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Title Page

Title

Doctors' professional identity and socialization from medical students to staff doctors in Japan

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Abstract

Objective

Becoming a doctor involves transforming a lay person into a medical professional, which is known as professional socialization. However, few studies have clarified the details of differences in the professional socialization process. The aim of our study was to clarify the process of professional socialization of medical students to residents to staff doctors.

Design

We used the narrative analysis as a theoretical framework.

Setting

This study was conducted in Japan.

Participants

Participants were collected using purposive sample of doctors with over 7 years of medical experience. We conducted semi-structured interviews from September 2015 to December 2016. We used a structured approach to integrate the sequence of events into coherent configurations.

Results

Participants were 13 males and 8 females with medical careers ranging from 8–30 years. All participants began to seriously consider their own career and embodied their ideal image of a doctor through clinical practice. As residents, the participants adapted as a member of the organization of doctors. Subsequently, doctors exhibited four patterns: first, they smoothly transitioned from ‘peripheral’ to ‘full’ participation in the organization; second, they could no longer participate peripherally but developed a professional image from individual social interactions; third, they were affected by outsiders’ perspectives and gradually participated peripherally; fourth, they could not regard the hospital as a legitimate organization and could not participate fully.

Conclusion

The professional socialization process comprises an institutional theory, professional persona, legitimate peripheral participation, and threshold concepts. These findings may be useful for supporting professional development.

(246 words)

Strengths and limitations of this study

- This study used narrative analysis, which organized narratives into thematic categories, as a theoretical framework to illustrate the trajectory of medical professional identity formation.
- Physicians experienced anticipatory socialization and organizational socialization, and professional socialization may be affected by career choice, and the inner and external professional image of physicians.
- We interviewed Japanese physicians, who experienced a relatively satisfactory advance in their careers as doctors based on Japanese contexts and culture.
- Our findings may be useful to medical educators for guiding doctors' career plans and suggest that educational researchers need to accumulate evidence on other perspectives of professional identity formation in future studies.

INTRODUCTION

The process by which a medical student matures into a health care professional is known as socialization (1). Professional socialization is defined as the process of transforming a beginner into a professional. This process integrates work-based norms, values, beliefs, knowledge, skills, and expected roles and adapts the beginner to the culture of the experts (2). A medical professional's identity, constructed through medical professional socialization, is defined as "a representation of self, achieved in stages over time during which the characteristics, values, and norms of the medical profession are internalized, resulting in an individual thinking, acting, and feeling like a physician" (3). That is, medical professional socialization aims to develop a professional identity and adapt a person to the role of a medical expert (4,5).

In practice, the socialization of doctors is affected by role models, clinical experience (6–8), the health care system, a school or organizational environment, as well as by the attitudes of colleagues and supervisors towards patients (8,9). Additionally, most doctors adapt to the organization by acquiring the necessary skills to carry out his/her duties (10–13). Doctors thereby become members of the organization of a hospital, and are conscious of belonging to the community and of their responsibility as doctors (14,15).

A doctor's professional socialization and the development of their identity are some of the most important aspects of medical education (16–19). However, few studies have clarified the details of differences in the professional socialization process, such as when and how doctors are influenced by organizations and the education system, and how their professional identity as a doctor is acquired. A formal outline of the process of socialization might provide medical educators and program directors with clues on how to prevent identity crises for doctors-in-training.

We aimed to clarify the process of professional socialization of medical students to residents to staff doctors by examining how doctors perceive their acquired knowledge and values in the process of developing their professional identity as a doctor.

METHODS

Theoretical framework

We used narrative analysis which is defined as a group of methods used to interpret commonality among stories (20). Our present aim is consistent with that of narrative analysis because we examined the subjects' narrative as a whole rather than as de-contextualized fragmented data. Narrative analysis inductively clarifies a typology of narratives, conceptually organizes them into thematic categories, and then illustrates exemplar narratives or vignettes (20,21). Common thematic elements across a number of participants are used to develop a descriptive framework of professional socialization (21). In addition, narrative analysis has been used in previous studies that also examined the professional identity of medical professionals (22–24). We therefore adapted the narrative analysis as a theoretical framework for the present study.

Setting

Setting is Japanese medical education context. The Japanese medical training system differs from the US medical education system in several ways (25) (Figure 1). In Japan, high school graduates are assessed for their eligibility to enter medical school, and the standard undergraduate medical education program is six years. The Japanese national

exam comprises only one examination while the United States Medical License Exam (USMLE) involves three examinations. In 2004, the Council for Matching, a non-government organization, implemented and organized a system to match graduating medical students to two-year residency programs in Japan. Previously, there had been no nationwide matching system, and residents had to randomly apply to individual training programs in which they were interested. In the US, third- and fourth-year medical students are provided with this type of training. After the initial two years of required postgraduate training in Japan, trainees advance in his or her own career path. Some doctors enter graduate school, while others proceed to advanced clinical training courses as fellows, or move on to become general practitioners in the community.

Data collection: semi-structured interview

We conducted semi-structured interviews from September 2015 to December 2016. Semi-structured interviews are the primary method used for data collection in socialization studies (26,27). We interviewed each participant for 90–120 minutes in a private room or quiet cafe, after obtaining consent from the interviewee. We developed a series of questions that would allow us to compare the contents and diversity of

expertise, and demonstrate the relationship between the socialization of doctors and acquisition of knowledge and values. The questions were: “What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?”; “Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?”; “How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior resident, and staff doctor? How did you select your professional career?”; and “Please describe the events that influenced your learning while developing as a doctor.”

JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions. In addition, we chose the most appropriate interviewer for each participant such that the combination of interviewee and interviewer would allow the interviewee to feel at ease and provide frank answers to questions such as those inquiring about relationships between residents and teaching doctors in previous workplaces. Moreover, if the interviewers could not conduct in-person interviews due to logistical issues such as residential distance, the interviews were conducted using the online communication tool Skype ™. During

Skype-conducted pilot interviews, the influence of the interviewer with respect to matters like quality of voice were verified.

Patient and Public involvement

No patient involved.

Study participants

The specialty of general physicians in social consciousness is ambiguous and general physicians tend to struggle with their identity due to the overlap in the scope of practice with that of general internal medicine, general pediatrics, psychiatry, and obstetrics-gynecology. As a result, general physicians have difficulties with professional identity formation within mainstream biomedicine and with the counterculture movement (28,29). Thus, to clarify the professional socialization process, we recruited more general physicians than specialists because physicians are more interested in their identity and how others perceive them (27). We selected study participants using purpose sampling, in which we discussed multifaceted aspects of the participants' careers, such as gender facilities; location; career experience, including training

organization, university hospital, community hospital and clinic, and career changes; experience in academic research; and their cooperation with the interview.

The inclusion criterion was a doctor with a medical career of 7 years or longer, on the basis that they would have sufficient experience to be able to look back and reflect on their training and career.

Data analysis

All interviews were recorded using a voice recorder and transcribed verbatim. The interview contents were analyzed using the 4 steps of structural analysis proposed by Gregg and Gregg (2006):

Step 1: Divide the text into episodes, which comprise the plot/sequence of the story

Step 2: Eliminate material that is irrelevant to the plot (often facts)

Step 3: Identify the stanzas in each episode that contain an embedded story

Step 4: Identify contrasts in binary oppositions and mediating terms (a blend of the shared features) within and across each episode.

The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of

8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors checked whether the plots matched the contents that each had divided into stages using the original data. According to step 3, we identified the stanzas in which the participants' narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis (21).

Ethics

This study was conducted with prior approval from the Ethics Committee of the Faculty of Medicine, University of Tsukuba (No.1001). All participants provided informed consent prior to participation. To protect privacy, interviewee quotes in this paper are identified by randomly assigned number codes rather than the participants' names.

RESULTS

Demographic data of the participants

The participants comprised 16 Japan Primary Care Association-certified Family Physicians, as well as 1 cardiologist, 2 gastroenterologists, 1 brain surgeon, 1 obstetrician and gynecologist, and 1 emergency and orthopedic surgeon. The 21 Japanese participants included 8 females, and all had clinical experience ranging from 8 to 30 years. The participants belonged to 8 city hospitals, 5 clinics, and 7 universities, while 1 was a graduate student in the UK (Table 1). By location, the participants worked in Ibaraki Prefecture, Tokyo, Hokkaido, Kanagawa, Kyoto, Okinawa and the UK.

Table 1. Demographic data of study participants

Code number	Gender	Clinical experience (years)	Specialty	Institution
1	M	12	General physician	Clinic
2	F	12	General physician	University
3	M	12	General physician	Clinic
4	M	14	General physician, Palliative medicine	University
5	M	12	General physician	Hospital
6	F	12	General physician, Palliative medicine	PhD Student

7	M	11	General physician	Clinic
8	F	11	General physician, Palliative medicine	Hospital
9	F	8	General physician	Hospital
10	M	13	General physician	Clinic
11	M	30	General physician, cardiologist	Hospital
12	F	16	General physician	University
13	F	12	General physician	Clinic
14	M	11	General physician	Hospital
15	F	9	General physician	Hospital
16	M	19	General physician	Hospital
17	M	13	Emergency and orthopedic surgery	University
18	M	14	Obstetrics and gynecology	Hospital
19	M	13	Brain surgeon	University
20	M	22	Gastroenterologist	University
21	F	21	Gastroenterologist	University

Overview of professional socialization as a doctor

We conducted in-person interviews with all participants except 2, who were interviewed using Skype ™. We found that all doctors related to the common themes of "Realization as a Doctor" as medical students in clinical practice and "Organizational Socialization" as residents through the process of becoming a member of their attending hospital. Subsequently, we identified 4 distinct patterns among the participants. These 4 patterns of professional socialization may represent the different ways individuals balance organizational socialization according to their particular specialty area and self-learning style (Table2) (Figure 2).

Table 2. Four patterns of self-learning styles and specialty areas

	When and what specialty area	Self-learning style	Organizational socialization
Pattern 1	Clarify professional image during the training after graduation	Reflective learning	Sophisticated balance between LPP [a] in hospital and individual learning style
Pattern 2	Develop clear values and	Transformative learning	Focus more on own

	roles as physicians from contact with different values		professional image than LPP in hospital
Pattern 3	Need role models and professional belonging	Public persona, and focus more on LPP in hospital than individual learning style	
Pattern 4	Hesitate to conduct LPP, then explore professional belonging and professional identity as a doctor in an organization		

[a] LPP: Legitimate peripheral participation

Realization as a doctor

Medical students began to compare their observations of doctors, healthcare professionals, the community, and hospitals with their imagined concepts, and started to seriously consider doctors' tasks, attitudes, and way of thinking during clinical practice. They contemplated their own career and whether they themselves aligned with their image of a doctor. When the two did not match, they explored and embodied their ideal image through the clinical experience of other doctors and patients. (Table 3)

Organizational socialization

During their junior residency, which refers to a two-year period of work experience following graduation as a doctor, all participants experienced organizational socialization in hospitals as they conducted rotations across the medical departments. They had to carry out tasks as instructed by their supervisors and as such learned their role as doctors in the hospital.

In addition, doctors valued their colleagues as an inner group, as doctors with whom they felt a kinship and friendship because of what they had been through together as residents. Some compared their own ability, motivation, and enjoyment of work with that of their colleagues. In contrast, some felt emotional undulations such as depressive

moods because they regarded colleagues as rivals, with envy, as markers of their own success or failure, and as competitors.

They strengthened their mutual connections to reflect on their experience with colleagues in their inner group. Some experienced catharsis effects when they shared such feelings and emphasized their mutual emotions upon reflection. Participants who could not develop relationships with their colleagues or who did not have colleagues relied on senior and teaching doctors of similar ages. These participants developed similar relationships to those that others developed with their inner group.

In organizational socialization as a doctor, relationships with colleagues or close supervising doctors as an inner group resulted in both positive and negative factors influencing adaptation in the hospital. (Table 3)

Table 3. Emergent themes and professional identity formation based on interviews about realization as a doctor and organizational socialization.

Theme	**Professional Identity Formation**	**Example quotes**
Realization as a doctor	Started to consider doctors' image	Doctor 2: "I was not very interested in any of the medical departments. I was told to go to the community clinic where a general practitioner worked, (and once there) I found I wanted to be like a medical doctor I met there. For the first time, my image of the future became vivid. Since then, I

		have continued to strongly want to become a general practitioner."
		Doctor 16: "When I was a fifth-year medical student, I had a vague but solid image of community healthcare. At that time, I participated in clinical training in public health. The clinical training was conducted by public health nurses in rural areas of X Prefecture. I just followed the public health nurses in clinical training."
		Doctor 13: "(What was particularly striking was) what patients told me during home visits. 'I understand that medical doctors want to specialize in a particular area, and rise in the ranks. That's good. However, as they rise to greatness, they gradually stop listening to us. I want you to be a doctor closer to patients.' This is what one patient told me."
Organizational socialization	Started organizational socialization in hospitals	Doctor 3: "When I worked in the surgery department, I was generally not regarded as a doctor who was primarily responsible for a particular patient but as a doctor in charge of patients."
		Doctor 5: "Why do I need to come into the clinic on holidays? ...My superior told me that it was to see patients once daily, without fail. I just answered 'Yes'."
		Doctor 19: "Including chores, ..I stayed up until late at night, together with doctors in the lowest position. ...I did what persons in the lowest position should do in the manner appropriate for those in the lowest position."
	Compared others	Doctor 1: "I cared so much about what other people thought of me, compared to my other colleagues. I felt something like an inferiority complex."

		Doctor 2: “At the beginning, I was cold and unfriendly. ...The hospital tried to foster us as doctors and we felt that we were in competition with one another.”
	Connected with colleagues	Doctor 1: “Looking back ...well, I think it was good because it created and fostered a sense of solidarity and created bonds among us. We shared the feeling that we all worked together, we all did our best together, and we all worked together while encouraging each other.”
		Doctor 3: “When I talked about my failures, it actually reduced the burden on my heart. We shared our experiences and did not criticize each other. We worked under these circumstances, which contributed to our mental stability because we felt that we received training in a safe and secure environment, and did not need to hold things inside.”
	Connected with senior doctors	Doctor 8: “There were many doctors responsible for supervising and instructing residents. So I learned a lot and saw a lot, and whenever I faced difficulties, even small challenges, I was taught and instructed. ...They always kept me in their mind ...they were always kind to me, and they let me join their group.”

Professional socialization

The 4 patterns of professional socialization that we identified differed according to three themes: specialty area, self-learning style and organizational socialization (Table 4).

Pattern 1: Sophisticated balance between LPP and individual learning style

Participants exhibiting this pattern established their professional image in the early stages and seriously considered themselves doctors and handled tasks smoothly by working in an organization that matched their professional image.

Those who struggled to be a doctor that matched the image required by their hospital sometimes created new ways to solve this problem by involving other staff. The staff, who had no obligation to help, supported them because they felt a belonging and professional identity in the hospital. These behaviors are concordant with the model of a reflective practitioner in an organization.

They could voluntarily commit to education, partnership, leadership and administration work as a doctor, where they had increasing opportunities to train residents and to work with various healthcare professionals.

Participants with this pattern initiated LPP smoothly in the organization and identified their own professional image within two years after graduation because they had a role

model in the training hospitals. They subsequently proceeded to professional socialization as a part of continuous organizational socialization.

Pattern 2: Focused more on their own professional image than LPP in the hospital

Participants with this pattern generated their professional image or learning style in their own way. Based on this, they clarified their own values and roles in practice. When they were junior residents, for example, when the participants' professional image was clearer, they could actively participate in the training hospital and develop their own goals. They had opportunities to transform their learning style by following their role models' advice.

In addition, they experienced transformative learning when they struggled to adapt to their changing life cycle and new environment, which they had never experienced previously. Through their experience, they developed the ability to reflect on their learning style and role as a doctor and look back on themselves with a broad perspective.

Even those who were able to create a professional image in the early stages of their training could transform their values if they came into contact with others with better

values. In this way, they confirmed their own role by creating relationships with others and exploring meaningful perspectives for their own growth.

Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)

Participants with this pattern had not established their own professional image as a doctor when they were medical students and trainees. Therefore, they adapted their learning styles to those accepted by the organization concerned. Through these adapted styles, they were able to become like their superior role models or establish a professional image that was as close as possible to the externally recognized professional image accepted within the organization.

Several characteristics of this pattern differed between specialists and generalists. Even when specialists such as neurosurgeons or obstetrician-gynecologists had not adequately established their own professional image while they were trainees, they stayed in these specialty departments and were eventually able to successfully establish their own individual learning styles and stably place themselves in strategic positions within the organization. They could be distinguished from other specialists and were externally recognizable professionals. That is, they established their own professional image under

the apprenticeship system embedded in the organization and through experiential learning, which helped them build their own specialty. Their professional socialization therefore occurred successfully through their organizational socialization.

In contrast, general physicians and emergency doctors are less defined by a particular procedural skill or role. Therefore, they struggled to adapt to organizational socialization because their externally recognized professional belonging remained vague. In addition, the learning styles of general physicians and emergency doctors varied depending on the organization, and it therefore took them longer to establish their own learning styles.

In this way, they experienced LPP in any organization to which they were assigned. They experienced organizational socialization at each of their training hospitals while they participated in clinical rotations, and made comparisons with their own professional image.

Pattern 4 : Professional image was unclear

To identify their ideal image of a doctor, participants with this pattern adapted to the ways of fulfilling duties accepted by the organization concerned, relied upon recognition from others, and only did things that were required by the organization.

Therefore, they failed to establish their own learning styles at the beginning, and wanted teaching doctors to lead them, or to accumulate experience in areas in which they had not yet acquired experience.

They were not confident as doctors and tended to confirm the validity of their decisions with staff who were widely trusted in the organization. This demonstrates that doctors continue to explore their own professional image even after they become established doctors. As a result, they wanted a place of training where they could fill holes in their knowledge. Some doctors established their image as a doctor under the conditions provided to them, while others tried to find their personal identity through relationships with other doctors.

Table 4. Emergent themes and professional identity formation based on interviews about 4 patterns of professional socialization

Theme	**Professional Identity Formation**	**Example quotes**
Professional socialization Pattern 1:	Established their professional	Doctor 3: "I was able to commit myself to (the department's) philosophy and vision ...my boss sincerely endeavored to teach it."

Sophisticated balance between LPP and individual learning style	image in the early stages	Doctor 20: "I was able to be engaged in diagnosis through treatment ...I wanted to involve myself in actual clinical practice as a teaching doctor, which was my desire ...I think that this area will grow in the future."
	Struggled to be a doctor	Doctor 3: "(In the early phase of my senior residency) I established good relationships with junior residents working in the same hospital. I noticed that the junior residents were extremely unknowledgeable, or not adequately taught, as I had expected, but were forced to survive under these circumstances anyway. Therefore, I supported their survival, even though I was not asked to do so by anyone."
		Doctor 16: "(After returning to the hospital) I invited first-year and second-year residents from the primary care course to attend the study group meetings, where I gave talks to invoke discussion amongst them. In addition, I thought that such an organization should exist for residents, and three of us who started our residencies at the same time collaborated to create a new organization for residents."
	Committed to the work as non-clinicians	Doctor 16: "(When training residents), I realized that individuals differ in their speed of learning, ...When a resident could not achieve a predetermined target, I tried to intervene in his/her training as soon as I noticed that the resident was failing to achieve the target and that it was becoming a problem."

Pattern 2: Focused more on their own professional image than LPP in the hospital	Clarified their own values and roles in practice	Doctor 2: "In the Department of General Medicine, we have to address issues for which there are no solutions, and we need to handle individuality very seriously; that is, we have to think about how we approach individual patients. I thought that these things were very challenging."
		Doctor 6: "I have thought that palliative care was a good fit for me since junior residency... I wanted to concentrate on a specialized area so as to actually experience self-efficacy because I had not developed self-efficacy as a general physician during my senior residency."
	Transformed their learning style	Doctor 6: "I knew the scope of learning in the area of family medicine and identified what I had to learn within that scope from my rotations. I showed my goals to my teaching doctor (Oben) and told my Oben, 'this is what I want to learn'. That is what I did. I continued in this way for a while; that is, setting goals and trying to achieve them."
		Doctor 7: "I learned almost everything by asking the instructing doctors to teach me from scratch. And when I was told to read some text after asking a question, I always read it prior to starting work. That was my learning style."
	Struggled to adapt to the life of doctors	Doctor 2: "I had to manage raising a child and doing housekeeping with working in a well-balanced manner. This balancing act helped me to work efficiently in clinical settings. I thought that the two were somehow interlinked. Thus, I successfully balanced the two and I think I enjoyed both of them."

		Doctor 6: “After I started a doctoral course, I was not engaged in clinical practice at all. This was not good for me and I found that the lack of engagement in clinical practice did not increase my self-efficacy. Therefore, I want a good balance between research and clinical practice.”
Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)	Identified role as a specialist	Doctor 18: “I actually knew nothing about emergency care in the Department of Gynecology; I was not good with women and I didn't know anything about gynecology, so I thought that it would be good for me to work in that department for about one year. The doctor told me about lots of things that had occurred in the past. What the doctor told me was more than what I learned from textbooks, and to be honest, I did not need to find the time to read books. I did not 'study' to become a specialist doctor.”
		Doctor 19: “After surgery, we had a meeting for about 2 hours late at night ...reading images on a screen, and in this way, I increased my knowledge about various diseases. (At the training hospital) there were doctors specialized in the spinal cord. There, I learned about surgery of the spinal cord.”
	Identified role as a generalist	Doctor 1: “There are many cases of fever due to unknown causes, right?... At present, I frequently come up with ideas to change my mood to a positive state. However, I did not do that when I was training. I don’t think that I enjoyed my days very much.”
		Doctor 11: “Twelve years after graduation, I had finally become a doctor. I mean, after all, I had studied what I needed to study. Before that time, the only way to learn was to ask specialists.”
Pattern 4 : Professional image was	Waited out the period set for	Doctor 5: “In the beginning, in my first year of being a doctor, I often questioned, ‘why should I go to the hospital on holidays? I understood that I

unclear	professional identity formation - moratorium	should go, but I would rather not go as much as possible...' Ultimately, I realized that I had acquired the ability to handle anything without thinking. (After completing my senior residency training), I very often tried to find an area that I was interested in. Consequently, for 6 months from the beginning of my seventh year, I worked at the Department of Internal Medicine of Metabolism as part of my rotations."
		Doctor 8: "(When I was a resident) I had no confidence and I therefore did not say or touch unnecessary things. As such, I was so passive and hesitant ...Even now, I think I still have such an attitude, although there is no definitive reason for this. However, something changed and happened, and I learned from it, which broadened my perspective. I became aware that other doctors were in trouble and that I had to learn more. I wanted to learn more with other doctors because I also did not know enough."
		Doctor 9: "I didn't hold the perspective that 'I will learn in this department for the sake of my future.' So I only focused on the department that I was assigned to. I never thought that I enjoyed my job. Therefore, after qualifying as a doctor, I wondered if it was right. For me, it is significantly important to help somebody (as a doctor). I am very motivated by the fact that somebody needs me. "
		Doctor 10: "When teaching another senior resident, I felt, 'Oh, that resident improved a lot in a short time!' Upon reflection, I looked back on my own progress and realized how much his skills had improved. This triggered me to think about my own skills. ...I am not good at thinking about multiple things at the same time, even though this is frequently required of doctors. Therefore, I tried to

		train myself to think about multiple things simultaneously."
		Doctor 13: "I noticed for the first time that my teaching doctor was surprised with me, which made me look back on what I had done over the past two years. That particular doctor told me over and over again, forcefully, that hospitals and comprehensive medical care services and the like are really necessary. ...In the middle of my training as a senior resident, I returned to the hospital."

DISCUSSION

In the early stages of the socialization process of doctors, doctors experienced realization as doctors as well as organizational socialization to adapt to the hospital in which they were receiving their residency training. Subsequently, the doctors exhibited four patterns of professional socialization that differed according to three themes: specialty area, self-learning style and organizational socialization. Some doctors, even those that developed into established doctors, became lost in the professional socialization process. Our study uniquely demonstrates the chronological patterns of the professional socialization of doctors using educational theories.

Our finding that there are common factors between the realization and organizational socialization of doctors is in agreement with the institutional theory (31). Medical

universities are predetermined to train doctors using an intended and hidden curriculum. Several studies have indicated that medical students in a university's medical school are ideologically socialized as clinicians with respect to their vision and experience (32–34). In clinical training for medical students, realization as a doctor is interpreted as anticipatory socialization (35,36). This realization has been suggested to begin when a person starts to realistically review his/her career, while focusing on their profession, before he/she participates in a specific organization. In contrast, when students become junior residents, they fulfill roles required by the organization, such as a hospital, to secure progress in their organizational socialization (13,37,38). During this period, however, the students' skills have not reached a high level and they therefore contribute to their organizations by fulfilling the various roles required by the organizations. Through these processes, they become adapted to the hospital as established doctors and achieve socialization.

Professional organizations are affected by a professional image, which is composed of the perspectives of outsiders and self-recognition of one's own competency (39,40). Doctors struggle to develop an external persona according to the expectations of their surroundings. In Patterns 3 and 4, in which the professional image is vague or unclear and is not recognized by the organization, the participants temporarily experienced a

‘pretend’ socialization in terms of the culture and their role at training hospitals. However, their experience differed from that of the ideal identity in their specialty area, and they therefore required role models as external examples. Therefore, they had to accordingly accumulate experience in areas in which they were not competent to establish an image of a doctor that matched the professional image. In contrast, specialists, for whom the professional image is externally established (e.g., gastroenterologists, obstetrician-gynecologists, and neurosurgeons) began practicing LPP in the organization once they had chosen their specialization. They were subsequently integrated as members of the organization while developing their professional identity as specialists.

In Pattern1, even medical doctors who wanted to become general physicians continued to engage in LPP in the organization once they had established a professional identity and externally recognized persona as a general physician within the hospital. These experiences can promote determination as a doctor through threshold concepts (TCs)(41). TCs, which are usually transformative, integrative, irreversible, bounded and often troublesome, are key to formalizing a professional identity in a vague professional image. In particular, the reflective practice of playing multiple ambiguous roles which

are expected in their organization, such as noblesse oblige that doctors should use their social position to help others, leads to TCs (42).

In this way, training at an organization which provides a professional image that is consistent with that of the trainee enables LPP and helps the trainee to develop their professional identity. However, when the professional images differed, some trainees distanced themselves or struggled to become a member of the organization. These series of processes for building the professional identity and socialization of doctors may enable medical teachers or residency program directors to provide career support to medical students or junior residents.

Additionally, the trajectory of professional identity formation can include recognition of relationships among medical staff, as is observed with “relationalism” and the “Uchi/Soto dynamic” in Japanese culture. Relationalism applies to systems that place importance on the relational nature of reality (43), and the Uchi/Soto dynamic is the concept of inside-outside positionalities for engaging the meaning-making potential. These cultural backgrounds affected the development of physicians such that they compared themselves to their peers or superior doctors in the same organization as part of their inner group and worried about whether they could be regarded as an independent physician by the organization as a form of social consciousness.

This study had the following limitations: we only interviewed 21 participants in Japan, of whom many were general physicians and only a small number were specialists; many of the participants had advanced their careers as doctors relatively satisfactorily; only 2 doctors had experienced pregnancy and childbirth; and none became doctors after 2010, when the rules for clinical training for doctors were revised by the Japanese government. The study results should be interpreted with these limitations and those related to Japanese culture in the above-mentioned context in mind.

Allowing for these limitations, this study clarified the process of socialization of medical doctors based on detailed interviews focused on the continuity of their careers as doctors. It should be noted that very few studies of this type have been conducted to date. The findings of this study have the potential to substantially impact the development of future medical school curricula. In addition, these findings will act as a guide for individual doctors considering their career plans, and may help organizations which consider doctors' career plans. Our future plans to evaluate medical professional identity formation include cross-sectional studies or cohort studies to check the robustness of our present results at greater scale(44).

Conclusion

This study suggests that anticipatory socialization and organizational socialization of medical doctors may be similarly achieved, and professional socialization may be affected by the extent to which medical doctors establish their professional identity; the extent to which their professional image matches that of the organization; and the extent to which the professional image is externally recognized. Our study demonstrates the process of the socialization of doctors, and is expected to provide insight to various stakeholders engaged in medical education.

CONTRIBUTORSHIP STATEMENT

JHar, SO, and JHam, were involved in the conception and design of this study, carried out all qualitative enquiries, analyzed the data and wrote the paper.

COMPETING INTERESTS

The authors report no conflicts of interest.

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DATA SHARING STATEMENT

No data are available.

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Figure Legends

Figure 1: Medical education system in Japan and the U.S.

Figure 2: Professional socialization as a doctor

LPP: Legitimate peripheral participation

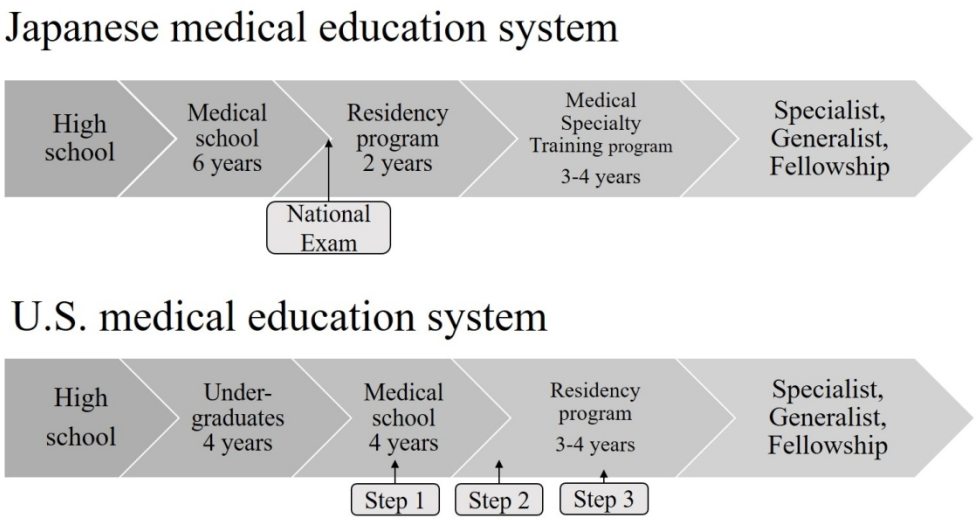

Figure 1: Medical education system in Japan and the U.S.

259x193mm (150 x 150 DPI)

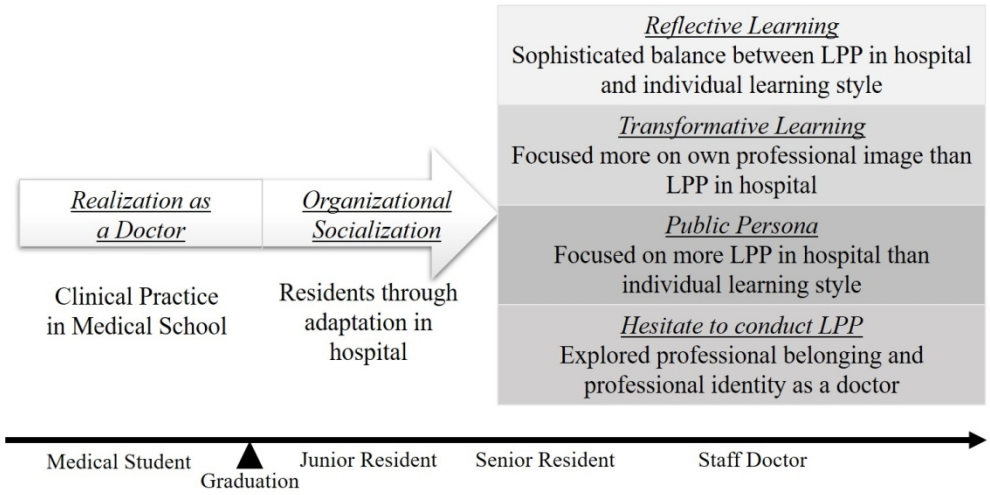

Figure 2: Professional socialization as a doctor
LPP: Legitimate peripheral participation

257x129mm (150 x 150 DPI)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	P10 JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions.
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Junji Haruta, MD, PhD [1], Sachiko Ozone, MD, PhD [2], Jun Hamano, MD, PhD [3] [1]Department of Primary Care and Medical Education, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [2]Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [3]Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan
3. Occupation	What was their occupation at the time of the study?	Junji Haruta, MD, PhD: Dr. Haruta is an Associate Professor at the Department of Primary Care and Medical Education, University of Tsukuba, Japan. Sachiko Ozone, MD,

		PhD: Dr. Ozone is an Assistant Professor at Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba. Jun Hamano, MD, PhD: Dr. Hamano is an Assistant Professor at Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba.
4. Gender	Was the researcher male or female?	Junji Haruta and Jun Hamano are male. Sachiko Ozone is female.
5. Experience and training	What experience or training did the researcher have?	Junji Haruta learned Qualitative research in PhD and participated in HERG Qualitative Research Course in Oxford, 24-28 April 2017.
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	We selected study participants using purpose sampling. Some participants have opportunities to work with authors.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Same above.
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	P14, Result, Demographic data of the participants
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	P8. Methods, Theoretical framework
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive sampling

11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	We used e-mail.
12. Sample size	How many participants were in the study?	P14, Result, **Demographic data of the participants**
13. Non-participation	How many people refused to participate or dropped out? Reasons?	When we explained the aim of research, no participants refused.
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	P8 Method, setting
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	No.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	P14, Result, Demographic data of the participants
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	P10. The questions were: "What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?"; "Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?"; "How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior resident, and staff doctor? How did you select your professional career?"; and "Please describe the events that influenced your learning while developing as a doctor."
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	One time.

19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	P12. All interviews were recorded using a voice recorder and transcribed verbatim.
20. Field notes	Were field notes made during and/or after the inter view or focus group?	No.
21. Duration	What was the duration of the inter views or focus group?	P3. We conducted semi-structured interviews from September 2015 to December 2016.
22. Data saturation	Was data saturation discussed?	P12-13. The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of 8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors checked whether the plots matched the contents that each had divided into stages using the original data. According to step 3, we identified the stanzas in which the participants' narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative

		pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Results
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Results
27. Software	What software, if applicable, was used to manage the data?	We do not use the special software. We used the Excel to mange the data.
28. Participant checking	Did participants provide feedback on the findings?	No.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Discussion
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

BMJ Open

Doctors' professional identity and socialization from medical students to staff doctors in Japan: narrative analysis from a family physician perspective

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	General practice / Family practice, Qualitative research
Keywords:	MEDICAL EDUCATION & TRAINING, QUALITATIVE RESEARCH, SOCIAL MEDICINE

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Title Page

Title

Doctors' professional identity and socialization from medical students to staff doctors in Japan: narrative analysis from a family physician perspective

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Keywords

Medical Education & Training, Qualitative Research, Social Medicine

Word count 4102 words

Abstract

Objective

Becoming a doctor involves transforming a lay person into a medical professional, which is known as professional socialization. However, few studies have clarified differences in the professional socialization process in detail. The aim of this study was to clarify the process of professional socialization of medical students to residents to staff doctors.

Design

We used narrative analysis as a theoretical framework.

Setting

This study was conducted in Japan.

Participants

Participants were collected using a purposive sample of doctors with over 7 years of medical experience. We conducted semi-structured interviews from September 2015 to December 2016, then used a structured approach to integrate the sequence of events into coherent configurations.

Results

Participants were 13 males and 8 females with medical careers ranging from 8–30 years. All participants began to seriously consider their own career and embodied their ideal image of a doctor through clinical practice. As residents, the participants adapted as a member of the organization of doctors. Subsequently, doctors exhibited four patterns: first, they smoothly transitioned from 'peripheral' to 'full' participation in the organization; second, they could no longer participate peripherally but developed a professional image from individual social interactions; third, they were affected by outsiders' perspectives and gradually participated peripherally; fourth, they could not regard the hospital as a legitimate organization and could not participate fully.

Conclusion

The professional socialization process comprises an institutional theory, professional persona, legitimate peripheral participation, and threshold concepts. These findings may be useful in supporting professional development.

(245 words)

Strengths and limitations of this study

- This study used narrative analysis to illustrate the trajectory of medical professional identity formation.

- Strengths include identification of the socialization patterns of medical doctors in the continuity of their careers.
- Limitations include a small sample size of 21 Japanese participants, of whom many were family physicians and only a small number were specialists.
- Our findings may be useful to medical educators in guiding doctors' career plans.

INTRODUCTION

The process by which a medical student matures into a health care professional is known as socialization (1). Professional socialization is defined as the process of transforming a beginner into a professional. This process integrates work-based norms, values, beliefs, knowledge, skills, and expected roles, and adapts the beginner to the culture of the experts (2). A medical professional's identity, constructed through medical professional socialization, is defined as "a representation of self, achieved in stages over time during which the characteristics, values, and norms of the medical profession are internalized, resulting in an individual thinking, acting, and feeling like a physician" (3). That is, medical professional socialization aims to develop a professional identity and adapt a person to the role of medical expert (4).

In practice, the socialization of doctors is affected by role models, clinical experience (5), the health care system, and school or organizational environment, as well as by the attitudes of colleagues and supervisors towards patients (6). Additionally, most doctors adapt to the organization by acquiring the necessary skills to carry out their duties (7,8). Doctors thereby become members of the organization of a hospital, and are conscious of belonging to the community and of their responsibility as doctors (9). According to the concept of legitimate peripheral participation (LPP), medical students become

incorporated into the community of doctors as members based on degree of participation, and how participation and non-participation change over time (9).

A doctor's professional socialization and the development of their identity are some of the most important aspects of medical education (10–14). However, few studies have clarified the details of differences in the professional socialization process, such as when and how doctors are influenced by organizations and the education system, and how their professional identity as a doctor is acquired. A formal outline of the process of socialization might provide medical educators and program directors with clues on how to prevent identity crises for doctors-in-training.

In particular, the specialty of family physician is more ambiguous than other specialties, and family physicians tend to struggle with their identity due to the overlap in the scope of their practice with that of general internal medicine, general pediatrics, psychiatry, and obstetrics-gynecology. Family physicians are more interested in their identity and how others perceive them (15) because they have difficulties with professional identity formation within mainstream biomedicine and with the counterculture movement internationally (16,17). Thus, professional socialization from a family physician perspective may better reveal details of how anguish and/or struggle with professional identity formation is manifested than the perspectives of other specialties.

Here, therefore, with a focus on evaluation from the perspective of family physicians, as distinct from the perspectives of other specialties, we aimed to clarify the process of professional socialization of medical students to residents to staff doctors. In particular, the specific aim of this study was to examine how doctors perceive their acquired knowledge and values in the process of developing their professional identity as a doctor.

METHODS

Theoretical framework

We used narrative analysis, which is characterized as a group of methods used to interpret commonality among stories (18). Our present aim is consistent with that of narrative analysis because we examined the subjects' narrative as a whole rather than as de-contextualized fragmented data. Narrative analysis inductively clarifies a typology of narratives, conceptually organizes them into thematic categories, and then illustrates exemplar narratives or vignettes (18,19). Common thematic elements across a number of participants are used to develop a descriptive framework of professional socialization (19). A number of other studies of the professional identity of medical professionals have also used narrative analysis (20,21). We therefore adapted narrative analysis as a theoretical framework for the present study.

Setting

The setting was the Japanese medical education system (Figure 1). Similarly to many other countries, eligibility to enter medical school in Japan is assessed in high school graduates. The standard undergraduate medical education program is six years. The Japanese national exam comprises only a single examination, in sixth grade. In 2004,

the Council for Matching, a non-government organization, implemented and organized a system to match graduating medical students to two-year residency programs in Japan. A nationwide matching system had not been previously available, and residents had to randomly apply to individual training programs in which they were interested. After the initial two years of required postgraduate training in Japan, each trainee advances into his or her own career path. Some doctors enter graduate school, while others proceed to advanced clinical training courses as fellows, or move on to become family physicians in the community.

According to OECD data for 2017, the overall average number of doctors per 1,000 people was 3.3, compared to 2.4 in Japan (22). In contrast, Japan has the greatest number of hospital beds among OECD countries and approximately 100,000 clinics, of which more than 90% are private and less than 10% are public (23,24). Additionally, many doctors traditionally open primary care clinics after several years of organ-specific training at medical school or a large hospital (25). For family medicine, however, the number of Japanese doctors who have officially completed training as family physicians as of April, 2020 is only 732 (26). Due to this wide dispersion of relatively few doctors in hospitals and the paucity of family physicians, some organ-specific doctors encounter opportunities to work in primary-care settings, where

relatively small numbers of doctors often struggle to provide care to large numbers of patients(25). For this reason, many physicians in universities work in clinics and/or outpatient departments in community hospitals once or twice a week. In contrast, family physicians who belong to a clinic generally work only in that clinic.

Data collection: semi-structured interview

We conducted semi-structured interviews from September 2015 to December 2016. Semi-structured interviews are the primary method used for data collection in socialization studies (15,27). We interviewed each participant for 90–120 minutes in a private room or quiet cafe, after obtaining consent from the interviewee. We developed a series of questions that would allow us to compare the contents and diversity of expertise, and demonstrate the relationship between the socialization of doctors and acquisition of knowledge and values. The questions were: “What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?”; “Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?”; “How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior

resident, and staff doctor? How did you select your professional career?"; and "Please describe the events that influenced your learning while developing as a doctor."

JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions. In addition, we chose the most appropriate interviewer for each participant such that the combination of interviewee and interviewer would allow the interviewee to feel at ease and provide frank answers to questions, such as those inquiring about relationships between residents and teaching doctors in previous workplaces. Moreover, if the interviewers could not conduct in-person interviews due to logistical issues such as residential distance, the interviews were conducted using the online communication tool Skype™. Skype-conducted pilot interviews were conducted, in which the influence of the interviewer with respect to matters like sound quality were verified.

Patient and public involvement

No patients were involved.

Study participants

To clarify the professional socialization process of family physicians, who typically have a more diverse career than other specialists, we selected study participants using purpose sampling, in which we discussed multifaceted aspects of the participants' careers, such as facilities; location; career experience, including training organization, university hospital, community hospital and clinic, and career changes; experience in academic research; and their cooperation with the interview. As much as possible, interviewers were paired with interviewees with whom they had not worked with for more than one year.

The inclusion criterion was a doctor with a medical career of 7 years or longer, on the basis that they would have sufficient experience to be able to look back and reflect on their training and career.

Data analysis

All interviews were recorded using a voice recorder and transcribed verbatim. The interview contents were analyzed using the 4 steps of structural analysis proposed by Gregg and Gregg (2006)(28):

Step 1: Divide the text into episodes, which comprise the plot/sequence of the story

Step 2: Eliminate material that is irrelevant to the plot (often facts)

Step 3: Identify the stanzas in each episode that contain an embedded story

Step 4: Identify contrasts in binary oppositions and mediating terms (a blend of the shared features) within and across each episode.

The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of 8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors together checked whether the plots matched the contents that each author individually had divided into stages using the original data. In step 3, we identified the stanzas in which the participant's narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis (19).

Ethics

This study was conducted with prior approval from the Ethics Committee of the authors' University. All participants provided informed consent prior to participation. To protect privacy, interviewee quotes in this paper are identified by randomly assigned number codes rather than the participants' names.

RESULTS

Demographic data of the participants

The 21 participants included 16 Japan Primary Care Association-certified Family Physicians, of whom 1 had a subspecialty of cardiology; 2 had a subspecialty of palliative medicine; and 1 was a PhD student in the UK. The remaining 5 consisted of 2 gastroenterologists, 1 brain surgeon, 1 obstetrician and gynecologist, and 1 emergency and orthopedic surgeon. Eight of the 21 participants were female, and all had clinical experience ranging from 8 to 30 years. The participants belonged to 8 city hospitals, 5 clinics, and 7 universities, while 1 was a graduate student in the UK (Table 1). By location, the participants worked in Ibaraki Prefecture, Tokyo, Hokkaido, Kanagawa, Kyoto, Okinawa and the UK.

Table 1. Demographic data of study participants

Code number	Gender	Clinical experience (years)	Specialty	Institution
1	M	12	Family physician	Clinic
2	F	12	Family physician	University
3	M	12	Family physician	Clinic
4	M	14	Family physician, Palliative medicine	University

5	M	12	Family physician	Hospital
6	F	12	Family physician	PhD Student
7	M	11	Family physician	Clinic
8	F	11	Family physician, Palliative medicine	Hospital
9	F	8	Family physician	Hospital
10	M	13	Family physician	Clinic
11	M	30	Family physician, cardiologist	Hospital
12	F	16	Family physician	University
13	F	12	Family physician	Clinic
14	M	11	Family physician	Hospital
15	F	9	Family physician	Hospital
16	M	19	Family physician	Hospital
17	M	13	Emergency and orthopedic surgery	University
18	M	14	Obstetrics and gynecology	Hospital
19	M	13	Brain surgeon	University
20	M	22	Gastroenterologist	University
21	F	21	Gastroenterologist	University

Overview of professional socialization as a doctor

We conducted in-person interviews with all participants except 2, who were interviewed using Skype™. We found that all doctors related to the common themes of "Realization as a Doctor" as medical students in clinical practice and "Organizational Socialization" as residents through the process of becoming a member of their attending hospital. Subsequently, we identified 4 distinct patterns of professional socialization among the participants. These 4 patterns may represent the different ways individuals balance organizational socialization according to their particular specialty area and self-learning style (Table2, Figure 2).

Table 2. Four patterns of self-learning style and specialty area

	When and what specialty area	Self-learning style	Organizational socialization
Pattern 1	Clarify professional image during training after graduation	Reflective learning	Sophisticated balance between LPP [a] in hospital and individual learning style

Pattern 2	Develop clear values and roles as physicians from contact with different values	Transformative learning	Focus more on own professional image than LPP in hospital
Pattern 3	Need role models and professional belonging	Public persona, and focus more on LPP in hospital than individual learning style	
Pattern 4	Hesitate to conduct LPP, then explore professional belonging and professional identity as a doctor in an organization		

[a] LPP: Legitimate peripheral participation

Realization as a doctor

Medical students began to compare their observations of doctors, healthcare professionals, the community, and hospitals with their imagined concepts, and started to seriously consider doctors' tasks, attitudes, and way of thinking during clinical practice. They contemplated their own career and whether they themselves aligned with their image of a doctor. When the two did not match, they explored and embodied their ideal image through the clinical experience of other doctors and patients. (Table 3)

Organizational socialization

During their junior residency, which refers to a two-year period of work experience following graduation as a doctor, all participants experienced organizational socialization in hospitals as they conducted rotations across the medical departments. They had to carry out tasks as instructed by their supervisors and in this way learned their role as doctors in the hospital.

In addition, doctors valued their colleagues as an inner group, as doctors with whom they felt a kinship and friendship because of what they had been through together as residents. Some compared their own ability, motivation, and enjoyment of work with that of their colleagues. In contrast, some felt emotional undulations such as depressive

moods because they regarded colleagues as rivals, with envy, as markers of their own success or failure, and as competitors.

They strengthened their mutual connections with colleagues in their inner group in order to reflect on their experience. Some experienced effects of catharsis when they shared such feelings, and the resulting reflection brought about a shared emphasis on their mutual emotions. Participants who could not develop relationships with their colleagues or who did not have colleagues relied on senior and teaching doctors of similar ages. These participants developed similar relationships to those that others developed with their inner group.

During this organizational socialization as a doctor, relationships with this inner group of colleagues or close supervising doctors brought out a range of responses which had both positive and negative effects on their adaptation in the hospital (Table 3).

Table 3. Emergent themes and professional identity formation based on interviews about realization as a doctor and organizational socialization.

Theme	**Professional Identity Formation**	**Example quotes**
Realization as a doctor	Started to consider doctors' image	Doctor 2: "I was not very interested in any of the medical departments. I was told to go to the community clinic where a family physician worked, (and once there) I found I wanted to be like a

		medical doctor I met there. For the first time, my image of the future became vivid. Since then, I have continued to strongly want to become a family physician."
		Doctor 16: "When I was a fifth-year medical student, I had a vague but solid image of community healthcare. At that time, I participated in clinical training in public health. The clinical training was conducted by public health nurses in rural areas of X Prefecture. I just followed the public health nurses in clinical training."
		Doctor 13: "(What was particularly striking was) what patients told me during home visits. 'I understand that medical doctors want to specialize in a particular area, and rise in the ranks. That's good. However, as they rise to greatness, they gradually stop listening to us. I want you to be a doctor closer to patients.' This is what one patient told me."
Organizational socialization	Started organizational socialization in hospitals	Doctor 3: "When I worked in the surgery department, I was generally not regarded as a doctor who was primarily responsible for a particular patient but as a doctor in charge of patients."
		Doctor 5: "Why do I need to come into the clinic on holidays? ...My superior told me that it was to see patients once daily, without fail. I just answered 'Yes'."
		Doctor 19: "Including chores, ..I stayed up until late at night, together with doctors in the lowest position. ...I did what persons in the lowest position should do in the manner appropriate for those in the lowest position."
	Compared others	Doctor 1: "I cared so much about what other people thought of me, compared to my other colleagues. I felt something like an inferiority complex."

		Doctor 2: “At the beginning, I was cold and unfriendly. ...The hospital tried to foster us as doctors and we felt that we were in competition with one another.”
	Connected with colleagues	Doctor 1: “Looking back ...well, I think it was good because it created and fostered a sense of solidarity and created bonds among us. We shared the feeling that we all worked together, we all did our best together, and we all worked together while encouraging each other.”
		Doctor 3: “When I talked about my failures, it actually reduced the burden on my heart. We shared our experiences and did not criticize each other. We worked under these circumstances, which contributed to our mental stability because we felt that we received training in a safe and secure environment, and did not need to hold things inside.”
	Connected with senior doctors	Doctor 8: “There were many doctors responsible for supervising and instructing residents. So I learned a lot and saw a lot, and whenever I faced difficulties, even small challenges, I was taught and instructed. ...They always kept me in their mind ...they were always kind to me, and they let me join their group.”

Professional socialization

The 4 patterns of professional socialization that we identified differed with respect to three themes: specialty area, self-learning style and organizational socialization (Table 4).

Pattern 1: Sophisticated balance between LPP and individual learning style

Participants exhibiting this pattern established their professional image in the early stages and seriously considered themselves doctors and handled tasks smoothly by working in an organization that matched their professional image.

Those who struggled to be a doctor that matched the image required by their hospital sometimes created new ways to solve this problem by involving other staff. The participants, who had no obligation to help, supported their hospital and staff because they felt a belonging to and professional identity with the hospital. These behaviors of the participants are concordant with the model of a reflective practitioner in an organization. Through the reflection, participants were able to voluntarily commit to education, partnership, leadership and administration work as a doctor, which gave them increasing opportunities to train residents and to work with various healthcare professionals.

Participants with this pattern initiated LPP smoothly in the organization and identified their own professional image within two years after graduation because they had a role model in the training hospitals. They subsequently proceeded to professional socialization as a part of continuous organizational socialization.

Pattern 2: Focused more on their own professional image than LPP in the hospital

Participants with this pattern generated their professional image or learning style in their own way. Based on this, they clarified their own values and roles in practice. When they were junior residents, for example, when the participants' professional image was clearer, they could actively participate in the training hospital and develop their own goals. They had opportunities to transform their learning style by following their role models' advice.

In addition, they experienced transformative learning when they struggled to adapt to their changing life cycle and new environment, which they had never experienced previously. Through their experience, they developed the ability to reflect on their learning style and role as a doctor and look back on themselves from a broad perspective.

Even those who were able to create a professional image in the early stages of their training could transform their values if they came into contact with others with better values. In this way, they confirmed their own role by creating relationships with others and exploring meaningful perspectives for their own growth.

Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)

Participants with this pattern had not established their own professional image as a doctor when they were medical students and trainees. Therefore, they adapted their learning styles to those accepted by the organization concerned. Through these adapted styles, they were able to become like their superior role models or establish a professional image that was as close as possible to the externally recognized professional image accepted within the organization.

Several characteristics of this pattern differed between specialists and generalists. Even when specialists such as neurosurgeons or obstetrician-gynecologists had not adequately established their own professional image while they were trainees, they stayed in these specialty departments and were eventually able to successfully establish their own individual learning styles and stably place themselves in strategic positions within the

organization. They could be distinguished from other specialists and were externally recognizable professionals. That is, they established their own professional image under the apprenticeship system embedded in the organization and through experiential learning, which helped them build their own specialty. Their professional socialization therefore occurred through their organizational socialization.

In contrast, family physicians and emergency doctors are less defined by a particular procedural skill or role. They therefore struggled to adapt to organizational socialization because their externally recognized professional belonging remained vague. In addition, the learning styles of family physicians and emergency doctors varied depending on the organization, and it therefore took them longer to establish their own learning styles. In this way, they experienced LPP in any organization to which they were assigned. They experienced organizational socialization at each of their training hospitals while they participated in clinical rotations, and made comparisons with their own professional image.

Pattern 4 : Professional image was unclear

To identify their ideal image of a doctor, participants with this pattern adapted to the ways accepted by their organization for the fulfillment of duties, relied upon recognition

from others, and limited their activities to those required by the organization. As a result, they failed to establish their own learning style at the beginning, and wanted teaching doctors to lead them, or to accumulate experience in areas in which they had not yet acquired experience. They were not confident as doctors and tended to confirm the validity of their decisions with staff who were widely trusted in the organization. This demonstrates that doctors continue to explore their own professional image even after they become established doctors. As a result, they wanted a place of training where they could fill holes in their knowledge. Some doctors established their image as a doctor under the conditions provided to them, while others tried to find their personal identity through relationships with other doctors.

Table 4. Emergent themes and professional identity formation based on interviews about 4 patterns of professional socialization

Theme	**Professional identity formation**	**Example quotes**
Professional socialization Pattern 1:	Established their professional	Doctor 3: "I was able to commit myself to (the department's) philosophy and vision ...my boss sincerely endeavored to teach it."

Sophisticated balance between LPP and individual learning style	image in the early stages	Doctor 20: "I was able to be engaged in diagnosis through treatment ...I wanted to involve myself in actual clinical practice as a teaching doctor, which was my desire ...I think that this area will grow in the future."
	Struggled to be a doctor	Doctor 3: "(In the early phase of my senior residency) I established good relationships with junior residents working in the same hospital. I noticed that the junior residents were extremely unknowledgeable, or not adequately taught, as I had expected, but were forced to survive under these circumstances anyway. Therefore, I supported their survival, even though I was not asked to do so by anyone."
		Doctor 16: "(After returning to the hospital) I invited first-year and second-year residents from the primary care course to attend the study group meetings, where I gave talks to invoke discussion amongst them. In addition, I thought that such an organization should exist for residents, and three of us who started our residencies at the same time collaborated to create a new organization for residents."
	Committed to the work as non-clinicians	Doctor 16: "(When training residents), I realized that individuals differ in their speed of learning, ...When a resident could not achieve a predetermined target, I tried to intervene in his/her training as soon as I noticed that the resident was failing to achieve the target and that it was becoming a problem."

Pattern 2: Focused more on their own professional image than LPP in the hospital	Clarified their own values and roles in practice	Doctor 2: "In the Department of General Internal Medicine, we have to address issues for which there are no solutions, and we need to handle individuality very seriously; that is, we have to think about how we approach individual patients. I thought that these things were very challenging."
		Doctor 6: "I have thought that palliative care was a good fit for me since junior residency... I wanted to concentrate on a specialized area so as to actually experience self-efficacy because I had not developed self-efficacy as a family physician during my senior residency."
	Transformed their learning style	Doctor 6: "I knew the scope of learning in the area of family medicine and identified what I had to learn within that scope from my rotations. I showed my goals to my teaching doctor (Oben) and told my Oben, 'this is what I want to learn'. That is what I did. I continued in this way for a while; that is, setting goals and trying to achieve them."
		Doctor 7: "I learned almost everything by asking the instructing doctors to teach me from scratch. And when I was told to read some text after asking a question, I always read it prior to starting work. That was my learning style."
	Struggled to adapt to the life of doctors	Doctor 2: "I had to manage raising a child and doing housekeeping with working in a well-balanced manner. This balancing act helped me to work efficiently in clinical settings. I thought that the two were somehow interlinked. Thus, I successfully balanced the two and I think I enjoyed both of them."

		Doctor 6: “After I started a doctoral course, I was not engaged in clinical practice at all. This was not good for me and I found that the lack of engagement in clinical practice did not increase my self-efficacy. Therefore, I want a good balance between research and clinical practice.”
Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)	Identified role as a specialist	Doctor 18: “I actually knew nothing about emergency care in the Department of Gynecology; I was not good with women and I didn't know anything about gynecology, so I thought that it would be good for me to work in that department for about one year. The doctor told me about lots of things that had occurred in the past. What the doctor told me was more than what I learned from textbooks, and to be honest, I did not need to find the time to read books. I did not 'study' to become a specialist doctor.”
		Doctor 19: “After surgery, we had a meeting for about 2 hours late at night ...reading images on a screen, and in this way, I increased my knowledge about various diseases. (At the training hospital) there were doctors specialized in the spinal cord. There, I learned about surgery of the spinal cord.”
	Identified role as a generalist	Doctor 1: “There are many cases of fever due to unknown causes, right?... At present, I frequently come up with ideas to change my mood to a positive state. However, I did not do that when I was training. I don’t think that I enjoyed my days very much.”
		Doctor 11: “Twelve years after graduation, I had finally become a doctor. I mean, after all, I had studied what I needed to study. Before that time, the only way to learn was to ask specialists.”
Pattern 4 : Professional image was	Waited out the period set for	Doctor 5: “In the beginning, in my first year of being a doctor, I often questioned, ‘why should I go to the hospital on holidays? I understood that I

unclear	professional identity formation - moratorium	should go, but I would rather not go as much as possible...' Ultimately, I realized that I had acquired the ability to handle anything without thinking. (After completing my senior residency training), I very often tried to find an area that I was interested in. Consequently, for 6 months from the beginning of my seventh year, I worked at the Department of Internal Medicine of Metabolism as part of my rotations."
		Doctor 8: "(When I was a resident) I had no confidence and I therefore did not say or touch unnecessary things. As such, I was so passive and hesitant ...Even now, I think I still have such an attitude, although there is no definitive reason for this. However, something changed and happened, and I learned from it, which broadened my perspective. I became aware that other doctors were in trouble and that I had to learn more. I wanted to learn more with other doctors because I also did not know enough."
		Doctor 9: "I didn't hold the perspective that 'I will learn in this department for the sake of my future.' So I only focused on the department that I was assigned to. I never thought that I enjoyed my job. Therefore, after qualifying as a doctor, I wondered if it was right. For me, it is significantly important to help somebody (as a doctor). I am very motivated by the fact that somebody needs me. "
		Doctor 10: "When teaching another senior resident, I felt, 'Oh, that resident improved a lot in a short time!' Upon reflection, I looked back on my own progress and realized how much his skills had improved. This triggered me to think about my own skills. ...I am not good at thinking about multiple things at the same time, even though this is frequently required of doctors. Therefore, I tried to

		train myself to think about multiple things simultaneously."
		Doctor 13: "I noticed for the first time that my teaching doctor was surprised with me, which made me look back on what I had done over the past two years. That particular doctor told me over and over again, forcefully, that hospitals and comprehensive medical care services and the like are really necessary. ...In the middle of my training as a senior resident, I returned to the hospital."

DISCUSSION

This study showed that, in the early stages of their socialization process, doctors experienced not only realization as doctors, but also organizational socialization, in which they adapted to the hospital in which they underwent residency training. Subsequently, the doctors exhibited four patterns of professional socialization that differed according to three themes: specialty area, self-learning style and organizational socialization. Some doctors - even those who developed into established doctors - became lost in the professional socialization process. Our study uniquely demonstrates the chronological patterns of the professional socialization of doctors using educational theories.

Our finding that there are common factors between the realization and organizational socialization of doctors is in agreement with the institutional theory (29). Medical universities are predetermined to train doctors using both intended and hidden curriculum. Several studies have indicated that medical students in a university's medical school are ideologically socialized as clinicians with respect to their vision and experience (30). In clinical training for medical students, realization as a doctor is interpreted as anticipatory socialization (31). This realization has been suggested to begin when a person starts to realistically review his/her career, while focusing on their profession, before he/she participates in a specific organization. In contrast, when students become junior residents, they fulfill roles required by the organization, such as a hospital, to secure progress in their organizational socialization (32,33). During this period, however, the students' skills have not reached a high level and they therefore contribute to their organizations by fulfilling the various roles required by the organization. Through these processes, they become adapted to the hospital as established doctors and achieve socialization.

Professional organizations are affected by a professional image, which is composed of the perspectives of outsiders and self-recognition of one's own competency (34). Doctors struggle to develop an external persona consistent with the expectations of their

surroundings. In Patterns 3 and 4, in which the professional image is vague or unclear and is not recognized by the organization, the participants temporarily experienced a 'pretend' socialization in terms of the culture of their training hospital and their role in it. However, their experience differed from that of the ideal identity in their specialty area, and they therefore required role models as external examples. Accordingly, they had to accumulate experience in areas in which they were not competent to establish an image as a doctor that matched the professional image (e.g., family physician or emergency physician). In contrast, specialists, for whom the professional image is externally established (e.g., gastroenterologists, obstetrician-gynecologists, and neurosurgeons) began practicing LPP in the organization once they had chosen their specialization. They were subsequently integrated as members of the organization while developing their professional identity as specialists.

In Pattern 1, medical doctors who wanted to become family physicians continued to engage in LPP in the organization after they had established a professional identity and externally recognized persona as a family physician within the hospital. These experiences can promote determination as a doctor through threshold concepts (TCs)(35). TCs, which are usually transformative, integrative, irreversible, bounded and often troublesome, are key to formalizing a professional identity in a vague professional

image. In particular, TCs often arise when doctors engage in the reflective practice of playing the multiple ambiguous roles expected of them within their organization, based on the sense of *noblesse oblige* – the notion that doctors should use their social position to help others (36).

In this way, training at an organization which provides a professional image that is consistent with that of the trainee enables LPP and helps the trainee to develop their professional identity. We found, however, that when professional images differed, some trainees distanced themselves or struggled to become a member of the organization. These series of processes for building the professional identity and socialization of doctors may enable medical teachers or residency program directors to provide career support to medical students or junior residents.

This study had the following limitations: we only interviewed 21 participants in Japan, of whom many were family physicians and only a small number were specialists; many of the participants had advanced their careers as doctors relatively satisfactorily; only 2 doctors had experienced pregnancy and childbirth; and none became doctors after 2010, when the Japanese government revised the rules for clinical training for doctors. The findings may be subject to a degree of sample selection and response bias in that some

participants were known to the interviewers and volunteered to participate. The study results should be interpreted with these limitations in mind, along with the fact that the findings reflect the perspectives of family physicians and Japanese culture in the above-mentioned context.

Allowing for these limitations, this study clarified the process of socialization of medical doctors. This clarification was based on detailed interviews which focused on the continuity of the participants' careers as doctors from a family physician perspective, as compared to the perspectives of other specialties. Nevertheless, doctors in other specialties may also find our results useful given that very few studies of this type have been conducted. Our findings have the potential to substantially impact the development of future medical school curricula. For example, in career education, the patterns of socialization of medical doctors may provide trainee doctors with an idea of career milestones and ways to choose a career. In addition, these findings will act as a guide for individual doctors considering their career plans, and may help organizations which consider doctors' career plans by showing the potential need to reflect on the four patterns of self-learning style and specialty areas at milestones. Our future plans to evaluate medical professional identity formation include cross-sectional studies or cohort studies to check the robustness of our present results at larger scale (37).

Conclusion

This study suggests that anticipatory socialization and organizational socialization of medical doctors may be similarly achieved, and that professional socialization may be affected by the extent to which medical doctors establish their professional identity; the extent to which their professional image matches that of the organization; and the extent to which the professional image is externally recognized. Our study uncovers the process by which doctors are socialized, and is expected to offer insight to various stakeholders engaged in medical education.

CONTRIBUTORSHIP STATEMENT

JHar, SO, and JHam, were involved in the conception and design of this study, carried out all qualitative enquiries, analyzed the data and wrote the paper.

COMPETING INTERESTS

The authors report no conflicts of interest.

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DATA SHARING STATEMENT

No data are available.

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Figure Legends

Figure 1: Medical education system in Japan

Figure 2: Professional socialization as a doctor

LPP: Legitimate peripheral participation

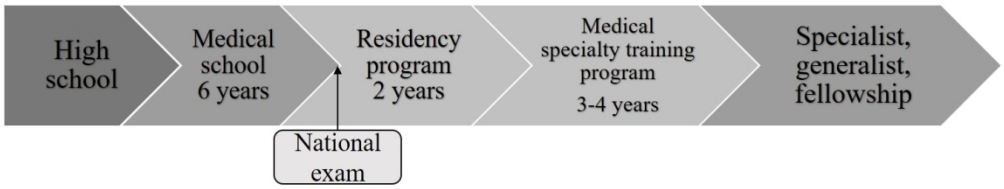

Figure 1: Medical education system in Japan

252x120mm (150 x 150 DPI)

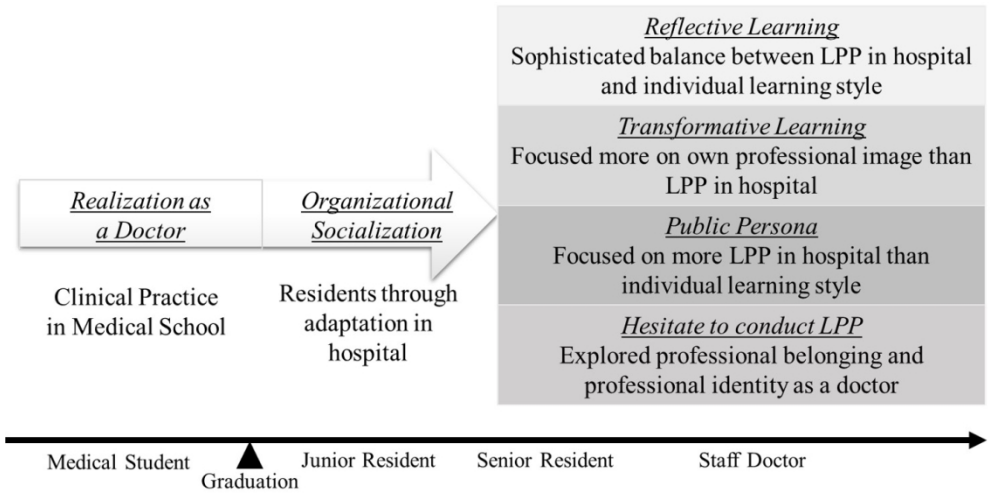

Figure 2: Professional socialization as a doctor
LPP: Legitimate peripheral participation

254x128mm (149 x 149 DPI)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	P10 JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions.
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Junji Haruta, MD, PhD [1], Sachiko Ozone, MD, PhD [2], Jun Hamano, MD, PhD [3] [1]Department of Primary Care and Medical Education, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [2]Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [3]Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan
3. Occupation	What was their occupation at the time of the study?	Junji Haruta, MD, PhD: Dr. Haruta is an Associate Professor at the Department of Primary Care and Medical Education, University of Tsukuba, Japan. Sachiko Ozone, MD,

		PhD: Dr. Ozone is an Assistant Professor at Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba. Jun Hamano, MD, PhD: Dr. Hamano is an Assistant Professor at Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba.
4. Gender	Was the researcher male or female?	Junji Haruta and Jun Hamano are male. Sachiko Ozone is female.
5. Experience and training	What experience or training did the researcher have?	Junji Haruta learned Qualitative research in PhD and participated in HERG Qualitative Research Course in Oxford, 24-28 April 2017.
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	We selected study participants using purpose sampling. Some participants have opportunities to work with authors.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Same above.
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	P14, Result, Demographic data of the participants
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	P8. Methods, Theoretical framework
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive sampling

11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	We used e-mail.
12. Sample size	How many participants were in the study?	P14, Result, **Demographic data of the participants**
13. Non-participation	How many people refused to participate or dropped out? Reasons?	When we explained the aim of research, no participants refused.
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	P8 Method, setting
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	No.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	P14, Result, Demographic data of the participants
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	P10. The questions were: "What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?"; "Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?"; "How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior resident, and staff doctor? How did you select your professional career?"; and "Please describe the events that influenced your learning while developing as a doctor."
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	One time.

19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	P12. All interviews were recorded using a voice recorder and transcribed verbatim.
20. Field notes	Were field notes made during and/or after the inter view or focus group?	No.
21. Duration	What was the duration of the inter views or focus group?	P3. We conducted semi-structured interviews from September 2015 to December 2016.
22. Data saturation	Was data saturation discussed?	P12-13. The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of 8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors checked whether the plots matched the contents that each had divided into stages using the original data. According to step 3, we identified the stanzas in which the participants' narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative

		pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Results
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Results
27. Software	What software, if applicable, was used to manage the data?	We do not use the special software. We used the Excel to mange the data.
28. Participant checking	Did participants provide feedback on the findings?	No.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Discussion
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results

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Doctors' professional identity and socialization from medical students to staff doctors in Japan: narrative analysis in qualitative research from a family physician perspective

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	General practice / Family practice, Qualitative research
Keywords:	MEDICAL EDUCATION & TRAINING, QUALITATIVE RESEARCH, SOCIAL MEDICINE

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Title Page

Title

Doctors' professional identity and socialization from medical students to staff doctors in Japan: narrative analysis in qualitative research from a family physician perspective

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Keywords

Medical Education & Training, Qualitative Research, Social Medicine

Word count 4102 words

Abstract

Objective

Becoming a doctor involves transforming a lay person into a medical professional, which is known as professional socialization. However, few studies have clarified differences in the professional socialization process in detail. The aim of this study was to clarify the process of professional socialization of medical students to residents to staff doctors.

Design

We used narrative analysis in qualitative research as a theoretical framework.

Setting

This study was conducted in Japan.

Participants

Participants were collected using a purposive sample of doctors with over 7 years of medical experience. We conducted semi-structured interviews from September 2015 to December 2016, then used a structured approach to integrate the sequence of events into coherent configurations.

Results

Participants were 13 males and 8 females with medical careers ranging from 8–30 years. All participants began to seriously consider their own career and embodied their ideal image of a doctor through clinical practice. As residents, the participants adapted as a member of the organization of doctors. Subsequently, doctors exhibited four patterns: first, they smoothly transitioned from 'peripheral' to 'full' participation in the organization; second, they could no longer participate peripherally but developed a professional image from individual social interactions; third, they were affected by outsiders' perspectives and gradually participated peripherally; fourth, they could not regard the hospital as a legitimate organization and could not participate fully.

Conclusion

The professional socialization process comprises an institutional theory, professional persona, legitimate peripheral participation, and threshold concepts. These findings may be useful in supporting professional development.

(245 words)

Strengths and limitations of this study

- This study used narrative analysis to illustrate the trajectory of medical professional identity formation.

- Strengths include applying narrative analysis suitable for identifying the socialization patterns of medical doctors in the continuity of their careers.
- Limitations include a small sample size of 21 Japanese participants, of whom many were family physicians and only a small number were specialists.
- Participants consisted of 13 males and 8 females with medical careers ranging from 8–30 years.

INTRODUCTION

The process by which a medical student matures into a health care professional is known as socialization (1). Professional socialization is defined as the process of transforming a beginner into a professional. This process integrates work-based norms, values, beliefs, knowledge, skills, and expected roles, and adapts the beginner to the culture of the experts (2). A medical professional's identity, constructed through medical professional socialization, is defined as "a representation of self, achieved in stages over time during which the characteristics, values, and norms of the medical profession are internalized, resulting in an individual thinking, acting, and feeling like a physician" (3). That is, medical professional socialization aims to develop a professional identity and adapt a person to the role of medical expert (4).

In practice, the socialization of doctors is affected by role models, clinical experience (5), the health care system, and school or organizational environment, as well as by the attitudes of colleagues and supervisors towards patients (6). Additionally, most doctors adapt to the organization by acquiring the necessary skills to carry out their duties (7,8). Doctors thereby become members of the organization of a hospital, and are conscious of belonging to the community and of their responsibility as doctors (9). According to the concept of legitimate peripheral participation (LPP), medical students become

incorporated into the community of doctors as members based on degree of participation, and how participation and non-participation change over time (9).

A doctor's professional socialization and the development of their identity are some of the most important aspects of medical education (10–14). However, few studies have clarified the details of differences in the professional socialization process, such as when and how doctors are influenced by organizations and the education system, and how their professional identity as a doctor is acquired. A formal outline of the process of socialization might provide medical educators and program directors with clues on how to prevent identity crises for doctors-in-training.

In particular, the specialty of family physician is more ambiguous than other specialties, and family physicians tend to struggle with their identity due to the overlap in the scope of their practice with that of general internal medicine, general pediatrics, psychiatry, and obstetrics-gynecology. Family physicians are more interested in their identity and how others perceive them (15) because they have difficulties with professional identity formation within mainstream biomedicine and with the counterculture movement internationally (16,17). Thus, professional socialization from a family physician perspective may better reveal details of how anguish and/or struggle with professional identity formation is manifested than the perspectives of other specialties.

Here, therefore, with a focus on evaluation from the perspective of family physicians, as distinct from the perspectives of other specialties, we aimed to clarify the process of professional socialization of medical students to residents to staff doctors. In particular, the specific aim of this study was to examine how doctors perceive their acquired knowledge and values in the process of developing their professional identity as a doctor.

METHODS

Theoretical framework

We used narrative analysis, which is characterized as a group of methods used to interpret commonality among stories (18). Our present aim is consistent with that of narrative analysis because we examined the subjects' narrative as a whole rather than as de-contextualized fragmented data. Narrative analysis inductively clarifies a typology of narratives, conceptually organizes them into thematic categories, and then illustrates exemplar narratives or vignettes (18,19). Common thematic elements across a number of participants are used to develop a descriptive framework of professional socialization (19). A number of other studies of the professional identity of medical professionals have also used narrative analysis (20,21). We therefore adapted narrative analysis as a theoretical framework for the present study.

Setting

The setting was the Japanese medical education system (Figure 1). Similarly to many other countries, eligibility to enter medical school in Japan is assessed in high school graduates. The standard undergraduate medical education program is six years. The Japanese national exam comprises only a single examination, in sixth grade. In 2004,

the Council for Matching, a non-government organization, implemented and organized a system to match graduating medical students to two-year residency programs in Japan. A nationwide matching system had not been previously available, and residents had to randomly apply to individual training programs in which they were interested. After the initial two years of required postgraduate training in Japan, each trainee advances into his or her own career path. Some doctors enter graduate school, while others proceed to advanced clinical training courses as fellows, or move on to become family physicians in the community.

According to OECD data for 2017, the overall average number of doctors per 1,000 people was 3.3, compared to 2.4 in Japan (22). In contrast, Japan has the greatest number of hospital beds among OECD countries and approximately 100,000 clinics, of which more than 90% are private and less than 10% are public (23,24). Additionally, many doctors traditionally open primary care clinics after several years of organ-specific training at medical school or a large hospital (25). For family medicine, however, the number of Japanese doctors who have officially completed training as family physicians as of April, 2020 is only 732 (26). Due to this wide dispersion of relatively few doctors in hospitals and the paucity of family physicians, some organ-specific doctors encounter opportunities to work in primary-care settings, where

relatively small numbers of doctors often struggle to provide care to large numbers of patients(25). For this reason, many physicians in universities work in clinics and/or outpatient departments in community hospitals once or twice a week. In contrast, family physicians who belong to a clinic generally work only in that clinic.

Data collection: semi-structured interview

We conducted semi-structured interviews from September 2015 to December 2016. Semi-structured interviews are the primary method used for data collection in socialization studies (15,27). We interviewed each participant for 90–120 minutes in a private room or quiet cafe, after obtaining consent from the interviewee. We developed a series of questions that would allow us to compare the contents and diversity of expertise, and demonstrate the relationship between the socialization of doctors and acquisition of knowledge and values. The questions were: “What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?”; “Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?”; “How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior

resident, and staff doctor? How did you select your professional career?"; and "Please describe the events that influenced your learning while developing as a doctor."

JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions. In addition, we chose the most appropriate interviewer for each participant such that the combination of interviewee and interviewer would allow the interviewee to feel at ease and provide frank answers to questions, such as those inquiring about relationships between residents and teaching doctors in previous workplaces. Moreover, if the interviewers could not conduct in-person interviews due to logistical issues such as residential distance, the interviews were conducted using the online communication tool Skype™. Skype-conducted pilot interviews were conducted, in which the influence of the interviewer with respect to matters like sound quality were verified.

Patient and public involvement

Patients and the public were not involved in the design or conduct of the study.

Study participants

To clarify the professional socialization process of family physicians, who typically have a more diverse career than other specialists, we selected study participants using

purpose sampling, in which we discussed multifaceted aspects of the participants' careers, such as facilities; location; career experience, including training organization, university hospital, community hospital and clinic, and career changes; experience in academic research; and their cooperation with the interview. As much as possible, interviewers were paired with interviewees with whom they had not worked with for more than one year.

The inclusion criterion was a doctor with a medical career of 7 years or longer, on the basis that they would have sufficient experience to be able to look back and reflect on their training and career.

Data analysis

All interviews were recorded using a voice recorder and transcribed verbatim. The interview contents were analyzed using the 4 steps of structural analysis proposed by Gregg and Gregg (2006)(28):

Step 1: Divide the text into episodes, which comprise the plot/sequence of the story

Step 2: Eliminate material that is irrelevant to the plot (often facts)

Step 3: Identify the stanzas in each episode that contain an embedded story

Step 4: Identify contrasts in binary oppositions and mediating terms (a blend of the shared features) within and across each episode.

The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of 8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors together checked whether the plots matched the contents that each author individually had divided into stages using the original data. In step 3, we identified the stanzas in which the participant's narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis (19).

Ethics

This study was conducted with prior approval from the Ethics Committee of the authors' University. All participants provided informed consent prior to participation.

To protect privacy, interviewee quotes in this paper are identified by randomly assigned number codes rather than the participants' names.

RESULTS

Demographic data of the participants

The 21 participants included 16 Japan Primary Care Association-certified Family Physicians, of whom 1 had a subspecialty of cardiology; 2 had a subspecialty of palliative medicine; and 1 was a PhD student in the UK. The remaining 5 consisted of 2 gastroenterologists, 1 brain surgeon, 1 obstetrician and gynecologist, and 1 emergency and orthopedic surgeon. Eight of the 21 participants were female, and all had clinical experience ranging from 8 to 30 years. The participants belonged to 8 city hospitals, 5 clinics, and 7 universities, while 1 was a graduate student in the UK (Table 1). By location, the participants worked in Ibaraki Prefecture, Tokyo, Hokkaido, Kanagawa, Kyoto, Okinawa and the UK.

Table 1. Demographic data of study participants

Code number	Gender	Clinical experience (years)	Specialty	Institution
1	M	12	Family physician	Clinic
2	F	12	Family physician	University
3	M	12	Family physician	Clinic
4	M	14	Family physician, Palliative medicine	University

5	M	12	Family physician	Hospital
6	F	12	Family physician	PhD Student
7	M	11	Family physician	Clinic
8	F	11	Family physician, Palliative medicine	Hospital
9	F	8	Family physician	Hospital
10	M	13	Family physician	Clinic
11	M	30	Family physician, cardiologist	Hospital
12	F	16	Family physician	University
13	F	12	Family physician	Clinic
14	M	11	Family physician	Hospital
15	F	9	Family physician	Hospital
16	M	19	Family physician	Hospital
17	M	13	Emergency and orthopedic surgery	University
18	M	14	Obstetrics and gynecology	Hospital
19	M	13	Brain surgeon	University
20	M	22	Gastroenterologist	University
21	F	21	Gastroenterologist	University

Overview of professional socialization as a doctor

We conducted in-person interviews with all participants except 2, who were interviewed using Skype™. We found that all doctors related to the common themes of "Realization as a Doctor" as medical students in clinical practice and "Organizational Socialization" as residents through the process of becoming a member of their attending hospital. Subsequently, we identified 4 distinct patterns of professional socialization among the participants. These 4 patterns may represent the different ways individuals balance organizational socialization according to their particular specialty area and self-learning style (Table2, Figure 2).

Table 2. Four patterns of self-learning style and specialty area

	When and what specialty area	Self-learning style	Organizational socialization
Pattern 1	Clarify professional image during training after graduation	Reflective learning	Sophisticated balance between LPP [a] in hospital and individual learning style

Pattern 2	Develop clear values and roles as physicians from contact with different values	Transformative learning	Focus more on own professional image than LPP in hospital
Pattern 3	Need role models and professional belonging	Public persona, and focus more on LPP in hospital than individual learning style	
Pattern 4	Hesitate to conduct LPP, then explore professional belonging and professional identity as a doctor in an organization		

[a] LPP: Legitimate peripheral participation

Realization as a doctor

Medical students began to compare their observations of doctors, healthcare professionals, the community, and hospitals with their imagined concepts, and started to seriously consider doctors' tasks, attitudes, and way of thinking during clinical practice. They contemplated their own career and whether they themselves aligned with their image of a doctor. When the two did not match, they explored and embodied their ideal image through the clinical experience of other doctors and patients. (Table 3)

Organizational socialization

During their junior residency, which refers to a two-year period of work experience following graduation as a doctor, all participants experienced organizational socialization in hospitals as they conducted rotations across the medical departments. They had to carry out tasks as instructed by their supervisors and in this way learned their role as doctors in the hospital.

In addition, doctors valued their colleagues as an inner group, as doctors with whom they felt a kinship and friendship because of what they had been through together as residents. Some compared their own ability, motivation, and enjoyment of work with that of their colleagues. In contrast, some felt emotional undulations such as depressive

moods because they regarded colleagues as rivals, with envy, as markers of their own success or failure, and as competitors.

They strengthened their mutual connections with colleagues in their inner group in order to reflect on their experience. Some experienced effects of catharsis when they shared such feelings, and the resulting reflection brought about a shared emphasis on their mutual emotions. Participants who could not develop relationships with their colleagues or who did not have colleagues relied on senior and teaching doctors of similar ages. These participants developed similar relationships to those that others developed with their inner group.

During this organizational socialization as a doctor, relationships with this inner group of colleagues or close supervising doctors brought out a range of responses which had both positive and negative effects on their adaptation in the hospital (Table 3).

Table 3. Emergent themes and professional identity formation based on interviews about realization as a doctor and organizational socialization.

Theme	**Professional Identity Formation**	**Example quotes**
Realization as a doctor	Started to consider doctors' image	Doctor 2: "I was not very interested in any of the medical departments. I was told to go to the community clinic where a family physician worked, (and once there) I found I wanted to be like a

		medical doctor I met there. For the first time, my image of the future became vivid. Since then, I have continued to strongly want to become a family physician."
		Doctor 16: "When I was a fifth-year medical student, I had a vague but solid image of community healthcare. At that time, I participated in clinical training in public health. The clinical training was conducted by public health nurses in rural areas of X Prefecture. I just followed the public health nurses in clinical training."
		Doctor 13: "(What was particularly striking was) what patients told me during home visits. 'I understand that medical doctors want to specialize in a particular area, and rise in the ranks. That's good. However, as they rise to greatness, they gradually stop listening to us. I want you to be a doctor closer to patients.' This is what one patient told me."
Organizational socialization	Started organizational socialization in hospitals	Doctor 3: "When I worked in the surgery department, I was generally not regarded as a doctor who was primarily responsible for a particular patient but as a doctor in charge of patients."
		Doctor 5: "Why do I need to come into the clinic on holidays? ...My superior told me that it was to see patients once daily, without fail. I just answered 'Yes'."
		Doctor 19: "Including chores, ..I stayed up until late at night, together with doctors in the lowest position. ...I did what persons in the lowest position should do in the manner appropriate for those in the lowest position."
	Compared others	Doctor 1: "I cared so much about what other people thought of me, compared to my other colleagues. I felt something like an inferiority complex."

		Doctor 2: “At the beginning, I was cold and unfriendly. ...The hospital tried to foster us as doctors and we felt that we were in competition with one another.”
	Connected with colleagues	Doctor 1: “Looking back ...well, I think it was good because it created and fostered a sense of solidarity and created bonds among us. We shared the feeling that we all worked together, we all did our best together, and we all worked together while encouraging each other.”
		Doctor 3: “When I talked about my failures, it actually reduced the burden on my heart. We shared our experiences and did not criticize each other. We worked under these circumstances, which contributed to our mental stability because we felt that we received training in a safe and secure environment, and did not need to hold things inside.”
	Connected with senior doctors	Doctor 8: “There were many doctors responsible for supervising and instructing residents. So I learned a lot and saw a lot, and whenever I faced difficulties, even small challenges, I was taught and instructed. ...They always kept me in their mind ...they were always kind to me, and they let me join their group.”

Professional socialization

The 4 patterns of professional socialization that we identified differed with respect to three themes: specialty area, self-learning style and organizational socialization (Table 4).

Pattern 1: Sophisticated balance between LPP and individual learning style

Participants exhibiting this pattern established their professional image in the early stages and seriously considered themselves doctors and handled tasks smoothly by working in an organization that matched their professional image.

Those who struggled to be a doctor that matched the image required by their hospital sometimes created new ways to solve this problem by involving other staff. The participants, who had no obligation to help, supported their hospital and staff because they felt a belonging to and professional identity with the hospital. These behaviors of the participants are concordant with the model of a reflective practitioner in an organization. Through the reflection, participants were able to voluntarily commit to education, partnership, leadership and administration work as a doctor, which gave them increasing opportunities to train residents and to work with various healthcare professionals.

Participants with this pattern initiated LPP smoothly in the organization and identified their own professional image within two years after graduation because they had a role model in the training hospitals. They subsequently proceeded to professional socialization as a part of continuous organizational socialization.

Pattern 2: Focused more on their own professional image than LPP in the hospital

Participants with this pattern generated their professional image or learning style in their own way. Based on this, they clarified their own values and roles in practice. When they were junior residents, for example, when the participants' professional image was clearer, they could actively participate in the training hospital and develop their own goals. They had opportunities to transform their learning style by following their role models' advice.

In addition, they experienced transformative learning when they struggled to adapt to their changing life cycle and new environment, which they had never experienced previously. Through their experience, they developed the ability to reflect on their learning style and role as a doctor and look back on themselves from a broad perspective.

Even those who were able to create a professional image in the early stages of their training could transform their values if they came into contact with others with better values. In this way, they confirmed their own role by creating relationships with others and exploring meaningful perspectives for their own growth.

Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)

Participants with this pattern had not established their own professional image as a doctor when they were medical students and trainees. Therefore, they adapted their learning styles to those accepted by the organization concerned. Through these adapted styles, they were able to become like their superior role models or establish a professional image that was as close as possible to the externally recognized professional image accepted within the organization.

Several characteristics of this pattern differed between specialists and generalists. Even when specialists such as neurosurgeons or obstetrician-gynecologists had not adequately established their own professional image while they were trainees, they stayed in these specialty departments and were eventually able to successfully establish their own individual learning styles and stably place themselves in strategic positions within the

organization. They could be distinguished from other specialists and were externally recognizable professionals. That is, they established their own professional image under the apprenticeship system embedded in the organization and through experiential learning, which helped them build their own specialty. Their professional socialization therefore occurred through their organizational socialization.

In contrast, family physicians and emergency doctors are less defined by a particular procedural skill or role. They therefore struggled to adapt to organizational socialization because their externally recognized professional belonging remained vague. In addition, the learning styles of family physicians and emergency doctors varied depending on the organization, and it therefore took them longer to establish their own learning styles. In this way, they experienced LPP in any organization to which they were assigned. They experienced organizational socialization at each of their training hospitals while they participated in clinical rotations, and made comparisons with their own professional image.

Pattern 4 : Professional image was unclear

To identify their ideal image of a doctor, participants with this pattern adapted to the ways accepted by their organization for the fulfillment of duties, relied upon recognition

from others, and limited their activities to those required by the organization. As a result, they failed to establish their own learning style at the beginning, and wanted teaching doctors to lead them, or to accumulate experience in areas in which they had not yet acquired experience. They were not confident as doctors and tended to confirm the validity of their decisions with staff who were widely trusted in the organization. This demonstrates that doctors continue to explore their own professional image even after they become established doctors. As a result, they wanted a place of training where they could fill holes in their knowledge. Some doctors established their image as a doctor under the conditions provided to them, while others tried to find their personal identity through relationships with other doctors.

Table 4. Emergent themes and professional identity formation based on interviews about 4 patterns of professional socialization

Theme	**Professional identity formation**	**Example quotes**
Professional socialization Pattern 1:	Established their professional	Doctor 3: "I was able to commit myself to (the department's) philosophy and vision ...my boss sincerely endeavored to teach it."

Sophisticated balance between LPP and individual learning style	image in the early stages	Doctor 20: "I was able to be engaged in diagnosis through treatment ...I wanted to involve myself in actual clinical practice as a teaching doctor, which was my desire ...I think that this area will grow in the future."
	Struggled to be a doctor	Doctor 3: "(In the early phase of my senior residency) I established good relationships with junior residents working in the same hospital. I noticed that the junior residents were extremely unknowledgeable, or not adequately taught, as I had expected, but were forced to survive under these circumstances anyway. Therefore, I supported their survival, even though I was not asked to do so by anyone."
		Doctor 16: "(After returning to the hospital) I invited first-year and second-year residents from the primary care course to attend the study group meetings, where I gave talks to invoke discussion amongst them. In addition, I thought that such an organization should exist for residents, and three of us who started our residencies at the same time collaborated to create a new organization for residents."
	Committed to the work as non-clinicians	Doctor 16: "(When training residents), I realized that individuals differ in their speed of learning, ...When a resident could not achieve a predetermined target, I tried to intervene in his/her training as soon as I noticed that the resident was failing to achieve the target and that it was becoming a problem."

Pattern 2: Focused more on their own professional image than LPP in the hospital	Clarified their own values and roles in practice	Doctor 2: "In the Department of General Internal Medicine, we have to address issues for which there are no solutions, and we need to handle individuality very seriously; that is, we have to think about how we approach individual patients. I thought that these things were very challenging."
		Doctor 6: "I have thought that palliative care was a good fit for me since junior residency... I wanted to concentrate on a specialized area so as to actually experience self-efficacy because I had not developed self-efficacy as a family physician during my senior residency."
	Transformed their learning style	Doctor 6: "I knew the scope of learning in the area of family medicine and identified what I had to learn within that scope from my rotations. I showed my goals to my teaching doctor (Oben) and told my Oben, 'this is what I want to learn'. That is what I did. I continued in this way for a while; that is, setting goals and trying to achieve them."
		Doctor 7: "I learned almost everything by asking the instructing doctors to teach me from scratch. And when I was told to read some text after asking a question, I always read it prior to starting work. That was my learning style."
	Struggled to adapt to the life of doctors	Doctor 2: "I had to manage raising a child and doing housekeeping with working in a well-balanced manner. This balancing act helped me to work efficiently in clinical settings. I thought that the two were somehow interlinked. Thus, I successfully balanced the two and I think I enjoyed both of them."

		Doctor 6: “After I started a doctoral course, I was not engaged in clinical practice at all. This was not good for me and I found that the lack of engagement in clinical practice did not increase my self-efficacy. Therefore, I want a good balance between research and clinical practice.”
Pattern 3: Clarified their own vague professional image by referring to role models or the organizations to which they belonged (specific persons or organizations)	Identified role as a specialist	Doctor 18: “I actually knew nothing about emergency care in the Department of Gynecology; I was not good with women and I didn't know anything about gynecology, so I thought that it would be good for me to work in that department for about one year. The doctor told me about lots of things that had occurred in the past. What the doctor told me was more than what I learned from textbooks, and to be honest, I did not need to find the time to read books. I did not 'study' to become a specialist doctor.”
		Doctor 19: “After surgery, we had a meeting for about 2 hours late at night ...reading images on a screen, and in this way, I increased my knowledge about various diseases. (At the training hospital) there were doctors specialized in the spinal cord. There, I learned about surgery of the spinal cord.”
	Identified role as a generalist	Doctor 1: “There are many cases of fever due to unknown causes, right?... At present, I frequently come up with ideas to change my mood to a positive state. However, I did not do that when I was training. I don’t think that I enjoyed my days very much.”
		Doctor 11: “Twelve years after graduation, I had finally become a doctor. I mean, after all, I had studied what I needed to study. Before that time, the only way to learn was to ask specialists.”
Pattern 4 : Professional image was	Waited out the period set for	Doctor 5: “In the beginning, in my first year of being a doctor, I often questioned, ‘why should I go to the hospital on holidays? I understood that I

unclear	professional identity formation - moratorium	should go, but I would rather not go as much as possible...' Ultimately, I realized that I had acquired the ability to handle anything without thinking. (After completing my senior residency training), I very often tried to find an area that I was interested in. Consequently, for 6 months from the beginning of my seventh year, I worked at the Department of Internal Medicine of Metabolism as part of my rotations."
		Doctor 8: "(When I was a resident) I had no confidence and I therefore did not say or touch unnecessary things. As such, I was so passive and hesitant ...Even now, I think I still have such an attitude, although there is no definitive reason for this. However, something changed and happened, and I learned from it, which broadened my perspective. I became aware that other doctors were in trouble and that I had to learn more. I wanted to learn more with other doctors because I also did not know enough."
		Doctor 9: "I didn't hold the perspective that 'I will learn in this department for the sake of my future.' So I only focused on the department that I was assigned to. I never thought that I enjoyed my job. Therefore, after qualifying as a doctor, I wondered if it was right. For me, it is significantly important to help somebody (as a doctor). I am very motivated by the fact that somebody needs me. "
		Doctor 10: "When teaching another senior resident, I felt, 'Oh, that resident improved a lot in a short time!' Upon reflection, I looked back on my own progress and realized how much his skills had improved. This triggered me to think about my own skills. ...I am not good at thinking about multiple things at the same time, even though this is frequently required of doctors. Therefore, I tried to

		train myself to think about multiple things simultaneously."
		Doctor 13: "I noticed for the first time that my teaching doctor was surprised with me, which made me look back on what I had done over the past two years. That particular doctor told me over and over again, forcefully, that hospitals and comprehensive medical care services and the like are really necessary. ...In the middle of my training as a senior resident, I returned to the hospital."

DISCUSSION

This study showed that, in the early stages of their socialization process, doctors experienced not only realization as doctors, but also organizational socialization, in which they adapted to the hospital in which they underwent residency training. Subsequently, the doctors exhibited four patterns of professional socialization that differed according to three themes: specialty area, self-learning style and organizational socialization. Some doctors - even those who developed into established doctors - became lost in the professional socialization process. Our study uniquely demonstrates the chronological patterns of the professional socialization of Japanese doctors including their hospital training, using educational theories.

Our finding that there are common factors between the realization and organizational socialization of doctors is in agreement with the institutional theory (29). Medical universities are predetermined to train doctors using both intended and hidden curriculum. Several studies have indicated that medical students in a university's medical school are ideologically socialized as clinicians with respect to their vision and experience (30). In clinical training for medical students, realization as a doctor is interpreted as anticipatory socialization (31). This realization has been suggested to begin when a person starts to realistically review his/her career, while focusing on their profession, before he/she participates in a specific organization. In contrast, when students become junior residents, they fulfill roles required by the organization, such as a hospital, to secure progress in their organizational socialization (32,33). During this period, however, the students' skills have not reached a high level and they therefore contribute to their organizations by fulfilling the various roles required by the organization. Through these processes, they become adapted to the hospital as established doctors and achieve socialization.

Professional organizations are affected by a professional image, which is composed of the perspectives of outsiders and self-recognition of one's own competency (34). Doctors struggle to develop an external persona consistent with the expectations of their

surroundings. In Patterns 3 and 4, in which the professional image is vague or unclear and is not recognized by the organization, the participants temporarily experienced a 'pretend' socialization in terms of the culture of their training hospital and their role in it. However, their experience differed from that of the ideal identity in their specialty area, and they therefore required role models as external examples. Accordingly, they had to accumulate experience in areas in which they were not competent to establish an image as a doctor that matched the professional image (e.g., family physician or emergency physician). In contrast, specialists, for whom the professional image is externally established (e.g., gastroenterologists, obstetrician-gynecologists, and neurosurgeons) began practicing LPP in the organization once they had chosen their specialization. They were subsequently integrated as members of the organization while developing their professional identity as specialists.

In Pattern 1, medical doctors who wanted to become family physicians continued to engage in LPP in the organization after they had established a professional identity and externally recognized persona as a family physician within the hospital. These experiences can promote determination as a doctor through threshold concepts (TCs)(35). TCs, which are usually transformative, integrative, irreversible, bounded and often troublesome, are key to formalizing a professional identity in a vague professional

image. In particular, TCs often arise when doctors engage in the reflective practice of playing the multiple ambiguous roles expected of them within their organization, based on the sense of *noblesse oblige* – the notion that doctors should use their social position to help others (36).

In this way, training at an organization which provides a professional image that is consistent with that of the trainee enables LPP and helps the trainee to develop their professional identity. We found, however, that when professional images differed, some trainees distanced themselves or struggled to become a member of the organization. These series of processes for building the professional identity and socialization of doctors may enable medical teachers or residency program directors to provide career support to medical students or junior residents.

This study had the following limitations: we only interviewed 21 participants in Japan, of whom many were family physicians and only a small number were specialists; many of the participants had advanced their careers as doctors relatively satisfactorily; only 2 doctors had experienced pregnancy and childbirth; and none became doctors after 2010, when the Japanese government revised the rules for clinical training for doctors. The findings may be subject to a degree of sample selection and response bias in that some

participants were known to the interviewers and volunteered to participate. The study results should be interpreted with these limitations in mind, along with the fact that the findings reflect the perspectives of family physicians and Japanese culture in the above-mentioned context.

Allowing for these limitations, this study clarified the process of socialization of medical doctors. This clarification was based on detailed interviews which focused on the continuity of the participants' careers as doctors from a family physician perspective, as compared to the perspectives of other specialties. Nevertheless, doctors in other specialties may also find our results useful given that very few studies of this type have been conducted. Our findings have the potential to substantially impact the development of future medical school curricula. For example, in career education, the patterns of socialization of medical doctors may provide trainee doctors with an idea of career milestones and ways to choose a career. In addition, these findings will act as a guide for individual doctors considering their career plans, and may help organizations which consider doctors' career plans by showing the potential need to reflect on the four patterns of self-learning style and specialty areas at milestones. Our future plans to evaluate medical professional identity formation include cross-sectional studies or cohort studies to check the robustness of our present results at larger scale (37).

Conclusion

This study suggests that anticipatory socialization and organizational socialization of medical doctors may be similarly achieved, and that professional socialization may be affected by the extent to which medical doctors establish their professional identity; the extent to which their professional image matches that of the organization; and the extent to which the professional image is externally recognized. Our study uncovers the process by which doctors are socialized, and is expected to offer insight to various stakeholders engaged in medical education.

CONTRIBUTORSHIP STATEMENT

JHar, SO, and JHam, were involved in the conception and design of this study, carried out all qualitative enquiries, analyzed the data and wrote the paper.

COMPETING INTERESTS

None declared.

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DATA SHARING STATEMENT

No data are available.

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Figure Legends

Figure 1: Medical education system in Japan

Figure 2: Professional socialization as a doctor

LPP: Legitimate peripheral participation

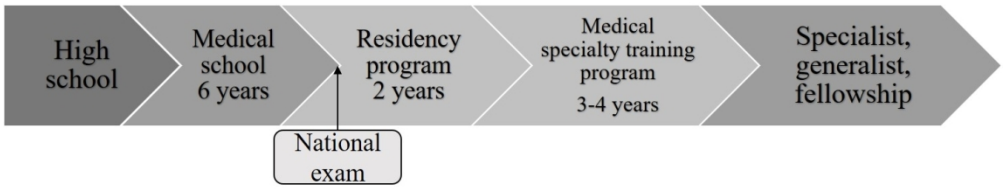

Figure 1: Medical education system in Japan

252x120mm (150 x 150 DPI)

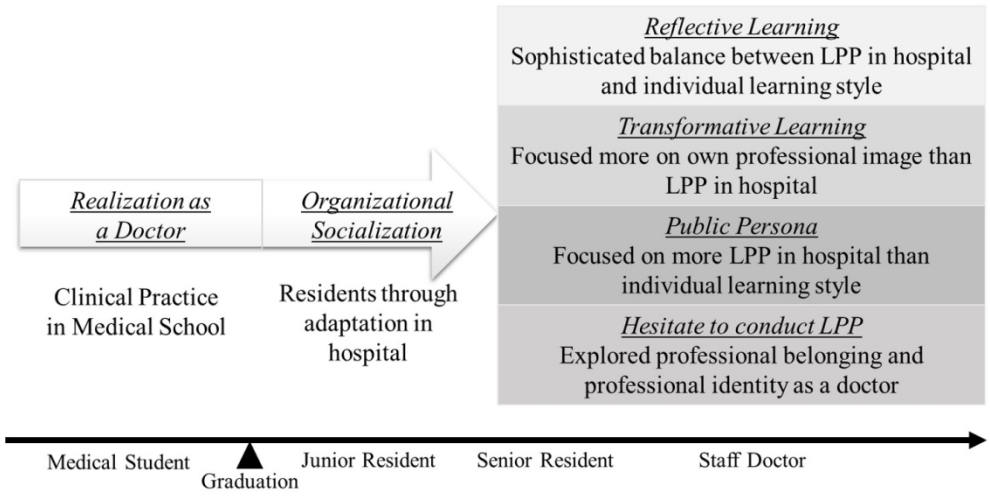

Figure 2: Professional socialization as a doctor
LPP: Legitimate peripheral participation

254x128mm (149 x 149 DPI)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	P10 JHar, SO and JHam conducted pilot interviews on each other to standardize the interviewing technique and interview questions.
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Junji Haruta, MD, PhD [1], Sachiko Ozone, MD, PhD [2], Jun Hamano, MD, PhD [3] [1]Department of Primary Care and Medical Education, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [2]Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan [3]Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba, Tsukuba City, Ibaraki Prefecture, Japan
3. Occupation	What was their occupation at the time of the study?	Junji Haruta, MD, PhD: Dr. Haruta is an Associate Professor at the Department of Primary Care and Medical Education, University of Tsukuba, Japan. Sachiko Ozone, MD,

		PhD: Dr. Ozone is an Assistant Professor at Department of General Medicine and Primary Care, Faculty of Medicine, University of Tsukuba. Jun Hamano, MD, PhD: Dr. Hamano is an Assistant Professor at Division of Clinical Medicine, Faculty of Medicine, University of Tsukuba.
4. Gender	Was the researcher male or female?	Junji Haruta and Jun Hamano are male. Sachiko Ozone is female.
5. Experience and training	What experience or training did the researcher have?	Junji Haruta learned Qualitative research in PhD and participated in HERG Qualitative Research Course in Oxford, 24-28 April 2017.
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	We selected study participants using purpose sampling. Some participants have opportunities to work with authors.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Same above.
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	P14, Result, Demographic data of the participants
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	P8. Methods, Theoretical framework
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive sampling

11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	We used e-mail.
12. Sample size	How many participants were in the study?	P14, Result, **Demographic data of the participants**
13. Non-participation	How many people refused to participate or dropped out? Reasons?	When we explained the aim of research, no participants refused.
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	P8 Method, setting
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	No.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	P14, Result, Demographic data of the participants
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	P10. The questions were: "What kinds of things did you learn and how did you learn them when you were a medical student, junior resident, senior resident, and staff doctor?"; "Did you make changes between being a medical student and your training? If so, what did you change and how did you make these changes?"; "How did you feel about the image of the doctor you envisaged before entering the medical department, or becoming a medical student, junior resident, senior resident, and staff doctor? How did you select your professional career?"; and "Please describe the events that influenced your learning while developing as a doctor."
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	One time.

19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	P12. All interviews were recorded using a voice recorder and transcribed verbatim.
20. Field notes	Were field notes made during and/or after the inter view or focus group?	No.
21. Duration	What was the duration of the inter views or focus group?	P3. We conducted semi-structured interviews from September 2015 to December 2016.
22. Data saturation	Was data saturation discussed?	P12-13. The three authors analyzed the entire narratives provided by the 21 participants and divided them into 5 sections: before medical school, medical student, junior resident, senior resident and staff doctor. JHar extracted relevant material from the interviews of 8 participants, as did SO for 6 participants, and JHam for 7 participants. Subsequently, the three authors checked whether the plots matched the contents that each had divided into stages using the original data. According to step 3, we identified the stanzas in which the participants' narrative was associated with professional socialization. JHam, SO and JHar compared the series of stories on professional identity formation and clarified the themes based on the concept of professional socialization. We ensured that the themes appeared as a consistent narrative

		pattern across each interview. We conducted periodic data analysis, and checked the steps performed by each author to ensure consistency in interpretation and appropriate sampling to improve the robustness of the analysis
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Results
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Results
27. Software	What software, if applicable, was used to manage the data?	We do not use the special software. We used the Excel to mange the data.
28. Participant checking	Did participants provide feedback on the findings?	No.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Discussion
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.