards and accreditation in medical education: a view from the WFME. Acad Med, 2006; 81: 43-48.
2) Topping KJ: The effectiveness of peer tutoring in further and higher education: a typology and review of the literature. High Educ, 1996; 32: 321-345.
3) Zaidi Z, Jaffery T, Shahid A, Moin S, Gilani A, Burdick W: Change in action: using positive deviance to improve student clinical performance. Adv Health Sci Educ Theory Pract, 2012; 17: 95–105.
4) Parish SJ, Weber CM, Steiner-Grossman P, Milan FB, Burton WB, Marantz PR: Teaching clinical skills through videotape review: a randomized trial of group versus individual reviews. Teach Learn Med, 2006; 18: 92-98.
5) Burgess AW, Roberts C, Black KI, Mellis C: Senior medical student perceived ability and experience in giving peer feedback in formative long case examinations. BMC Med Educ, 2013; 13: 79.