




Development of Professional Care Program for Nurses in Dementia Wards and Its Educational Effects

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Yoko Takeuchi, PhD (student), RN, MSN^{1,2} , Mayumi Kato, RN, PhD³ , Tatsuru Kitamura, MD⁴, Daisuke Toda, RN, PhD⁵, Yoshimi Taniguchi, RN, PhD³, Miho Shogenji, RN, PhD³, and Hiromasa Tsujiguchi, JD, PhD³ 

Abstract

Purpose: To develop an education program for nurses specializing in dementia care, and to investigate its effects. **Methods:** An intervention study of nurses was conducted using a quasi-experiment with 3 randomly assigned groups. Participants were 51 nurses from a psychiatric hospital dementia ward, divided into an intervention program group (17 nurses), a knowledge-acquisition-only group (16 nurses), and a usual-care group (18 nurses) as controls. The program group intervention comprised 3 frameworks: motivation for achieving the task, acquisition of professional knowledge required for dementia care, and sharing of successful experiences based on professional knowledge. The knowledge-acquisition-only group received only the acquisition of professional knowledge framework, and the usual-care group received only the usual-care framework. The intervention period was 3 months. **Results:** Post-intervention, the program group had a significantly greater sense of self-efficacy associated with professional knowledge and significantly greater self-efficacy associated with practice compared with the knowledge-acquisition-only and the usual-care groups. Professional knowledge was acquired by 80% of the program group, compared with 70% of the knowledge-acquisition-only group. A co-occurrence network diagram of the multivariate analysis results produced by text mining of the descriptive data indicated that nurses provided care for symptoms specific to different diseases based on their pathological mechanisms. **Conclusion:** Program implementation led to the acquisition of deeper knowledge and greater self-efficacy by sharing expertise-based practices and successful experiences, compared with desk-based learning in a single workshop lecture, suggesting the program's usefulness in clinical practice.

Keywords

dementia care, professional knowledge, self-efficacy, nursing education, two-way ANOVA, text mining

Introduction

The number of people with dementia worldwide is expected to increase rapidly from 35.6 million in 2012 to 115.4 million in 2050.¹ Improving the knowledge and skills of individuals who provide care for people with dementia has become an important global challenge. Reviews of measures to meet this challenge in various countries²⁻⁵ have suggested the necessity of reconsidering educational content for nurses who provide dementia care. Previous studies have reported that nurses lack sufficient knowledge and skills,^{6,7} leading to a lack of confidence.⁸ One study in the USA showed that education for nurses led to reduced use of antipsychotics for people with dementia in nursing homes that provide long-term care.⁹ This suggests that nurses' acquisition of knowledge can improve care for people with dementia. Therefore, there is a need to develop

¹ Division of Health Sciences, Graduate School of Medical Sciences, Kanazawa University, Kanazawa, Ishikawa, Japan

² Kinjo University, Hakusan, Ishikawa, Japan

³ Faculty of Health Sciences, Institute of Medical, Pharmaceutical and Health Sciences, Kanazawa University, Kanazawa, Ishikawa, Japan

⁴ Ishikawa Prefectural Takamatsu Hospital, Kahoku, Ishikawa, Japan

⁵ Department of Nursing, Toyama Prefectural University, Toyama, Japan

Corresponding Author:

Mayumi Kato, RN, PhD, Certified Coach for Clinical Safety, Faculty of Health Sciences, Institute of Medical, Pharmaceutical and Health Sciences, National University Corporation Kanazawa University, 5-11-80 Kodatsuno, Kanazawa, Ishikawa 920-0942, Japan.

Email: mykato@mhs.mp.kanazawa-u.ac.jp



educational programs that adequately consider the knowledge necessary for dementia care and provide nurses with professional practice experience.

Existing educational programs for dementia care include a program in Austria for professional training in communication with people with dementia,¹⁰ a program in Norway for improving communication with family members of people with dementia,¹¹ and a program in China to train medical professionals in the knowledge and appropriate attitudes toward people with dementia.¹² These programs mainly comprise basic education, such as communication skills, and attitudes toward people with dementia.

Medical providers of dementia care must incorporate the concept of respect for the "personhood"¹³ of people with dementia as a basic element of care.¹⁴ These are basic concepts of dementia care and are important elements to include in educational programs.

However, education for nurses who provide dementia care must also cover knowledge specific to different types of dementia, because symptoms vary by dementia type. Dementia types include Lewy body dementia, dementia associated with Parkinson's disease, frontotemporal dementia, and cerebrovascular dementia, in addition to Alzheimer's dementia. Characteristic symptoms include the hallucinations, delusions, and Parkinson's symptoms associated with Lewy body dementia, and the stereotyped behaviors, disinhibition, and antisocial behaviors associated with frontotemporal dementia. Despite substantial information about the symptoms and management of dementia,¹⁵⁻²⁴ there are no studies on the incorporation of such information into educational programs for nursing practice. It has been suggested that nurses' understanding of the symptoms of different types of dementia and their ability to provide care based on such knowledge would help to meet the needs of people with dementia.²⁵ Therefore, it is necessary to develop a dementia care educational program to provide nurses with such specialized knowledge.

Previous studies have indicated that professional practice of nurses is correlated with self-efficacy,^{26,27} and their autonomy is significantly correlated with self-efficacy,²⁸ suggesting that the inclusion of self-efficacy in the educational programs is effective. Its usefulness has already been demonstrated in some studies that focused on enhancing self-efficacy of nurses through educational programs for dementia care.^{8,29-32} However, these studies just showed the increase of self-efficacy as a result of implementing intervention programs, but did not proactively incorporate self-efficacy into educational programs as content. Bandura has shown that motivation to achieve tasks can lead to increased self-efficacy.³³ He proposed 4 main sources of information that affect awareness of self-efficacy: "performance accomplishments," "vicarious experience," "verbal persuasion," and "physiological states."³⁴ The use of motivation leading to self-efficacy and the sources of information that affect the awareness of self-efficacy in educational programs for dementia care may lead to increased self-efficacy in nurses as an educational effect.

Taken together, these findings suggest the usefulness of developing an educational program that enables nurses to acquire professional knowledge for dementia care and to increase their self-efficacy for dementia care through practice.

The development of such an educational program could compensate for nurses' lack of confidence due to a lack of knowledge of dementia care provision,⁸ and could enhance nurses' self-efficacy. This may encourage nurses to feel that they are capable of providing specialized dementia care. In addition, enhanced self-efficacy in dementia care practice may improve the well-being of people with dementia.

Purpose

In this study, we developed an educational program for specialized care as an intervention for nurses in dementia wards and examined its effects on the knowledge acquisition of nurses and the self-efficacy associated with knowledge-based practice.

Methods

Design

This was an intervention study of an educational program for nurses. The study used a quasi-experimental design with a randomly sampled intervention group and 2 control groups in 3 wards. The study groups comprised a program group and 2 control groups: a knowledge-acquisition-only group and a usual-care group. The program group received an intervention that consisted of 3 frameworks: motivation to achieve tasks, acquisition of specialized knowledge necessary for dementia care, and sharing of successful experiences based on the specialized knowledge. The knowledge-only group learned only specialized knowledge necessary for dementia care, and the usual-care group did not learn any specialized knowledge.

Participants

In Japan, treatment for people with dementia is mainly provided at psychiatric hospitals that can use psychotropic drugs according to the guidelines of the Japanese Ministry of Health, Labor and Welfare. The inclusion criteria for the participant facilities emphasized the need to compare the intervention effects under the same cultural and philosophical conditions. On the basis of these criteria, we selected a psychiatric hospital that specialized in dementia care and had 3 dementia wards. The 3 wards were assigned to the following 3 groups: A, program group; B, knowledge-acquisition-only group; and C, usual-care group. The assignment was performed by having the ward representatives simultaneously open envelopes containing papers with letters A, B, and C on them in the presence of the researcher. Participants were full-time nurses who directly provided care to people with dementia. We excluded nurse managers who did not directly provide care, as well as nursing assistants.

Subjects	Purpose		Contents provided by the program		Format																			
	Frameworks					Positioning																		
						duration																		
Nurse in dementia ward	Enhancing self-efficacy		Perform interactive justification of dementia care based on professional knowledge referring to five elements of learning theory (Knowles, M, 1975) as follows. <ul style="list-style-type: none"> • Direction of learning: Have nurses solve current problems so that they acquire the ability to cope with the problems they are facing. • Experience: Discuss the difficulties in dementia care, etc. and develop the discussion by combining new subjects nicely based on their experiences including failures based on the basis of their experiences as nurses. • Readiness for learning: Discuss the topics that seem to be directly relevant to their profession. • Concept of the learner: Consider and respect growing interests in self-determined matters. • Motivation for learning: Motivate nurses to think that they can do it by themselves. 		Workshop	Introduction to the program	20 min																	
	Motivation for achieving the task					Lecture	60 min																	
	Acquisition of professional knowledge		Indicate the observation points and care points based on the conditions of major diseases associated with dementia based on basic concepts in dementia care that are necessary for nurses upon specialize in dementia care and give one-directional lecture of practical contents.																					
	Acquisition of professional knowledge necessary for dementia care		<table border="1"> <thead> <tr> <th colspan="3">Different types of dementia</th> </tr> <tr> <th>Disease name</th> <th>Cause</th> <th>Main symptoms</th> </tr> </thead> <tbody> <tr> <td>Lewy body dementia</td> <td rowspan="2">Synucleopathy</td> <td>Visual and auditory hallucinations, Parkinson's symptoms, cognitive changes, sleep disorders, etc.</td> </tr> <tr> <td>Parkinson's disease</td> <td>Thrill, muscle stiffness, slow movement, abnormal posture, etc.</td> </tr> <tr> <td>Frontotemporal dementia</td> <td rowspan="2">Tauopathy</td> <td>Stereotypical behavior, excursion, disinhibition, anti-social behavior, etc.</td> </tr> <tr> <td>Alzheimer's-type dementia</td> <td>Memory, judgment, impaired orientation, agnosia and apraxia, etc.</td> </tr> <tr> <td>Vascular dementia</td> <td>Cerebrovascular</td> <td>Symptoms vary depending on the part of the blood vessels in the brain damaged</td> </tr> </tbody> </table>			Different types of dementia			Disease name	Cause	Main symptoms	Lewy body dementia	Synucleopathy	Visual and auditory hallucinations, Parkinson's symptoms, cognitive changes, sleep disorders, etc.	Parkinson's disease	Thrill, muscle stiffness, slow movement, abnormal posture, etc.	Frontotemporal dementia	Tauopathy	Stereotypical behavior, excursion, disinhibition, anti-social behavior, etc.	Alzheimer's-type dementia	Memory, judgment, impaired orientation, agnosia and apraxia, etc.	Vascular dementia	Cerebrovascular	Symptoms vary depending on the part of the blood vessels in the brain damaged
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Vascular dementia	Cerebrovascular	Symptoms vary depending on the part of the blood vessels in the brain damaged																						
Basic concepts		Basic concepts of dementia care such as the respect for the "personhood", nurses' attitudes toward people with dementia, and communication skills.																						
Enhancing self-efficacy		Nurses share following experiences based on the acquisition of professional knowledge to enhance their self-efficacy as follows. <ul style="list-style-type: none"> • Nurses practice based on their professional knowledge for one month after the workshop, which allows them to have successful experiences. • After one month passed, nurses repeatedly share successful experiences on a daily basis with reference to following four information sources (Bandura, 1977) for increasing self-efficacy for the next two months. 		Practice of nurses based on professional knowledge	Follow-up	Three months																		
Sharing successful experiences based on professional knowledge		(1) Performance accomplishments: To have successful experiences by verbalizing with talking and writing what they think they could do, however small they are. (2) Vicarious experience: To try to share successful experiences of others to serve for modeling in a way that they can also do them. (3) Verbal persuasion: To be praised, encouraged, or valued for efforts by others for what they could do. (4) Physiological states: To experience happy feeling when one feels when one thought 'I could make it', or to experience emotional feeling that one normally feel when praised by others.																						

Figure 1. Outline of a nurse education program aimed at developing human resources for nurses who specialize in dementia care.

Intervention

The program group received specialized sets of information specific to different types of dementia required by nurses in dementia wards, in addition to basic information about the concepts of dementia care. We used previous research, professional journals, and advice from a physician who was a dementia specialist to develop the content of the specialized information sets. The framework used to structure the program was based on Bandura's concept of self-efficacy and is described below. The study was conducted from November 2018 to March 2019, and the intervention period was 3 months.

Nurse Education Program for Professional Dementia Care

The program consisted of 3 frameworks: motivation for achieving the task, acquisition of professional knowledge required for dementia care, and sharing of successful experiences based on professional knowledge (Figure 1).

The first framework, motivation for achieving the task, was designed to strengthen self-efficacy.³⁴ This was based on a report that motivation for achieving a task and communicating the necessity of actions to those who perform them increases self-efficacy.³⁴ Implementation of the program motivates

nurses by making them recognize that they will acquire the knowledge necessary for dementia care, and thus will be able to provide professional care. We used Knowles's learning theory³⁵ to fit the program to the experiences and interests of the nurses as adults.³⁶ The program was designed so that a researcher directed the nurses toward learning to become motivated while eliciting their interests and experiences by referring to the following main concepts: "direction of learning," "experience," "readiness for learning," "concept of the learner," and "motivation for learning."³⁵ This part of the program, which served as an introduction to the entire program, was conducted during a 20-minute interactive meeting between a researcher and the nurses, and preceded the acquisition of professional knowledge.

The second framework was the acquisition of professional knowledge necessary for dementia care. Knowledge necessary for dementia care is important for improving the well-being of people with dementia. In this framework, we presented to nurses the concepts including respect for patients' "personhood"¹³ as a basic concept of dementia care. In addition, we included in the presentation information about the mechanisms and characteristic symptoms of Alzheimer's disease, Lewy body dementia with associated Parkinson's symptoms, cerebrovascular dementia, and frontotemporal dementia. The information was presented in such a way that nurses could understand the characteristic symptoms arising from different pathologies and provide therapeutic care according to those symptoms. The information was provided in the form of an oral lecture using PowerPoint (supplemental material 1) and a text handout (supplemental material 2) containing detailed information. Due to time constraints, the lecture did not cover all the material, but the text handout provided a more comprehensive version of the information for nurses to learn after the lecture. This part was the core of the program. The lecture was a 1-way presentation that lasted 60 minutes.

The third framework was the sharing of successful experiences based on professional knowledge aimed at enhancing self-efficacy. It consisted of discussion sessions that allowed nurses to share their successful experiences in practice based on professional knowledge. The sessions were based on the 4 information sources proposed by Bandura³⁴ to enhance self-efficacy in dementia care. This step represented a follow-up to the acquisition of professional knowledge. Following previous studies,^{10,12,32} the duration of this phase was 3 months. Specifically, a researcher provided a guidance session to a representative nurse, who subsequently led nurse practice and follow-up discussions. Following the guidance, the nurses practiced for 1 month using their specialized knowledge. Subsequently, they participated in discussion sessions based on their successful experiences during the practice, referring to the 4 information sources proposed by Bandura to enhance self-efficacy. We interpreted "Performance accomplishments" as talking about successful experiences, "vicarious experience" as modeling others' success, "verbal persuasion" as being praised by others, and "physiological states" as experiencing the feeling of being praised. The discussions were conducted for 15 minutes during

daily meetings and continued for 2 months. In parallel, nurses repeatedly provided feedback on their practice. We also asked nurses to write down the contents of their successful experiences that stemmed from their acquired specialized knowledge. The researcher checked once a month with the representative nurse to determine if the nurses had had any problems with the procedure.

Measurements

The participant characteristics of gender, age, years of clinical experience, years working in dementia wards, innate self-efficacy, and willingness to care for people with dementia were investigated. There are 2 levels of self-efficacy.³⁴ The first level depends on individual personalities, not on specific individual issues and situations, whereas the second level is influenced by issues and situations, affects behaviors, and is often used for clinical and educational research. In the current study, we first confirmed that the 3 participant groups were similar by investigating participant characteristics at baseline, which were not likely to change over the long term, using the Generalized Self-Efficacy Scale.³⁷ Then, we used the Generalized Self-Efficacy Scale by Narita et al. of a 23-items consisting of 3 factors,³⁷ a Japanese version of the self-efficacy scale published by Sherer et al.³⁸ to examine the second level of self-efficacy, which was expected to increase because of the intervention. Responses were provided using a 5-point Likert scale ranging from "I don't think so" (1 point) to "I think so" (5 points). Reverse item responses were summed after reversing the score. Higher scores indicated higher estimated self-efficacy.

Additionally, a visual analog scale (VAS) was used to measure motivation in the 3 groups, to assess the level at which participants were willing to provide care for individuals with dementia. The VAS allowed respondents to freely enter their own assessment results as a point on a 100-mm horizontal line. On this bipolar scale, category labels are placed at both ends of the line.^{39,40} The label "strongly think so" (a score of 10) was placed on one end of the line and the label "do not think so at all" (a score of 0) was placed on the other end of the line. Subjects were asked to mark the position that best represented their feelings. Four items were related to motivation in reference to items that have been measured in previous studies on professional autonomy in nursing.⁴¹

Primary Outcomes

Self-efficacy associated with professional knowledge. The acquisition of professional knowledge in the program was evaluated using the VAS by an item related to the self-efficacy associated with professional knowledge. This score system assessed whether nurses' self-efficacy increased through acquiring professional knowledge.

The 6 items related to self-efficacy associated with professional knowledge included several anxiety-related items, which were treated as reversed items.

Self-efficacy associated with the program. In addition to the self-efficacy associated with knowledge, the program incorporated motivation for achieving the task, designed to enhance self-efficacy and sharing of successful experiences based on professional knowledge. This allowed us to determine whether self-efficacy increased using a general self-efficacy scale. This scale examines the effects of interventions on the 2 levels of self-efficacy proposed by Bandura.³⁴

The Japanese version of the Generalized Self-Efficacy Scale⁴² is a 16-item questionnaire consisting of 3 factors: “motivations for behaviors,” “anxiety for failure,” and “confidence of social contribution,” and its reliability and validity have been confirmed. Each item is a dichotomous question and possible responses are “yes” or “no”; higher scores indicate greater self-efficacy.

Secondary Outcomes

Acquisition of professional knowledge: Program group vs. knowledge-acquisition-only group. We measured how well participants in the program group and the knowledge-acquisition-only group understood the acquired knowledge before and after the interventions using a 6-point scale: “very much” (6 points), “fairly well” (5 points), “somewhat” (4 points), “not much” (3 points), “only a little” (2 points), and “not at all” (1 point).

We developed the knowledge items, which evaluated 6 basic concepts of dementia care and 16 items on the characteristics of Alzheimer’s dementia, Lewy body dementia, Parkinson’s disease, cerebrovascular dementia, and frontotemporal dementia, which are the main types of dementia, as well as observation points and care points based on these conditions related to these dementia types. This questionnaire was validated by a dementia specialist.

Confidence regarding practice for 4 self-efficacy information sources: program group. To determine whether discussion among nurses about their own successful experiences, according to Bandura’s³⁴ proposed 4 information sources that affect the recognition of self-efficacy, led to an increase in self-efficacy, we conducted a survey using the 6-point scale, which contained items relating to the information sources “performance accomplishments,” “vicarious experience,” “verbal persuasion,” and “physiological states.”

We also conducted a survey using the 6-point scale to determine which of the 4 information sources influenced self-efficacy.

Successful experiences associated with the acquisition of professional knowledge: Program group. We asked participants to freely describe the pieces of knowledge they acquired in the program focusing on those they felt necessary for practicing. We also asked them to report their successful experiences in which they felt they could practice based on the knowledge acquired. The professional knowledge survey was used to evaluate successful experiences, and the responses used as evidence for what was learned and what was successful.

Data Analysis

The homogeneity of data on participant characteristics was confirmed using the χ^2 test, Fisher’s test, the Kruskal–Wallis test, and one-way analysis of variance (ANOVA). The homogeneity of VAS scores for the Generalized Self-Efficacy Scale and its subscales (motivations for behaviors, anxiety for failure, and confidence of social contribution) for the 3 groups (program group, knowledge-acquisition-only group, and usual-care group) were confirmed using one-way ANOVA of total scores for each scale. After the normal distribution of scores on each scale was confirmed, the differences between the scores at baseline and at 3 months were examined using paired t-tests to test whether there was a significant difference in scores before and after the program. In addition, we conducted a two-way ANOVA to examine the significance of the differences in scores before and after the program among the 3 groups for paired and unpaired factors. When significant differences were observed, we performed Bonferroni post-hoc tests to confirm the significance of differences between groups, and score differences before and after the program. For the acquisition of professional knowledge, differences in total scores between baseline and 3 months later were tested using paired t-tests and two-way ANOVA for paired and unpaired factors, respectively. To estimate the extent of confidence in self-practice based on the 4 self-efficacy sources, ratios were calculated for the respective items to obtain the total score average and standard deviation. IBM SPSS Statistics software ver. 24 (IBM Corp., Armonk, NY, USA) was used for statistical analyses, with a criterion of significance of less than 5%. Data on the successful experiences described by nurses were analyzed using KH Coder, an open source software program for text mining created by Higuchi (Ritsumeikan University).⁴³ The program performed multivariate analysis on frequent words in the qualitative data and produced a co-occurrence network to illustrate the connections between words,^{32,44,45} which allowed us to search the concepts contained in the data.

Ethical Considerations

The study was conducted with the approval of Kanazawa University Medical Ethics Review Board (approval number: 883-1).

We guaranteed the participants and the director of the facility that individuals were free to choose whether or not to participate in the study, that we did not seek compulsory cooperation, that there would be no disadvantage if individuals did not agree to participate, and that participants could withdraw at any point in the experiment. We explained the purpose, method, and ethical aspects of the study verbally and in writing, then obtained written informed consent. We guaranteed that we would keep all information obtained during the intervention confidential to ensure that participants would not experience any disadvantageous outcomes.

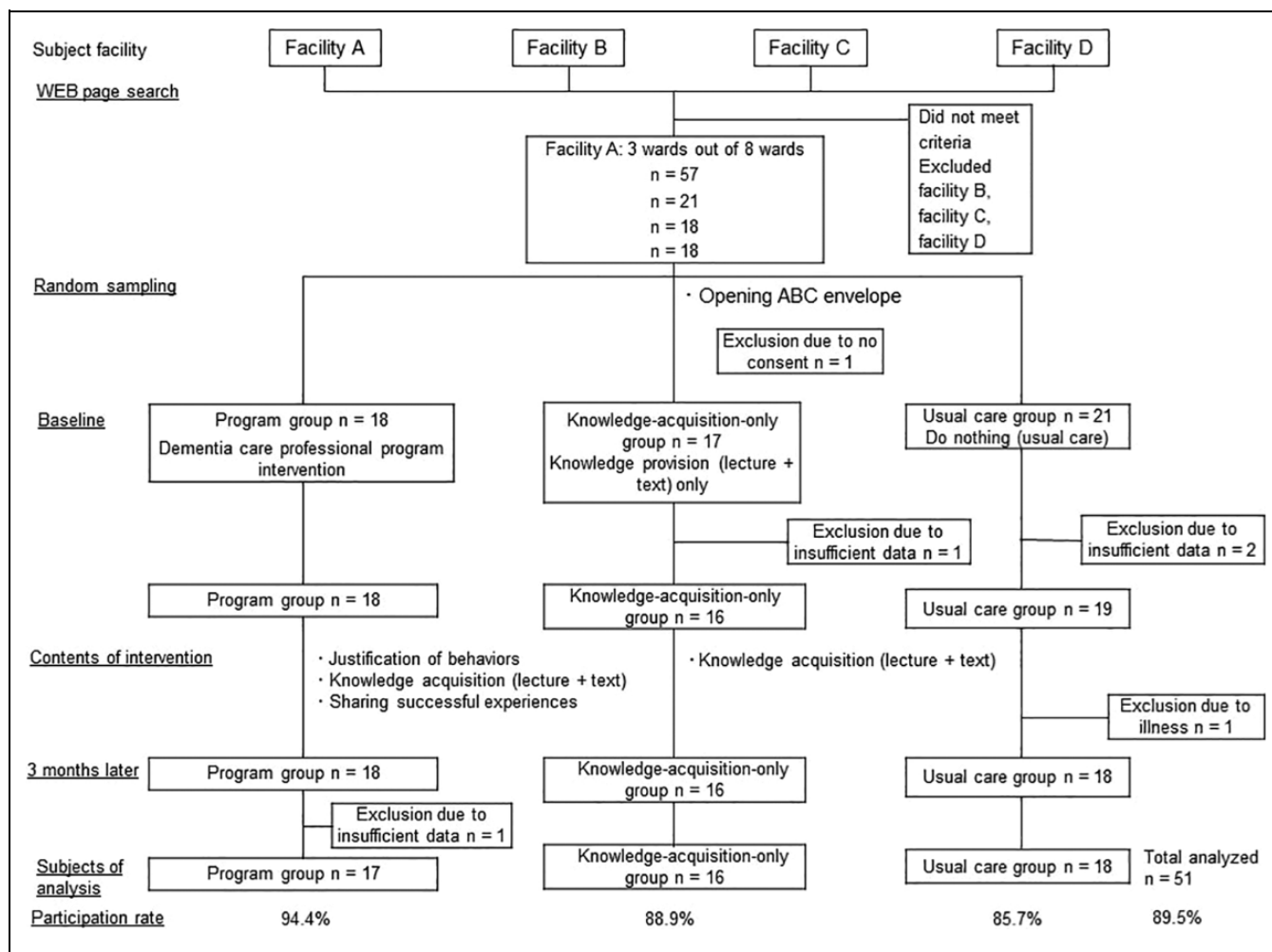


Figure 2. Participation status.

Results

As shown in Figure 2, only one of 4 hospitals with public websites in midwestern Japan met the selection criteria for participating facilities. One participant in the program group was excluded owing to lack of data after 3 months, so data for 17 subjects were included in the final analysis. There were 16 nurses in the knowledge-acquisition-only group, after exclusion of 1 subject from whom consent was not obtained and 1 subject with insufficient baseline data. There were 18 nurses in the usual-care group, after exclusion of 2 subjects owing to insufficient baseline data and one owing to illness in the preceding 3 months. The participation rates were 94.4%, 88.9%, and 85.7%, respectively, for the program group, knowledge-acquisition-only group, and usual-care group. Overall, the rate of participation was 89.5%; data for 51 subjects were analyzed out of the 57 nurses working in the dementia ward. All participants were registered nurses. Most had completed 3 years of undergraduate education at nursing schools, whereas others were graduates of 4-year courses at a nursing university. None of the nurses had received training in dementia care.

Participant Characteristics

As shown in Table 1, there were no significant differences in participants' characteristics between groups, including gender, age, years of clinical experience, and years of experience in the dementia ward. There were no significant between-group differences in scores on innate self-efficacy and willingness to care for dementia.

The Effect of Self-Efficacy Associated With Professional Knowledge

Regarding the effects of the training on self-efficacy associated with professional knowledge assessed using VAS scores, paired t-tests revealed significant differences on 5 items in the program group, 3 items in the knowledge-acquisition-only group, and 1 item in the usual-care group (Table 2).

Two-way ANOVA revealed significant differences in pre- and post-program scores, and significant interactions between group and pre-/post-scores on 4 items. Post-hoc Bonferroni tests of scores on these 4 items confirmed that the knowledge-acquisition-only group scored significantly higher

Table 1. Participants' Characteristics.

Variables	Total N = 51	Program group n = 17	Knowledge- acquisition -only group n = 16	Usual care group n = 18	p-value
Gender n (%)					
Male	11 (22.0)	3 (18.0)	4 (25.0)	4 (22.0)	0.901 ^a
Female	40 (78.0)	14 (82.0)	12 (75.0)	14 (78.0)	
Age (years) mean \pm SD	43.2 \pm 10.0	44.3 \pm 8.3	44.1 \pm 11.5	41.3 \pm 10.4	0.652 ^c
Age n (%)					
20–29	5 (10.0)	1 (6.0)	1 (6.0)	3 (16.0)	0.900 ^b
30–39	16 (31.0)	4 (24.0)	5 (31.0)	7 (40.0)	
40–49	14 (28.0)	7 (41.0)	4 (25.0)	3 (16.0)	
50 \leq	16 (31.0)	5 (29.0)	6 (38.0)	5 (28.0)	
Years of clinical experience (years) mean \pm SD	19.1 \pm 10.8	20.5 \pm 9.0	19.6 \pm 11.7	17.3 \pm 11.9	0.591 ^c
Years of experience in dementia wards (years) mean \pm SD	6.8 \pm 5.0	7.9 \pm 4.8	6.1 \pm 4.5	6.3 \pm 5.5	0.373 ^c
By years of experience in dementia wards n (%) Years of experience = X					
<5	21 (42.0)	4 (24.0)	9 (56.0)	8 (44.0)	0.701 ^b
5 \leq X < 10	14 (27.0)	7 (41.0)	2 (13.0)	5 (28.0)	
10 \leq X < 20	16 (31.0)	6 (35.0)	5 (31.0)	5 (28.0)	
Generalized self-efficacy scale Total score mean \pm SD	67.1 \pm 10.5	62.9 \pm 11.1	67.3 \pm 8.6	70.8 \pm 10.7	0.083 ^d
Items related to motivation for dementia care Total score mean \pm SD					
Willingness to practice dementia care	6.7 \pm 1.9	7.0 \pm 1.4	6.0 \pm 2.4	7.5 \pm 1.8	0.174 ^c
Willingness to learn dementia care	6.8 \pm 1.9	6.8 \pm 1.8	5.9 \pm 2.1	7.4 \pm 1.6	0.069 ^c
I would like to continue practicing if the care is necessary for people with dementia	7.9 \pm 1.5	7.7 \pm 1.3	7.7 \pm 1.6	8.3 \pm 1.7	0.265 ^c
I think that acquiring professional knowledge leads to willingness to practice	8.1 \pm 1.7	8.5 \pm 0.9	7.8 \pm 2.0	8.0 \pm 2.0	0.790 ^c

SD: Standard deviation.

^a χ^2 test. ^bFisher's test. ^cKruskal-Wallis test. ^dOne-way ANOVA.

than the usual-care group on the item "I'm confident that I have acquired professional knowledge of dementia" after the intervention. The program group scored significantly lower than the usual-care group on the item "I have successful experiences that lead to patients' well-being in dementia care" before the intervention. However, this difference was not retained after the intervention, indicating a post-intervention score increase in the program group.

Effects on Self-Efficacy

Although two-way ANOVA indicated no significant difference between the 3 groups in Generalized Self-Efficacy Scale scores, paired t-tests revealed a significant increase in the confidence of social contribution from 0.5 ± 0.7 to 1.0 ± 0.8 ($p = 0.015$) in the program group (Table 2).

Acquisition of Professional Knowledge: Program Group vs. Knowledge-Acquisition-Only Group

As shown in Table 3, scores on the understanding of knowledge significantly increased in the 2 groups that received training and acquired professional knowledge. The rates of self-reported understanding increased from 59.6% to 81.6% in the program group and from 55.5% to 66.9% in the knowledge-acquisition-only group; paired t-tests indicated that the

intra-group differences were significant in both groups ($p = 0.001$ and $p = 0.008$ for the program group and knowledge-acquisition-only group, respectively). The increase was greater in the program group, although a two-way ANOVA showed that the difference was not significant.

Confidence Regarding Practice in 4 Self-efficacy Information Sources: Program Group

Evaluation of whether the discussions based on the 4 information sources proposed by Bandura³⁴ to affect the awareness of self-efficacy led to self-confidence in practice revealed that more than half of the total scores on all items were for "leads to confidence very much" (31%) and "leads to confidence fairly well" (32%), as shown in Table 4. Combining these scores with those for "somewhat leads to confidence" (31%) showed that more than 90% of the scores indicated that the intervention led to varying amounts of confidence.

Regarding which of the 4 information sources affecting self-efficacy awareness led to increased confidence, the average scores indicated that "verbal persuasion" (5.3 ± 0.8) most clearly led to confidence, followed by "performance accomplishments" (5.1 ± 1.1), "physiological states" (4.9 ± 0.7), and "vicarious experience" (4.2 ± 0.8).

Table 2. Results of Self-Efficacy and Generalized Self-Efficacy Associated With the Professional Knowledge of Dementia Care Before and After the Intervention, N = 51.

Variables	Program group n = 17				Knowledge-acquisition-only group n = 16				Usual care group n = 18				Three groups × before and after interaction		
	Before		After		Before		After		Before		After		t-test p-value	t-test p-value	
	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD	mean ± SD					
Items related to self-efficacy associated with professional knowledge															
1. I feel self-efficacy regarding my ability to acquire professional knowledge about dementia	3.5 ± 1.8	5.1 ± 1.6	0.007	3.7 ± 1.6	5.7 ± 1.4	0.001	3.8 ± 1.4	4.1 ± 1.4	0.179	0.013	0.013	0.179	0.013	a	B>C
2. I feel self-efficacy regarding my ability to practice care based on my professional knowledge of dementia	4.1 ± 1.5	5.3 ± 1.4	0.023	4.1 ± 1.6	5.7 ± 1.4	0.006	4.2 ± 2.0	4.8 ± 1.4	0.150	0.251	0.251	0.150	0.251		
3. I have successful experiences of improving patients' well-being in dementia care	5.1 ± 1.8	6.8 ± 1.7	0.001	5.9 ± 2.2	6.8 ± 1.7	0.177	6.9 ± 2.1	6.7 ± 2.1	0.595	0.017	0.017	0.595	0.017	a	A<C
4. I think that acquiring professional knowledge leads to self-efficacy in practice	8.4 ± 1.3	8.6 ± 1.3	0.579	8.1 ± 2.0	7.7 ± 1.8	0.431	8.1 ± 2.1	8.1 ± 0.4	0.971	0.555	0.555	0.971	0.555		
5. I'm anxious about how to provide dementia care	6.3 ± 2.0	5.1 ± 2.0	0.035	6.6 ± 2.4	5.8 ± 2.0	0.304	5.0 ± 2.5	6.0 ± 2.2	0.019	0.012	0.012	0.019	0.012	a	
6. I don't have sufficient professional knowledge for dementia care	7.1 ± 2.2	5.6 ± 2.0	0.048	7.0 ± 2.1	5.5 ± 2.0	0.025	6.3 ± 1.9	6.9 ± 1.5	0.116	0.014	0.014	0.116	0.014	a	
Generalized self-efficacy scale Total	5.2 ± 3.2	5.5 ± 2.9	0.691	6.2 ± 3.6	7.3 ± 4.0	0.225	5.8 ± 3.5	5.6 ± 3.0	0.765	0.470	0.470	0.765	0.470		
Motivations for behaviors Total	2.1 ± 1.8	2.0 ± 1.8	0.904	2.6 ± 2.1	2.6 ± 2.1	0.900	2.9 ± 2.1	2.7 ± 1.8	0.399	0.851	0.851	0.399	0.851		
Anxiety for failure Total	2.6 ± 1.5	2.5 ± 1.7	0.627	2.9 ± 1.5	3.4 ± 1.8	0.130	2.1 ± 1.5	1.9 ± 1.6	0.399	0.252	0.252	0.399	0.252		
Confidence of social contribution Total	0.5 ± 0.7	1.0 ± 0.8	0.015	0.7 ± 0.9	1.3 ± 1.5	0.083	0.7 ± 0.8	1.1 ± 1.1	0.090	0.859	0.859	0.090	0.859		

A, program group; B, knowledge-only group; C, usual care group.

Before indicates the baseline, and After indicates 3 months later. P-values for 3 groups × Before and After show the results of unpaired two-way ANOVA with replicate measurements.

^a Bonferroni post-hoc test was performed when a significant difference was found in p-values. Between-group differences are indicated by > and < only when significant difference was found by Bonferroni post-hoc test.

Items 5 and 6 are related to self-efficacy associated with professional knowledge, and are reversed items.

Table 3. Extent of Understanding for Professional Knowledge of Dementia Care in the Program Group and the Knowledge-Acquisition-Only Group.

Variables	Program group n = 17			Knowledge-acquisition-only group n = 16			Two groups × before and after
	Baseline	3 months later	t-test p-value	Baseline	3 months later	t-test p-value	Interaction
Extent of understanding of professional knowledge Total score mean ± SD (%)	78.7 ± 18.5 (59.6)	107.6 ± 11.7 (81.6)	0.000	77.8 ± 17.3 (55.5)	93.9 ± 19.8 (66.9)	0.008	0.068
Basic concepts Total score mean ± SD (%)	385 ± 4.25 (62.9)	516 ± 3.6 (84.3)	0.000	360 ± 4.6 (58.8)	418 ± 5.8 (68.3)	0.008	
Lewy body dementia Total score mean ± SD (%)	175 ± 3.2 (57.2)	248 ± 1.8 (81.0)	0.000	164 ± 2.9 (53.6)	208 ± 2.7 (68.0)	0.003	
Parkinson's disease Total score mean ± SD (%)	172 ± 3.0 (56.2)	239 ± 1.7 (78.1)	0.000	163 ± 2.6 (53.3)	202 ± 2.7 (66.0)	0.010	
Vascular dementia Total score mean ± SD (%)	182 ± 3.0 (59.5)	244 ± 1.7 (79.7)	0.000	164 ± 2.7 (53.6)	201 ± 2.7 (65.7)	0.017	
Frontotemporal dementia Total score mean ± SD (%)	237 ± 4.1 (58.1)	329 ± 12.5 (80.6)	0.000	217 ± 3.9 (53.2)	269 ± 4.0 (65.9)	0.012	
Alzheimer's-type dementia Total score mean ± SD (%)	187 ± 2.8 (61.1)	254 ± 1.8 (83.0)	0.000	177 ± 2.5 (57.8)	204 ± 2.6 (66.6)	0.074	

P values for 2 groups × Before and After show the results of unpaired two-way ANOVA with no correspondence by repeated measurements. SD: standard deviation.

% represents the percentage relative to full score.

Table 4. Evaluation of the Sharing of Successful Experiences Based on Professional Knowledge Aimed at Enhancing Self-Efficacy.

Variables	Program group n = 17						Scores from 4 sources
	Number of people in 6-point scale						Confidence for practice
	Leads to confidence very much	Leads to confidence fairly well	Somewhat leads to confidence	Leads to confidence only a little	Does not lead to confidence so much	Not confident at all	
n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	mean ± SD	
Performance accomplishments (successful experience)	8 (47.1)	4 (23.5)	4 (23.5)	0 (0)	1 (5.9)	0 (0)	5.1 ± 1.1
Vicarious experience	1 (5.9)	5 (29.4)	8 (47.1)	3 (17.6)	0 (0)	0 (0)	4.2 ± 0.8
Verbal persuasion	9 (52.9)	4 (23.5)	4 (23.5)	0 (0)	0 (0)	0 (0)	5.3 ± 0.8
Physiological states	3 (17.6)	9 (52.9)	5 (29.4)	0 (0)	0 (0)	0 (0)	4.9 ± 0.7
Total	21 (31)	22 (32)	21 (31)	3 (4)	1	0 (0)	

Successful Experiences Associated With the Acquisition of Professional Knowledge: Program Group

The changes the nurses described (i.e., the professional knowledge they acquired in the program and their successful experiences) were illustrated as a co-occurrence network of frequent words through text mining (Figure 3).

The results for the basic concepts indicated that care based on the patient's characteristics was linked to the patient's smile and increased self-esteem, confirming the educational effect. For the specific disease-type networking, clusters of words associated with pathological mechanisms were frequently

found. For example, "acetylcholine esterase," "tau," and "protein" in the "amyloid" cluster were found for Alzheimer's dementia. "Dopamine" and "release" were found for Lewy body dementia. For Lewy body dementia, words representing the characteristic behaviors of this disease, such as "delusion," "hallucination," and "visual hallucination," were found, confirming that type-specific symptoms were also learned.

Discussion

Examination of the effects of a nurse education program specializing in dementia care revealed that nurses in the program

in practice. These educational effects indicate the usefulness of this program for practice.

Educational Effects of the Program

The results showed that both the program group and the knowledge-acquisition-only group acquired knowledge. In both groups, increased scores were found for the items “I feel self-efficacy regarding my ability to acquire professional knowledge about dementia” and “I feel self-efficacy regarding my ability to practice care based on my professional knowledge of dementia,” whereas no change was observed in the usual-care group (Table 2). These results suggest that nurses’ belief that they could correctly understand the conditions of patients with different types of dementia by acquiring knowledge, and that they could practice care according to the patients’ conditions, affected their self-efficacy. This finding is in accord with a previous study reporting that accurate knowledge about patients’ conditions enhanced self-efficacy.⁴⁶ The significant decrease in scores for the item “I don’t have sufficient professional knowledge for dementia care” also suggests that providing professional knowledge compensates for nurses’ lack of sufficient knowledge. One of the novel aspects of the current study was the incorporation of each observation point and care point based, respectively, on the characteristics of different types of dementia and the care needed for those conditions. Therefore, the fact that we were able to demonstrate the effectiveness of the program in 2 groups suggests that the professional knowledge content provided in this study was useful.

Regarding the acquisition of knowledge in the program group, the content of professional knowledge acquired was also presented as a co-occurrence network diagram obtained by text mining. The co-occurrence network indicated a relationship between nurses’ attitudes toward people with dementia and their understanding of pathological mechanisms, suggesting that nurses provide care based on their understanding of knowledge in general.

Words such as “smile” and “enhanced self-esteem” were highlighted in the basic concepts, which is suggestive of nurses’ attitudes to experiences of successful care provision. Nurses provided specific care for patients with different symptoms, which was targeted to particular conditions associated with specific types of dementia. This suggests that nurses’ knowledge was integrated through their care practice. Markedly different co-occurrence network diagrams were generated for different types of dementia, suggesting that nurses were able to provide care on the basis of their understanding of such differences.

A significant increase in scores for the item “I have successful experiences of improving patients’ well-being in dementia care” and a significant decrease for the item “I’m anxious about how to provide dementia care” were observed only in the program group, not in the knowledge-acquisition-only group or the usual-care group. We suggest that successful experiences were effective for patients’ well-being only in the program group because nurses in this group put professional knowledge into

practice and discussed their successful experiences. The same mechanisms may apply to the reduction in anxiety about how to engage in dementia care. It appeared that nurses’ self-efficacy was enhanced by sharing their successful experiences and being praised by others for those successful experiences. In addition, listening to the successful experiences of others may have added successful experiences to nurses’ internal models, which in turn increased self-efficacy, making nurses feel that they themselves could achieve the same. The increased self-efficacy resulting from sharing successful experiences may have reduced nurses’ anxiety about care. These results suggest that the implementation of the program increased nurses’ successful experiences and reduced their anxiety about how to engage in care, whereas receiving a single lecture at a workshop did not do so.

Thus, these results suggest that the training program exerted educational effects other than simply knowledge acquisition. The program involved sharing motivation for achieving the task and successful experiences based on professional knowledge to enhance self-efficacy, and complex interactions between these 2 factors may have caused the favorable effects we observed. A previous report indicated that placing more emphasis on the purpose of behaviors leads to increased self-efficacy and a higher rate of practicing behaviors considered to be challenging.³⁶

The acquisition of professional knowledge and then the incorporation of that knowledge into practice that the program structure permitted likely allowed nurses to directly apply their knowledge to practice, leading to a profound understanding of the meaning of knowledge through their experiences. Moreover, nurses probably became aware of their capabilities during the process of sharing successful experiences. The increase in self-efficacy resulting from being able to practice professional care prompted nurses to further their understanding, which in turn affected acquisition rates. These can be considered advantages of learning with a program structure rather than desk-based learning based on lectures alone. Our results suggest that incorporating the concept of enhancing self-efficacy into the structure of the educational program yielded positive educational effects.

According to Surr et al.⁴⁷ effective dementia educational programs should “involve the roles and experiences of participants,” “support theory- and practice-based learning,” and “support practical and adaptive learning.” Our dementia educational program included these elements, which may have led to the educational effects observed.

Issues and Prospects in Nursing Education

The co-occurrence network confirmed that nurses learned most of the contents in the lecture, which we thought important for them. However, frequently occurring terms associated with Lewy body dementia with Parkinson’s symptoms, such as “brachybasia” and “slow,” should already have been learned during undergraduate education. In other words, nurses frequently mentioned not only their newly learned professional

knowledge but also knowledge already learned in their undergraduate course. Although it is unclear whether nurses did not possess this knowledge or whether they relearned it, these results suggest that nurses should continue to receive education in clinical practice in the form of postgraduate education. It appears that nurses find it difficult to obtain postgraduate education that provides the professional knowledge necessary for dementia care while providing care in clinical practice. However, this program could substantially reduce the time and financial burdens of nurses in acquiring professional knowledge while increasing their self-efficacy in dementia care. Thus, we recommend implementation of this program, and suggest that it could lead to improvements in the well-being of people with dementia.

In Japan, the cost of dementia care is charged to patients in wards staffed by nurses who have received sufficient training in dementia care, because providing care to hospitalized people with dementia is challenging. The proposed program is also intended to be used as a training course to supplement existing lectures. This would not only benefit people with dementia and enhance the self-efficacy of nurses, but could also potentially reduce training costs.

Limitations

An important limitation of this study is that there is no way to assess whether nurses' improved self-efficacy and knowledge led to improved patient care and outcomes. The study included only 1 hospital, because it was the only hospital we located with 3 dementia wards (which was a requirement for including 3 groups of participants to control for educational background). This limitation should be considered in future studies. A further limitation is that we were unable to differentiate the effects of motivation for achieving the task to enhance self-efficacy from the effects of sharing successful experiences based on professional knowledge, because these factors are intertwined.

Conclusion

We examined the effects of a nurse education program specializing in dementia care as part of the development of the course. The acquisition of professional knowledge necessary for dementia care exerted stronger positive effects on enhancing self-efficacy associated with knowledge in the program group than in the knowledge-acquisition-only group and the usual-care group. These findings suggest that sharing successful experiences positively affects self-efficacy associated with practice. The acquisition rate of professional knowledge was 70% in the knowledge-acquisition-only group compared with 80% in the program group, suggesting that more in-depth understanding can be achieved by applying knowledge in practice in addition to desk-based learning. Considering the educational effects demonstrated by these findings, we believe that the proposed program will be beneficial for training general nurses in clinical practice.

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ORCID iD

Yoko Takeuchi  <https://orcid.org/0000-0001-6182-7771>

Mayumi Kato  <https://orcid.org/0000-0001-6423-0559>

Hiromasa Tsujiguchi  <https://orcid.org/0000-0001-7511-0165>

Supplemental Material

Supplemental material for this article is available online.

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