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Impact of Hands-on Experience of a Cadaver Dissection on the Professional Identity Formation of Health Sciences Students

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ABSTRACT

Background In Japan, some nursing and health science universities that train nurses and/or clinical laboratory technicians have a curriculum in which students observe medical students performing a cadaver dissection. Observing a cadaver dissection is believed to affect the formation of a student's professional identity. This study aimed to investigate the effects of observing a cadaver dissection on the professional identity of nursing and clinical laboratory science students to find an effective educational support system for developing professional identity.

Methods Sophomores majoring in nursing science or clinical laboratory science were asked to complete a questionnaire with a professional identity scale before and after hands-on experience of a cadaver dissection performed by medical students. After their hands-on session was complete, they responded to a free-answer question about acquiring a professional identity.

Results The professional identity score of nursing students significantly decreased after the hands-on experience of the cadaver dissection. No significant change in professional identity score was observed in the clinical laboratory science students. However, the effect size (*r*) was moderate.

Conclusion Although professional identity formation fluctuates immediately after the experience of the hands-on experience of a cadaver dissection, the findings do suggest that these hands-on sessions will be effective for developing their professional identity if educational support is provided to help them utilize what they learned through reflection.

Key words cadaver dissection; clinical laboratory science students; health sciences students; nursing students; professional identity

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Nurses require career development to improve their nursing quality.[1] Recently, however, the early resignation of novice nurses due to the gap between their competency soon after completing basic nursing training and that required in a clinical setting has become a social problem.[2] A survey in Japan revealed that the turnover rate of novice nurses was 7.8% in 2015 and 7.6% in 2016, indicating that some nurses left their jobs without building their careers.[3]

A career in the nursing field can be a self-realization process to improve competence through the nurse's work experience rather than a mere career track.[4] This self-realization process through work experience closely relates to acquiring a professional identity that affects the commitment of nurses to their jobs. According to Erikson,[5] occupational identity is the most central domain of identity formation, demonstrating an individual's values, beliefs, and commitment to work and helping an adolescent to commit to their education, work, and occupation. It has been reported that a high professional identity is associated with higher stress tolerance, a better job title, a good working environment, the presence of a spouse (or child), a longer career, and a higher ability to self-educate.[6] It suggests that enhancing a person's professional identity may lead to the development of their professional ability and maturity. Previous studies in Japan have revealed that the professional identity of nursing students tends to decrease or fluctuate during the period from program entrance through graduation and, therefore, educational support is needed to help them develop this identity.[7–9]

One of the educational curricula that may contribute to the fluctuation of these students' professional identity is the observation of a cadaver dissection. Some nursing and health science universities that train nurses and clinical laboratory technicians have a curriculum in which students observe medical students performing a cadaver dissection. A previous study that investigated the significance of observing a cadaver dissection reported that students developed their awareness as healthcare professionals and learned about philosophical matters such

as life and death through their observations.[10] In another study reported that the emotional impact of the anatomy room experience was positive and even challenging.[11] However, there have been no studies on the effects of observing a cadaver dissection on the formation of a professional identity among nursing and health science students. Therefore, this study aimed to investigate the effects of observing a cadaver dissection on the formation of a professional identity among nursing and clinical laboratory science students to find an effective educational support system for developing professional identity.

SUBJECTS AND METHODS

Subjects

Ninety-three sophomore students of the Faculty of Medicine, School of Health Sciences (nursing and clinical laboratory science students) expressed interest in hands-on experience of a cadaver dissection. Among them, those who gave consent to participate were included in the study.

Timing and content of the hands-on experience of the cadaver dissection

The subjects experienced a cadaver dissection performed by sophomore medical students for 90 minutes in November. Each group, consisting of four students from the School of Health Sciences, experienced a cadaver dissection. The subjects actually touched the organs and listened to the medical students and teachers explain each organ.

Contents of survey

The subjects recorded their background information and professional identity scales on the questionnaire form before hands-on experience of the cadaver dissection. After the hands-on session, they recorded their professional identity scales again and responded to a free-answer question in the questionnaire.

Background information

The subjects were asked to answer questions about their age and sex.

Professional identity

The Professional Identity Scale of Nurses, developed by Hatano et al.[7] was used to measure professional identity. This scale consists of 12 questions to be answered using a five-point Likert scale ranging from "Strongly agree" to "Strongly disagree". A higher total score indicates a higher professional identity. The questions were as follows: 1. I want to continue to work as a nurse as long as possible; 2. I am suitable for a nursing job; 3. If I could choose my job again, I would choose to be a nurse; 4. If a high school student wishes to be a nurse, I would encourage him/her; 5. I'm proud of being a nurse; 6. I want to learn more about nursing; 7. I'm satisfied with my choice to be a nurse; 8. I'm confident that I can work as a nurse; 9. I want to further enhance my nursing skills; 10. If my child wishes to be a nurse, I will encourage him/her; 11. I can utilize my nursing abilities; and 12. Working as a nurse is worthwhile for me. For clinical laboratory science students, the terms "nurse" and "nursing" in these questions were replaced with "clinical laboratory technician" and "clinical laboratory," respectively.

Free-answer question

In order to identify students' learning about professional identity formation, the students were asked to give a free answer to the following question: "What kind of learning did you get in cadaver dissection for you who will be a healthcare professional in the future?"

Timing and method of the survey

The survey was conducted during cadaver dissection conducted in late November 2016. An anonymous self-administered questionnaire was used for the survey. The researcher distributed a subject recruitment document and a questionnaire to students, and orally asked them to participate in the survey. Students who gave their consent to participate in the study completed the questionnaire before and after hands-on experience of the cadaver dissection. The completed questionnaires were collected on the day the survey was given.

Data Analysis

Change in professional identity score

A paired *t*-test was performed to evaluate differences in professional identity score before and after the students' hands-on experience of the cadaver dissection. The Shapiro-Wilk test was used before all statistical tests to determine whether variables were normally distributed. A significance level of $P = 0.05$ was used for all tests. SPSS Statistics Ver. 24 (IBM Japan, Tokyo, Japan) was used for all statistical analyses. We adopted r as the effect size (r) which is the strength among the variables recommended by Field.[12] The effect size was calculated by Microsoft Excel for Mac 2011.

Analysis of free answers

Free description was analyzed using a qualitative approach. The conceptualization approach is a qualitative and inductive methodology that is suitable for

Table 1. Background of subjects

	Nursing students $n = 58$	Clinical laboratory science students $n = 22$
Age (years)		
Mean (SD)	20.2 (1.9)	20.1 (0.9)
Range	19–34	19–23
Sex, *n* (%)		
Male	5 (8.6)	7 (31.8)
Female	53 (91.4)	15 (68.2)

Table 2. Professional identity score of students before and after hands-on experience an anatomy practice

Student type		Mean	SD	*P* value	Effect size (*r*)
Nursing	Before	41.7	7.0	0.027*	0.29
$n = 58$	After	40.7	7.1		
Clinical laboratory science	Before	43.9	4.2	0.211	0.27
$n = 22$	After	44.6	4.4		

*$P < 0.05$

holistically understanding human behaviors constituting various phenomena and the experiences of people who underwent such phenomena.[13] The free answers were transcribed and coded, and then categorized and further subcategorized based on their similarities and differences. The results of the analysis were discussed among researchers and trying to enhance the trustworthiness.

Ethics

This study was conducted with approval from the Tottori University Faculty of Medicine Ethics Committee (Approval Number 1705A044). The researcher explained the study to the participants, including the purpose and method of study as well as the protection of personal information, orally and in writing. The subjects were considered to have consented to participate in the study if they submitted the informed consent form and the completed questionnaire.

RESULTS

Background of subjects

A summary of the subjects' background is given in Table 1. Fifty-eight of the responders were nursing students (five males, 53 females) and their mean age was 20.2 ± 1.9 years. Twenty-two of the responders were clinical laboratory science students (seven males, 15 females) and their mean age was 20.1 ± 0.9 years.

Change in professional identity score

The change in professional identity score of the subjects is shown in Table 2.

The score of the nursing students ($n = 58$) was 41.7 ± 7.0 before hands-on experience of a cadaver dissection and was 40.7 ± 7.1 after the session, which was significantly different ($P = 0.027$). The effect size (r) was 0.29.

The score of the clinical laboratory science students ($n = 22$) was 43.9 ± 4.2 before hands-on experience of a cadaver dissection and 44.6 ± 4.4 after the session, which was not significantly different ($P = 0.211$). The effect size (r) was 0.27.

Analysis of free answers

Table 3 shows the categorized and further subcategorized free answers to the question about learning about professional identity formation of the nursing students and the clinical laboratory science students. The answers of the nursing students were classified into the following nine categories: deeper understanding of and interest in the organs; deeper understanding of and interest in the human body; building an image of care for patients before death; significance of existence after death; accepting that death is not fearful; view of the afterlife; development of responsibility and awareness as a health professional/learner; development of a more professional attitude toward work by looking at diseased organs; and anxiety about and pride in engaging in work that affects life and death.

The answers of the clinical laboratory science students were classified into the following four categories: deeper understanding of and interest in the organs; deeper understanding of and interest in the human body; development of responsibility and awareness as a health professional/learner; and development of a more professional attitude toward work by looking at diseased organs.

DISCUSSION

In this study, no significant change in professional identity score was observed in the clinical laboratory science students. However, the effect size (r) was moderate.

A clinical laboratory technician is responsible for performing several physiological laboratory tests, such as blood, microbiological, and respiratory function tests, as well as electroencephalography. In terms of professional identity formation, the subcategories "Understanding of the positional relationship of the organs by looking at and touching them," "Understanding of perceptional aspects of the organs such as weight, elasticity, and color," "Understanding of the three-dimensional structure of the organs that cannot be learned from textbooks," "Building an image of disease conditions by looking at and touch-

Table 3. Learning about professional identity formation of nursing students and clinical laboratory science students

Category	Subcategory	Description number of nursing students	Description number of clinical laboratory science students
1. Deeper understanding of and interest in the organs	Understanding of the three-dimensional structure of the organs that cannot be learned from textbooks	6	7
	Building an image of disease conditions by looking at and touching the lesions	6	6
	Understanding of the positional relationship of the organs by looking at and touching them	4	3
	Understanding of perceptional aspects of the organs such as weight, elasticity, and color	3	3
	Understanding the organs body more deeply	3	1
2. Deeper understanding of and interest in the human body	Understanding of the complexity of the structure of the human body	6	2
	Understanding of the individual variability of the human body depending on characteristics such as age, sex, and disease	4	1
	Having a deeper interest in the human body	4	1
3. Building an image of care for patients before death	Imagining the patients' daily life by looking at and touching diseased organs	5	
	Building an image of awareness and behavior as a nurse who is at a patient's bedside when he/she dies	5	
4. Significance of existence after death	Realizing the preciousness of human life	3	
	Realizing the significance of existence, even after death	3	
	Realizing that people are valuable to others, even after death	2	
	Realizing that death is not the end	2	
5. Accepting that death is not fearful	Erasing the image of death as a fearful thing	2	
	Realizing the importance of accepting death as it is	2	
6. View of the afterlife	Realizing the importance of health	2	
	Realizing the preciousness and importance of being alive	2	
7. Development of responsibility and awareness as a health professional/learner	Appreciation for donors of the bodies developed through the extraordinary and special experience	6	
	Increase of motivation triggered by appreciation for donors and their families	5	1
	Development of a sense of responsibility as a healthcare professional	4	
	Resolve to work as a healthcare professional	3	1
	Importance of team medical care recognized through the interaction with medical students	3	
8. Development of a more professional attitude toward work by looking at diseased organs	Recognition of roles as a healthcare professional	5	1
	Recognition of roles of a healthcare provider provoked by looking and touching diseased organs	3	
	Empathy for patients developed by imagining them suffering from a disease	3	
9. Anxiety about and pride in engaging in work that affects life and death	Anxiety about engaging in work that affects life and death	3	
	Pride in engaging in work that affects life and death	2	

ing the lesions," "Understanding of the complexity of the structure of the human body," and "Understanding of the individual variability of the human body depending on characteristics such as age, sex, and disease" can be placed broadly under categories such as "Deeper understanding of and interest in the organs" and "Deeper understanding of and interest in the human body." The hands-on experience of touching actual human organs may have led to a deeper understanding, which in turn, affected the clinical laboratory science students' image of and interest in their professional identity as a clinical laboratory technician. No significant change in professional identity score was observed in the clinical laboratory science students. However, we observed a moderate effect ($r = 0.27$) of hands-on dissection on the professional identity of students. Future research with more students may help to clarify the effectiveness of hands-on dissection on professional identity formation. Additionally, observations of changes to professional identity over time after hands-on dissections will be required.

The professional identity score given by nursing students after they experienced a cadaver dissection was significantly lower than that before the hands-on session. A previous study that investigated changes in the professional identity of nursing students reported that the score was the highest among freshmen.[14] Another study reported that freshmen do not accurately recognize that nursing is difficult work because they have a general image of nurses as kind, friendly, and calm people and apply such an image to themselves.[7] In the present study, the subjects' free answers categorized into "development of a more professional attitude toward work by looking at diseased organs," "Development of responsibility and awareness as a health professional/learner," and "anxiety about and pride in engaging in work that affects life and death" suggested that they compared their original image of nurses with reality and their recognition of reality led to the lowered professional identity score. It has been reported that the process of developing a professional identity during adolescence proceeds through a cycle consisting of three phases: 1) fluctuation of an already-formed professional identity (facing a crisis); 2) making efforts toward self-realization (coping with concerns); and 3) overcoming concerns. Then, a professional identity is developed and changed through repetition of this cycle, and is established and stabilized gradually.[15, 16] Another study reported that people who reflected on their own professional identity and explored their way of life acquired a higher self-affirmation and a higher sense of self-stability.[17] Based on these findings, researchers consider that a decrease in professional identity is an important step in the development of a professional identity. It seems that the hands-on experience of a cadaver dissection corresponds to the first phase in the development of professional identity during adolescence. It is possible that nursing students acquire a stronger professional identity through a process in which they recognize the hard reality of nurses that is different from their original image, experience an identity crisis in which they believe they cannot apply the reality of nurses to themselves, and try to overcome such a crisis. Therefore, hands-on experience of a cadaver dissection on their own may not be sufficient if that only induces the first phase of professional identity development. Rather, it may be important to provide educational support so that the hands-on experience of a cadaver dissection triggers a rotation through the cycle of all professional identity development phases.

The classifications "Deeper understanding of and interest in the organs" (Category 1) and "Deeper understanding of and interest in the human body" (Category 2) were common to both nursing students and clinical laboratory science students. The number of categories differed between nursing students and clinical laboratory science students, and the latter group did not have answers that could be placed in Categories 3–6 and 9. This difference can be attributed to the fact that the second-year nursing students had already experienced a clinical practice component of their studies, coming into contact with patients and experiencing the death of patients under their care. It is possible that such an experience led to answers that fit into Categories 3–6 and 9, which ultimately led to a lower professional identity score among nursing students.

Kolb's experiential learning theory is an example of a model that shows a process in which people learn from experience and mature.[18] According to Kolb, people learn things through a cycle consisting of a specific experience, reflection, acquisition of lessons from the reflection, and adaption to the next situation.[18] If Kolb's model is applied to the development cycle of professional identity, "a specific experience" corresponds to the first phase, and an example of this is the hands-on experience of a cadaver dissection. Similarly, "acquisition of lessons from the reflection" corresponds to the second phase, and an example of this is reflection. "Adaption to the next situation" corresponds to the third phase, and an example of this is that students find how to utilize the lessons they learned for the future.

In conclusion, professional identity formation fluctuates immediately after the experience of a hands-on experience of a cadaver dissection, we consider that the hands-on session can be effective if educational

support is provided to students so that they can discuss their hands-on experience with each other, reflect on the experience by creating a report about the hand-on experience, and find out how to utilize the lessons learned.

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