【原著論文】

Development of a Critical Pathway for Diabetes Care within Home Care Nursing for the Elderly
- Development of a Proposed Critical Pathway and the Results of a Trial Using it -

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Key words: diabetes, the elderly, home care nursing, critical pathway

Abstract

The purpose of this study was to develop a proposed critical pathway (CP) for diabetic care in home care nursing for the elderly and examine the possibilies for its use. . The following 3-Step were contained in the methodology; [Step 1: Survey of home care nursing records and interview survey of visiting nurses], [Step2: Development of a proposed CP and method of reaching a consensus with experts], [Step 3: Trial application of the developed proposed CP]. 42 visiting nurses participated and used the proposed CP as a trial and their evaluations of the 12 endpoints are presented. As a result these 4 endpoints accounted for 60 ～ 70% of the total responses, "effect on the prevention of acute diabetic complications", "implementation of diabetic care needed", "use for the evaluation of diabetic care" and "thorough assessment of diabetic care";. The endpoints with lowest rates of responses were "reduction in time for keeping nursing records" (11.9%) followed by "applicability of a care protocol (including the CP) in the station" (28.6%) and "promotion of collaboration with professionals from other fields" (33.3%).Based on the above results, the usefulness of the developed CP for diabetic care was evaluated highly. The above results suggest that the CP developed in the present study can be applied if the process of diabetic care in home care nursing for the elderly and its endpoints of the CP are refined, and also if the roles of medical institutions and home care nursing are clarified.

I. INTRODUCTION

With the westernization of Japanese lifestyles, the number of people affected by diabetes in Japan has been continually growing. The role of visiting nurses is anticipated to increase in the future as a result of shorter inpatient stays and the increasingly aged society. Since diabetes is a chronic disease, a long-term care program from diagnosis/identification to late stage complications is necessary. A standardized care program will lead to the assurance of the quality and safety of diabetic care, and thus approaches such as the critical pathway method have been introduced in care at many medical institutions. We believe that the provision of diabetic care based on a standardized critical pathway index by home care visiting nurses will standardize and improve the quality of nursing care. Furthermore, we have found that such care leads users to live more independent lives, ameliorates their quality of life (QOL), and

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prevents spiraling healthcare costs.

Twenty-one studies on critical pathways for diabetic care in home care nursing were found in PubMed for the period from 1995 to 2010 when searched for with the keywords "critical pathway x home care nursing x diabetes." There have been studies on the improvement of educational effects with the use of critical pathways for foot care (Fritschi C, 2001; Berry RM, 2004), and a study on the improvement of patients' levels of satisfaction with the promotion of collaboration between an emergency team and specialized nurses at the time of onset of hypoglycemia (Walker A, 2006). Furthermore, there has also been a case study showing that the application of a critical pathway to a patient with end-stage diabetic nephropathy and his family led to specialized nurses and involved the demonstration of leadership, the smooth implementation of a team-based approach, and satisfactory attendance at the moment of death (Dethloff SB, 2004). Nonetheless, there have been no such papers on critical pathways in Japan.

The purpose of this study was to develop a proposed critical pathway for diabetic care within home care nursing for the elderly and examine the possibility of its use.

II. DEFINITIONS OF TERMS

Critical pathway (hereinafter referred to as CP): A standard model with respect to time- regarding the sequence and timing of management plans, applicable to people affected by a specific disease or symptom, and used to effectively achieve nursing goals.

Elderly diabetic patients (hereinafter referred to as users): Patients with type 2 diabetes mellitus aged 65 years or older who depend on Insulin at home.

III. METHODOLOGY

This study was carried out in the following 3 steps from January 2008 to September 2010:

1. Step 1 (Basic survey on the development of the CP)

We conducted a basic survey on the development of the CP based on home care nursing records in order to reveal temporal characteristics of diabetic care provided by visiting nurses. An interview survey with visiting nurses was also performed to identify details of diabetic care.

1) Survey on home care nursing records

Five visiting nurses from prefecture A, who provided consent to participate in the survey, were asked to fill out a self-developed questionnaire form based on nursing records on diabetic care for the 12 months from the start of the home care nursing for the users. The items investigated were "Eating," "Being active," "Medication taking," and "Reducing risk," as well as effects in the implementation rate of care over time for each user.

2) Interview survey of visiting nurses

A semi-structured interview investigation based on the practical process of diabetic care provided to users was conducted with 10 expert visiting nurses from prefecture AOM, who consented to take part in the study. The investigated items were categorized by area of care, including "Eating," "Being active," "Medication taking," "Monitoring BG (blood glucose)," "Problem-solving for BG," "Reducing risk," and "Living with diabetes." These areas of care were selected based on the 7 diabetic self-management activities that were found to be outcomes of Diabetes Self-Management Education (DSME) developed by the American Association of Diabetes Educators (AADE, 2003). The researchers performed a series of analysis, and the results

were then reviewed and corrected by 2 nursing researchers skilled in qualitative studies, so that a consensus was reached among them.

2. Step 2 (Development of a proposed CP and method of reaching a consensus with experts)

We specified the objectives as promoting the stability of blood glucose control in users, preventing the onset and aggravation of diabetic complications, and improving the QOL of the users and their families in the CP. A proposed CP was prepared based on evidence obtained in Step 1 and an examination of the literature. The proposed CP jn was reviewed by researchers and experts consisting of 1 diabetic specialist, 6 certified diabetic educators and/or nurses well-trained in diabetic care, and 2 education researchers. Furthermore, an evaluation of the appropriateness of the contents of the CP by researchers with experience as visiting nurses specializing in home nursing science was added.

3. Step 3 (Trial application of the developed proposed CP)

Visiting nurses were asked to use the proposed CP as a trial for evaluating the applicability of the developed proposed CP.

1) Subjects

A total of 44 visiting nurses from prefecture AOM who understood the purpose of the study and provided consent to participate in this study used the proposed CP as a trial for one month on 22 elderly diabetic patients. After the trial, we asked the nurses to fill out a questionnaire form concerning the proposed CP.

2) Details of the survey

The details of the survey included the attributes of visiting nurses and visiting nurse stations, 12 endpoints for the usefulness of the proposed CP as a result of the trial use and 4 items concerning the necessity for improvements to be made. The usefulness of the CP was assessed by using 4 levels for each endpoint: "strongly agree," "agree," "disagree," and "strongly disagree." Responses on the necessity for improvement were given as "necessary" and "not necessary."

3) Analysis method

Descriptive statistics were obtained for each investigated item, and the necessity of improvement. In the 12 endpoints for CP usefulness we examined the differences for the positions of the visiting nurses and dunation of experience in home care nursing by using Mann-Whitney's U-test ; the nursing system of the station, duration of nursing experience and the presence/absence of qualifications for diabetes by using Kruskal-Wallis-test. SPSS ver. 15.0 for Windows was used for the analysis. The significance level was set to 0.05.

4) Ethical considerations

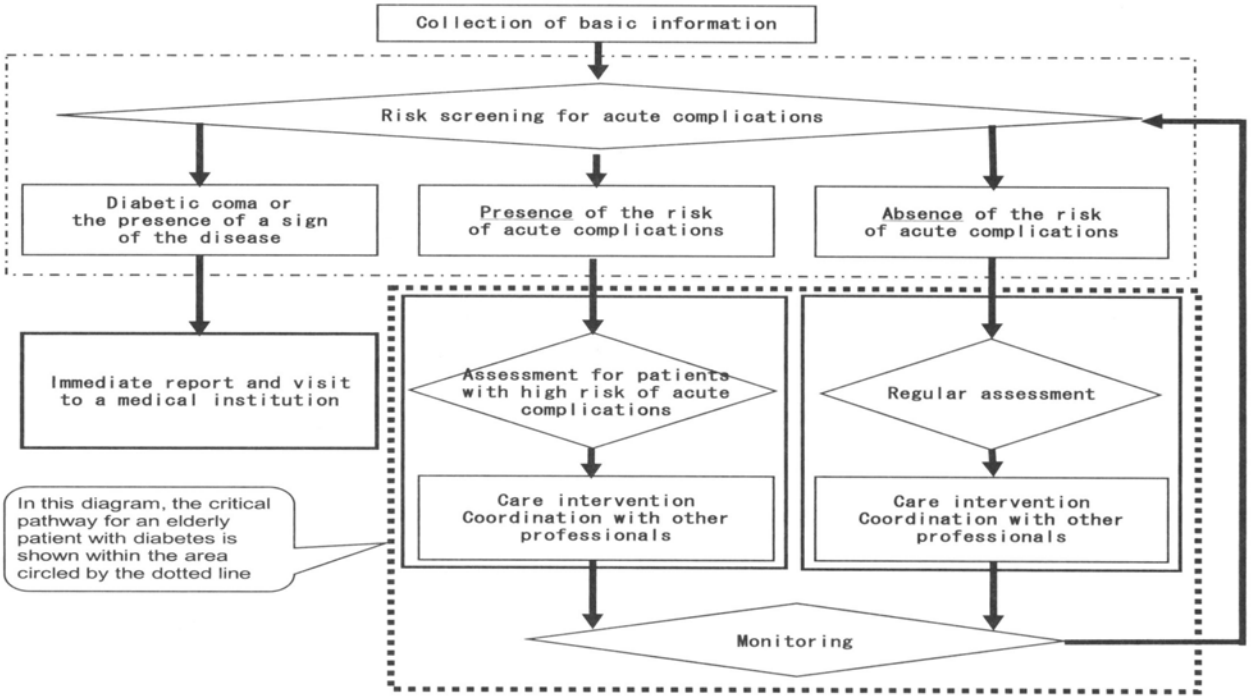
Ethical considerations were explained orally to the visiting nurse station managers, visiting nurses and users as well as a written explanation. They were requested to use the proposed CP as a trial, after giving written consent to participate in the study. They filled out the questionnaire form of their own free will, and anonymity was ensured. The survey was approved by the Ethical Review Board of Hirosaki University beforehand.

V. RESULTS

1. Basic survey for the development of a CP

1) Characteristics of diabetic care based on home nursing records

The results of the analysis of the records of treatment of 5 elderly diabetic patients revealed that the implementation rate of care was 40%



Critical pathway for elderly diabetes patients and summary of attachments
(1) Basic information sheet for elderly diabetes patients receiving home care [prepared with reference to the face
(2) Risk screening table for acute complications [independently developed]
(3) Critical pathway table [independently developed]
(4) Coding table of reasons for variance [independently developed with reference to the coding table of reasons for variance developed by Kanoya et al. (Kanoya, 2000)]
The above materials are to be used together for the trial

Figure 1　Process of diabetes care for elderly patients and relating materials in domiciliary

to 90% during the two-month period from the initial session, but did not fall by half or markedly change thereafter. There were no changes in the implementation rate of care in response to changes in the activity or diabetic condition of users. The rate was found to be constant, thus there were no characteristics of care noted by visit period or disease stage. A comparison of the implementation rate by details of care showed that the rate for "Medication taking" and "Reducing risk" tended to be higher than that for "Eating" and "Being active" in all users.

2) The state of diabetic care based on the interview survey with visiting nurses

From the details of care for the 10 elderly diabetic patients based on the practical processes carried out by the visiting nurses, 211 items were extracted and classified into 56 categories. The area of care termed "Problem-solving for BG" contained 5 assessment items and 7 care items including intervention and coordination with professionals from other fields. The area of care termed "Medication taking" included 6 assessment items and 7 care items, "Monitoring BG" contained 1 assessment item and 2 care items, "Reducing risk" included 4 assessment items and 7 care items, "Eating" contained 4 assessment items and 6 care items, "Being active" included 1 assessment item and 4 care items, and "Living with diabetes" contained 1 assessment item and 2 care items.

2. Development of a proposal CP and method of forming a consensus with experts

As a first step, the protocol for the use of the CP was proposed, as illustrated in Figure 1, based on the practical process of diabetic care carried

Table 1　Critical Pathway for Elderly Diabetes Patients in Home Care Nuring

[Screening for acute complications: including testing]

Care objectives: To promote the stability of blood glucose control
To prevent the onset and aggravation of diabetic complications

Enter a circle if care is required and proceed to the right column.
Proceed to the Outcome column if care is not required.

Inclusion criteria: Elderly patients with type 2 diabetes mellitus who are on insulin therapy at home.
Exclusion criteria: Patients at risk of diabetic coma.

Month/Day	/					/		/
Item	Assessment		Necessity of care	Care	Variance	Outcome	Variance	Monitoring
Problem-solving for BG	Every time	☐ **Risk screening sheet for acute complications: the box "there is a risk of hypoglycemia" is checked**		☐ Implement care to deal with hypoglycemia symptoms (e.g., providing soft drinks, sugar sticks, etc.). ☐ Confirm and provide instructions on the timing, times, contents and amount of meals; length and amount of activity (physical exercise), and timing and method of insulin injection. ☐ Provide a physician with patient information if hypoglycemia symptoms do not improve or occur frequently.		☐ Hypoglycemia symptoms do not occur.		☐ If hypoglycemia symptoms occur, perform a reassessment and review the details of care.
	Monthly	☐ Understanding and handling of hypoglycemia symptoms.		☐ Provide instructions if the user does not know about hypoglycemia symptoms and how to handle them. ☐ Provide instructions on how to handle emergency situations.		☐ The user can handle hypoglycemia symptoms properly.		☐ If the user cannot handle hypoglycemia symptoms properly, perform a reassessment and review the details of care.
	Every time	☐ **Risk screening sheet for acute complications: the box "there is a risk of hyperglycemia" is checked**		☐ Provide care to deal with hyperglycemia symptoms (e.g., provide sufficient drinking water, etc.) ☐ Check and provide instructions on the timing, times, contents and amount of meals; length and amount of activity (physical exercise), and timing and method of insulin injection. ☐ Provide a physician with patient information if hyperglycemia symptoms do not improve or occur frequently.		☐ Hyperglycemia symptoms do not occur.		☐ If hyperglycemia symptoms occur, perform a reassessment and review the details of care.
	Monthly	☐ Understanding and handling of hyperglycemia symptoms.		☐ Provide instructions if the user does not know about hyperglycemia symptoms and how to handle them. ☐ Provide instructions on how to handle emergency situations.		☐ The user can handle hyperglycemia symptoms properly.		☐ If the user cannot handle hyperglycemia symptoms properly, perform a reassessment and review the details of care.
Medication taking	Monthly	☐ Instructions on drug therapy and informing the user of changes.		☐ If any changes are made, provide instructions on the type and dose of drug and/or syringe .		☐ The user can properly administer an insulin injection as instructed by a physician. ☐ The user can take drugs properly as instructed by a physician.		☐ If the user cannot properly administer an insulin injection as instructed by a physician, perform a reassessment and review the details of care. ☐ If the user cannot take drugs properly as instructed by a physician, perform a reassessment and review the details of care.
	Every time	☐ Check drug therapy compliance through remaining amounts of insulin and drug and disposed injection needle.		☐ Handle noncompliance with insulin injection or medication. ☐ Confirm the amount of insulin, type of syringe and issues in daily activities, and report to and consult a physician. ☐ Provide instructions on the correct amount and timing of insulin injections and the doses and times of medication. ☐ If the noncompliance is caused by decreased cognitive ability of the user or the ability of a care provider, switch care provider or explain social resources to the user. ☐ Implement measures to improve drug compliance (displaying the amount of insulin, using a check list, etc.)				
	Monthly Weekly Semiannually	☐ User and family insulin injection procedures ☐ Injection sites (injection site area, atrophy, induration, redness and pain) ☐ Method of insulin management		☐ If the method of insulin injection is inappropriate, provide instructions for the user.				
	Monthly	☐ Concerns or questions about insulin therapy		☐ Answer questions or concerns about insulin therapy.		☐ The user can maintain insulin therapy.		☐ If the user cannot maintain insulin therapy, perform a reassessment and review the details of care.
Monitoring BG	Every time Every time Weekly Semiannually	☐ Blood glucose values and HbA1c data recorded in a diabetes notebook ☐ Data of blood glucose measurements instructed by a physician ☐ Test for urine glucose using a dipstick (only if a blood glucose meter is not available) ☐ Blood glucose values and HbA1c data from test data		☐ Explain the user's blood glucose levels. ☐ Compliment the user if their blood glucose levels are stable. ☐ Provide information on the user's blood glucose levels to other institutions. ☐ Instruct the user to bring a diabetes notebook to the institution providing services. ☐ Handle situations where self-measurements of blood glucose are considered to be inaccurate. ☐ Check the method of self-measurement of blood glucose and devices used. ☐ Reinstruct the method of self-measurement of blood		☐ The user can properly conduct self-measurement of blood glucose and test for urine glucose. ☐ The user can understand the results of self-measurement of blood glucose and urine glucose tests. ☐ The user can control blood glucose levels.		☐ If the user cannot properly conduct self-measurement of blood glucose or test for urine glucose, perform a reassessment and review the details of care. ☐ If the user cannot understand the results of self-measurement of blood glucose or urine glucose tests, perform a reassessment and review the details of care. ☐ If the user cannot control blood glucose levels, perform a reassessment and review the details of care.

Table 1　Critical Pathway for Elderly Diabetes Patients in Home Care Nuring

Month/Day	/					/		/
Item	Assessment		Necessity of care	Care	Variance	Outcome	Variance	Monitoring
Reducing risk	Monthly	☐ Regular visits to the Department of Internal Medicine or home visits		☐ If visits have been discontinued, ask the user for the reason and provide necessary instructions.		☐ The user continues their visits.		☐ If the user does not continue their visits, review the details of care.
	Semiannually	☐ Severity and condition of complications based on test data and records (retinopathy, nephropathy and neuropathy)	⇨	☐ Compliment the user if no aggravation is observed for retinopathy, nephropathy or neuropathy. ☐ If there is aggravation of retinopathy, nephropathy or neuropathy observed, discuss the reason with the user and family and set objectives for the future.		☐ Retinopathy, nephropathy or neuropathy do not occur or aggravate.		☐ If retinopathy, nephropathy or neuropathy occur or are aggravated, perform a reassessment and review the details of care.
	Every time Monthly	☐ Blood pressure measurement and edema ☐ Body weight or waist circumference		☐ If there are any significant changes in blood pressure or edema, report to a physician. ☐ If there are any significant changes in body weight or waist circumference, report to a physician.		☐ Nephropathy does not occur or aggravate.		☐ If nephropathy occurs or is aggravated, perform a reassessment and review the details of care.
	Monthly	☐ Foot area (skin color, palpable or nonpalpable dorsalis pedis artery, ulcer, callus/corn, and nail		☐ Provide the user with foot care or instructions on foot care. ☐ Communicate with other professionals about foot care or provide them with instructions on foot care.		☐ Foot lesions do not occur or aggravate.		☐ If a foot lesion occurs or is aggravated, perform a reassessment and review the details of care.
	Weekly	☐ Skin of the whole body (presence or absence of a skin disease)		☐ Assist the user in taking baths and give them bed baths, or provide instructions on taking baths or bed baths. ☐ Communicate with other professionals about skin care or provide them with instructions on skin care.		☐ Skin diseases do not occur or aggravate.		☐ If a skin disease occurs or is aggravated, perform a reassessment and review the details of care.
	Monthly	☐ Presence or absence or severity of the numbness of peripheral nerves		☐ Observe the safety of the user when they are moving around and improve the safety of their environment.		☐ The user does not fall. ☐ The user does not suffer an injury.		☐ If the user falls, perform a reassessment and review the details of care. ☐ If the user suffers an injury, perform a reassessment and review the details of care.
	Semiannually	☐ Regular visits to the Ophthalmology Department		☐ If visits have been discontinued, ask the user for the reason and provide necessary instructions.		☐ Reduced vision does not occur or aggravate.		☐ If reduced vision is aggravated, review the details of care.
	Monthly	☐ Oral cavity (denture failure and whether the user has periodontal disease) and testing the user's swallowing function		☐ Provide or instruct the user on oral care. ☐ Communicate with other professionals about oral care or provide them with instructions on oral care.		☐ Periodontal disease does not occur or aggravate.		☐ If a periodontal disease occurs or is aggravated, perform a reassessment and review the details of care.
	Monthly	☐ Presence or absence of diseases that are accompanied by fever, anorexia or diarrhea		☐ Provide the user with instructions on how to handle sick day (a disease accompanied by fever, anorexia or diarrhea).		☐ Hyperglycemia symptoms do not occur.		☐ If hyperglycemia symptoms occur, perform a reassessment and review the details of care.
Eating	Every time Every time Every time	☐ Details of the instructions on the contents of meals ☐ Timing and times of meals (including snacks) ☐ Contents and amount of meals (including snacks).		☐ If blood glucose control is poor, deal with matters related to meals. ☐ Provide instructions on the timing and times of meals. ☐ Provide instructions on the contents and amount of meals (including snacks). ☐ Consult a physician and dietician. ☐ Communicate with other professionals about meals or provide them with instructions. ☐ If the user shows a reduced ability of self-care or if a care provider shows a reduced ability to provide care, explain to the user social resources relating to meals (delivery services, helpers for preparing meals, catering, etc.).		☐ The user eats three meals a day on a regular schedule. ☐ The user eats meals with calories within the specified range. ☐ The user maintains appropriate blood glucose levels.		☐ If the user does not eat three meals a day on a regular schedule, perform a reassessment and review the details of care. ☐ If the user does not eat meals with calories within the specified range, perform a reassessment and review the details of care. ☐ If the user does not maintain appropriate blood glucose levels, perform a reassessment and review the details of care.
Being active	Every time Every time	☐ Amount of activity (physical exercise) ☐ Length of activity (physical exercise)		☐ Provide the user with instructions on increasing their range of activities and on performing exercises. ☐ Communicate with other professionals about activity (physical exercise) or provide them with instructions. ☐ Provide instructions to the user on the length of activities in order to prevent hypoglycemia。		☐ The user's bodily functions do not deteriorate. ☐ Disuse syndrome is not aggravated. ☐ The user does not develop hypoglycemia during activity (physical exercise).		☐ If the user's bodily functions deteriorate, perform a reassessment and review the details of care. ☐ If disuse syndrome is aggravated, perform a reassessment and review the details of care. ☐ If the user develops hypoglycemia symptoms during activity (physical exercise), perform a reassessment and review the details of care.
Living with diabetes	Monthly	☐ Anxiety and stress of the user in relation to treatment.		☐ Help the user handle stress during treatment. ☐ Provide with the user with psychological support for diet therapy, drug therapy and exercise therapy.		☐ The user does not suffer from much stress. ☐ The user maintains the motivation to carry out self-care.		☐ If the user suffers from a significant level of stress, perform a reassessment and review the details of care. ☐ If the user cannot maintain the motivation to carry out self-care, perform a reassessment and review the details of care.
	Monthly	☐ Anxiety and stress of the family in relation to treatment.		☐ Help the user's family handle stress during treatment. ☐ Provide the user's family with psychological support for diet therapy, drug therapy and exercise therapy.		☐ The family does not suffer from much stress. ☐ The family helps the user maintain the motivation to carry out self-care.		☐ If the family suffers from a significant level of stress, perform a reassessment and review the details of care. ☐ If the family cannot help the user maintain the motivation to carry out self-care, perform a reassessment and review the details of care.

out by the visiting nurses. Basic information was collected because the control of the disease and vital functions affect diabetic care for the elderly. Next, screening for acute complications was carried out independently from the CP, because the verification of hypoglycemic and hyperglycemic symptoms and their causes, which were included in the area of care termed "Problem-solving for BG," were preferentially assessed in the basic survey. If users were determined to be at a high risk of acute complications based on the results of screening for them, care which included the verification of information for identifying the cause of abnormal blood glucose was to be provided using a CP, and this was to include assessment for patients with high risk of acute complications. If users were judged to be at a low risk of acute complications, a CP for assessment (regular assessment), which did not include the verification of information for identifying the cause of abnormal blood glucose, was to be adopted. In addition, after the provision of care, the process of evaluating the level of achievement of each outcome was to be carried out, together with monitoring and reassessment. It was suggested by a specialist that when diabetic coma or its signs were identified in the screening for acute complications, an emergency medical examination at the medical institution was required, and thus it should be excluded from the application of the CP. Therefore, patients with diabetic coma or its signs were excluded from the CP assessment.

The items constituting the vertical axis of the CP framework were organized in descending order of priority based on the basic survey as follows: "Problem-solving for BG," "Medication taking," "Monitoring BG," "Reducing risk," "Eating," "Being active," and "Living with diabetes." Time was not included on the horizontal axis because none of the characteristics of the identified that were associated with changes in the clinical condition of the users or with the sequence of visits. Instead, assessment, care, outcome, and monitoring were selected based on the practical process of providing care. The details of each item were determined based on the basic survey, an examination of the existing literature, and the comments of the experts were as follows: 31 assessment items, 44 care items, 30 outcomes, and 30 monitoring items (Table 1).

3. Trial application of the developed proposed CP

Within the survey questionnaire, forms were collected from 46 subjects. Analyses were performed on 42 (91.3%) subjects who provided valid responses, after excluding those who provided the forms with missing answers.

1) Attributes of respondents

The respondents and their affiliation attributes are presented in Table 2.

Table 2　Respondents and their affiliation　n = 42

	n	%	Mean	SD
Nurse attributes				
Age			44.4	8.0
Sex				
Female	38	90.5		
Male	4	9.5		
Position				
Administrator	11	26.2		
Staff	31	73.8		
Qualification				
Certified diabetes educator	5	11.9		
Others	2	4.8		
None	35	83.3		
Duration of nursing experience (years)			18.2	8.3
Duration of experience with domiciliary care (years)			6.4	4.7
Attributes of visiting nurse stations				
Organization which established the station				
Medical corporation	11	26.2		
Social welfare corporation	6	14.3		
Medical association	4	9.5		
Nursing association	3	7.1		
Non-Medical Corporation	5	11.9		
Other	11	26.2		
No response	2	4.8		
Nursing system of the station				
Assignment system	21	50.0		
Team system	13	31.0		
Others	8	19.0		

2) Evaluation of the trial application of the CP

The visiting nurses used the CP as a trial, and their evaluations of the 12 endpoints are presented in Figure 2. Among all the endpoints, those that were evaluated highly, as determined by

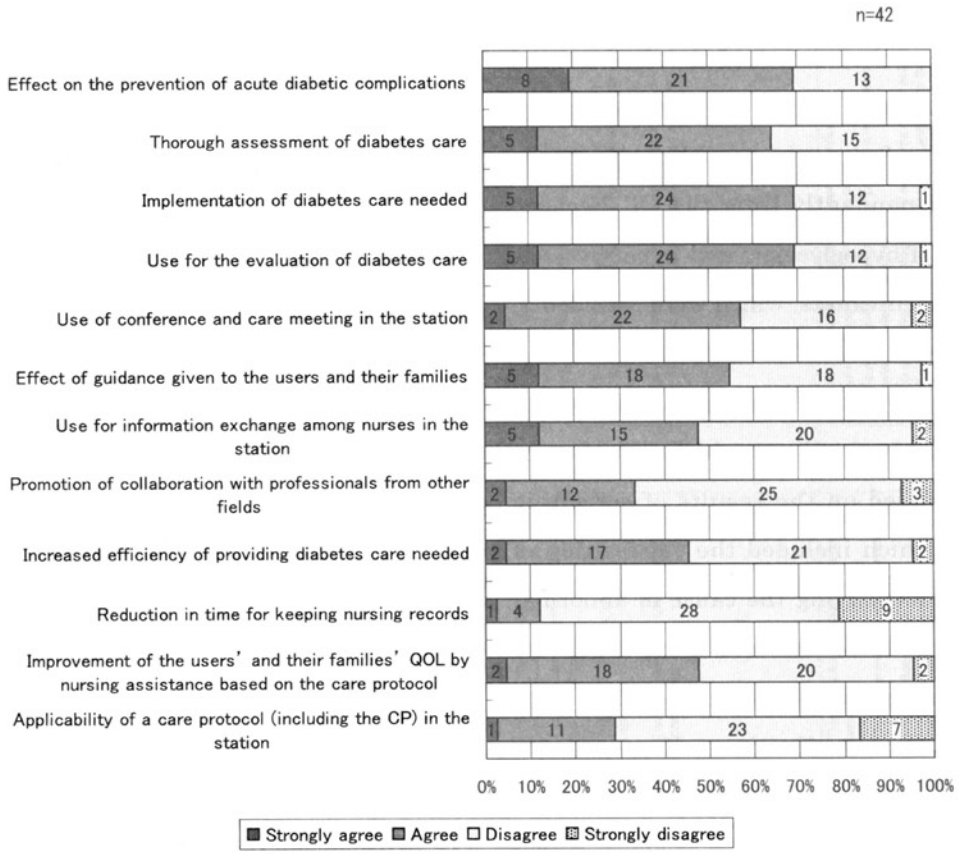


Figure 2　Evaluation of the trial of care protocol

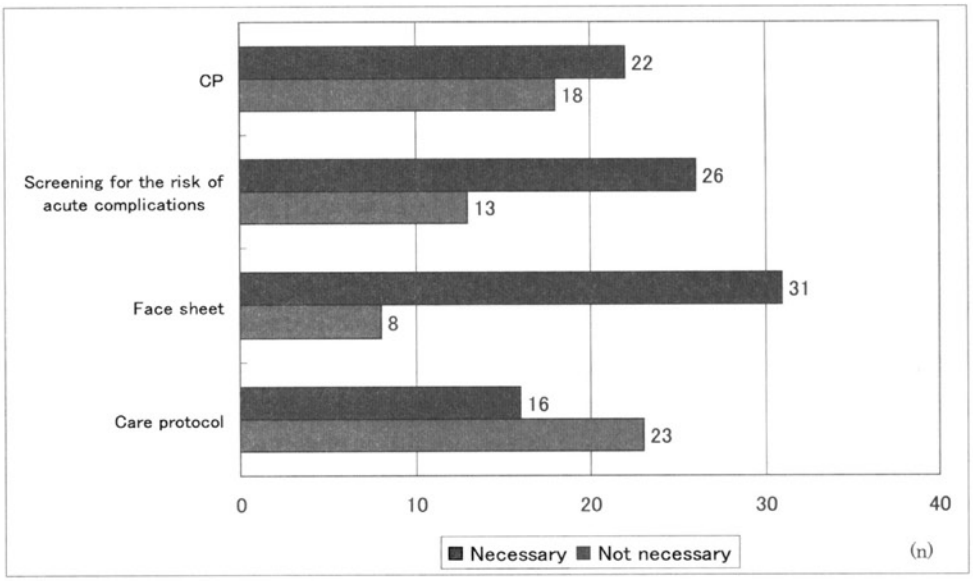


Figure 3　Necessity of improvement of the care protocol

the combined percentage of responses given as either "strongly agree" or "agree," were "effect on the prevention of acute diabetic complications" (69.0%), "implementation of diabetic care needed" (69.0%), "use for the evaluation of diabetic care" (69.0%), and "thorough assessment of diabetic care" (64.3%). These 4 endpoints accounted for 60~70% of the total. The endpoints with low rates of responses given as "strongly agree" and "agree" were "reduction in time for keeping nursing

records" (11.9%) followed by "applicability of a care protocol (including the CP) in the station" (28.6%) and "promotion of collaboration with professionals from other fields" (33.3%). There were no significant differences between the attributes of the team system and the charge system nurses and their evaluations of the 12 endpoints. However, the group from the charge system gave a lower value to the endpoint, "promotion of collaboration with professionals from other field". That is, the value of the charge system was lower than that of the team system ($p<0.05$).

The nurses' responses on the necessity of improvement of care protocol is presented in Figure 3. The percentage of responses given as "not necessary" was significantly higher compared with that given as "necessary" for the "face sheet" and "screening for the risk of acute complications."

Based on the above results, the usefulness of the developed CP for diabetic care was evaluated highly, whereas the evaluations of applicability in the stations in the actual setting and the promotion of collaboration with professionals from other fields were low.

VI. DISCUSSION

CP is tool used to guide evidence-based health care that have been implemented internationally since the 1980s (Kinsman L, 2010) and more than 80% of hospitals in the United States use CP as care strategies. CP has been developed for various diseases and it is known that CP reduced patient length stay and resource utilization in some diseases (Saint S, 2003). In Japan, CP has been pervaded gradually for hospital treatment and examination since about 1995 to shorten the length of hospital stay. The increased medical cost made us to apply CP for home care to reduce health care cost and supply patients a good care.

We developed a proposed CP for promoting the stability of blood glucose control in users, preventing the onset and aggravation of diabetic complications, and improving the QOL of users and their families. We obtained evaluations of the proposed CP by visiting nurses. The responses to the survey revealed that approximately 70% of the visiting nurses found the CP to be effective in terms of the "effect on the prevention of acute diabetic complications," "implementation of diabetic care needed," "use for the evaluation of diabetic care" and "thorough assessment of diabetic care." Therefore, these results suggest the possibility that the use of the developed proposed CP may improve the quality of diabetic care given by visiting nurses. Time was not included on the horizontal axis. Therefore this CP may be proper to be designated as clinical guideline. However, several important items could be selected based on the practical process. With regard to the "effect on the prevention of acute diabetic complications," it was found that the screening for acute diabetic complications, performed independently from the CP in the care protocol to clarify the importance of their assessment, was effective. In the best practices for home care nursing of the elderly, goals are defined as the prevention, early detection, and early treatment of acute complications (Masaki H, 2008). Hypoglycemia frequently occurs in elderly diabetic patients, and moreover, it lacks subjective symptoms and quickly deteriorates. In particular, severe hypoglycemia occurs commonly in elderly diabetic patients aged 75 years or older who have been on drug therapy or days when fever, diarrhea, and vomiting were present, and therefore careful observation for hypoglycemia is required. Similarly, it has also been demonstrated that elderly

diabetic patients tend to be more susceptible to hyperglycemia (Committee for Establishment of Evidence-based Diabetes Diagnostic Guidelines, Japan Diabetes Society, 2004). The presence of acute complications may be objectively assessed based on self-blood glucose monitoring, but only 6 subjects implemented it in this study. The number of patients who carried out self-blood glucose monitoring might have been limited because it is highly burdensome to the elderly, and even if measurement could be performed, the results would not be reflected in self-care. If blood glucose was poorly controlled, it would be pointed out by healthcare professionals after taking measurements. Considering such circumstances, assessments of symptoms of acute complications by visiting nurses were important, and this study suggests that the use of the developed CP might enable stable blood glucose control in users. In addition, the CP was found to be usable without bias in the attributes of visiting nurses, because there were no differences in the evaluations within the different positions of the visiting nurses, durations of nursing experience, the durations of experience in home care nursing, and the presence/absence of qualifications for treating diabetes. However, there was a evaluation from the different nursing station systems. The nurses in the assignment system did not have time to consider collaboration with others in the field because of the unfamiliarity of the trial CP.

The endpoints that were not evaluated highly included the "reduction in time for keeping nursing records." The reasons for this may be that the use of the developed CP required the nurses to fill out 4 types of forms, thus taking up time, and that the nurses might have been confused because they did not fully understand the method of application and terms such as "outcome" and "variance" mentioned in the CP. In addition, the use of the CP caused disturbance in the process of providing care because there were many items (31 assessment items and 41 intervention items) and the implementation of monitoring on each occasion overlapped with a reassessment during the next visit. In addition, the low evaluation on the "promotion of collaboration with professionals from other fields" may reflect the difficulty of collaboration with medical institutions. Since people in different professions and belonging to a variety of organizations are often involved in home care, we suspect that it is highly likely that a CP could function as a communication tool common to different professions (Corbett CF, 1994; Raiwet C, 1997). De Vries, in his study on the development of qualitative endpoints for diabetic care in home care nursing for the elderly, found that achievement in items concerning collaboration was influenced by the amount of information provided by physicians and medical institutions and the physicians' understanding of home care nursing (De Vries, 2007). Therefore, a review of the CP will not solve the problem of collaboration, but the promotion of collaboration with professionals from other fields may improve collaboration through changes in the awareness of the connection between the quality of medical institutions and home care nursing.

The above results suggest that the CP developed in the present study can be applied if the process of diabetic care in home care nursing for the elderly and the endpoints of the CP are refined, and also if the roles of the medical institutions and home care nursing are clarified.

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REFERENCES

AADE. (2003). Standards for outcomes measurement of diabetes self-management education: position statement. Diabe Educ. 29(5):804-16.

Berry RM, Raleigh ED. (2004). Diabetic foot care in a long-term facility. J Gerontol Nurs. 30(4):8-13.

Corbett CF. (1994). Critical paths: implications for improving practice. Home Care Nurs. 12(6):27-35.

Dethloff SB. (2004). A family decision to discontinue dialysis treatment for a patient: an advanced practice nurse (APN) guided process. Nephrol Nurs J. 31(4):443-4.

De Vries M, van Weert JC, Jansen J, et al. (2007). Step by step development of clinical care pathways for older cancer patients: Necessary or desirable? Eur J Cancer. 43:2170-2178.

Evelyn L. Parsons. (2003). Johns Hopkins Pediatrics at Home: Asthma Critical Pathway. Home Health Care Management & Practice. 15(4):335-39.

Fritschi C. (2001) Preventive care of the diabetic foot. Nurs Clin North Am. 36(2):303-20.

Kanoya Y, Sanada H, Numata M, et al. (2000). Development of a Standard Care Framework for Quality Assurance of Visiting Nursing for Patients who have Pressure Ulcers － Using the Idea of the Critical Path Method－. Jpn J PU. 2(1):7-16.

Kinasman L, Rotter T, James E, et al. (2010). What is a clinical pathway ? Development of a definition to inform the debate. BMC Med.8:31.

Masaki H, Yamamoto N, Yamamoto N-M, et al. (2008). Developing Quality Indicators for Diabetes Care in Geriatric Healthcare Nursing, J Acad Diabe Edu Nurs. 12(2):136-44.

Masaki H, Yamamoto N. (2008). Koureisya homonkango no sitsusihyou best purakityisu wo mezasite. 155-166, Tokyo: JNA Pub Com.

Price AG, McDaniel JL. (1995). Critical pathway. An effective way to manage care of the insulin-dependent diabetic. Nat Assoc Hom Car Mag (Caring). 14(2):24-7.

Raiwet C. (1997). Care maps across the continuum. Can Nurs. Jan;93(1):26-30.

Saint S, Hofer TP, Rose JS Kaufman SR, et al. (2003). Use of critical pathways to improve efficiency: A cautionary tale. Am J Manag Care. 9:758-765.

Walker A, James C, Bannister M, et al. (2006). Evaluation of a diabetes referral pathway for the management of hypoglycemia following emergency contact with the ambulance service to a diabetes specialist nurse team. Emerg Med J. 23(6):449-51.

高齢者訪問看護における糖尿病ケアのクリティカルパスの開発
—原案の開発と試行結果—

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キーワード:糖尿病，高齢者，訪問看護，クリティカルパス

要　旨

本研究は訪問看護師の糖尿病ケアの標準化に向けて、高齢者訪問看護における糖尿病ケアのクリティカルパス（ＣＰ）原案を開発するとともに、その適用可能性について検討することを目的とした。ＣＰ原案は縦軸に「血糖値に関する問題の解決」、「薬物管理」、「血糖モニタリング」、「合併症のリスク管理」、「食事」、「身体活動」、「心理社会適応」の７つのケア領域、横軸にケアプロセスを設定した。訪問看護師42名にＣＰ原案を試用してもらいアンケート調査を行った結果、「糖尿病急性合併症の予防の効果」、「必要とされる糖尿病ケアの実施」、「糖尿病ケアの評価への活用」について約70％の訪問看護師が有用であると評価した。一方、「看護記録の記録時間の短縮」11.9％、「ステーションでのＣＰの活用可能性」28.6％、「他職種との連携の促進」33.3％と評価が低かった。以上のことから、ＣＰ原案の試用により糖尿病ケアの有用性は示されたが、ＣＰの項目の精練化、アセスメントおよびケアの頻度、医療機関と訪問看護の役割の明確化の必要性が示唆された。