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A scale for Japanese type 2 diabetes patient ability to recognize and respond to family support : during the time without serious complications

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Abstract

This study aimed to create and examine the reliability and validity of a scale for the measurement of type 2 diabetes patient ability to recognize and respond to support provided by family members during the time without serious complications. The conceptual framework of this study followed the previous study clarified by the phenomenological method. Results showed that patients had the ability to recognize and respond to family support rather than simply acting as the recipient. From the result, this study created a draft scale of 38 items under eight concepts. We conducted a questionnaire survey on 186 type 2 diabetes patients without serious complications.

The draft scale was based on factorial analysis, with 22 items in 5 factors, as follows: Factor 1: susceptibility of the diabetes patient to looks from family members; Factor 2: ability to negotiate lifestyle with family members during diabetes therapy; Factor 3: patient ability to adjust within the family during diabetes therapy; Factor 4: family confidence in the diabetes patient; and Factor 5:shared family respect for lifestyle during diabetes therapy. Proportion of the total variance explained before promax rotation was 65.9%, confirming the validity of the construct. The Cronbach's coefficient α for the 22 items was 0.928, supporting internal consistency. The correlation coefficient with SOC was 0.166, so no correlation was found; however, the correlation coefficient with actual family cooperation was 0.472, indicating a significant correlation, and criterion-related validity was confirmed.

To summarize the scale constructed is reliable and valid, and the scale can be used for patient education to build a relationship that facilitates life together from time without serious complications.

Key words

diabetes, family, complications, ability, scale

I. Introduction

Because Type 2 diabetes patients without serious complications exercise a great deal of control over their treatment, with the exception of cases in which patients' meals are prepared for them, it is often difficult for them to maintain awareness of support provided by their families. As complications become more serious and begin to affect daily life, however, the need for support from family increases, causing the patient to become more aware. Meanwhile, nurses become aware of the role of family support during the initial period after diagnosis and when chronic conditions change, such as, for example, when they become more serious[1].

However, a study on patient perception of family as a resource also clarified that even when in the absence of serious complications, therapeutic behavior is based on the individual patient's determination regarding what he or she does or will do and what the family is asked to do[2]. It is assumed that patients

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adjust their lifestyles to each stage of disease based on accumulated formation of therapeutic behaviors. This suggests that the fundamental relationship between patient and family has already been established by the onset of complications that require specific diabetes-oriented support. It is also possible that a review of this relationship after the need for such support arises may cause certain difficulties in fully utilizing it. Therefore, it is necessary to assist both patient and family prior to the onset of serious complications in order to help them build a relationship that facilitates life together and effective care.

A number of studies on the relationship between diabetes patients and their families consider the patient as the recipient of assistance and family as the provider of assistance[3-5]. Studies have investigated intervention for diabetes patients and their families for the purpose of enhancing the ability of nurses to provide diabetes treatment information and teach techniques to strengthen the family support structure for the benefit of the patient[6-8]. Some studies have reported family intervention aimed at helping family exert a positive influence on patients with problems such as treatment non-compliance or poorly-controlled glycemia through the alteration of the family support structure[9-12]. In a study aimed at clarifying the relationship between the patients and their families, and ability to provide support, a Social Support Scale for Diabetic Patients and their Families was proposed for use in family education[13]. The scale is a measure of patient awareness of specific words and behaviors as family support. These studies have suggested that increasing family ability to provide support or patient recognition of support may be the key to ensuring that patients receive and benefit from appropriate support. However, some studies have reported that certain patients were unable to recognize and use support[14], which indicates the difficulty in providing care for diabetes patients and their families.

We postulated that patient inability to recognize and utilize family support, which undermines nursing care, may be due to a failure of nurses to recognize patients as those who have the ability to approach their families for support, simply seeing patients as the recipients of support in a previous study[15]. In that study, we quantitatively analyzed the perception of and response to family support by type 2 diabetes patients without serious complications whom healthcare professionals categorized as not in serious need of family support. As a result, it was clarified that patients were motivated to live better lives through their experience with and response to family support. Results showed that patients had the ability to recognize and respond to family support rather than simply acting as the recipient thereof, suggesting that cultivation of these abilities might lead to a more effective degree of patient-oriented family support. Furthermore, Inagaki et al.[2] pointed out that diabetes patients have difficulty in identifying their role in the family due to the lack of opportunity to learn to interact with and involve the family from the perspective of a diabetes patient, suggesting the necessity of indicating a patient model to facilitate the development of a favorable patient image. However, the study did not include an example of such a model. There is also no research which focused at time without serious complications. As was clarified in the previous report, the patient's ability to recognize and respond to family support is important in establishing patient-oriented family support. Therefore, the creation of a scale of this ability would serve as a model for patients in building a better relationship with their families prior to the onset of serious complications.

This study was carried out to create and validate a scale to measure patient ability to recognize and respond to support provided by family members based on the results of a previous qualitative study carried out from the viewpoint of establishing a patient-oriented family support structure.

II. Objectives

The objective of this study was to create and examine the reliability and validity of a scale for the measurement of type 2 diabetes patient ability to recognize and respond to support provided by family members during the time without serious complications.

III. Method

In order to create a scale for the measurement of patient ability to recognize and respond to support

provided by family members prior to the onset of serious complications, we performed creation of question item, and examination of content validity.

We created a scale through the collection of data, and item and exploratory factor analysis, to examine the reliability and validity of the scale.

1. Creation of a draft scale

1) Creation of question items

No studies have been carried out on patient ability to recognize and respond to support provided by family members prior to the onset of serious complications, nor have there been similar studies. Therefore, the conceptual framework of this study followed the previous study, "Thoughts of type Ⅱ diabetes patients with no severe complications about families" [15].

Based on nine themes in the previous study, we extracted eight concepts; namely, self-awareness as a diabetes patient within a family; acceptance of family support; consideration of change in self-image after developing diabetes; one's own control of relationships with family members; family harmony; expectation of support from family members; understanding that family members acknowledge the patient's attempt to appear strong; and a sense of respect from family members. We examined for overlap of question content, changing expressions and including separate questions where appropriate to create a scale with 38 items related to patient ability to recognize and respond to support provided by their family.

2) Examination of content validity

In order to examine content validity, three experienced nurses in this field of study examined the clarity of expressions and ease of response. Based on the results, we made appropriate changes in the expressions in question items.

2. Subjects

Subjects of this study were type 2 diabetes patients without complications treated as outpatients or hospitalized at one of the six general hospitals in I prefecture, and asymptomatic type 2 diabetes patients without serious complications. Patients with visual disorders that would significantly interfere with the reading of the questionnaire, patients with gangrene, patients undergoing dialysis (as serious complications), and patients living alone were excluded from the study.

3. Data collection

1) Surveyed items

In addition to the 38 items in the draft scale, we added a section regarding family cooperation status, 29 items related to sense of coherence (SOC), and items asking for basic information about the patient. A seven-point scale was used for both the draft and SOC scales.

(1) Status of family cooperation: In order to examine criterion-related validity, we used 10 question items regarding family support culled from the items for evaluating patient therapeutic behaviors created by Inagaki et al[16-17]. The question items are important for evaluating the relationship between patients and their families regarding support, and they are considered useful as diabetes education outcomes. Questions are about meals, exercise, medication, and consultations.

(2) SOC: Since the reliability and validity of family cooperation status have not been sufficiently examined. We need to examine another scale whose reliability and validity have been sufficiently established. However, the ability to recognize and respond is a new concept, which did not show concurrence with any factor. SOC is a scale of 29 items relating to comprehensibility, manageability, and meaningfulness[18]. We concluded that the ability to recognize and respond to support from the family in this draft scale and SOC exhibit similarity, which prompted us to examine their criterion-related validity. And patients with high SOC have an ability to form a network of support and benefit from others[19].

(3) Basic information: Age, gender, length of diabetes treatment, number of family members living together, family health status, complications, subjective symptoms of complications, therapeutic methods, HbA1c(JDS) during the most recent period, history of hospitalization due to diabetes, history of consultation for diabetes treatment

2) Questionnaire distribution and collection

We asked managers at six general hospitals in I prefecture for cooperation in conducting the questionnaire survey. Researchers and staff at the six cooperating hospitals provided subjects with a written explanation of the ethical considerations and

objectives of this study. Responses were collected by researchers, staff, from a collection box established for the purpose, or via mail in envelopes attached to the questionnaires. Response to the questionnaire was deemed to reflect consent to participation in the study. The data collection period was from January 2012 to June 2012.

4. Analytical method

Statistical analyses were carried out using SPSS17.0J statistical analysis software for Windows, and data was subjected to the methods described below.

1) Item analysis

Item analysis was carried out utilizing ceiling and floor effects, and Item-Total (I-T) correlation analysis.

2) Exploratory factor analysis

We applied exploratory factor analysis for items organized by item analysis utilizing the principal factor solution method and promax rotation.

3) Examination of reliability

We used Cronbach's coefficient alpha to evaluate internal consistency between the overall scale and each factor.

4) Examination of validity

(1) Exploratory factor analysis utilizing the principal factor solution method and promax rotation was carried out to confirm factor structure as an examination of construct validity.

(2) We calculated Spearman's rank-correlation coefficient between total scores of the scale and total scores of status of family cooperation, and between total scores of the scale and total scores of SOC to evaluate criterion-related validity.

5. Ethical considerations

Subjects received written and oral explanations of the purpose, meaning, and content of this study, the fact that it would have no effect on their medical care, that participation was voluntary and that they were free to withdraw at any time, and that the study results might be reported at academic conferences. Subjects also received contact and inquiry information. We also explained both orally and in writing that the questionnaire would be anonymous, and that the data would be stored under lock and disposed of in a manner that would render recovery impossible. Response to the questionnaire was deemed to constitute consent for participation this study.

This study was screened and approved by the Medical Ethics Committee of Kanazawa University prior to beginning.

IV. Results

Responses from 219 participants were collected (collection rate: 86.6%) and the number of valid responses was 186 (response rate: 84.9%).

1. Subjects

Subjects were 186 type 2 diabetes patients (males = 127, female = 57, and unknown = 2), the mean of the patients was 61.7 ± 11.9 (range, 20 - 88). Seventy-five subjects (40.3%), the highest percentage, reported living with one person, and 119 subjects (60.4%), also the highest percentage, reported that they considered their spouse as their family. Subjects with complications totaled 43 (23.1%), and subjects reporting subjective symptoms totaled 30 (16.1%). Nine subjects (4.8%) reported that the subjective symptoms were a disruption in their lives (Table 1).

2. Item analysis

We excluded three questionnaire items, which showed ceiling effects, and one item, which showed floor effects, from the draft scale. Three question items were also excluded because they showed r=0.2 or lower in the I-T correlation analysis.

3. Exploratory factor analysis and factor naming

Seven question items were excluded through item analysis, and exploratory factor analysis was carried out for the remaining 31 question items utilizing the principal factor analysis and promax rotation. Based on the results of scree plot, the number of factors was set between 4 and 6, and factor loadings were determined to be 0.4 or more. We excluded question items with factor loading of less than 0.4 and repeatedly performed factor analysis. Question item 4, "Diabetes is my own problem and has nothing to do with my family" showed 0.39; however, this item was retained because it was considered to be an important area of recognition for patients in building a patient-oriented family support relationship. We chose 22 items and 5 factors for the scale for type 2 diabetes patient ability to recognize and respond to family support during the time without serious complications (Table 2).

Table 1. Subject Overview (n=186)

			Number of respondents	Rate(%)
Age mean 61.7 ± 11.9 years				
		20 - 49 years	31	16.6
		50 - 59 years	32	17.2
		60 - 69 years	72	38.7
		70 - 79 years	40	21.5
		≧ 80 years	9	4.8
		Unknown	2	1.1
Gender		Male	127	68.3
		Female	57	30.6
		Unkonwn	2	1.1
Period of therapy		< 3 months	8	4.3
		4 - 11 months	14	7.5
		1 - 2 years	22	11.8
		3 - 4 years	23	12.4
		5 - 9 years	34	18.3
		10 - 19 years	56	30.1
		≧ 20 years	22	11.8
		Unknown	7	3.8
Therapeutic methods	Diet therapy	None	62	33.3
		Present	123	66.1
		Unknown	1	0.5
	Exercise therapy	None	87	46.8
		Present	98	52.7
		Unknown	1	0.5
	Oral administration	None	51	27.4
		Present	134	72.0
		Unknown	1	0.5
	Insulin	None	129	69.4
		Present	56	30.1
		Unknown	1	0.5
	Victoza	None	172	92.5
		Present	13	7.0
		Unknown	1	0.5
HbA1c		< 4.9 %	1	0.5
		5 - 5.9%	22	11.8
		6 - 6.9%	85	45.7
		7 - 7.9%	41	22.0
		8 - 8.9%	15	8.1
		≧ 9%	15	8.1
		Unknown	7	3.8
Complications		None	142	76.3
		Present	43	23.1
		Unknown	1	0.5
	Retinopathy	None	160	86.0
		Present	25	134.0
		Unknown	1	0.5
	Psychoneurosis	None	166	89.2
		Present	19	10.2
		Unknown	1	0.5
	Nephropathy	None	176	94.6
		Present	9	4.8
		Unknown	1	0.5
Subjective symptoms of complications		None	155	83.3
		Present	30	16.1
		Unknown	1	0.5
Troubles in daily life		None	175	94.1
		Present	9	4.8
		Unknown	2	1.1
Diseases other than diabetes		None	103	55.4
		Present	82	44.1
		Unknown	1	0.5
Number of family members living		2	75	40.3
		3	44	23.7
		4	29	15.6
		5	12	6.5
		6	8	4.3
		7 or more	10	5.4
		Unknown	8	4.3
The family member the subject feels is most immediate in relation to diabetes care		Spouse	119	64.0
		Child (Children)	21	11.3
		Other	46	24.7
		Unknown	11	5.9
Disease among family members		None	93	50.0
		Present	92	49.5
		Unknown	1	0.5
Hospitalization due to diabetes		None	64	34.4
		Present	121	65.1
		Unknown	1	0.5
Interview by a nurse at outpatient clinic		None	86	46.2
		Performed	95	51.1
		Unknown	5	2.7
Interview by a nurse with the family		None	108	58.1
		Performed	73	39.2
		Unknown	5	2.7

Factor 1 consists of items representing the patient's feeling that the family understands what he or she is unable to deal with as a diabetes patient, understands his or her being unhealthy because of diabetes, and how he or she attempts to appear strong in coping with being diabetic. We named this factor *susceptibility of the diabetes patient to looks from family members*.

Factor 2 consists of items representing the patient's desire to approach the family about matters related to life while undergoing therapy and to align his or her feelings and ideas with those of the family in an effort to move forward together. We named this factor *ability to negotiate lifestyle with family members during diabetes therapy*.

Factor 3 consists of items representing patient recognition of diabetes when considering their family. We named this factor *ability to adjust within the family during diabetes therapy*.

Factor 4 consists of items representing patient perception of the confidence the family has in him or her as someone who continues dealing with the disease, who is capable of managing the disease, and who attempts to cope with being diabetic. We named this *family confidence in the diabetes patient*.

Factor 5 consists of items representing patient behavior in consideration of the feeling of his or her family in attempting to restore the relationship with family after encountering differences in lifestyles, the patient's sense that the family is carefully and respectfully watching what he or she does, the patient's respect for life with his or her family and recognition of the importance of living with family. We named this factor *shared family respect for lifestyle during diabetes therapy*.

4. Examination of reliability

In order to examine the reliability of the 22-item scale, we calculated Cronbach's coefficient alpha (Table 3). Coefficient alpha was between 0.763 and 0.867 in sub items of the scale and at 0.928 for the overall scale with 22 items, which revealed the high internal consistency of the scale.

5. Examination of validity

(1) Construct validity

All items showed factor loading at 0.39 or greater, and the proportion of total variance for the 22 items

Table 2. Factor Analysis of the Scale for Type 2 Diabetes Patient Abiltiy to Recognize and Respond to Family Support (22 items) Pattern Matrix by Principal Factor Solution Method and Promax Rotation (n=186)

Item	Factor 1	2	3	4	5
Factor 1: Susceptibility of the diabetes patient to looks from family members (6 items)					
23C: Do you think your family understands the difficulty you have in managing diabetes?	.747	.112	.039	-.106	-.316
15C: Do you feel your family tries to understand you as a diabetes patient?	.679	.052	.087	.204	-.104
10C: Do you feel you are being cared for by your family even after you became diabetic?	.641	-.045	-.013	-.009	.274
28C: Do you think your family notices that you feel you are seen as an unhealthy person in society or the company because of diabetes?	.569	.179	-.097	.032	-.047
36C: Do you think your family understands both of your weaknesses and strengths?	.550	-.218	-.040	.154	.180
9C: Do you think your family is more anxious about your health compared to before you had diabetes?	.472	.028	.221	-.216	.366
Factor 2: Ability to negotiate lifestyle with family members during diabetes therapy (5 items)					
20S: Do you discuss with your family the reasons that caused a worsening of diabetes?	.058	.881	-.077	.025	-.054
19S: Do you confirm how your family feels about your meal?	.044	.715	.061	-.076	.043
24S: Do you talk with your family about how you feel about life as a diabetes patient?	.025	.679	-.089	-.012	.297
18S: Do you talk with your family about small things that happen in your daily life that are not related to diabetes but have an influence on your blood sugar control?	.146	.595	.060	.084	-.112
13S: Do you try to communicate the effort you make to cope with diabetes to your family?	-.286	.509	.213	.217	.143
Factor 3: Ability to adjust within the family during diabetes therapy (5 items)					
2C: Do you have any special feeling toward your family because of diabetes?	-.139	-.020	.876	-.103	.019
1C: Are you aware of your consideration of your family in your daily life as a diabetic?	.032	-.078	.707	.262	-.067
3S: Is diabetes an issue in your life with your family?	.126	.018	.675	.043	-.106
8S: Have you become more concerned about your family since the onset of diabetes?	.127	.177	.524	-.173	.169
4C: Do you think diabetes is your own problem and not related to your family?	.018	.015	.393	.009	.154
Factor 4: Family confidence in the diabetes patient (3 items)					
21C: Do you think your family understands your efforts to deal with diabetes?	.170	.210	-.048	.622	.016
22C: Do you think your family is confident in your capability to manage diabetes?	-.031	.043	-.076	.609	.148
33C: Do you think the reason your family interferes with your meals is that they are confident in your capability to manage diabetes?	.101	-.098	.113	.526	.193
Factor 5 : Shared family respect for lifestyle during diabetes therapy (3 items)					
12S: Do you try to accept the lifestyle your family considers the best?	-.175	-.026	.060	.278	.705
26S: Do you make an effort to restore your relationship with your family after encountering differences in lifestyles?	-.063	.227	-.029	.144	.629
30C: Do you try to follow instructions for meals, exercise, and oral administration, and do you feel that your family watches what you are doing with respect?	.456	-.059	-.107	.135	.462
Correlation among factors	I	II	III	IV	V
I	1.00	0.53	0.54	0.42	0.54
II		1.00	0.59	0.53	0.55
III			1.00	0.37	0.51
IV				1.00	0.47
V					1.00

the principal factor method and a promax rotation
Each figure indicate the number of the question item in the draft scale before factor analysis.
C: Ability to recognize S: Ability to response

Table 3. Cronbach's Coefficient Alpha (n=186) for the Scale for Type 2 Diabetes Patient Ability to Recognize and Respond to Family Support (22 items)

Factor	Cronbach's Coefficient α
Factor 1: Susceptibility of the diabetes patient to looks from family members (6 items)	0.829
Factor 2: Ability to negotiate lifestyle with family members during diabetes therapy (5 items)	0.868
Factor 3: Ability to adjust within the family during diabetes therapy (5 items)	0.810
Factor 4: Family confidence in the diabetes patient (3 items)	0.763
Factor 5 : Shared family respect for lifestyle during diabetes therapy (3 items)	0.798
Total 22 items	0.928

explained before promax rotation was 65.9%.

(2) Criterion-related validity

(a) The scale and family cooperation

In order to examine criterion-related validity, we calculated Spearman's rank-correlation coefficient (Table 4) from the total scores of the scale by setting one point for each question item for family cooperation status, 10 points in total, resulting in 0.472, which showed a significant correlation (p<0.01).

(b) The scale and SOC

In order to examine criterion-related validity, we calculated Spearman's rank-correlation coefficient with SOC (Table 5). As a result, the Spearman's rank-correlation coefficient of the total score of the scale and SOC was 0.166, which indicated an absence of correlation. Therefore, we calculated the coefficient of the sub items of the scale and SOC, which revealed a weak correlation in Factor 4 family confidence in the diabetes patient at 0.231, and in Factor 5 shared family respect for lifestyle during therapy at 0.260 (p<0.01). Furthermore, we calculated Spearman's rank-correlated coefficient between sub items of the scale and all the sub items of SOC (comprehensibility, manageability, and meaningfulness) (Table 6), which revealed a weak correlation between Factor 4 and comprehensibility at 0.216, between Factor 4 and manageability at 0.233, between Factor 5 and manageability at 0.268, and between Factor 5 and meaningfulness at 0.215 (p<0.01).

6. Relationship between the scale and SOC

Table 4. Spearman's Rank-correlation Coefficient between Family Cooperation Status and the Scale for Type 2 Diabetes Patient Ability to Recognize and Respond to Family Support

Factor	Family Cooperation Status
Factor 1: Susceptibility of the diabetes patient to looks from family members (6 items)	.395*
Factor 2: Ability to negotiate lifestyle with family members during diabetes therapy (5 items)	.484**
Factor 3: Ability to adjust within the family during diabetes therapy (5 items)	.275**
Factor 4: Family confidence in the diabetes patient (3 items)	.282**
Factor 5 : Shared family respect for lifestyle during diabetes therapy (3 items)	.296**
Total 22 items	.472**

**Correlation was significant at 1% level (both sides) *Correlation was significant at 5% level (both sides)

Table 5. Spearman's Rank-correlation Coefficient between SOC and the Scale for Type 2 Diabetes Patients Ability to Recognize and Respond to Family Support

Factor	SOC
Factor 1: Susceptibility of the diabetes patient to looks from family members (6 items)	.131
Factor 2: Ability to negotiate lifestyle with family members during diabetes therapy (5 items)	.153*
Factor 3: Ability to adjust within the family during diabetes therapy (5 items)	.025
Factor 4: Family confidence in the diabetes patient (3 items)	.231**
Factor 5 : Shared family respect for lifestyle during diabetes therapy (3 items)	.260**
Total 22 items	.166*

**Correlation was significant at 1% level (both sides) *Correlation was significant at 5% level (both sides)

Table 6. Spearman's Rank-correlation Coefficient between the Lower Items of SOC and the Lower Items of the Scale for Type 2 Diabetes Patient Ability to Recognize and Respond to Family Support

Factor	SOC		
	Comprehensibility	Manageability	Meaningfulness
Factor 1: Susceptibility of the diabetes patient to looks from family members (6 items)	.065	.174*	.146*
Factor 2: Ability to negotiate lifestyle with family members during diabetes therapy (5 items)	.117	.125	.134
Factor 3: Ability to adjust within the family during diabetes therapy (5 items)	.033	-.001	-.001
Factor 4: Family confidence in the diabetes patient (3 items)	.216**	.233**	.135
Factor 5 : Shared family respect for lifestyle during diabetes therapy (3 items)	.179*	.268**	.215**

**Correlation was significant at 1% level (both sides) *Correlation was significant at 5% level (both sides)

The average value of the total score of the scale was 94.9. We classified items with 94 points or lower into a low-score group and items with 95 points or greater as into a high-score group to calculate Spearman's rank-correlation coefficient between the scale and SOC (Table 7). In the low-score group, the scale and SOC showed no correlative relationship (0.007); however, the high-score group showed a weak correlation at 0.249 ($p<0.05$).

V. Discussion

1. Reliability and validity of the scale

Cronbach's coefficient alpha for the scale was 0.928, which confirmed internal consistency. According to exploratory factor analysis, the 22-item scale with 5 factors showed factor loading at 0.39 or greater, and the proportion of the total variance explained before promax rotation was 65.9%, which confirmed the construct validity of the scale. Spearman's rank-correlation coefficient between the total score of the scale and total score of family cooperation status was 0.472, which revealed a significant correlation ($p<0.01$). Furthermore, Spearman's rank-correlation coefficient between the total score of the scale and total score of SOC was 0.166 and showed no correlation; however, the sub items and SOC showed weak correlation, 0,231 with Factor 4 and 0.260 with Factor 5 ($p<0.01$). The above-mentioned facts confirmed validity.

2. Correlation between the sub items of the scale and SOC

Weak correlation was observed between Factor 4 *family confidence in the diabetes patient* and sub items of SOC, *comprehensibility* and *manageability*. Factor 4 consists of question items representing patient perception of the confidence the family has in him or her as someone who continues dealing with the disease, who is capable of managing the disease, and who attempts to cope with being diabetic. This suggests that the patient can explain how the family sees him or her, and that the patient has confidence that the family is capable of providing support when he or she needs it, revealing correlation with *comprehensibility and manageability*.

Factor 5 *shared family respect for lifestyle during therapy* and sub items of SOC *manageability* and *meaningfulness* showed slight correlation. Respecting life with family indicates that the patient feels it is possible to have a good lifestyle with the family, which showed correlation with *manageability*. Factor 5 indicates that patients are motivated to align their lifestyle with the lifestyles of the family, and in attempting to restore the relationship with his or her family after encountering differences in their lifestyles, which showed correlation with *meaningfulness*.

We consider the reason for the lack of correlation between the total scores of the scale and SOC as follows: SOC reveal the ability to flexibly and appropriately select action and resources according to the situation[20]. However, the results of this survey showed no apparent issues in the relationship with family for patients without serious complications. This can be explained from the results of the previous study[15]. Although patients recognize their family, they do not require direct support from them. For this reason patients deal with being diabetic without adverse effect to the family relationship, or get used to dealing with the disease in their life and do not think the disease will affect their relationship with family. Prior to the development of serious complications, serious issues in the family relationship were still unidentified, indicating a lack of correlation between the scale and SOC.

3. Relationship between the scale and SOC

In the high-score group, the total scores of the scale and SOC revealed weak correlation, while they did not reveal any correlation with the low-score group, which is the group of patients who have a low-ability to recognize and respond to support from their families. This might be explained by a study[15] showing that low ability to recognize and respond to support indicates that patients think they must manage

Table 7. Spearman's Rank-correlation Coefficient between the Scale and SOC in Low-score and High-score Groups of Type 2 Diabetes Patient Ability to Recognize and Respond to Family Support

The Scale	SOC
Low-score Group	.007
High-score Group	.249*

*Correlation was significant at 5% level (both sides)

without considering family cooperation. Patients with high SOC have an ability to form a network of support and benefit from others[19], which indicates that the low-score group in this study, which is assumed to think that they need to deal with the disease by themselves, is not going to create a family support structure. Such patients rarely create family support networks or benefit from others. For this reason the low-score group did not show correlation between the scale and SOC.

4. Meaning of the scale and utilization in nursing care

The reliability and validity of the scale were confirmed, making possible its use as a tool to suggest ways in which patients can be involved with family. We also suggest that nurses can utilize the scale in diabetes patient education to promote the more effective use of family support. However, the effectiveness of the family support has not been evaluated with the scores of the scale. Therefore, the scale should be used to facilitate mutual understanding between patients and their families. It is also possible for nurses to use the scale as an outcome index before and after medical treatment instruction and family intervention.

VI. Limitations and issues of this study

The scale created in this study showed correlation with family cooperation and with lower concepts of SOC. However, this was examined only with cross-sectional data; therefore, we have not examined the effect on blood sugar control over extended periods of time. Therefore, it is impossible for us to determine the desirable point values in the scale.

This study measures a new concept, the ability to recognize and respond to family support, and it is necessary to examine and confirm the validity of factors that are related to or influence this ability.

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日本人２型糖尿病患者の家族サポート感取・対応力尺度
―重度の合併症のない時期―

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要　旨

本研究の目的は、重度の合併症のない時期の２型糖尿病患者の家族サポート感取・対応力尺度を作成し､その信頼性と妥当性を検証することである。本研究における概念枠組は、現象学的方法で明らかにした先行研究に基づいている。先行研究は患者が家族のサポートの受け手というより、サポートを「受け取り、応える」という力をもっていたと説明された。その結果より、本研究は８つの概念38項目の尺度原案を作成し、重度の合併症のない時期の２型糖尿病患者186名を対象に質問紙調査を実施した。

尺度原案は因子分析等により、第１因子【糖尿病をもつ自分への家族からのまなざし感受力】、第２因子【療養生活を家族と共に歩むための相互交渉力】、第３因子【家族の中での糖尿病の位置づけ調整力】、第４因子【家族から向けられる糖尿病患者としての信頼力】、第５因子【療養生活に対する家族との相互尊重力】の５因子22項目が抽出された。プロマックス回転前の全分散を説明する割合は65.9%で構成概念妥当性が確認された。22項目のCronbachのα係数は0.928で内的整合性が支持された。SOCとの相関係数は、0.166と相関は認められなかったが、家族協力の実態との相関係数は0.472であり有意な相関が認められ基準関連妥当性が確認された。

以上より本尺度は信頼性と妥当性が認められ、２型糖尿病患者が重度の合併症のない時期から家族と共に歩むという関係を築く患者教育に用いることができると考える。