

Practical report

E-learning program designed to improve nursing practices to enhance interdisciplinary team care for diabetes patients — Self-evaluation by participants in an e-learning program and evaluation of learning materials —

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Key words

diabetes nursing, interdisciplinary team care, e-learning, self-evaluation, materials

Abstract

Purpose: The 25 item questionnaire was created as a learning tool for nurses to enhance interdisciplinary team care for diabetes patients in the previous study. Utilizing this questionnaire, an e-learning program designed to teach nurses the required skills was developed. The purpose of this study was to obtain and analyze self-evaluations of nursing practice in interdisciplinary team care following first-time participation in an e-learning program, and a subjective evaluation of the learning materials used in the program.

Method: This study targeted nurses in diabetes patient care, who were asked to view learning materials on a website, respond to the 25-item self-evaluation questionnaire, and evaluate the materials. Quantitative data was analyzed with descriptive statistics, and open-ended answers were qualitatively analyzed.

Results: Participants were 193 nurses whose mean age was 40.8 ± 9.5 , and whose mean number of years' experience providing diabetes patient care was 8.7 ± 6.7 . The total score of items associated with "expressing opinions to the team from the perspective of a nurse" was the lowest in the self-evaluation. In addition, 139 nurses (72.0%) indicated that "The learning materials would be useful for nurses engaged in diabetes patient care."

Conclusion: For this study, the self-evaluation scores for "expressing opinions to the team from the perspective of a nurse" were the lowest out of all categories, similar to as seen in previous research, but improvement of this skill is expected through learning or re-learning. Subjective evaluation of the e-learning materials was also acquired.

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Introduction

According to the 2016 National Health and Nutrition Survey conducted by the Ministry of Health, Labour and Welfare (MHLW) in Japan¹⁾, the number of individuals in Japan strongly suspected of having diabetes has reached 10 million, a 500,000 increase over the previous survey carried out in 2012²⁾. Because advancing diabetes leads to complications that require costly treatments, it is urgent to seek measures designed to prevent the disease from increasing in severity. MHLW established the Program for Preventing the Aggravation of Diabetic Nephropathy in April 2016 and entered into a cooperative agreement to promote the program with the Japan Medical Association's Japan Promotion Council for Diabetes Prevention and Countermeasures³⁾.

Ensuring the effectiveness of these measures requires interdisciplinary team care for diabetes patients. Nurses engaged in team care provide comprehensive support that includes both the physical and medical aspects of treatment, support that is as important as the role of the physician who serves as the leader of the team. An important role for the nurse in team care is, therefore, advocating for the patient^{4) 5)}. However, our previous study about diabetes nursing in Japan^{6) 7)} clarified that the level of satisfaction of nurses in team medicine was low, that they lacked confidence that they had the trust of physicians and other medical professionals, and that nurses do not sufficiently express their opinions to other medical staff from the standpoint of nurses. This highlights the need for nurses to gain confidence in their specializations and increase their ability to express their opinions during nursing care for diabetes patients to promote team medicine.

To achieve this, the focus was placed on e-learning. E-learning has been applied broadly in continuing education for nurses⁸⁾, and it has been reported to be a useful tool for busy nurses because it allows convenient access to material via mobile phones anytime and anywhere⁹⁾. Studies published to date include online education for students training to become medical care providers¹⁰⁾, the development and evalua-

tion of a basic program of heart disease in children¹¹⁾, improvement of nurses' evaluation skills through an e-learning program for self-evaluation in neurology¹²⁾, and the effect of an intervention program for traumatic brain injury patients and their families to develop partnership through interdisciplinary team care¹³⁾. These articles show the application of e-learning programs as a tool for medical care professionals and approaches taken to develop innovative educational programs. In addition, while a two-month online education program on diabetes care for nurses was reported to be effective¹⁴⁾, no studies have been conducted on educational approaches to increase nurses' skills in interdisciplinary team care for diabetes patients.

Therefore, e-learning materials were developed for nurses utilizing the previous study¹⁵⁻¹⁸⁾. This study was conducted to examine self-evaluation in nursing practice in interdisciplinary treatment following first-time participation in the e-learning program, and to gain a subjective evaluation of the learning materials used in the program.

Creating the e-learning method

1. The self-evaluation questionnaire to enhance interdisciplinary team care for diabetes patients composed of 25 items under 4 viewpoints

The focus was first placed on the roles of nurses in interdisciplinary team care for diabetes patients and conducted a qualitative study to clarify the perspective of skilled nurses regarding their roles in diabetes team care¹⁵⁾. Results revealed that nurses perceived their role as enhancing diabetes team care utilizing their viewpoints and methods as nurses, which they believe would lead to the more desirable practice of diabetes team care. Utilizing these results, the 25-item self-evaluation questionnaire was created for nurses, designed to enhance interdisciplinary team care for diabetes patients^{16) 17)}. The reliability and validity of these 25 items have been verified¹⁸⁾. This questionnaire consisted of four items on **Providing assistance to patients considering their physical and psychological conditions and lifestyle (Viewpoint 1)**, four items

on **Being aware of the need to include patients and their families in the team (Viewpoint 2)**, four items on **Respecting one another and improving as a team (Viewpoint 3)**, and 13 items on **Expressing opinions to the team from the perspective of a nurse (Viewpoint 4)** (25 items in total). The list of items is shown in Table 1.

2. Structure and content of the e-learning teaching materials

The purpose of the e-learning program was to recognize and encourage the practice of the 25 items in the questionnaire, which would improve nurses' skill in enhancing interdisciplinary team care for diabetes patients. After participants watched the introduction section (3 min. 30 sec.), they were asked to evaluate their practice of enhancing interdisciplinary team care for diabetes patients. They then watched the explanatory section (16 min. 30 sec.). Participants could access the website via a mobile terminal and do self-evaluation and also view these sections as time permitted. The outline is shown in Fig.1.

Research method

1. Subjects

Subjects were nurses engaged in diabetes pa-

tient care. 944 educational facilities of the Japan Diabetes Society Board-certified Diabetologists and facilities with Certified Nurses (CN) in Diabetes Nursing were asked to cooperate with the study. The head nurses at the cooperative facilities were asked to decide which nurses to participate, and provide the e-mail addresses of participants for use as IDs. There was no set maximum number of participants for each facility. All participants were registered and were sent e-mail notifications requesting that they access the e-learning website.

2. Survey contents

Participants were asked to provide responses to the self-reported questionnaire on the above-mentioned e-learning website. For further details, see Fig. 1.

1) Attribution

Gender, age, number of years' experience in providing nursing care for diabetes patients, presence or absence of certification of Certified Diabetes Educator of Japan (hereafter referred to as "CDEJ"), presence or absence of CN in Diabetes Nursing, facility address and number of beds.

2) State of Nurses in Promoting Team Medi-

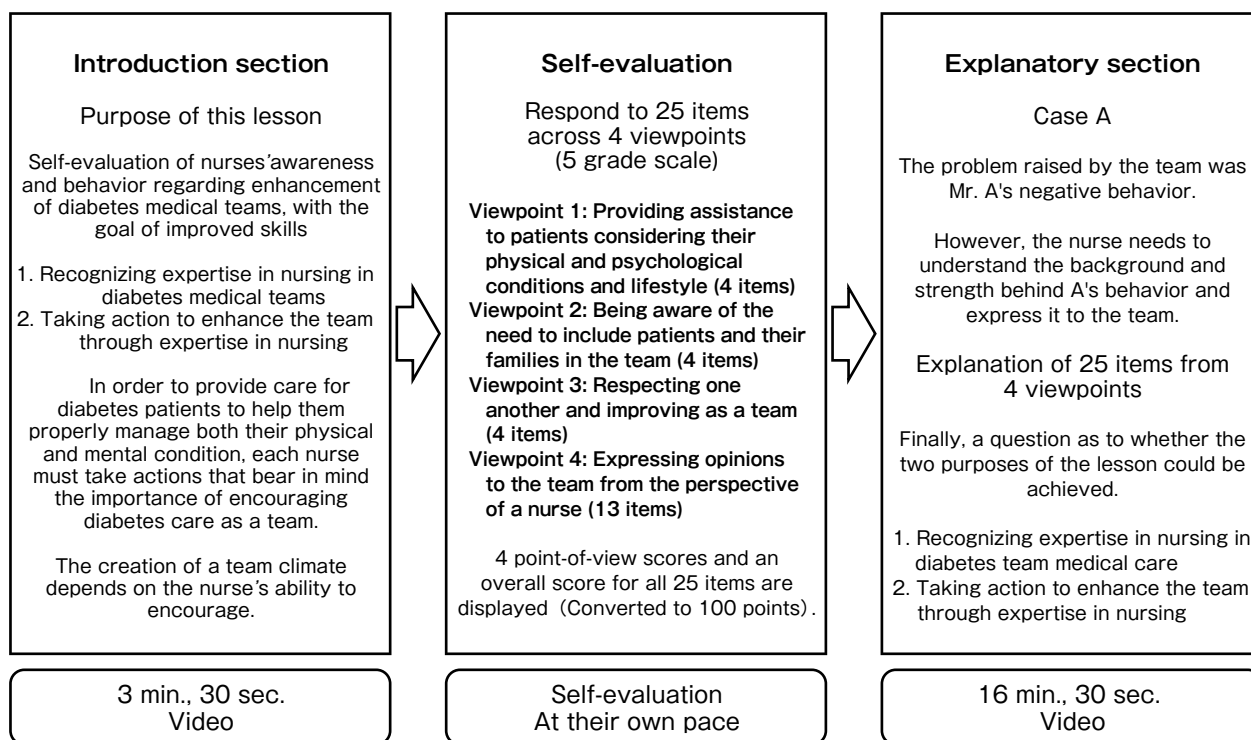


Figure 1 Structure and contents of e-learning materials

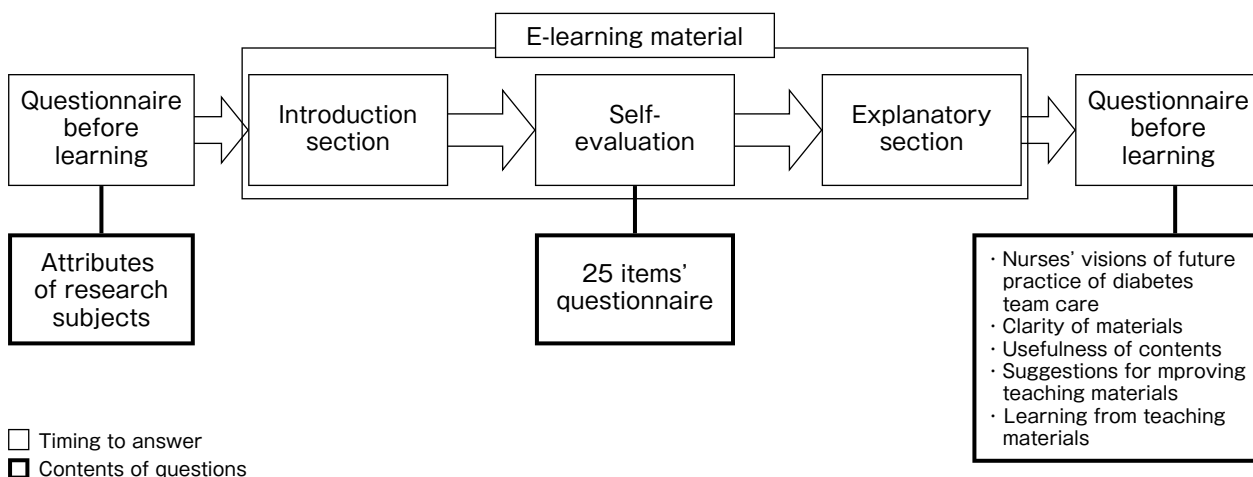


Figure 2 Procedure of data collection

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(1) the 25-item questionnaire on the promotion of team medicine for diabetes patients as a self-evaluation (Table 1), and (2) a 4-item questionnaire on nurses' vision of future practice of diabetes team care (the items being *I want to enhance diabetes team care from the nurse's standpoint, I want to engage in more discussion with other nursing staff to enhance diabetes team care from the nurse's standpoint, I can enhance diabetes team care from the nurse's standpoint, and I can encourage other nursing staff to promote diabetes team care together*) were provided, both of which applied a 5-point scale.

3) Subjective evaluation of e-learning materials by subject following first-time participation

Participants were asked to answer by 5-point scale evaluation for (1) three items regarding the clarity of materials, and (2) five items regarding usefulness of contents. They were also asked to write, as open-ended answers, (3) suggestions for improving teaching materials and (4) what they learned from teaching materials.

3. Data collection period

From March to June 2017

4. Data collection procedure

1) Just before learning (Questionnaire before learning)

Attributes of research subjects

2) After viewing introduction section (Self-evaluation)

The 25-item questionnaire on the promotion of team medicine for diabetes patients as a self-

evaluation

3) After viewing the explanatory section (Questionnaire after learning)

A 4-item questionnaire on nurses' vision of future practice of diabetes team care, subjective evaluation of e-learning materials ((1) three items regarding the clarity of materials, and (2) five items regarding usefulness of contents. They were also asked to write, as open-ended answers, (3) Suggestions for improving teaching materials and (4) what they learned from teaching materials.)

5. Data analysis

The 25 items of the self-evaluation to enhance interdisciplinary team care for diabetes patients provided five answer options: "strongly agree (5 points)," "somewhat agree (4 points)," "neither agree nor disagree (3 points)," "somewhat disagree (2 points)," and "strongly disagree (1 point)." Mean score) was calculated for each item. The final total of questionnaire items based on the 5-point scale was converted to a scale for which 100 points was the maximum possible total score.

Questionnaires on nurses' visions of future practice of team medicine for diabetes patients, and subjective evaluations of e-learning materials, were aggregated using a 2-point scale categorizing "strongly agree" and "somewhat agree" into "agree" and "neither agree nor disagree," "somewhat disagree," and "strongly disagree" into "disagree."

Table 1 The 25 items included in the Questionnaire for Nursing Practices in Diabetes Interdisciplinary Team Care

Viewpoint 1 : Providing assistance to patients considering their physical and psychological conditions and lifestyle

1. I try to respond to patients' questions, provide support to solve their problems in order to gain patient trust.
 2. I try to look at situations from the patient's point of view and provide care with professional judgment.
 3. I try to understand the physical and the psychological conditions of patients and work together with them.
 4. I imagine life as a diabetes patient and help them to express their feeling to medical professionals.
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Viewpoint 2 : Being aware of the need to include patients and their families in the team

5. Team members maintain their awareness of the need to cooperate with other team members, including patients and their families.
 6. Team members consider patients and their families as equal members of the team.
 7. Each team member tries hard to exercise his or her maximum strength for patients considering the patients and their families as team members.
 8. Team members work with patients' families to promote their understanding of life with diabetes and ask them to perform necessary roles.
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Viewpoint 3 : Respecting one another and improving as a team

9. I respect other team members and try to establish trusting relationships.
 10. I tell members when team care has changed patients' conditions for the better, and share the pleasure of this to motivate the team.
 11. When I feel any team member's proficiency and growth as a professional, I always mention it to that member.
 12. I consider the individual workload when we share work in the team.
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Viewpoint 4 : Expressing opinions to the team from the perspective of a nurse

13. When nursing care made good changes in patients, I share the contents with other professionals in an objective manner.
 14. I provide information on nursing skills that can be used by other professionals for patient education.
 15. I share my ideas as a nurse with other professionals.
 16. I try my best to have doctors recognize my nursing ability.
 17. When conflicting opinions with other professionals arise, I place a priority on patient safety and peace of mind, and try to coordinate opinions respecting the standpoint of the other professionals and maintain balance in the team.
 18. I respect the thoughts and lifestyle of diabetes patients and share information in the team.
 19. I try to develop team care for diabetes patients from the standpoint of the patient.
 20. I actively support patients by expressing opinions to team members on their behalf.
 21. I actively try to acquire knowledge and skill from other professionals.
 22. I try to work with individuals engaged in departments and divisions other than the team to facilitate the activities of the team within the organization.
 23. I try my best to vitalize team activities.
 24. I try to help diabetes patients live healthier and more secure lives, and share individual patient's goals with team members, including patients' families.
 25. I try to maintain good communication with doctors and establish trusting relationships.
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The actual state was analyzed by descriptive statistics, and the open-ended answers were qualitatively analyzed and summarized by similar content. In order to see comparisons between the presence or absence of professional qualifications related to diabetes and the consciousness and behavior of nurses, a Wilcoxon rank sum test was conducted on 25 items' self-evaluation scores.

Significance was set at $p < 0.05$, and statistical processing was conducted with SPSS ver. 23.0.

6. Ethical considerations

This study was approved by the Medical Ethics Committee of Kanazawa University (No. 689). Participation in this study was voluntarily. Access to the website and response to the questionnaire were deemed consent to participation in this study. The names of the facilities to which individual nurses were affiliated and their IDs were linked and anonymized to prevent identification of participants.

Results

1. Cooperative facilities and subjects of data analysis

944 facilities were asked to cooperate with

the study, and 145 agreed (15.3%). However, 106 facilities (11.2%) and 564 nurses were registered for participation. Among the 564 participants, 343 participants (60.8%) accessed website materials, 236 participants (41.8%) finished the e-learning program, and 193 participants (34.2%) completed the self-evaluation and questionnaire after the e-learning program. The 193 participants were included as subjects of this study (Fig. 3).

2. Subject attributes

Mean age of the participants was 40.6 ± 10.0 , mean years of diabetes nursing care experience was 8.7 ± 6.8 , number of participants with CDEJ was 96 (49.7%), and number of participants with Certification of Nurse in Diabetes Nursing was 29 (15.0%). For further details, see Table 2.

3. Subjective evaluation of e-learning materials by subject following first-time participation

1) Actual state of subject practice in regard to the enhancement of team care

(1) Self-evaluation questionnaire designed to enhance interdisciplinary team care for diabetes patients

Table 3 shows the average scores of each of the 25 items in the questionnaire. Each item was

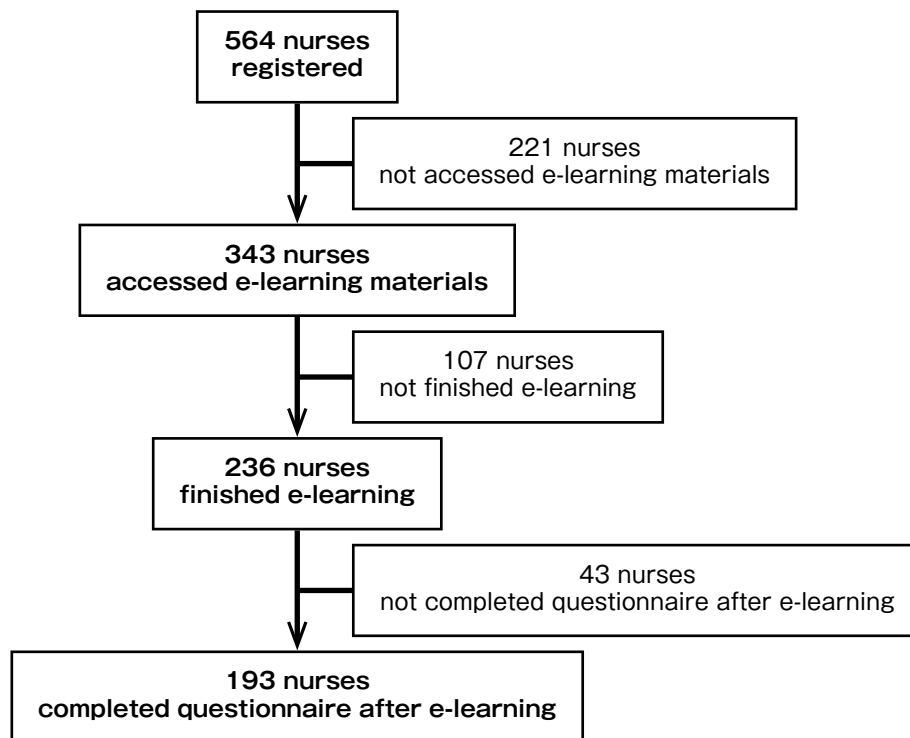


Figure 3 Participant flow diagram showing the enrolled sample and dropouts

evaluated on a scale of one to five. Three items exceeded 4 points. 5. *Team members maintain their awareness of the need to cooperate with other team members, including patients and their families averaged 4.10*, 1. *I try to respond to patients' questions, provide support to solve their problems in order to gain patient trust averaged 4.05*, and 9. *I respect other team members and try to establish trusting relationships averaged 4.02*. One item fell below 3 points. This item was 14. *I provide information on nursing skills that can be used by other professionals for patient education*, which averaged 2.95, the lowest among the items.

Table 4 shows the scores of four viewpoints of nurses converted to a 100-point scale. **Viewpoint 1, Providing assistance to patients considering their physical and psychological conditions and lifestyle**, was the highest at 78.6 ± 14.0 . **Viewpoint 4, Expressing opinions to the team from the perspective of a nurse**, was the

lowest at 68.9 ± 14.3 , the only viewpoint that fell below 70 points.

(2) Nurses' vision of future practice of diabetes team care

Among subjects that indicated "agree," 165 (85.4%) selected *I want to enhance diabetes team care from the nurse's standpoint*, 161 (83.4%) selected *I want to engage in more discussion with other nursing staff to enhance diabetes team care from the nurse's standpoint*, 121 (62.6%) selected *I can enhance diabetes team care from the nurse's standpoint*, and 92 (47.6%) selected *I can encourage other nursing staff to promote diabetes team care together*.

(3) Comparison between the scores of four viewpoints of self-evaluation and the presence or absence of professional qualifications related to diabetes (Table 5).

Regarding CDEJ, **Viewpoint 2, Being aware of the need to include patients and their families in the team**, revealed no difference in scores

Table 2 Attributes of the nurses

(n=193)

Attribute Classification		Number of respondents (nurses)	Rate (%)
Gender	Male	4	(2.0)
	Female	189	(98.0)
Age (mean : 40.6 ± 10.0)	20 – 29	33	(17.1)
	30 – 39	45	(23.3)
	40 – 49	73	(37.8)
	50 – 59 (years)	42	(21.8)
The number of years involved in diabetes education (mean : 8.7 ± 6.8)	< 5	68	(35.2)
	≥ 5 (years)	125	(64.8)
Certified Diabetes Educators of Japan (CDEJ) certification	Certified	96	(49.7)
	Uncertified	97	(50.3)
Certified diabetes nurses	Certified	29	(15.0)
	Uncertified	164	(85.0)
Location of individual facilities	Hokkaido	6	(3.1)
	Tohoku	9	(4.7)
	Kanto	35	(18.1)
	Chubu	56	(29.0)
	Kinki	43	(22.3)
	Chugoku	34	(17.6)
	Shikoku	0	(0.0)
	Kyushu (contained Okinawa)	10	(5.2)
Number of beds of individual facilities	< 99	14	(7.3)
	100 – 299	62	(32.1)
	300 – 499	67	(34.7)
	≥ 500	50	(25.9)

between the subjects with and without CDEJ, and other viewpoints and overall points revealed a significant difference ($p>0.05$). Regarding Certification of Nurse in Diabetes Nursing, **Viewpoint 2, Being aware of the need to include patients and their families in the team** and **Viewpoint**

3, Respecting one another and improving as a team revealed no difference in scores while other viewpoints and overall points revealed a significant difference ($p>0.05$).

2) Subjective evaluation of e-learning materials

Table 3 The average scores of each of the 25 items on the promotion of team medicine for diabetes patients as a self-evaluation (In order of high score) (5 = strongly agree, 1 = strongly disagree)

Viewpoint	Items	mean \pm SD
V 2	5. Team members maintain their awareness of the need to cooperate with other team members, including patients and their families.	4.10 \pm 0.85
V 1	1. I try to respond to patients' questions, provide support to solve their problems in order to gain patient trust.	4.05 \pm 0.80
V 3	9. I respect other team members and try to establish trusting relationships.	4.02 \pm 0.85
V 1	3. I try to understand the physical and the psychological conditions of patients and work together with them.	3.95 \pm 0.80
V 4	21. I actively try to acquire knowledge and skill from other professionals.	3.90 \pm 0.94
V 1	2. I try to look at situations from the patient's point of view and provide care with professional judgment.	3.88 \pm 0.89
V 1	4. I imagine life as a diabetes patient and help them to express their feeling to medical professionals.	3.82 \pm 0.85
V 4	25. I try to maintain good communication with doctors and establish trusting relationships.	3.76 \pm 0.96
V 2	6. Team members consider patients and their families as equal members of the team.	3.72 \pm 0.93
V 3	10. I tell members when team care has changed patients' conditions for the better, and share the pleasure of this to motivate the team.	3.69 \pm 1.02
V 3	11. When I feel any team member's proficiency and growth as a professional, I always mention it to that member.	3.61 \pm 1.09
V 2	7. Each team member tries hard to exercise his or her maximum strength for patients considering the patients and their families as team members.	3.60 \pm 0.87
V 4	20. I actively support patients by expressing opinions to team members on their behalf.	3.59 \pm 0.92
V 2	8. Team members work with patients' families to promote their understanding of life with diabetes and ask them to perform necessary roles.	3.54 \pm 0.97
V 4	23. I try my best to vitalize team activities.	3.54 \pm 1.07
V 4	18. I respect the thoughts and lifestyle of diabetes patients and share information in the team.	3.53 \pm 0.90
V 3	12. I consider the individual workload when we share work in the team.	3.52 \pm 1.02
V 4	19. I try to develop team care for diabetes patients from the standpoint of the patient.	3.51 \pm 1.09
V 4	15. I share my ideas as a nurse with other professionals.	3.47 \pm 0.99
V 4	24. I try to help diabetes patients live healthier and more secure lives, and share individual patient's goals with team members, including patients' families.	3.45 \pm 0.95
V 4	17. When conflicting opinions with other professionals arise, I place a priority on patient safety and peace of mind, and try to coordinate opinions respecting the standpoint of the other professionals and maintain balance in the team.	3.43 \pm 0.93
V 4	16. I try my best to have doctors recognize my nursing ability.	3.33 \pm 1.08
V 4	13. When nursing care made good changes in patients, I share the contents with other professionals in an objective manner.	3.17 \pm 1.02
V 4	22. I try to work with individuals engaged in departments and divisions other than the team to facilitate the activities of the team within the organization.	3.15 \pm 1.12
V 4	14. I provide information on nursing skills that can be used by other professionals for patient education.	2.95 \pm 1.09

Table 4 Each score at four viewpoints (Score converted in 100 points)

Viewpoints	Mean ± SD
1. Providing assistance to patients considering their physical and psychological conditions and lifestyle	78.6 ± 14.0
2. Being aware of the need to include patients and their families in the team	74.8 ± 15.0
3. Respecting one another and improving as a team	74.2 ± 15.6
4. Expressing opinions to the team from the perspective of a nurse	68.9 ± 14.3
Average of total points	72.3 ± 12.7

Table 5 Comparison between each of the four viewpoints in self-evaluation and the presence or absence of certification regarding diabetes nursing care

Viewpoints	Certified Diabetes Educators of Japan (CDEJ)	Score converted in 100 points	p-value	Certified diabetes nurses	Score converted in 100 points	p-value
1. Providing assistance to patients considering their physical and psychological conditions and lifestyle	Certified	83.7	0.001	Certified	89.1	0.001
	Uncertified	73.5		Uncertified	76.6	
2. Being aware of the need to include patients and their families in the team	Certified	75.3	0.687	Certified	78.7	0.143
	Uncertified	74.4		Uncertified	74.3	
3. Respecting one another and improving as a team	Certified	77.0	0.014	Certified	75.8	0.579
	Uncertified	71.5		Uncertified	74.0	
4. Expressing opinions to the team from the perspective of a nurse	Certified	73.0	0.001	Certified	76.1	0.003
	Uncertified	64.9		Uncertified	67.5	
Average of total points	Certified	75.7	0.001	Certified	78.5	0.004
	Uncertified	68.9		Uncertified	71.1	

Wilcoxon rank sum test

(1) Clarity of educational materials

Among subjects that indicated “agree,” 167 (86.5%) selected *letters used in the materials were easy to read*, 156 (80.8%) selected *narration was easy to understand*, and 135 (69.9%) selected *materials were easy to understand*.

(2) Usefulness of the contents

Among subjects that indicated “agree,” 152 (78.7%) selected *I think the materials are useful for nurses engaged in care for diabetes patients*, 142 (73.5%) selected *I want to tell other nursing staff about the contents*, 139 (72.0%) selected *I think these materials are useful for me*, 131 (67.8%) selected *these materials made me aware of a new aspect of the specialization in the diabetes team care*, and 117 (60.9%) selected *these materials gave me new knowl-*

edge on the specialization in the diabetes team care.

(3) Suggestions for improving teaching materials

There were 28 open-ended answers provided in total: 22 regarding “difficulty of online operation” and 6 regarding “requests for concrete examples.”

“Difficulty of online operation” included issues such as: users could not pause or rewind videos, could not hear audio, the online service did not work, users did not know how to proceed on the Web, or the screen did not open.

(4) Learning from teaching materials

There were 80 open-ended answers provided in total: 39 regarding “recognition of roles in the team as a nurse,” 14 regarding “recognition of

the importance of team collaboration," 13 regarding "importance of involving patients and families," 9 regarding "how to understand patients," and 5 regarding "reconfirming what has been practiced so far."

In "recognition of role in team as a nurse": expressing and disseminating the overall picture of the patients as understood from the perspective of nursing, becoming a key person to enhance a team, involving other occupations, activating a team by taking the initiative, and providing logical explanations to doctors and other occupations. In "recognition of the importance of team collaboration": the importance of supporting patients throughout the team, and opportunities to express opinions with the team. In "importance of involvement including patients and their families": the importance of including family members, and patients and families being members of a team.

Discussions

1. Nurses' self-evaluation on the enhancement of interdisciplinary team care for diabetes patients

Subjects had high specialization in diabetes nursing care. Approximately half of the subjects were CDEJ certified, and 65% had five or more years' experience in diabetes nursing care. **Expressing opinions to the team from the perspective of a nurse (Viewpoint 4)** revealed the lowest score, as was the case in the previous study^(6,7). **Being aware of the need to include patients and their families in the team (Viewpoint 2)** even for CDEJ- or Certified Nurse in Diabetes Nursing-certified nurses, the scores were not significantly higher, also the same as was found in the previous study^(6,7). This suggested that even nurses skilled in diabetes nursing were unaware of these two viewpoints.

Therefore, it is necessary to provide education that leads to improved awareness and behaviors regarding **Expressing opinions to the team from the perspective of a nurse**, and **Being aware of the need to include patients and their families in the team**. While motivation to enhance and discuss interdisciplinary team care

revealed 80% or more, only 60% indicated that they could enhance team care from the standpoint of the nurse, and less than 50% indicated that they could take the initiative in doing so. The previous study^(6,7) also showed that nurses' confidence and sense of satisfaction were low although their motivation for cooperation on a team was high, even CN in diabetes nursing had negative recognition such as "difficulty in relation with physician" and "lack of understanding by the organization and superiors". Additionally, it is clear that the score of self-evaluation of social skills and critical thinking attitudes of nurses is not high¹⁹⁾. It is expected that increasing nurses' skill to enhance team care will lead to increased confidence and sense of satisfaction.

2. Evaluation of educational materials

Seventy to eighty percent of subjects provided positive evaluations on the clarity of materials, and approximately 70% provided positive evaluations on the usefulness of materials. Opinions expressed in open-ended answers also indicated that the materials helped them learn and realize much. These results suggested that the materials were useful for nurses engaged in team practice.

The purpose of the e-learning program was to enable nurses to recognize and practice the 25 items included in the questionnaire, which requires their mastery. However, this study was limited to subjective evaluations such as the clarity and usefulness of materials. Therefore, it was not possible to quantify the knowledge acquired. It is necessary to create a test to evaluate knowledge and examine the level of achievement.

Though 60% of registrants accessed the system, those who filled out their questionnaire after learning decreased by half, to 30% of registrants. "Difficulty of online operation," indicated by open-ended answers for "suggestions for improving teaching materials," could also be considered one factor of that, but this is only an inference.

3. Application of this result and limitations of this study

Since the subject of this result is a group with high specialty in diabetes nursing, this result is

considered applicable to such nurses.

On the other hand, since only 30% of subjects completed the questionnaire after learning, out of the nurses who registered on the Web, there is a possibility that the result reflects the biases of subjects with high interest or motivation. This is one limitation of this study.

4. Future vision

Since the subjects of this study had specializations in diabetes nursing care, they were familiar with the contents of the learning materials and wanted to have more specific examples. This highlights the need to create more practical learning materials for specialized nursing staff. Anticipating the potential usefulness of the program for nurses with little experience in diabetes nursing care, the creation of easier and more attractive materials must also be considered. The 25 items are basic knowledge for the enhancement of interdisciplinary team care for diabetes patients, which are believed to be useful as learning materials for nurses who are motivated to work on a team for diabetes patients, or for nurses who have difficulties in their current team activities and seek solutions.

Furthermore, the authors would like to develop a learning program that utilizes this e-learning material in the future. Utilizing this material as a part of the learning program is our future goal.

Conclusion

Through the survey of the nurses who participated in an e-learning program for the first time and evaluation of the learning materials designed to improve nursing skills with the aim of enhancing interdisciplinary team care for diabetes patients, this study clarified that nurses' self-evaluation on expressing opinions to team members from the viewpoint of the nurse was the lowest among 4 viewpoints, as was the case in the previous study. It was found that nurses who used the e-learning materials provided positive subjective evaluations of the materials and realized the need to conduct objective evaluations. Specific ideas for materials targeting the level of knowledge of the subjects were also

gained.

Declaration of conflicting interests

It is hereby declared that there is no conflict of interest.

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多職種協働糖尿病チームケアを促進する看護実践e-learningプログラム －プログラムに参加した看護師による自己評価および教材評価－

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キーワード

糖尿病看護, 多職種協働チームケア, e-learning, 自己評価, 教材

要 旨

目的：先行研究にて看護師が多職種協働糖尿病チームケアを促進するための教材として25項目からなる質問表を作成した。この質問表を活用し、看護師に必要とされるスキル教育を行うため、e-learningプログラムを開発した。本研究の目的は、初回学習した看護師の自己評価の実態、および教材の主観的評価を明らかにすることである。

方法：糖尿病看護に携わっている看護師を対象とし、Webサイトでの教材視聴とチーム促進自己評価および教材評価に回答を求めた。量的データは統計学的に、自由記載は質的に分析した。

結果：分析対象者 193名、年齢 40.8 ± 9.5 歳、糖尿病看護経験 8.7 ± 6.7 年であった。糖尿病チームケア自己評価では、「看護的視点からチームへ表明し発信する」視点で最も点数が低かった。また「本教材は糖尿病ケアに携わっている看護師に役立つと思う」は139名（72.0%）であった。

結論：本研究では「看護的視点からチームへ表明し発信する」視点の自己評価が先行研究同様、最も点数が低かった。しかし本教材学習による今後のスキルアップが期待される。教材評価においては、ある程度の主観的評価を得られた。