

Development of a self-evaluation tool for the teaching style of nurses in diabetes patient education: For educational intervention with the goal of cultivating abilities of nurses who are involved in professional diabetes nursing care

メタデータ	言語: eng 出版者: 公開日: 2017-10-04 キーワード (Ja): キーワード (En): 作成者: メールアドレス: 所属:
URL	http://hdl.handle.net/2297/6085

Development of a self-evaluation tool for the teaching style of nurses in diabetes patient education

– For educational intervention with the goal of cultivating abilities of nurses who are involved in professional diabetes nursing care –

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Abstract

Teaching style self-evaluation tool for nurses was attempted in order to use it to intervene the education aiming to develop the abilities of nurses who are professionally involved in diabetes nursing care. Based on the previous study, questionnaire consisted of 54 items was created by setting two items for each nine components of the awareness and behaviors of nurses for each of three teaching styles. The three teaching styles are "the teaching style which shows an understanding of the realities of patient living conditions and attitudes", "the teaching style which provides knowledge" and "the teaching style which appeals to the patient's individuality". And the nine components of the awareness and behaviors of nurses are "attitude as nurses in diabetes patient education", "attitude expressions as nurses", "method of finding problems", "method of concrete education", "approach to the family", "awareness of the feelings of patients living with diabetes", "being conscious of the relations with patients", "how nurses feel about the effectiveness of their teaching efforts" and "the comprehensive evaluation of patient education".

As a result of factor analysis, ten factors were revealed and nine out of ten factors were loaded on each set of two items of the components for each teaching style. Five factors were associated with the "teaching style which shows an understanding of the realities of patient living conditions and attitudes", two factors were associated with the "teaching style which provides knowledge" and three factors were associated with the "teaching style which appeals to the patient's individuality". As the result of the factor analysis, 10 factors were picked out and nine out of ten factors were loaded on each set of two items of the components for each teaching style. It suggested that the components of the awareness and behaviors of nurses created based on the previous study was valid and indicated the direction of discussion for the educational intervention for nurses through the further modification and selection of the items for the future.

Key words

diabetes education, teaching style of nurses, self-evaluation tool,
educational intervention for nurses, cultivating abilities of nurses

INTRODUCTION

Tasaki¹⁾ (the author of this study) identified "teaching styles of nurses" in diabetes education in a previous study. The study investigated the attitudes that nurses develop — attitudes that are a combination

of awareness and behaviors involving professional knowledge and experience, cognition and judgment as individuals based on professional views of nursing care, professional bearing, and words and actions directed toward patients. In other words, these are

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the practical abilities that nurses utilize in diabetes care. It became clear that the "teaching styles of nurses" could be separated into styles that were less effective in achieving the goals of patient education and styles that were more effective, and that the latter was thought to be valuable for nurses. The existence of a process of quality change from the former to the latter style, in other words, the process of adopting a style which provides an effective means of patient education, made clear the possibility that nurses could change to an effective education style. In the process of this change, nurses became aware of their styles and attempted to cast them off or modified their styles by comparing them with effective styles as counterpoints. This could be said to be a process in which individuals found value in the effective practices of nurses who were in leadership positions, reevaluated their current practices by comparing them to the effective practices of such nurses and adopted the more effective practices. This suggested that the practical abilities of nurses would be improved through a method by which individual nurses could self-evaluate their professional practices and, therefore, the hope of contributing to the cultivation of practical abilities in nurses involved in diabetes care by developing such a method and including it in continuing education programs for nurses. The present study focuses on the development of a "self-evaluation tool for teaching styles", a method of intervention, as the first step in an intervention study for the education of nurses. The reason the term "self-evaluation" is used here is that the education of nurses who are involved with diabetes education is the education of adults, education that has the purpose of supporting exploratory learning and the learners' search for their own answers to questions. Therefore, it is appropriate to call this tool a "self-evaluation tool" that respects and increases learner autonomy.

The improvement of effective diabetes education techniques by nurses calls for urgent attention because of the recent increase in the number of patients with diabetes; therefore, nursing awareness for diabetes care has grown and nursing abilities have definitely improved. Japanese Certification Board for Diabetes Educator was established in 2001 with the aim of improving and standardizing the level

of education for patients with diabetes, to enhance patient education over a wide area and to bring about valuable behavioral change in the patients. Five vocational classifications, including not only nurses but also pharmacists, nutritionists, physiotherapists and clinical technologists, can obtain this certification and 11,778²⁾ educators have qualified as of 2005. 5,391²⁾ individuals, almost half the number of those who have obtained certification, are nurses and are expected to succeed at work. Nurses are also closer to patients' lives than the individuals in the other four vocational classifications, as professionals that specialize in helping patients to live healthy lives utilizing their own abilities. Because of their expertise, nurses play a primary role in the control of patient care. Five years have passed since this system was established, and the most important issue is to develop ways of providing effective patient education for diabetes patients. There were 63 presentations at the first academic conference, held in 1997, of Japan Academy of Diabetes Education and Nursing, which was established in 1996; however, the number of the presentations from clinical sites steadily increased to 180 in 2004 and 179 in 2005. There are many practical reports on effective education methods for teams using the critical path and examples of nursing care for patients that show definite improvement in nursing interest and ability in diabetes care.

Most of these are as yet reports-in-progress of their efforts at clinics and are in the process of being accumulated as available evidence³⁾. Although there is a tendency toward the improvement of awareness and ability in nursing care among the entire membership of nurses who are involved in diabetes nursing care, there remain few reports exploring the techniques of nurses as experts of diabetes education or reports showing the concrete content of nursing intervention. One of the causes of this lack is that nurses' heavy commitment at work allows little leisure for self-evaluation. The importance of self-evaluating individual practice in nursing care is advocated; however, the daily reality at busy clinics makes regular self-evaluation a challenge.

Benner⁴⁾ observed that excellent nursing practice can be achieved by the accumulation of experience; however, the manner in which experience is

accumulated is important. Experience that is accumulated and leads to the improvement of nursing practice is experience that is reviewed and for which meaning is sought. Schön⁵⁾ described the process of reflective practitioners gaining specialized experience and noted that "reflection on action" during the process is an activity wherein the individual looks back critically at approaches to the handling of situations, an important activity. Such activities are called reflection⁶⁾. To look back on one's own practices after the fact means to find the meaning in the experience; and examining experience is an essential activity for the achievement of pronesis. In other words, various findings and issues become apparent when one looks back at one's own practices, an activity which is thought to promote subsequent change and innovation.

This suggests, therefore, that the tool for self-evaluating nurses' teaching style in diabetes education mentioned above might be effective as an educational way to promote such reflection by nurses and improve their abilities in diabetes education. The purpose of this study is to develop a self-evaluation tool for teaching styles of nurses in diabetes education.

Review of literature

1. Phronesis and the technicalizing of patient education and nursing care conducted by nurses

For the past few years, research into nursing care for diabetes has steadily increased. While the establishment of Japanese Certification Board for Diabetes Educator has influenced the development of research aimed at clarifying diabetes nursing care methodology or identifying the techniques of experts in diabetes nursing care, such as the development of a nursing care practice model⁷⁾, analysis of nursing care by skilled nurses⁸⁾, patient goals envisioned by nurses⁹⁾, the status of patient issues and nursing care support that nurses are aware of¹⁰⁾, the process of outcome index development for diabetes education¹¹⁾, intervention methods for patients and their families¹²⁾⁻¹⁴⁾ and etc., there have been no studies that take the "teaching styles of nurses" into consideration¹⁵⁾, making this study an original concept in patient education for diabetes.

Recently, a Nursing practice algorithm plan¹⁶⁾ based

on patient awareness and behavior was proposed as an approach to visualizing the highly-specialized nursing practice of patient education. In addition, investigational research aiming at the development of a patient assessment algorithm¹⁷⁾ that facilitates effective intervention for the promotion of self-managing has been carried out.

2. Cultivation of the abilities of nurses who specialize in diabetes

While various education programs and methods of approach to patients with diabetes have been developed, an approach to improving the practical abilities of nurses who are on the side of patient care and education has not been undertaken. Japanese Certification Board for Diabetes Educator provides workshops across the country with the goal of developing the abilities of teams of co-medical specialists led by doctors. Education with the purpose of cultivating the practical abilities of nurses has been carried out on a daily basis through case studies and study meetings. Implementation of a curriculum to cultivate diabetes nursing staff at individual medical facilities has been reported¹⁸⁾ recently. However, there are as yet no such established continuing education programs for nurses who specialize in diabetes care.

3. Self-evaluation tools in nursing practice

According to Japana Centra Revuo Medicina, the focus on self-evaluation in nursing practice is a trend seen since 2003, a relatively new approach. As approaches related to concrete clinical nursing practices, the development of a self-evaluation scale for nursing practice and care in home nursing^{19) 20)}, and a self-evaluation scale for fall-prevention care by nurses²¹⁾ have been reported. Approaches to creating tools for nurses to self-evaluate and consider their nursing care and practices such as these have been seen; however, such an approach to diabetes nursing has not yet made its appearance.

Research Methods

1. Creating questionnaire items

The investigator's practical experience and previous studies^{1) 11) 12) 13) 14) 15)} informed the creation of questionnaire items (see below).

1) Identifying teaching styles

Teaching styles of nurses in diabetes education¹⁾

¹⁵⁾ are divided into two types: [a teaching style which does not show an understanding of the realities of patient living conditions and attitudes] (a teaching style lacking in the perspective of life emotions or life emotions not apparent teaching style) and [a teaching style which shows an understanding of the realities of patient living conditions and attitudes] (a teaching style making use of the perspective of life emotions or life emotions apparent teaching style). The former is general care based on educational programs in which nurses face difficulties in achieving an educational response from patients who are repeatedly in and out of the hospitals and in which patients tend to drop out of programs. The latter is individual care adjusted to patients which produces educational effects that motivate patients to try to apply what they have learned to their actual lives after leaving the hospital. In this study, the investigator divided the teaching style which does not show an understanding of the realities of patient living conditions and attitudes into two styles: a [teaching style which provides knowledge] and a [teaching style which appeals to the patient's individuality], and added the [teaching style which shows an understanding of the realities of patient living conditions and attitudes] to them to identify three styles in the category. The [teaching style which provides knowledge] is a style of teaching which is carried out according to nurses' initiative and is focused on knowledge. The [teaching style which appeals to the patient's individuality] is a style of teaching that makes the achievement of educational effects difficult because nurses try to adjust to the emotions that patients express but fail to fully understand essential feelings of patients, resulting in a failure that causes the nurse to lose the initiative in patient care and often ends up in the patient and nurse going round and round in circles. The [educational style which shows an understanding of the realities of patient living conditions and attitudes] is a style of education by which nurses can care for patients with diabetes by adjusting to the emotions that patients express or that nurses sense even if the patients aren't expressing them, a style that shows a consequent effect of a change in patient awareness and behaviors

2) Components in the awareness and behaviors of nurses for each teaching style

Nine components in the awareness and behaviors of nurses which are considered essential to effective diabetes educational practice by nurses were chosen. These components are as follows: "Attitude as nurses in diabetes patient education"; "Attitude expressions as nurses"; "Method of finding problems"; "Method of concrete education"; "Approach to the family"; "Awareness of the feelings of patients living with diabetes"; "Being conscious of the relations with patients", "How nurses feel about the effectiveness of their teaching efforts" and "The comprehensive evaluation of patient education". Two questionnaire items were created for the nine components for each of the three styles of teaching, which resulted in the creation of a total of 54 questionnaire items (Table 1).

3) Refining questionnaire items

Questionnaire items were examined with advice from four skilled nurses with a great deal of experience in diabetes education to determine whether or not the contents were relevant to the evaluation of the style of diabetes education, whether or not the contents were appropriate and whether or not the expressions were clear in order to increase the validity of the contents. Three nurses involved in diabetes education were asked to respond to the questionnaire and comment on items that they felt were difficult to understand or answer in order to refine the items and increase the superficial validity of the questionnaire.

A four-point Likert response scale was used for the 54 items included in this questionnaire: "strongly agree" (four points); "slightly agree" (three points); "slightly disagree" (two points); and "strongly disagree" (one point).

2. Data collection method

Subjects were nurses involved in diabetes patient education throughout Japan. The condition for subject selection was the conduct of diabetes patient education on a daily basis. Facilities for the parent population were selected from those: which are certified by Japan Diabetes Society; which fit the above condition; for which names, addresses and contact information were given on a website; and which are willing to participate in this survey. There were 464 facilities that fell into this category throughout Japan, and nurses working at these facilities and involved in diabetes education were targeted. Letters were sent to

Table 1 Questionnaire consisted of 54 items on self-evaluation for the teaching style of nurses in diabetes patient education

	Items
1. attitude as nurses in diabetes patient education	1) It cannot be helped even if patient education does not go well because the problem is usually caused by patients.
	2) It cannot be helped even if patient education does not go well because life at the hospital and at home are totally different.
	3) I believe that getting into patients' emotion should be the focal point of patient education.
	4) I would like to put my efforts into focusing on the patients' psychological issues.
	5) I would like to think about what patients should do to make living with diabetes easier, and work together with patients to find answers.
	6) I would like to find patient advantages and bring out patients' abilities to control diabetes.
2. attitude expressions as nurses	7) I am not specifically expressing my thoughts and attitudes as a nurse to patients.
	8) I tell patients that it is the patient who has to try hard.
	9) I tell patients to be open about the psychological problems they have.
	10) I tell patients that my main role is to listen to their psychological problems.
	11) I tell patients that we should work together to find the causes of the problems that prevent them from conducting the treatment activities well.
	12) I tell patients that we should work together to find ways to live more easily with diabetes.
3. method of finding problems	13) I do not try to get or confirm information about the problems of individual patients for the control of diabetes.
	14) I mainly try to get a general understanding of their lifestyles and how much knowledge about diabetes the patients have.
	15) I look into patients' psychological problems prior to anything else.
	16) I accept at face value the problems that patients express.
	17) I look at patients from the viewpoint of whether they feel that living with diabetes is difficult or a burdensome.
	18) I consider the way patients look at themselves and their way of handling social relations to determine whether they have developed problems with control.
4. method of concrete education	19) I mainly try to follow the manual in teaching basic diabetes knowledge to patients.
	20) I provide general knowledge on diabetes that as a nurse I feel might be helpful in patients' lives rather than asking patients' opinions.
	21) I do not provide active care but often limit my activities to listening to patients' descriptions of their lifestyles.
	22) I do not provide active care but focus on trying to listen to patients' feelings.
	23) I consider the patient's lifestyle together with the patient in order to help them come up with ways to modify their lifestyles and live well at home.
	24) I work to help patients realize the major cause of the problems that make living with diabetes difficult and orient them to a better lifestyle.
5. approach to the family	25) I do not actively communicate with patients' families.
	26) Regarding family care, I mainly check whether or not patients' families have a knowledge of diabetes and, if they do not, try to provide them with general knowledge.
	27) I consciously deal with patients and families separately.
	28) I deal with patients' families separately from patients, and place the focus of family care on listening to how families feel rather than on providing active care.
	29) I sit together with both the patient and the family and tell the patient's families how the patient feels and listen to how the family feels.
	30) I deal with patients and their families together, adjusting to each family's situation after an assessment of the dynamic relations within the family, in order to help them to share how patients feel living with diabetes.
6. awareness of the feelings of patients living with diabetes	31) I do not worry about whether or not I can understand how patients living with diabetes feel.
	32) I often feel that it is difficult to understand how patients living with diabetes really feel.
	33) I understand the feelings of patients living with diabetes that they cannot overcome, and am often stuck at that point.
	34) I sometimes feel too much empathy with patients living with diabetes, and this causes me to feel saddled with patients.
	35) I sometimes feel that I sense the patient's feeling that they have burdens or difficulties in living with diabetes.
	36) I sometimes feel intuitively what patients feel unconsciously about living with diabetes.
7. being conscious of the relations with patients	37) I am not worried about developing a trusting relationship with patients.
	38) I often can not build a trusting relationship with patients.
	39) I think of building a trusting relationship with patients as the goal of education.
	40) I think I have deep trusting relationships with patients.
	41) I think I keep a certain distance with patients while maintaining trusting relationships with them.
	42) I think patients trust my expertise based on the trusting relationship between us.
8. how nurses feel about the effectiveness of their teaching efforts	43) I think it is meaningless to worry about how patients have changed as the result of the education I have provided to them.
	44) I tend to give up on patients who are difficult to teach.
	45) I often feel the dilemma when I fail to teach patients well after trying hard to work with patients who are difficult to teach.
	46) I think that it is not a big problem even if I fail to teach patients well because I have trusting relationships with them.
	47) I often feel the changes in patient awareness and behaviors through education.
	48) I often feel that patients have obtained the strength to move on to a new stage through education.
9. the comprehensive evaluation of patient education	49) I do not comprehensively evaluate the results of the education that I provided to the patient.
	50) I comprehensively evaluate my patient education by checking how much knowledge about diabetes the patient has gained.
	51) I comprehensively evaluate my patient education by checking how much of a trusting relationship I have built with the patient.
	52) I comprehensively evaluate my patient education by checking the degree to which patients have expressed their feelings to me.
	53) I comprehensively evaluate my patient education by checking how much the patient's lifestyle activities have changed.
	54) I comprehensively evaluate my patient education by checking how the patient attaches meaning to treatment activities for diabetes and attempts to incorporate these activities into their lives through changes in the patient's words and actions.

: The teaching style which provides knowledge
 : The teaching style which appeals to the patient's individuality
 : The teaching style which shows an understanding of the realities of patient living conditions and attitudes

the director of the nursing service department of each facility inviting their participation in this study and inquiring about the number of nurses available for participation. After receiving replies, questionnaires were sent to the facilities that agreed to participate in the study for the number of nurses who were available to participate. 293 out of 464 facilities (63.1%) replied to the request, and 239 (81.6%) agreed to participate. The percentage of participation in the research was 51.5%.

Background information included participant sex, age, the number of years involved in diabetes education, the number of years of clinical nursing experience, certification as diabetes educators, licensing in diabetes nursing, the location of the facilities at which participants were employed, types of facilities, the number of patient beds at the facilities, departments in which participants were employed and participant job titles.

The period of investigation was from July 29th to September 30th, 2005.

3. Ethical considerations

Approval was obtained for this study from the Kanazawa University Board of Medical Ethics Review. Questionnaires were sent only to facilities from which agreement to participate in this study was obtained. Facilities were asked only to deliver the questionnaires to individual nurses, and nurses were asked to return the questionnaire responses individually. Participants were informed via a document attached to the questionnaire that participation in this anonymous survey should be of their own free will, that data would be handled carefully so as not to identify the facilities and individuals, and that data would not be utilized for purposes other than the purposes of this research. Return of questionnaires was considered consent to participation in this study.

4. Analysis method

The reliability and validity of the method were examined according to the procedure of the scale creation. Factor analysis was used for the validity of constructive concept, G-P analysis for differential validity, and general self-efficacy scale (GSE) for criterion-related validity. SPSS 13.0 was used for all data analysis.

Result

1,593 out of 2,899 questionnaires were returned for a collection rate of 54.9%. 1,096 yielded analyzable data and the valid response rate was 68.8%.

1. Background of the respondents (Table 2)

Female respondents numbered 1,088 (99.3%), accounting for the majority of respondents. 289 (26.4%), the largest category of the respondents, were between 26 and 30 years of age. This was followed by 209 respondents (19.1%) between 21 and 25 years of age, 187 respondents (17.1%) between 31 and 35 years of age, 148 respondents (13.5%) between 36 and 40 years of age and 118 respondents (10.8%) between 41 and 45 years of age. 312 respondents (28.5%), the largest group, had been involved in diabetes education for greater than one year and less than three years. This was followed by 285 respondents (26.0%) with more than five years and less than ten years and 264 (24.1%) with more than three years and less than five years. 545 respondents (49.7%) had more than ten years of clinical nursing experience, accounting for the half of the respondents. This was followed by 261 respondents (23.8%) with more than five years and less than ten years and 143 respondents (13.0%) with more than three years and less than five years, showing that there were many nurses who had longer experience. 312 respondents (28.5%) were certified as Diabetes Educators (CDE), and 784 (71.5%) respondents did not hold CDE, showing that nurses holding CDE accounted for less than 30%. 25 (2.3%) respondents were certified as Expert Diabetes Nurses, and 1,071 (97.7%) respondents were not in possession of such certification, showing that there were only a few respondents in possession of Certified Expert Nurse for Diabetes. 226 nurses (20.6%) were employed at facilities located in Kanto, 205 (18.7%) were employed at facilities in Kinki, 181 (16.5%) were employed at facilities in Chubu, 150 (13.7%) were employed at facilities in Tohoku, 127 (11.6%) were employed at facilities in Kyushu, 80 (7.3%) were employed at facilities in Hokkaido, 77 (7.0%) were employed at facilities in Chugoku and 50 (4.6%) were employed at facilities in Shikoku, showing that many nurses were employed at facilities located in the central area of Honshu. 905 (82.6%), the overwhelming majority of respondents, were

Table2 Background of subjects

		(n =1096)	
	Attribute Classification	Number of respondents (nurses)	Rate (%)
Sex	Male	8	0.7
	Female	1088	99.3
Age	21 ~ 25	209	19.1
	26 ~ 30	289	26.4
	31 ~ 35	187	17.1
	36 ~ 40	148	13.5
	41 ~ 45	118	10.8
	46 ~ 50	81	7.4
	51 ~ 55	53	4.8
	56 ~ 60 (years)	11	1
The number of years involved in diabetes education	< 1	123	11.2
	1 ≤ and < 3	312	28.5
	3 ≤ and < 5	264	24.1
	5 ≤ and < 10	285	26.0
	10 ≤ (years)	112	10.2
The number of years of clinical nursing experience	< 1	26	2.4
	1 ≤ and < 3	121	11.0
	3 ≤ and < 5	143	13.0
	5 ≤ and < 10	261	23.8
	10 ≤ (years)	545	49.7
Certification as diabetes educa- tors (CDE)	Certified	312	28.5
	Uncertified	784	71.5
Certified Expert Nurse	Certified	25	2.3
	Uncertified	1071	97.7
The location of the facilities at which participants were em- ployed	Hokkaido	80	7.3
	Tohoku	150	13.7
	Kanto	226	20.6
	Chubu	181	16.5
	Kinki	205	18.7
	Chugoku	77	7.0
	Shikoku	50	4.6
	Kyushu (contained Okinawa)	127	11.6
Types of facilities	General hospitals	905	82.6
	Hospitals with several departments	159	14.5
	Single department hospitals	10	0.9
	Clinics	2	0.2
	Other types of facilities	20	1.8
The number of patient beds at the facilities	< 300	142	13.0
	300 ≤ and < 500	357	32.6
	500 ≤ and < 800	375	34.2
	800 ≤ (beds)	222	20.2
Departments in which partici- pants were employed	Solely at hospital wards.	805	73.4
	Both to hospital wards and outpatient depart- ments	163	14.9
	Only to outpatient departments	103	9.4
	Home-visit care	2	0.2
	Other categorys	23	2.1
Participant job titles	Chief nurses	40	3.6
	Associate chief nurses (Senior staff members)	145	13.2
	The staff member in charge of education	51	4.7
	General staff	843	76.9
	Other positions	17	1.6

employed at general hospitals. This was followed by 159 respondents (14.5%) employed at hospitals with several departments, 10 respondents (0.9%) employed at single department hospitals, 2 respondents (0.2%) employed at clinics and 20 respondents (1.8%) employed at other types of facilities. 375 respondents (34.2%) were employed at facilities with between 500 and 799 beds and 357 respondents (32.6%) were employed at facilities with between 300 and 499 beds, showing that 732 respondents (66.8%) were employed at facilities with more than 300 beds and less than 800 beds, a number that accounted for a significant majority of the total number of respondents. 222 respondents (20.2%) were employed at facilities with more than 800 beds. 142 respondents (13.0%) were at facilities with less than 300 beds. 805 respondents (73.4%), by far the vast majority of nurses, were working solely at hospital wards. This was followed by 163 respondents (14.9%) assigned both to hospital wards and outpatient departments, 103 respondents (9.4%) assigned only to outpatient departments, 2 respondents (0.2%) assigned to home-visit care and 23 respondents (2.1%) in the category of other. 843 respondents (76.9%), a marked majority of respondents, were employed as general staff. This was followed by 145 respondents (13.2%) employed as associate chief nurses (senior staff members), 51 respondents (4.7%) employed as the staff member in charge of education, 40 respondents (3.6%) employed as chief nurses and 17 respondents (1.6%) employed in other positions.

2. Validation of constructive concept

1) Analysis of items

After an examination of G-P analysis and I-T correlation in order to select items that would serve to increase reliability, the cluster analysis method that seemed the easiest to interpret was chosen and items used for factor analysis were selected. The number of data items for this survey totaled more than 1,000; therefore, the K-means method that would be effective for observed values involving large numbers of data items to be clustered was selected. The ability to set the number of clusters by analyzers suggested that it was possible to attempt the initial purpose, to identify three different teaching styles. This resulted in a profile plot (polygonal line graph) of the average

value of each score for the 54 items for each of the three teaching style clusters, and this was sufficient to determine the validation of the clustering of the three teaching styles visually as well. 20 of 54 items that revealed only slight differences in the average values among the three teaching style clusters and in which it was difficult to clearly identify teaching styles were deleted and the following factor analysis was conducted:

2) Factor analysis

First, KMO and Bartlett Test were conducted in order to determine whether or not the data could be utilized for factor analysis. As KMO was 0.828, which was greater than 0.5, and null hypothesis is rejected at $p < 0.001$ of significance probability in Bartlett; it was confirmed that factor analysis could be applied.

Method of maximum likelihood and promax rotation were conducted. Deleting the items for which factor loading was less than 0.35, an analysis was conducted and 10 factors were employed. To determine the number of categories, a baseline characteristic value of greater than 1 was used. As shown in Table 3, the seventh category is the only category that includes three items. The remaining nine factors each include two items, bringing the total number of items to 21 items. Five factors, namely the first, second, third, fourth and ninth consisted of ten items relating to a "teaching style which shows an understanding of the realities of patient living conditions and attitudes." Two factors, namely the fifth and tenth consisted of four items relating to a "teaching style which provides knowledge." Three factors, namely the sixth, seventh and eighth consisted of seven items relating to a "teaching style which appeals to the patient's individuality." Nine out of the ten factors, however, included only two items each. Of the nine components relating to the awareness and behaviors of nurses that were each separated into three teaching styles and given two items each, five components relating to a "teaching style which shows an understanding of the realities of patient living conditions and attitudes" such as "attitude as nurses in diabetes patient education," "attitude expressions as nurses," "approach to the family," "how nurses feel about the effectiveness of their teaching efforts" and "the Comprehensive evaluation of patient

Table 3 A result of factor analysis about the teaching style self-evaluation tool for nurses in diabetes patient education

Items	1st factors	2nd factors	3rd factors	4th factors	5th factors	6th factors	7th factors	8th factors	9th factors	10th factors
< 1st factors : "The teaching style which shows an understanding of the realities of patient living conditions and attitudes" -Attitude as nurses in diabetes patient education > (2items)										
5) I would like to think about what patients should do to make living with diabetes easier, and work together with patients to find answers.	0.877	-0.055	-0.086	-0.057	0.060	0.006	0.009	-0.02	-0.029	-0.036
6) I would like to find patient advantages and bring out patients' abilities to control diabetes.	0.761	-0.057	-0.024	-0.009	-0.005	-0.001	0.059	-0.010	-0.050	-0.065
< 2nd factors : "The teaching style which shows an understanding of the realities of patient living conditions and attitudes" -How nurses feel about the effectiveness of their teaching efforts > (2items)										
47) I often feel the changes in patient awareness and behaviors through education.	-0.037	0.912	-0.081	-0.034	0.031	-0.002	-0.0008	-0.048	-0.001	0.0002
48) I often feel that patients have obtained the strength to move on to a new stage through education.	-0.033	0.896	0.007	-0.017	-0.009	-0.011	0.042	-0.005	-0.059	0.003
< 3rd factors : "The teaching style which shows an understanding of the realities of patient living conditions and attitudes" -Approach to the family > (2items)										
30) I deal with patients and their families together, adjusting to each family's situation after an assessment of the dynamic relations within the family, in order to help them to share how patients feel living with diabetes.	-0.028	-0.053	0.913	0.005	0.027	-0.001	0.025	-0.004	-0.074	-0.025
29) I sit together with both the patient and the family and tell the patient's families how the patient feels and listen to how the family feels.	-0.051	-0.022	0.811	-0.075	0.021	0.009	0.062	-0.002	-0.052	0.002
< 4th factors : "The teaching style which shows an understanding of the realities of patient living conditions and attitudes" -The comprehensive evaluation of patient education > (2items)										
53) I comprehensively evaluate my patient education by checking how much the patient's lifestyle activities have changed.	-0.054	0.012	-0.082	0.948	0.024	0.010	0.014	-0.016	-0.008	0.015
54) I comprehensively evaluate my patient education by checking how the patient attaches meaning to treatment activities for diabetes and attempts to incorporate these activities into their lives through changes in the patient's words and actions.	0.014	-0.065	0.016	0.786	-0.036	0.024	0.005	0.002	-0.040	-0.003
< 5th factors : "The teaching style which provides knowledge" -Method of concrete education > (2items)										
19) I mainly try to follow the manual in teaching basic diabetes knowledge to patients.	-0.023	0.030	-0.010	0.033	0.950	-0.011	-0.021	0.045	-0.024	-0.069
20) I provide general knowledge on diabetes that as a nurse I feel might be helpful in patients lives rather than asking patients' opinions.	0.110	-0.008	0.046	-0.036	0.486	0.063	-0.024	-0.092	0.040	0.062
< 6th factors : "The teaching style which appeals to the patient's individuality" -The comprehensive evaluation of patient education > (2items)										
51) I comprehensively evaluate my patient education by checking how much of a trusting relationship I have built with the patient.	0.011	-0.014	-0.029	-0.041	0.042	0.918	-0.090	-0.005	0.039	-0.044
52) I comprehensively evaluate my patient education by checking the degree to which patients have expressed their feelings to me.	-0.041	-0.013	0.053	0.090	-0.002	0.657	0.134	-0.045	-0.028	0.044
< 7th factors : "The teaching style which appeals to the patient's individuality" -Awareness of the feelings of patients living with diabetes, (method of concrete education) > (3items)										
33) I understand the feelings of patients living with diabetes that they cannot overcome, and am often stuck at that point.	0.118	-0.070	-0.052	-0.009	0.010	-0.062	0.570	-0.078	-0.036	0.044
34) I sometimes feel too much empathy with patients living with diabetes, and this causes me to feel saddled with patients.	-0.029	0.055	0.155	-0.028	-0.044	0.078	0.509	0.024	0.102	-0.030
21) I do not provide active care but often limit my activities to listening to patients' descriptions of their lifestyles.	-0.102	-0.007	-0.052	-0.086	0.129	0.009	0.404	0.032	0.010	-0.022
< 8th factors : "The teaching style which appeals to the patient's individuality" -Attitude expressions as nurses > (2items)										
10) I tell patients that my main role is to listen to their psychological problems.	0.014	-0.057	-0.021	-0.012	-0.022	-0.025	0.007	0.907	-0.003	-0.008
9) I tell patients to be open about the psychological problems they have.	-0.052	0.016	0.023	-0.006	-0.024	-0.012	0.017	0.576	0.056	0.002
< 9th factors : "The teaching style which shows an understanding of the realities of patient living conditions and attitudes" -Attitude expressions as nurses > (2items)										
12) I tell patients that we should work together to find ways to live more easily with diabetes.	0.032	-0.036	-0.019	-0.077	0.002	0.021	0.098	-0.038	0.906	0.036
11) I tell patients that we should work together to find the causes of the problems that prevent them from conducting the treatment activities well.	-0.007	-0.022	-0.104	0.028	0.008	-0.004	0.065	0.079	0.819	-0.021
< 10th factors : "The teaching style which provides knowledge" -Attitude as nurses in diabetes patient education > (2items)										
2) It cannot be helped even if patient education does not go well because life at the hospital and at home are totally different.	-0.042	0.049	-0.016	0.006	-0.033	-0.021	0.040	0.020	-0.020	0.626
1) It cannot be helped even if patient education does not go well because the problem is usually caused by patients.	-0.054	-0.055	-0.021	0.005	0.098	0.020	-0.084	-0.051	0.077	0.618
Contribution rate of factors (%)	17.97	8.23	5.55	4.52	4.13	4.11	3.51	3.30	3.10	3.08
Accumulative contribution rate of factors (%)	17.97	26.21	31.76	36.28	40.42	44.53	48.04	51.35	54.45	57.54

education," two components relating to a "teaching style which provides knowledge" such as "attitude as nurses in diabetes patient education" and "method of concrete education," and two components relating to a "teaching style which appeals to the patient's individuality" such as "attitude expressions as nurses" and "the final evaluation of patient education" were loaded factors. Accumulative contribution rate by ten factors were 57.54% which was believed to be explained well.

3. Criterion-related validity

1) Concurrent validity

There was a weak positive correlation shown as $r = 0.201$ between the subscale scores and general self-efficacy scale scores. The subscale scores were arrived at by the addition of the subscale scores of ten items that included the first, second, third, fourth and ninth factors, all components of the "teaching style which shows an understanding of the realities of patient living conditions and attitudes" that were more effective in achieving the goals of patient education, in order to check concurrent validity for the 21 items set as the subscale.

2) Discriminant (divergent) validity (G-P analysis)

Ten factors were separated into three teaching styles. The average scores of the upper and lower groups for each item of each style were compared by t-test. Consequently, all the items in these three teaching styles exhibited a significant difference at the level of 0.001%, which confirmed each items' ability to discriminate for each style.

4. Examination of reliability

Because most of the subscales of each factor consisted of two items, it was impossible to examine the reliability of each factor by calculating the α coefficient. However, a high positive correlation, 0.559~0.692, was seen among the items of five factors relating to the "teaching style which shows an understanding of the realities of patient living conditions and attitudes" and a relatively high positive correlation, 0.402~0.414, among the items of two factors relating to the "teaching style which provides knowledge". Among the items of three factors relating to the "teaching style which appeals to the patient's individuality" a lower to relatively higher positive correlation, 0.260~0.599, was seen in all but

one item. The one exception showed no correlation at 0.089; however, this was one of three items with factor loading added for the seventh factor and with a separate component. Therefore, the correlation coefficient of items associated with the same teaching style suggested that twenty items were reliable to some extent.

In addition, regarding the correlation among the three teaching styles, there was a low positive correlation (0.201) between "the style which shows an understanding of the realities of patient living conditions and attitudes" and "te teaching style which appeals to the patient's individuality"; and there was a low negative correlation (-0.292) between "the style which shows an understanding of the realities of patient living conditions and attitudes" and "the style which provides knowledge". There was almost no correlation (0.111) between "the style which appeals to the patient's individuality" and "the style which provides knowledge".

Discussion

1. Components required for the nursing practices of individuals involved in diabetes patient education

Questionnaire items created for this study are all original. They were drawn from and based on previous qualitative and inductive study carried out by the author^{1) 11) 12) 13) 14) 15)}. The intention of this study was not the creation of a scale but the development of an intervention tool for education conducted by nurses. In other words, this study did not require scales to categorize nurses into each style, but the creation of an educational tool to give nurses the opportunities to understand the tendencies and characteristics of their practices. Therefore, it was meaningful to be able to confirm a certain level of validity and reliability in 21 items through factor analysis and in 20 items through correlation coefficient within the same styles, among 54 items of the questionnaire that had been established by setting up two items for each component, relating to the awareness and behaviors of nurses for each teaching style. Generally, more than three items are often loaded onto one factor for factor analysis; however, it is meaningful to have loaded factors onto each set of two items for the each teaching style in this study, and it is possible to conclude that the

components of awareness and behaviors of nurses based on the previous studies are valid. In other words, among nine components which are thought to be important for patient education, four components such as "attitude as nurses in diabetes patient education", "attitude expressions as nurses", "method of concrete education" and "the comprehensive evaluation of patient education" were revealed as factors in two styles, and three components such as "approach to the family", "awareness of the feelings of patients living with diabetes" and "how nurses feel about the effectiveness of their teaching efforts" were revealed as factors in one style. The reason for the differences in the degree of factor loading to the components of awareness and behaviors of nurses depending on the teaching styles is possibly because nurses cannot be sufficiently aware of all the components and conduct adequate nursing care. However, considering that the rate of accumulative contributing is 57.54%, it is believed that approximately 60% of nurses are able to see the tendencies in their own teaching styles from such viewpoints by paying attention to these components.

2. What is needed to utilize the results of this study as a teaching tool for nurses who are professionally involved in diabetes nursing care

Among 5,391 nurses nationwide who hold Certified Diabetes Educator¹⁾, only 312 (5.7%) participated as respondents in this study. However, 28.5% of the 1,096 nurses who participated as respondents in this study hold Certified Diabetes Educator. This is a figure that represents approximately 30%, which indicates that the respondents in this study are a group of people who are putting energy into diabetes patient education. Because the items belong to "the style which shows an understanding of the realities of patient living conditions and attitudes", which showed the high effect of education, were 10 and that was the most among three styles, it is believed that the self-evaluation which showed that they were contributing a certain amount of effective patient education was reflected on it. Therefore, groups of nurses that are putting effort relatively hard into diabetes patient education are the ones that can adopt the questionnaire items confirmed in this study as an educational tool. And this answers the purpose of this study.

Because there was a weak negative correlation between "the style which shows an understanding of the realities of patient living conditions and attitudes" and "the style which provides knowledge", these two styles are contradictory as it was initially located by the degree of educational effect and it is easy to distinguish these styles. However, because there was a low positive correlation between "the style which shows an understanding of the realities of patient living conditions and attitudes" which was considered more effective in achieving goals of patient education and "the style which appeals to the patient's individuality" which was considered less effective in achieving goals of patient education, it is believed that the discrimination power of the items which explained the awareness and behaviors of nurses in these styles were weak. In nursing care, the importance of attentive hearing and empathy for understanding what the patient is feeling is emphasized and that makes people believe that nurses bring about the effect of care to patients only by making a strong effort to it. It is "the style which shows an understanding of the realities of patient living conditions and attitudes" that assesses accurately the entire picture of patients who are living with diabetes and conduct the nursing intervention such that can bring the valuable change in the awareness and behaviors of patients, while understanding what the patient is feeling. This is a style which brings the results unachievable by simply understanding what the patient is feeling. Therefore, it requires reviews and careful selection of the expressions in order to identify the meanings like this for making it as a tool from now. It is also necessary to discuss the way of presenting it to the subjects of teaching.

Conclusion

Teaching style self-evaluation tool for nurses was attempted in order to use it to intervene the education aiming to develop the abilities of nurses who are professionally involved in diabetes nursing care. Based on the previous study, questionnaire consisted of 54 items was created by setting two items for each nine components of the awareness and behaviors of nurses for each of three teaching styles. The three teaching styles are "the teaching style which

shows an understanding of the realities of patient living conditions and attitudes", "the teaching style which provides knowledge" and "the teaching style which appeals to the patient's individuality". And the nine components of the awareness and behaviors of nurses are "attitude as nurses in diabetes patient education", "attitude expressions as nurses", "method of finding problems", "method of concrete education", "approach to the family", "awareness of the feelings of patients living with diabetes", "being conscious of the relations with patients", "how nurses feel about the effectiveness of their teaching efforts" and "the comprehensive evaluation of patient education". As the result of the factor analysis, 10 factors were picked out and nine out of ten factors were loaded on each set of two items of the components for each teaching style. It suggested that the components of the awareness and behaviors of nurses created based on the previous study was valid and indicated the direction of discussion for the educational intervention for nurses through the further modification and selection of the items for the future.

Acknowledgment

I would like to express appreciation for all the nurses who gave the cooperation for the implementation of this study.

This study was a part of research subsidized by the grand-in-aid scientific research of 2004-2006 (fundamental research (C)).

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糖尿病教育における看護師の教育スタイル自己評価ツールの開発 —糖尿病看護に専門的に携わる看護師の能力育成をめざす教育介入に向けて—

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要 旨

糖尿病看護に専門的に携わる看護師の能力育成をめざす教育介入に用いるために、看護師の教育スタイル自己評価ツールの作成を試みた。先行研究に基づき、3つの教育スタイルごとに、看護師の意識と行為の9要素を2項目ずつ設定し、54項目からなる質問票を作成した。3つの教育スタイルとは、『生活心情がみえている教育スタイル』、『知識を提供する教育スタイル』、『心に密着する教育スタイル』であり、看護師の意識と行為の9要素とは、「糖尿病患者教育における看護師としての姿勢」、「看護師としての姿勢の表明」、「問題点の見出し方」、「具体的な教育の仕方」、「家族に対するはたらきかけ」、「糖尿病をもちながら生活する患者の思いの感知」、「患者との関係に対する意識」、「自分が行った教育場面の手ごたえ」、「総合的に患者教育を評価する視点」である。

因子分析の結果、10因子が抽出され、10因子のうち9因子が教育スタイルごとの要素2項目ずつに因子負荷がついていた。また5つの因子が『生活心情がみえている教育スタイル』から、2つの因子が『知識を提供する教育スタイル』から、3つの因子が『心に密着する教育スタイル』からそれぞれ構成されていた。このことより、先行研究に基づき作成した看護師の意識と行為の要素が妥当であったと考えられ、今後はさらに項目の修正や精選を行い看護師への教育介入へ向け検討を重ねていく方向性が示唆された。