Popular social media as a tool for enhancing community-based end-of-life care education for health care professionals: A formative study

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Abstract

The purpose of this study is twofold: to assess the acceptance and usefulness of Nagoya University Small Private Online Courses, which is an online end-of-life care educational program through popular social media designed to supplement traditional end-of-life care education among health care professionals; and to get constructive feedback with the aim of enhancing the impact of the program on fundamental knowledge of and attitudes toward end-of-life care provision. All 107 participants nationwide enrolled in this educational program completed the entire study. We found evidence of the beneficial effect of the social media strategies on participants' knowledge and practice towards end-of-life care. In addition, data analyses provided insights into modifiable factors associated with learners' active participation.

Key words: social network service, end-of-life care, medical education, community care, Small Private Online Courses (SPOCs)

In recent years, the number of deaths of the elderly has increased very rapidly in Japan (Hirakawa et al., 2017). While the majority of Japanese would prefer to die at home, they are instead dying in hospital partly due to lack of limited resources to implement and sustain a home care infrastructure. There has consequently been an increased national awareness about the importance of quality end-of-life care education and provision in the community (Japan Geriatric Society, 2012).

The last decade has witnessed numerous changes in community-based end-of-life care education in Japan. Among the most prominent, the Japan Geriatric Society issued a position statement on end-of-life care for the elderly in 2001, and again in 2012, that emphasized the crucial role of education in end-of-life care for the elderly (Japanese Geriatric Society Ethics Committee et al., 2014). The statement further proposed that concrete and practical instruction in the care of dying elderly patients, including the management of symptoms and communication skills, be provided to health care professionals, e.g., nurses, care managers, homecare workers, social workers, etc. Another important change is the heightened interest in learning about home end-of-life care for the elderly on the part of care and welfare professionals (Hirakawa, 2012). Due to the growing number of disabled elderly and demands for restricting hospital beds and medical expenditure, Japanese national and local governments have become more cognizant of the need for interprofessional education (IPE) to enhance community-based end-of-life care (Arai et al., 2015; Asakawa et al., 2017).

However, health care professionals involved in community-based integrated care have to balance their limited time between elderly care and community-based education due to the shortage of heath care workers (Asakawa et al., 2017; Galvin et al., 2014; Ogawa et al., 2014), and gaining time to teach and learn end-of-life care is challenging.

In addition, although the development and implementation of IPE programs tend to rely largely on a limited number of well-trained planners and facilitators with 'hands-on' expertise in facilitating IPE, resources are scarce for trainer development and the acquisition of additional trainers (Hirakawa et al., 2017). Thus, there is still a lack of empirical evidence regarding the types of approaches that would effectively prepare health care workers for this line of work.

Therefore, new educational methods are needed to efficiently and effectively disseminate fundamental knowledge on end-of-life care for the elderly and modify care providers' attitudes toward dying patients. The recent paradigm shift from traditional face-to-face learning toward information technology-based learning such as e-learning promise to meet the new obligation. E-learning uses internet technologies to deliver a broad array of educational materials that enhance knowledge to nontraditional settings such as nursing homes, home care, and other community settings (Ruz et al., 2007). A number of articles in the e-learning literature revealed that e-learning is an efficient approach and resulted in medical knowledge gains that were comparable with other more traditional educational methods (Chumley-Jones et al., 2002: Cook et al., 2010: Ruz et al., 2007). Nevin et al. (2014) developed an e-learning program for internal medicine residents at a US university hospital, and suggested that such tool can be used to develop strategies to increase learning in time-constrained educational settings.

However, e-learning presents substantial challenges. E-learning design and development are costly and require tremendous institutional effort and commitment. That is, in addition to content experts, the initial investment required to develop e-learning includes an e-learning infrastructure, equipment, multimedia specialists, and other technical personnel (Ruz et al., 2007). Although educators have often spoken of e-

learning as a single entity or a cluster of similar activities with homogeneous effects, they are becoming increasingly aware of the usefulness of incorporating social media into learning settings. Social media are internet-mediated tools that enable people to create, share, and exchange information, ideas, pictures, and videos in virtual communities and networks (Alsobayel, 2016). These could prove to be particularly popular and budget-friendly learning tools for medical, care and welfare professionals whose time is highly restricted.

The present educational program was designed around a popular social media platform, LINE, which allowed participants to actively engage in communicating with the trainers and keep learning at their own tempo, at place and time that they choose by themselves, until the end of the program. LINE is a freeware application for instant communication on electronic devices such as smartphones. LINE users can exchange texts, images, video and audio files, as well as stickers. The LINE@ professional edition of LINE also has a contents reservation and distribution system which helps the trainers save time and labor and facilitates the distribution of Q&A type questions.

Purpose

The purpose of this formative study is twofold: to assess the acceptance and usefulness of an online end-of-life care educational program through popular social media designed to supplement traditional end-of-life care education among health care professionals; and to get constructive feedback with the aim of enhancing the impact of the program on fundamental knowledge of and attitudes toward end-of-life care provision.

Method

Participant recruitment and Setting

We created a study administrative office for our social media-based educational program at Nagoya University in April 2014. We named our program NU-SPOCs (Nagoya University Small Private Online Courses). SPOCs are small restricted-access programs offering a tailor-made educational course to a small group of people. We then launched NU-SPOCs hub offices in seven regions: Hokkaido (Sapporo City), Tohoku (Akita City), Kanto (Yokohama City), Tokai (Nagoya City), Kansai (Himeji City), Shikoku (Tokushima City), and Kyushu (Asakura City). Each office was asked to recruit a number of participants in various districts via snowball sampling. The eligibility requirements included being involved or interested in community-based end-of-life care regardless of workplace and professional category. The study included a convenience sample from health care professionals in the districts who were already using LINE.

Program design

This study utilized a one-group pre-test-post-test design. The elements of the NU-SPOCs included: (1) voluntary participation, (2) calculation of response rate, (3) one question a day followed by feedback (correct answer and explanation of key concepts), and (4) one-to-one question section by physician. The elements could be managed online via LINE. Upon registration, participants logged in with a unique username and were provided mutually anonymous services. The program also included small incentives to motivate participation, such as a certification of completion and a special award (gifts of less than one US dollars) for participants with a high response rate (over 80%).

NU-SPOCs rounds lasted from February 2016 to March 2017. Each round was about three months and included fundamental and general end-of-life care questions

created by the first author, who is a geriatric physician and end-of-life care researcher; the questions were drawn from Japanese end-of-life care textbooks, the National Medical Practitioners Qualifying Examination, and the National Nursing Examination. Because a previous study suggested that lack of knowledge of end-of-life care among health professionals is one of the most common barriers to quality end-of-life care in Japan (Nakazawa et al., 2009), we created the questions to enhance knowledge. The types of questions were true/false or multiple choice, which is one of the very useful types of questions that can be used to check the knowledge. The questions were sent daily to participants at 10:00 and the answers at 22:00, except on weekends, through LINE's automatic message delivery system. Original educational video clips and paper-based materials on end-of-life care for the elderly were also sent to participants on every other weekends to affect the participants' attitude. The contents of the materials were as follows: tube-feeding and life-sustaining treatment (leaflet), quick references about symptom management (leaflet), communication in end-of-life care (video clip), funeral makeup (leaflet), list of picture books dealing with death and dying, advance care planning form (leaflet), and pain scale developed for older people with dementia (leaflet).

The program was set up so that participants could review prior questions/answers on their LINE screen. There was no time limit to respond and participants could send their answers through LINE at any time.

Assessment

The questionnaires could be accessed via our study website or via a link provided in our daily LINE messages right after completion of the program. Assessment focused on continuous participation in the program and improvement in knowledge, attitudes and

practices about end-of-life care for elderly. Continuous participation was assessed according to response rate and accuracy. To assess the learning effect, study questionnaires were administered both before and after the educational intervention. The questionnaire comprised major groups of questions: the short form of the Frommelt Attitude Toward Care of the Dying scale, Form B - Japanese version (FATCOD-Form B-J) (Frommelt, 2003; Nakai et al, 2006), the Palliative Care Knowledge Test as well as two scales evaluating self-reported practices and difficulties experienced in palliative care for health professionals (Nakazawa et al., 2009: Nakazawa et al., 2010). The authors excluded some questions from the question groups to focus on non-cancer elderly people. The Frommelt questions were graded on a 5-point Likert scale where a score of 1 signifies that the response was not at all desirable and a score of 5 signifies that the response was completely desirable. The FATCOD Scale Form B is a 30-item scale designed to measure participants' attitudes toward providing care to dying patients and their families. It includes two subscales: positive attitude toward caring for the dying patient and perception of patient- and family-centered care. The worded items of the FATCOD Scale, Form B are rated on a 5-point Likert scale. Both the full and the short form of the FATCOD-Form B-J Scale are from the Japanese version of FATCOD Scale, Form B, with high reliability and validity.

Three months after the final participant received the posttest, we invited all participants to take part in a self-reported online evaluation questionnaire survey to get detailed feedback concerning usability, feasibility, and merit and demerit of the e-learning system. The responses were examined using qualitative content analysis (Graneheim & Lundman, 2004). Common themes were coded by the first author, who is experienced in qualitative analysis.

Statistical analysis

Analyses focused on use of the system, points needing improvement and impact on knowledge, attitudes and practices. Data on learning impacts were analyzed statistically comparing pre and post-test scores. We analyzed the data using the software, IBM SPSS Statistics for Windows, Version 24.0 (IBM Corp, Armonk, NY, USA), compared the inter-group changes over time performing the paired-t test, and evaluated categorical data with the chi-square test. $P<0.05$ were considered to be significant.

Ethics clearance

This study was approved by the Bioethics Review Committee of Nagoya University School of Medicine (approval number 9089). Written informed consent was obtained from all participants.

Results

All 107 participants enrolled in this educational program completed the entire study (Table 1). Participants answered a total of 5652 questions throughout the program. The percentage of questions completed (questions answered/total participants × total questions) was 61.4 (5652/7552), and the percentage of questions correctly answered (questions correctly answered/questions answered) was 64.1 throughout the program (3622/5652).

Figure 1 details the trend of participants' responses to the questions throughout the program. The response rate was about 95% on day 1 and it was assumed that it would gradually decline as time proceeded. However, the rate stayed above 50% until the end

of the program.

Table 2 shows the changes in participants' knowledge, attitudes, and practices about end-of-life care for the elderly. The participants showed significant increases in knowledge on intravenous route (p=0.019) and practices in pain assessment (p=0.012), and nearly significant increases in delirium care (p=0.060).

Table 3 shows the themes extracted from content analysis. The findings from the analysis identified three main themes: educational methods and techniques, behavior modifications, and learner motivation.

Educational methods and techniques

Participants were satisfied with Q&A type. It was a great convenience to study at any time and at any place; some participants stated that *'I can use my commuting time efficiently'* (Fifty-nine, female, care manager). The participants were also satisfied with the system's user-friendliness; others stated that *'LINE'* (Fifty-three, female, nurse) *or 'Mobile-based learning'* (Forty, female, care manager) *was convenient.*

Behavior modifications

Participants mentioned that they acquired advanced medical knowledge and succeeded in improving their ability to provide end-of-life care.

"I learned a lot about end-of-life care and was able to checked my comprehension." (Fifty-five, female, care worker)

"*I improved my abilities to explain end-of-life care to my clients."* (Fifty-seven, femal, care manager)

As for application to staff education, they mentioned that they applied this program to staff education in their workplaces, with one participant stating that *'we discussed the questions with peers who also took part in the program'* (Thirty-eight, male, care worker).

Learner motivation

One of the most difficult aspects of providing education is motivating the participants. Participants who are not motivated will not learn effectively. Some participants claimed that this program is useless, while others highly evaluate it. The participants were unmotivated for different reasons as follows:

"Since I rarely deal with end-of-life patients, I don't think this program is useful." (Fifty-seven, male, care manager)

"This program is too basic to be practically useful." (Thirty-eight, female, nurse)

While meeting the educational needs of learners encourages them to actively participate, offering them small incentives makes learning fun and motivates them to push themselves. Some participants needed an extra push to keep learning until the end of the program, with one participant stating like 'the award of a certificate was a great incentive' (Twenty-seven, female, nurse).

Discussion

We developed a social media-based educational program via an automatic question delivery system that encourages health care professionals to keep learning about end-of-

life care right through to the end of the program. We examined participants' knowledge, attitudes and practices before and after the intervention, and administered a follow-up questionnaire survey with the aim of improving the system. We found both qualitative and quantitative evidence of the beneficial effect of the social media strategies on participants' knowledge and practice towards end-of-life care. In addition, data analyses provided insights into modifiable factors associated with learners' active participation.

While social media-based education has been used in medical education settings (Sutherland & Jalali, 2017), reports of its integration and effect in community education settings have been limited. Our results suggest the possible application of social-media to community-based medical education. In our overall system evaluation questionnaire results, participants highlighted the appeal and benefits of LINE and mobile internet. In addition, a participant mentioned that he or she felt at ease requesting explanations regarding particular questions via LINE. It is worth noting that in some countries, such as Saudi Arabia (Alsobayel, 2016), social media are widely and frequently used by health care professionals as an informal professional development tool.

We designed our assessment strategy based on the data compiled through the use of social media-based learning approaches. These strategies provide new opportunities for educators to monitor and assess learner engagement and performance. Social media-based strategies such as NU-SPOCs offer supplementary participant assessment, in addition to onsite evaluations with observations and self-report questionnaires. In analyzing the data, we were able to examine the trends of use and attrition. In addition, via social media, we achieved a relatively high response rate to post and follow-up questionnaires in comparison with traditional methods such as mail surveys.

The statistically significant increases in positive responses upon question

retesting suggest an improvement in participant knowledge about intravenous fluids and practice toward pain assessment in end-of-life care. Our daily Q&A type questions dealt primarily with major end-of-life care issues such as eating and drinking choices and pain management. In addition, our results may also have been influenced by the materials we distributed biweekly which provided detailed information on symptom management and artificial nutrition such as tube feeding and intravenous hyperalimentation. One of these materials dealt with the use of tube feeding or intravenous fluids at the terminal stage. Another set of materials explained how to recognize whether a patient is in pain, and introduced visual pain scales such as face scale which are widely used in end-of-life care settings. We also distributed material regarding concrete symptom-based action plans.

However, we found no statistically significant improvements in other areas than pain assessment and intravenous fluids. This may be partly due to the small sample size, but to the failure of accessing the website where we uploaded related audiovisual educational materials by some participants. Also, a number of participants stated that our program did not meet their learning needs due to lack of pre-assessment of learner level.

Although our program probably gave some ideas to the participants, it may not have changed their attitude toward end-of-life care provision. In a prior study, Shimizu (2015) suggested that while nursing students taking palliative care lectures were moved by what they learnt, they ultimately did not show a substantial change in attitude toward death or dying, partly due to a lack of opportunity to share their feeling with others such as peers. Another previous study suggested that because of the complex and sensitive nature of end-of-life related healthcare and activities, educational programs focusing only on providing information generate anxiety and conflicting thoughts for the participants (Hirakawa et al., 2009).

Study limitations

Despite promising findings, our program underscores several weaknesses that need to be addressed. First, even though we recruited study participants nationwide via snowball sampling, this study included a relatively small number of participants, with the majority of whom were from a few districts. Thus, the current study had limited statistical power and generalizability of its findings. Second, it is uncertain what specific audiovisual educational materials uniquely contributed to the observed changes when compared to question and answer distribution alone, and the extent of that contribution. In addition**,** we cannot confirm which specific motivational support, such as certification, reminder mail, simple dialogue with us, and small gift, uniquely contributed to our results. Third, the fact that the same person conducted all the study questionnaires via the same system may have led to a social desirability bias into the participants' responses. Fourth, since the sample of our social media-based survey was drawn from health care professionals already active online, it is likely that it was biased toward those more likely inclined to use social media for professional development. Fifth, we did not investigate self-learning or on-the-job practice during our study period. Finally, we were not able to investigate the participants' individual learning styles, including time to answer, thinking time, references and browsing, and peer learning, partly due to our lack of familiarity with some of the more sophisticated functions of the online application.

Conclusion

We developed a social media-based educational program via an automatic question delivery system that encourages health care professionals to keep learning about end-of-

life care right through to the end of the program. The study used a qualitative and quantitative approach to examine participants' knowledge, attitudes and practices before and after the intervention. We found evidence of the beneficial effect of the social media strategies on participants' knowledge and practice towards end-of-life care. In addition, data analyses provided insights into modifiable factors associated with learners' active participation.

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Table 1. Participants characteristics (n=107)

Variable	M±SD	n
Age	44.8±9.02	
Gender (Female)		77
Region		
Hokkaido		11
Tohoku		27
Kanto		4
Tokai		56
Kansai		2
Shikoku		6
Kyushu		1
License		
Nurse		20
Care manager/worker		75
Others		12
End-of-life wishes (Do-not-resuscitate)		80
Positive attitude toward home end-of-life care provision		76

Table 2. Effect of the NU-SPOCs on participants' attitudes toward end-of-life care (n=107)

Variable	Pre	Post	p-value
Knowledge			
Palliative care should only be provided for patients who have no curative treatments available	2.92±0.31	2.93±0.34	0.685
Palliative care should not be provided along with anti-cancer treatments	2.71±0.56	2.79±0.52	0.191
There is no route except central venous for patients unable to maintain a peripheral intravenous route	2.27±0.68	2.47±0.71	0.019
Intravenous infusion will not be effective for alleviating dry mouth in dying patients	1.75±0.76	1.88±0.87	0.183
Attitude			
FATCOD-Form B-J			
Positive attitude toward caring for the dying patient	3.76±0.82	3.83±0.81	0.226
Perception of patient- and family-centered care	3.54±0.90	3.59±0.89	0.418
Practice			
Pain			
To evaluate pain, I ask the patient directly regarding pain intensity or use the pain intesity scale when the patient cannot reply	2.93±1.32	3.06±1.24	0.329
I understand the sitation of the patient experienceing pain	3.23±1.26	3.56±1.15	0.012
I evaluate the effectiveness of rescue doses	3.30±1.39	3.47±1.28	0.171
Delirium			
I help patient's orientation with clock and calendar to prevent and improve delirium	3.11±1.32	3.36±1.27	0.060
I evaluate discomfort from deteriorating delirium (e.g., urination, defecation, pain, anxiety)	3.37±1.10	3.55±1.13	0.100
I inquire about the family's concerns about delirium	3.47±1.18	3.44±1.13	0.811
Communication			
I talk with the patient and family in a quiet and private place	4.21±0.77	4.21±0.85	0.921
I use open-ended questions for the patient and family	3.95±0.91	4.01±0.96	0.598
I confirm understanding of conditions by eliciting questions from the patient and family	3.74±0.90	3.79±0.88	0.566

Table 3. Participants' evaluation for the improvement of the NU-SPOCs

Theme	Category	Quotation
Educational methods and techniques	Q&A type	One question per day is easy to manage
		I can use my commuting time efficiently
		The format allows to quickly review the questions
	Education Medium	LINE was convenient
		One-on-one question section by a physician was good useful
		Mobile-based learning was convenient
Behavior modifications	Basic knowledge	We acquired advanced medical knowledge
		I learned a lot about end-of-life care
	Practical use	I improved my ability to care for a bereaved family
		I improved my ability to explain end-of-life care to my clients
	Application to staff education	I applied this program to staff education
		We discussed the questions with peers who also took part in the program
Learner motivation	Meeting of needs	Since I rarely deal with end-of-life patients, I don't think this program is useful
		This program is too basic to be practically useful
		This program allows me to stay up-to-date with policy changes
	Impetus for self-learning	I miss the program because I enjoyed it everyday
		I read the references and textbooks to supplement what I learned via this program
	Opportunity for self-reflection	This program was a good opportunity to look back on my routine tasks
		This program was a good opportunity to reflect on my career
	Certification as incentive	The award of a certificate was a great incentive

Figure 1. trend of participants' response rates to the questions throughout the program