How do the first year students find the way of learning medicine in Japan?

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**Abstract**

**Background:** There are students who drop out medical school during the early years.

**Objectives:** We investigated how the first year students find the way of learning medicine.

**Material and methods:** We developed a freshman orientation program that combined PBL and simulation learning with SPs. We collected freshman's impressions in 2013 and 2014 from their freely written comments after the course and then qualitatively analyzed their responses.

**Results:** Five main categories were labeled anxiety, knowledge, reconstructing visions, expanding community and readiness. The story lines generated from this result is as follows. The students were obsessed with the large volume of knowledge they needed to acquire. They began to reconstruct their future visions. Many recognized the necessity to expand their range of relationships through learning with peers and SPs. They also began to transfer this learning activity to diverse social experiences. These experiences were useful for building readiness to learn.

**Conclusion:** Freshmen, who are neither laypersons nor medical professionals, could lead to establishing a readiness to start a medical career through expanding their community. This can be experienced only at this stage of their learning. It is a good time for an intervention to modify behavior to improve the learning of medicine.

**Keywords:** first year students, PBL, SP, qualitative study

**Introduction**
Medical students in the U.S. reportedly experience high rates of stress, often leading to increased anxiety and decreased academic motivation (Compton et al. 2008; Del-Ben et al. 2013). Self-doubt is highly prevalent among first-year medical students, affecting their sense of identity and purpose (Liu et al. 2015). These days the situation is similar in Japanese medical schools, and the numbers of students who make failing grades, particularly in the early years, or leave school are increasing. (The 8th Regular press of Association of Japanese Medical colleges. 2017). There are 82 medical schools in Japan, including 31 private schools such as our institution. All of these schools adapt a 6-year course of education. In Japan, the entrance examination for medical school is highly competitive (Suzuki et al. 2008). At our school, approximately 20 to 30% of students are promoted directly from high school, and many others spend several years at a prep school to pass the entrance examination. Although the average age at admission to our school is 19-20 years, many of these students likely do not recognize themselves as adult learners.

Our medical school, which is a private school in Japan, provides a freshman orientation program “introduction to medicine”. This program has been modified as an awareness reform program in which students would learn how to learn medicine (Fujikura et al. 2014). The program has been held for first-year medical school students since 2013 consisted of problem-based learning (PBL) tutorials, large-classroom lectures, simulation learning using role-play with simulated patients (SPs), and team-based learning (TBL), presented in this order. This course employed many educational strategies, and we believe it helped students understand what they learn and how to learn during their 6 years of medical and to get an overview of the learning roadmap. After the program ends, students were asked to give their impressions by submitting unconstrained comments.

To investigate how the first year students in medical school are trying to adapt to the learning of medicine, we conducted a qualitative analysis of student’s opinion using a self-administered open-ended questionnaire for this program

**Methods**

**Structure of the "introduction to medicine" program**

The program consisted of 11 sessions of 120 minutes (Figure 1). After an orientation, the students were given clinical case tasks in PBL (thyroid disease in 2013 and acromegaly in 2014). They had not completed any basic biomedical science or clinical science courses, but these clinical tasks were linked to the students’ basic science learning topics. For supplementation, large-classroom lectures by teachers from the physiology or endocrinology department, and TBL (including tests for summary) were incorporated into the program. Students also learned basic medical interview skills through role-play with SPs, whose cases were related to the aforementioned PBL tasks. All of our SPs are volunteer citizens and can be viewed as laypersons. In 2013, 19 SPs (7 men and 12 women) with a mean age of 62.4 ± 9.4 years old (mean ± SD) participated. In 2014, 17 SPs (6 men and 11 women) with a mean age of 63.8 ± 8.2 years participated.

**Participants**

Written informed consent was obtained from each of the participating students before the start of the analysis. Ninety-one students (61 men and 30 women) in 2013 and 109 students (68 men and 41 women) in 2014 gave consent to participate in the study, and the unconstrained comments they submitted were investigated. The average age at admission to our school was 19.2 ± 1.7 years (mean ± SD) in 2013 and 19.7 ± 1.8 years in 2014.

**Qualitative study**
Students were asked to give their impressions by submitting unconstrained comments. The written responses were then qualitatively analyzed using Steps Coding and Theorization (SCAT) (Aomatsu et al. 2013) to generate emergent themes. SCAT is an easily accessible qualitative data analysis method. The background of this method is from the grounded theory approach. In the present study, a physician and a psychologist conducted the analysis according to a previously reported process (Maeno et al. 2013). Briefly, the written comments were reviewed by the physician and psychologist and significant sections were extracted. These were coded based on content, keeping the original opinion, after which they were divided into subcategories and each was given a title. These subcategories were then consolidated into main categories, taking into account their emergent themes, and also were given a title. A third researcher read the transcripts and results of the analysis as an independent auditor to assess dependability and confirm the ability of the analysis. A fourth author supervised the analysis of the results.

**Ethical considerations**

The protocol was approved by the Nippon Medical School Ethics Committee under reference number #26-10. When the questionnaire was given to the participants, they were all informed that no identifiable information would be used in the results. They were also informed that this study was an anonymous questionnaire survey that was not scored and not considered for grading, and that the analysis was carried out after their grades had been decided. There was no penalty for not participating.

**Results**

Following the SCAT method (Maeno et al. 2013), 167 descriptions were extracted from the students’ open-ended responses. The descriptions were coded based on content and classified into 9 subcategories based on this coding. These subcategories were then grouped into 5 main categories based on identified emergent themes. The main categories based on their emergent themes were [anxiety], [knowledge], [reconstructing vision], [expanding community], and [readiness].

In the paragraphs that follow, square brackets ([…] denote main categories, angle brackets (<…>) denote subcategories, and double quotation marks ("…") denote representative descriptions.

Table shows the main categories, sub categories and their representative descriptions.

1. [Anxiety]

* A vague anxiety: 6 descriptions

"There are quite a few students who have anxiety about their everyday life as medical students. One of the reasons may be their hard challenging studies."

2. [Knowledge]

* An obsession with the volume of knowledge one must learn: 26 descriptions

"The biggest problem is the fact that, as revealed by the comprehensive examination, I have not absorbed any knowledge from the classes. This was because I did not study hard enough, especially without a real review."
Acquiring confidence through use of knowledge: 18 descriptions

"I felt the existence of patients who are positioned on the opposite side of the knowledge."

3. [Reconstructing vision]

Getting rid of the existing vision: 18 descriptions

"Listening to the future hope of their fellow students and talking to themselves about their future visions creates mutual sympathy, which may lead to the development of passion."

Searching for role models: 4 descriptions

"I want to deepen my learning about medicine by keeping in mind an image of myself becoming a doctor, even if it is a vague image."

4. [Expanding community]

Shifts from chumship to peer: 27 descriptions

"Since I had not experienced serious discussions, it was a valuable experience for me to have a discussion among students intending to study medicine."

"I have realized the importance of deepening understanding by seeking advice from peers and not by trying to simply solve things by myself."

Another experience of the "decentralization": 37 descriptions

"In the actual community, I usually do not have many opportunities to have contact with people whom I have not talked with, especially with people older than me. I deeply appreciate the simulated patients for giving me such an important opportunity."

5. [Readiness]

Diverse social experiences: 25 descriptions

"I want to improve my communication skills by talking with various people through university club activities, companionship, volunteers, school events, etc., and by trying to convey my feelings, trying to expose myself to the diverse ideas and feelings of others, and trying to incorporate these experiences into my life."

Marginal man in medicine: 6 descriptions

"Although we are medical students, our medical knowledge is extremely limited. Therefore, the lessons provided during this time period in the first year appear to be extremely significant, because we have learned that there are things seen from the non-medical standpoint."

The story lines generated from this result is as follows.
Each student had a [anxiety] which is generally observed in people in their early twenties. Some students recognized that [knowledge] is something they acquire for their patients to solve the patients' clinical problems. They were able to use this recognition to escape from an excessive <obsession with the volume of knowledge to learn> and to decrease their [anxiety]. Through the <shifts from chumship to peer>, the experience of collaborative learning with peers also decreased their [anxiety]. To take a clinical professor's lecture, they began to <search for their role models>. Moreover, they began [reconstructing vision]. In the process of students' recognizing the diversity of their friends' ideas and SPs' ideas, reminded students of the need to appreciate the diverse thoughts and feelings of others. This is <another experience of the "decentralization"> defined by Piaget and they recognized the importance of [expanding community]. The use of PBL and the participation of SPs in the program enabled students to have more diverse experiences through extracurricular and/or social activities. This is useful for building [readiness] to learn and developing communication skills. There are students who can metarecognize the significance of themselves being a <marginal man in medicine> after joining a group of professionals, which can be experienced only at this stage of their learning. It is a good time for an intervention to modify behavior to improve the learning of medicine.

Discussion

Japanese medical students and andragogy

In Japan, many students come to medical school within a few years of graduating from high school. By that time, each of the students is supposed to have developed their own learning method. However, the main purpose of their learning up then may have been only to accumulate knowledge to pass the entrance examination. Understanding adult learning theories is required for learners at the early stages of their medical education (Taylor 2013). We introduced the andragogy of Malcolm Knowles during the orientation lecture for this program. This type of simple metacognitive intervention into students' learning attitude, such as self-efficacy or deep-learning, sometimes fails to induce the desired behavior modification (Papinczak. 2008). We must therefore take the readiness to learn of each student into consideration, and provide opportunities for students to define learning tasks such that they relate to their daily life and provide an appropriate learning method.

Acquiring confidence through use of knowledge

Although most first year students do not fully understand the concept of PBL, we believe that PBL curricula foster self directed learning (Hendry et al. 2006, Blumberg P & Michael JA. 1992). PBL is known to be useful for integrating a diverse population of students into a new learning environment (Mclean et al. 2006).

In this program, the students were given clinical case tasks, and they learned pathophysiology of the disease as part of the PBL. While wrestling with these tasks, they often felt fear as a result of the volume of knowledge they needed to learn. They also had <vague anxiety> and experienced difficulty that is generally observed during adolescence (Eccles et al.1993). Through the experience of interacting with patients (SPs), despite their poor knowledge, learners came to recognize new meanings of learning; that is, [knowledge] is not something they acquire for themselves so they can pass exams, it something they acquire for their patients so they can solve the patients’ clinical problems. Some students were able to use that recognition to escape from an excessive <obsession with the volume of knowledge to learn> and so decrease their [anxiety] and increase their motivation to study. Students’ <acquiring confidence through use of knowledge> was observed. Through the <shifts from chumship to peer>, the experience of collaborative learning with peers decreased their [anxiety].

Expanding community and readiness
First year medical students are able to learn more effectively through open discussion in small groups with SPs than with teachers (Nestel et al. 2002). In this program, SPs acted as patients with a disease in the learning task for PBL. In this simulated medical interview, SPs provided students with feedback about their communication skills and manners from the standpoint of laypersons or people of the same generation as their parents. Some students appreciated that unconstrained conversations with SPs during the intervals between training sessions were extremely useful and impressive.

These experiences made students aware that they must acquire the skills to communicate with people from different generations. They also pointed out that "it was their first opportunity to discuss medicine and medical science with their peers", and that learning with peers and SPs had multiplier effects. In other words, students re-experienced the "decentering defined by Piaget" (Buck-Morss.1997) and began [expanding community].

**Establishing readiness and maintaining motivation**

Knowles commented on the readiness to learn as follows. "Adults become ready to learn those things they need to know and be able to do in order to cope effectively with their real-life situations" (Knowles.1984). During this course, students began to recognize the necessity for <diverse social experience>. This may affect the establishment of [readiness] to learn about communication relating to their real daily lives.

Learning through student-centered curricula usually results from a mixture of extrinsically provided cues and intrinsic motivation, rather than from intrinsic motivation alone (Schmidt 2000). Intrinsic motivation to learn reportedly decreases during the first year in medical school (Del-Ben et al. 2013). Changes in attitude during medical school can also be related to a ceiling on high attitude scores, loss of idealism and the impact of the unintended curriculum (Woloschuk et al. 2004). Our program effectively motivated and satisfied learners just as early clinical exposure does (Johnson et al. 1998), and learners began to ask us to continue to provide attractive programs. Students sometimes regard themselves as passive participants. Other students are critical of their peers' passivity or the external stimulation provided by the medical school.

A small number of students recognized themselves positively as a <marginal man in medicine>. From the standpoint of the moratorium situation, they estimate that the marginal man is not a doctor, layperson or patient, but is a fresh member of a health profession. Eva emphasizes that it is a "state" (learning situation) rather than a "trait" (learner characteristic) that best predicts learning behavior (Eva. 2003). Consequently, the period when a medical student recognizes himself to be a marginal man may be a good time for an intervention to modify behavior to improve the learning of medicine.

**Conclusion**

First year students had an anxiety arising from excessive obsession with the volume of knowledge to learn. Through the experience of collaborative learning with peers and SPs as lay persons decreased their anxiety. In the process of students' recognizing the diversity of their peers' ideas and SPs' ideas, reminded students of the need to appreciate the diverse thoughts and feelings of others. Freshmen, who are neither laypersons nor medical professionals, could lead to establishing a readiness to start a medical career through expanding their community. This can be experienced only at this stage of their learning. It is a good time for an intervention to modify behavior to improve the learning of medicine.
Take Home Messages

Notes On Contributors

Terumichi Fujikura is a professor of Center for Medical Education, Nippon Medical School and contributed in study design, data acquisition, qualitative analysis and manuscript preparation.

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Appendices

Figure 1: Structure of the "introduction to medicine" program
| Session | Duration (minutes) | Method | Contents                                      |
|---------|-------------------|--------|----------------------------------------------|
| 1       | 120               | Lecture| Orientation                                  |
| 2       | 120               | PBL    | PBL tutorial, Self-directed learning         |
| 3       | 120               | PBL    | PBL tutorial, Self-directed learning         |
| 4       | 120               | PBL    | PBL tutorial, Self-directed learning         |
| 5       | 120               | PBL    | PBL tutorial, Self-directed learning         |
| 6       | 120               | Lecture| Large class lecture, basic science           |
| 7       | 120               | Lecture| Large class lecture, clinical science        |
| 8       | 120               | Role-play| Medical interview, skills training       |
| 9       | 120               | Role-play| Medical interview, skills training (with SPs) |
| 10      | 120               | TBL    | Summary of program                           |

**Figure 2: The main categories, sub categories and their representative descriptions**

| Categories / Subcategories | Representative descriptions                                                                 | Number of descriptions |
|---------------------------|---------------------------------------------------------------------------------------------|------------------------|
| 3. Reconstructing vision  |                                                                                                                                               |
| Get rid of the existing vision | "To date, first-year undergraduate students have studied only liberal arts and have not yet been exposed to medical sciences. Consequently, they have no chance to develop self-awareness as a medical scientist." | 18                     |
|                           | "Listening to the future hope of their fellow students and talking to themselves about their future visions create mutual sympathy, which may lead to the development of passion." |                        |
| Search for role models    | "It is desirable to have clinicians’ lectures to students as early as the first-year. Such lectures have a great influence on the students carrier choices." | 4                      |
|                           | "I want to deepen my learning about medicine by keeping in mind an image of myself becoming a doctor even if it is a vague image." |                        |
### Declaration of Interest

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