



Original article

Mobile medical services and experiential learning in community-based clinical clerkships enhancing medical students' positive perceptions of community healthcare

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Abstract

Objective: Previous studies have investigated medical students' interest in family medicine, as well as their intentions to work in rural areas after taking part in community-based clinical clerkships. Community-based clerkships are designed to teach medical students community healthcare and to increase the number of physicians working in rural communities following their graduation. However, few studies have examined which clerkship experiences, specifically, enhance medical students' positive perceptions on community healthcare. This study aimed to examine the association between experiential learning in community-based clerkships and students' positive perceptions on community healthcare.

Patients and Methods: From 2015 to 2017, we conducted a questionnaire survey of 290 final year medical students, before and after completion of their community-based clerkships. The survey asked the students about their perceptions (categorized into "Worthwhile" and "Confident") of community healthcare and experiential learning during their clerkships. We assessed 13 medical learning areas involving healthcare, medical care, welfare, and nursing care practice. Multivariable logistic regression was used to evaluate the factors associated with positive student perceptions.

Results: Of the 290 students, 265 (91.3%) completed both the pre- and post-questionnaires. Of these, 124 (46.8%) were female, 67 (25.2%) were from small towns (of <100,000 people), and 87 (32.8%) selected clinical clerkships within depopulated areas. A total of 205 (73.3%) students reported positive perceptions on community healthcare. There was a significant association discovered between students' positive perceptions on community-based healthcare and them taking part in experiential learning in mobile medical services (43 [16.2%] students experienced mobile medical services—adjusted odds ratio 6.65, 95% confidence intervals 1.67–26.4, $p = 0.007$).

Conclusion: Medical students' positive perceptions on community healthcare were discovered to be associated with them taking part in experiential learning in mobile medical services during their community-based clerkships.

Key words: experiential learning, mobile medical service, community-based clerkship, medical education, community healthcare

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Introduction

Japan is the most rapidly aging country worldwide, following Italy, France, Greece, Spain, and Belgium¹. In addition, the population of Japan continues to decline, with depopulated areas, with poorer medical service access, expanding². One of the goals of community-based clerkships, in Japan, is to teach medical students about the needs and importance of community-based integrated healthcare systems in areas such as medical care, welfare, and nurs-

ing care³). Community-based clerkships allow medical students to experience giving lectures on primary healthcare to residents, patients, and family members. Students also follow a trained physician and learn about conducting medical check-ups in both schools and workplaces. The clerkships also provide students with training at welfare and nursing care facilities, and teach them to manage community-level problems.

However, despite placement efforts, physicians in Japan are unevenly distributed in terms of geography⁴) and medical departments⁵). This is because Japanese physicians are allowed to choose their medical department and workplace following graduation. Therefore, we should promote students' positive perceptions on community healthcare in order to ensure a better distribution of physicians nationwide.

Previous studies have shown that most medical students are interested in family medicine,⁶) and that some do intend to work in rural areas⁷) following their community-based clerkships.

These clerkships aim to teach medical students about community-oriented medicine⁸), and thereby increase the number of physicians working in rural districts following graduation. However, relatively few studies have examined how these clerkship experiences affect students' overall perceptions on community-based healthcare.

This study aimed to examine the association between experiential learning in community-based clerkships and students' positive perceptions on community healthcare.

Patients and Methods

Study design

This study utilized an observational, cross-sectional design via a self-administered questionnaire.

Participants

From 2015 to 2017, all 290 sixth year undergraduate students undertook a two week community-based clerkship at Saga University, Japan. Prior to the clerkship, students underwent lectures and bedside training in the university hospital for five years. During the clerkship, students received clinical training for one week, as well as training in small hospitals for another week. Students were allowed to select their desired training location from a group of 11 clinics and 11 hospitals. Some of these clinics and hospitals are in populated towns, whereas others are in more depopulated areas. Depopulated areas are defined by the Japanese Ministry of Internal Affairs and Communications in several ways. They are defined as having: 1) a population reduction rate of >32%, 2) a population reduction rate of >27% with a >36% proportion of elderly people (aged >65 years old), 3) a population reduction rate of >27% with a <11% proportion of young people (aged 15–30 years old), or 4) an average

financial index of ≤ 0.5 ⁹). Every weekend during their clerkships, the students met with each other in order to share and discuss their experiences. Three teachers facilitated each of these discussions (which lasted around 60 minutes each) and also presented a few lectures.

Measures: student perceptions and clerkship experiences

Students completed a self-administered questionnaire before and after their clerkships. The questionnaire was developed with reference to a previous study¹⁰). The pre-questionnaire assessed the student's demographic characteristics: age, sex, hometown (whether or not they were from a small town with <100,000 people), and training place (whether or not they had trained in a depopulated area). We measured these factors as they have been discovered to be associated with physician retention¹¹). Two items were used to measure students' perceptions on community healthcare: "I think practicing community healthcare is worthwhile" (labeled as "Worthwhile"), and "I am confident about practicing community healthcare" (labeled as "Confident"). We then used a Visual Analogue Scale (VAS) to rate their perceptions. The post-questionnaire evaluated these same perceptions again. Increased VAS scores in the factors of "Worthwhile" or "Confident" indicated positive perceptions. In addition, the post-questionnaire evaluated students' overall learning experiences. These were assessed using 13 items related to different learning areas: "outpatient care", "hospital care", "home-visit medical care", "home-visit nursing care", "day services" (facilities outside the home providing a range of services including watching, bathing, rehabilitation, and recreation), "rehabilitation" (provided at hospitals, care facilities, or homes), "health check-ups" (medical examinations for the prevention and early detection of illnesses including detailed examinations for abnormalities), "vaccination" (inoculation and education), "health education" (patient education during medical care and health lectures outside the hospital), "placement in mobile medical services" (particularly in depopulated areas where doctors use public halls or community meeting places to provide medical care), "on-call work", "ambulatory care", and "placement in welfare facilities". These areas were originally suggested as the standard medical education program in 2000 by an educational skills workshop for clinical lecturers on community-based medicine¹²). Response choices for these 13 items were "experienced", "observed", and "not performed". Based on their responses, students were then assigned to one of two groups: either "experienced" or "non-experienced". The former category comprised "experienced" responses, whereas the latter was comprised of both "observed" and "not performed" responses¹³).

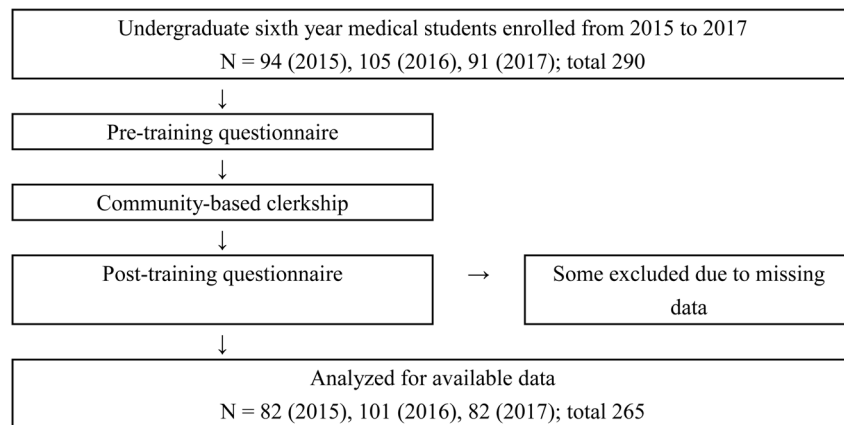


Figure 1 Inclusion criteria.

Ethical considerations

Students provided written informed consent. Completion of the questionnaire was voluntary, and all participants were free to withdraw from the study at any time. To minimize any social desirability bias, we assured students that their responses would not affect their overall academic assessment.

Ethical approval

This research was approved by the ethics committee of Saga University (29-28).

Statistical analysis

We excluded responses with missing data from the analyzed data (non-responses and responses that were too difficult to understand). Statistical analysis was conducted using STATA/SE ver. 14.0 (StataCorp LLC, College Station, TX, USA). The statistical significance level was set at $p < 0.05$.

First, we described the categorical and numerical data for the students' characteristics and questionnaire responses using proportions, mean values, and standard deviations (SD).

Second, we analyzed the differences in students' perceptions (as either "Worthwhile" or "Confident") before and after their clerkships, using the paired *t*-test.

Prior to the next analysis, we divided the students into two groups, according to whether or not their VAS scores increased (indicating a positive change) post-clerkship. We also calculated the number and proportion of students showing positive perceptions (either with a "Worthwhile" or "Confident" response). Then, we calculated the overall proportion of positive change. Next, we categorized students into groups according to whether they had undergone each of the 13 learning areas.

Third, we analyzed the correlation between positive change and scores on the 13 types of learning areas using a multivariate analysis (multiple logistic regression analysis).

Results

Of the 290 involved students, 265 (91.3%) completed both the pre- and post-questionnaires (Figure 1). Of these, 124 (46.8%) were female, with the overall mean (SD) age being 23.9 (1.7) years. A total of 67 (25.2%) students had grown up in a small town (with <100,000 people), with 87 (32.8%) selecting clinical clerkships in depopulated areas.

Table 1 shows the 13 learning areas within the clinical clerkships. The three activities experienced most frequently were outpatient care (163 [61.5%]), home-visit medical care (131 [49.4%]), and day services (117 [44.1%]).

VAS scores of students' perceptions on community healthcare were as follows. The mean (SD) scores on "Worthwhile" for pre-training, post-training, and the difference between these two groups were 78.5 (16.0), 82.8 (14.7), and 4.3 (18.2), respectively. Mean (SD) scores on "Confident" for pre-training, post-training, and the differ-

Table 1 Students' clinical clerkship learning areas (N=265)

Learning areas	Experienced group N (%)
Outpatient care	163 (61.5)
Hospital care	107 (40.3)
Home-visit medical care	131 (49.4)
Home-visit nursing care	94 (35.4)
Day services	117 (44.1)
Rehabilitation	112 (42.2)
Health check-ups	22 (8.3)
Vaccination	12 (4.5)
Health education	32 (12.0)
Placement in mobile medical services	43 (16.2)
On-call work	14 (5.2)
Ambulatory care	26 (9.8)
Placement in welfare facilities	59 (22.2)

Experienced group: Students who reported having "experienced" the learning area.

Table 2 Association between student characteristics, experienced learning areas, and positive change in students' attitudes towards community healthcare (N=265)

	Positive perception		
	AOR	95% CI	<i>p</i> *
Gender (female)	0.65	0.21, 1.86	0.41
Originally from a small city of <100,000 people	0.88	0.44, 1.77	0.73
Clerkship in a depopulated area	1.53	0.70, 3.34	0.28
Outpatient care	1.24	0.61, 2.50	0.53
Hospital care	0.97	0.47, 1.98	0.94
Home medical care	1.02	0.45, 2.31	0.94
Home nursing care	0.75	0.30, 1.88	0.54
Day services	1.52	0.65, 3.58	0.32
Rehabilitation	0.57	0.26, 1.25	0.16
Health check-ups	0.82	0.21, 3.19	0.78
Vaccination	0.81	0.12, 5.31	0.82
Health education	0.62	0.19, 2.02	0.43
Placement in mobile medical services	6.65	1.67, 26.4	0.007
On-call work	1.94	0.37, 10.1	0.43
Ambulatory care	0.74	0.26, 2.08	0.57
Placement in welfare facilities	0.63	0.24, 1.69	0.36

AOR: Adjusted Odds Ratio; CI: Confidence Interval. *p*: *p* value. Positive perception was defined in terms of whether the clerkship positively changed the students' attitudes. *Multiple logistic regression analysis adjusted for the above variables.

ence between these two groups were 48.5 (18.9), 55.1 (18.2), and 6.5 (20.5), respectively. The “Worthwhile” and “Confident” scores were found to be significantly increased by the clerkship experiences (both $p < 0.001$). The proportion of positive change was 141 out of 265 (53.2%) in terms of the “Worthwhile” category, 161 out of 265 (60.7%) in terms of the “Confident” category, and 205 out of 265 (73.3%) in terms of “positive perception”.

Table 2 shows the associations between overall positive perception change and each experiential learning area. There was a significant correlation found between positive perceptions and placement in mobile medical services (adjusted odds ratio 6.65, 95% confidence interval [CI] 1.67–26.4, $p = 0.007$), following adjusting for participants' gender, hometown, and training location. A separate analysis of the “Worthwhile” and “Confident” scores retained the positive correlation between these two variables (adjusted odds ratio 1.82, 95% CI 0.77–4.30 for “Worthwhile”; adjusted odds ratio 3.09, 95% CI 1.19–8.03 for “Confident”) (Table 3).

Discussion

Present and previous study findings

Similar to previous reports^{7,10}, we found that self-reported positive attitudes towards practicing community healthcare increased following experiential learning in community-based clinical clerkships. A previous study found that students' positive attitudes were associated with health edu-

cation practices¹⁰. In this study, we identified an association between mobile clinical practices and students' attitudes towards community healthcare.

The importance of exploring factors associated with positive perceptions (“worthwhile” and “confident”)

Peoples' attitudes are composed of cognitive, affective, and behavioral components¹⁴. Kernan and Trebbi reported that attitudes are generally consistent over time, and that behavioral changes occur following cognitive and affective ones¹⁵. Assessment of community healthcare as a worthwhile pursuit has a positive cognitive influence on students' attitudes. However, this does not encompass a positive affective impact as well. We also measured whether students felt confident or not in practicing community healthcare. We subsequently defined students' positive perceptions in terms of whether they perceived community healthcare as worthwhile and if they felt confident in practicing it. Therefore, students' positive perceptions towards community healthcare reflected both positive cognitive and affective changes, which are then likely to result in behavioral ones. We targeted final year students, as they are the closest to choosing their career following graduation and, thus, any attitude changes may then affect their behaviors.

Table 3 Association between student characteristics, experienced learning areas, and positive changes in students' attitudes towards community healthcare (N=265)

	Worthwhile			Confident		
	AOR	95% CI	<i>p</i> *	AOR	95% CI	<i>p</i> *
Gender (female)	0.24	0.07, 0.80	0.02	1.23	0.72, 2.11	0.43
Originally from a small city of <100,000 people	0.76	0.42, 1.37	0.36	1.97	1.01, 3.84	0.04
Clerkship in a depopulated area	0.92	0.49, 1.71	0.80	1.30	0.70, 2.41	0.38
Outpatient care	0.99	0.55, 1.79	0.99	1.39	0.76, 2.55	0.27
Hospital care	0.68	0.38, 1.23	0.21	1.05	0.57, 1.94	0.85
Home medical care	0.66	0.33, 1.31	0.24	1.08	0.53, 2.19	0.82
Home nursing care	0.83	0.39, 1.78	0.64	0.98	0.44, 2.15	0.96
Day services	1.34	0.66, 2.69	0.41	1.20	0.58, 2.48	0.61
Rehabilitation	0.98	0.52, 1.84	0.95	0.74	0.38, 1.44	0.38
Health check-ups	1.26	0.41, 3.88	0.68	0.78	0.23, 2.58	0.68
Vaccination	0.84	0.16, 4.21	0.83	0.76	0.13, 4.43	0.76
Health education	1.03	0.40, 2.67	0.93	1.01	0.36, 2.82	0.97
Placement in mobile medical services	1.82	0.77, 4.30	0.16	3.09	1.19, 8.03	0.02
On-call work	1.09	0.32, 3.65	0.88	4.55	0.87, 23.5	0.07
Ambulatory care	1.28	0.52, 3.18	0.58	0.66	0.25, 1.71	0.40
Placement in welfare facilities	1.17	0.54, 2.53	0.68	0.43	0.18, 1.00	0.05

AOR: Adjusted Odds Ratio; CI: Confidence Interval. Worthwhile defined via a positive response to the item “I think practicing community healthcare is worthwhile”. Confident defined via a positive response to the item “I am confident about practicing community healthcare”. Positive change was defined as a positive difference between pre- and post-training VAS scores on “Worthwhile” and “Confident”. *Multiple logistic regression analysis adjusted for the above variables.

Meaningful experiential learning in mobile medical services

Mobile medical services are a strategy used in depopulated areas where it is more difficult to provide adequate healthcare facilities. In Japan, mobile medical services are mainly used for the healthcare of elderly patients and for depopulated areas¹⁶. In such areas, doctors often have to use public halls or community meeting places in order to provide adequate medical care. This is more efficient than home-visit care, as it allows for access to many people at one time. Medical staffs are thus able to shorten visits to homes and reduce their overall transport costs. One study reported that care visits are increasing and more physicians are therefore needed to deliver healthcare services and provide high-quality patient care, while maintaining low medical costs¹⁷. However, there are currently not enough physicians to deliver this form of service. Experiential learning in mobile medical services could be the solution to addressing this problem. Mobile medical service experience during their clerkships may help students to develop better skills to practice in communities with declining and aging populations¹, which may then help to mitigate the problems associated with depopulation² and the uneven distribution of doctors^{4, 5}. Thus, mobile medical services have a substantial educational effect, on top of increasing students' overall positive perceptions of community healthcare.

Other experiential learning

Although not statistically significant, a confident attitude was mildly associated with the experience of on-call work. On-call work involves supporting patients outside of the usual working hours. This can be useful in preventing inappropriate usage of medical care, such as when patients with minor health concerns seek treatment at large hospitals¹⁸ or call for an ambulance instead of a taxi¹⁹. Experiencing on-call work can help medical students to learn that clinic physicians mainly care for patients with milder symptoms, whereas those in hospitals provide care for people with moderate to severe symptoms or who need hospitalization. This can help students to recognize that access to appropriate healthcare is necessary for all communities.

We did not find a statistically significant association between any learning area and changes in the “Worthwhile” attitude. The participants were final year students, so it is likely that they thought that community healthcare was worthwhile prior to undertaking their clerkship (mean VAS score for “Worthwhile” was 78.5 and for “Confident” it was 48.5). Therefore, ceiling effects may have influenced responses to this questionnaire item.

Limitations

This study had a few limitations. First, it was conducted in a single center and none of the clinics or hospitals in the study were in urban areas or on remote islands. To ensure

that the findings are generalizable, other types of facilities and settings should be included in future research. Second, we did not randomly assign students' training places. Third, although we measured 13 learning areas, we did not evaluate the effect of other possible factors. Fourth, we were not able to adjust for factors relating to students' educator, medical department, ability, or enthusiasm. In addition, relationships with staff, patients, and families might have affected students' attitude changes.

Conclusion

Medical students' positive perceptions of community healthcare during their community-based clerkships were significantly associated with experiential learning in mobile medical services.

Presentation at a conference: We presented these findings at the WONCA Asia Pacific Regional Conference 2019.

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Conflicts of interest: The authors report no conflicts of interest for this study.

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