A novel scale for measuring social competence in patients with type 2 diabetes receiving hemodialysis

Original Article

A novel scale for measuring social competence in patients with type 2 diabetes receiving hemodialysis

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Abstract

Purpose:
When beginning dialysis treatment, patients with type 2 diabetes face a need to build new relationships, as support receivers, with the people close to them, who become support givers. Taking as our base "social competence", i.e. the ability to connect with people and build society, we created a social competence scale for Japanese patients with type 2 diabetes receiving dialysis. This study tested the reliability and validity of the scale.

Method:
This is a cross-sectional study that focuses on Japanese patients with type 2 diabetes receiving dialysis (n=163, males=121, females=42). The mean age of the patients was 65.1 ±10.3 (range 44-91). The mean duration of dialysis was 6.0±4.7 years (range 0.5-25). Our data were analyzed using exploratory factor analysis, criterion related validity, and reliability testing.

Results:
The final version of the social competence scale for patients with type 2 diabetes receiving dialysis was composed of 5 factors, with 32 items. All 32 items had a Cronbach's α of 0.89, with a total distribution of 49.05%. The scale showed a significant correlation with KiSS-18.

Conclusion:
This study suggests that a social competence scale for Japanese patients with type 2 diabetes receiving dialysis may be used as an essential tool for nurses in assessing the relationships between patients and those close to them. Also, by clarifying the constituent factors of social competence in patients with type 2 diabetes receiving dialysis, the study enables nurses to develop education programs for patients to cultivate their social competence. The study therefore facilitates the provision of better care in practical clinical care settings.

KEY WORDS
hemodialysis; type 2 diabetes; social competence; cross-sectional study

Introduction

The prevalence of diabetes and end-stage renal disease (ESRD) is increasing globally[1-4]. Hemodialysis, peritoneal dialysis, and renal transplantation are methods for treating ESRD. In Japan, hemodialysis treatment is chosen in over 90% of cases, which is the second highest rate globally[5]. For the context,

hemodialysis is included in the country's insurance systems, and the individual patient does not bear the costs of the treatment. The treatment can be continued on an outpatient basis. Transplantation is a difficult option, for instance, due to shortages of organ donors. Dialysis is most manageable, producing the most favorable treatment results globally[4-6]. These

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factors form the contextual basis for the predominance of hemodialysis treatment in Japan. Diabetic nephropathy is the most common and affects 39.0% of all hemodialysis patients in Japan[4]. The number of patients receiving hemodialysis for type 2 diabetes is on the rise, whereas type 1 diabetes is on decline[7].

Patients with diabetes receiving dialysis have a poor quality of life[8,9]. Their mortality risk is 1.9 times that of non-diabetes receiving dialysis, and cardiovascular disease is a frequent occurrence[9]. In recent years, however, survival rates have improved in Japan[4].

Patients with diabetes receiving dialysis face three key dilemmas related to their daily living. First, the patients find it difficult to surrender their autonomy and rely on the people around them for their care[11]. Their management is primarily left to medical practitioners, and a distinction between the responsibilities of the patient and the medical practitioner concerning patient care is often difficult. Second, this unclear distinction of responsibilities can be challenging for patients to integrate the management of both their diabetes treatment and dialysis treatment into their daily lives. Third, a range of disease-associated complications (e.g., visual or neural impairments) force them to rely upon others for their routine medical care, and they often find it difficult to make the switch. Therefore, along with life support centered care, there is also a need for care focused on everyday life around maintenance phase dialysis.

There have been several studies concerning the relationships between patients with diabetes receiving dialysis and the people close to them. Some have reported troubled relationships between patients and their caregivers medical practitioners and family members[12-15]. One study also reported patients being depressed due to introspection. They showed aggression towards dependence and caregivers, for reasons such as having ended up on dialysis despite having undergone treatment for diabetes[16].

Patients are poorly receptive to dialysis[17], and they tend to have negative views about themselves[18]. Meanwhile, they can also be labeled as troublesome patients by medical practitioners[19] due to their treatment non-compliance, over aggressiveness, or overreliance on the medical practitioner. Family members often feel exhausted after years of living with medical care, making patients rethink their needs and demands[19]. Dialysis treatment consumes time and energy, rendering patients unable to fulfill their normal role in the family[20,21]. Research also indicates a close association between mortality rate and isolation or lack of social support in these patients[21]. We understand from each of these studies that dialysis patients with diabetes are prone to feeling isolated and alienated from their surroundings. It is necessary for these patients to connect with each other in order to eliminate the feeling of isolation.

We focused on the capabilities of dialysis patients with type 2 diabetes to bond with groups close to them. Our research suggests that these patients can leverage their ability to bond with the people close to them, despite these interpersonal relationships being based in vastly different environments [23,24]. The nature of this latent ability, i.e., the capability and the behavioral means used to build these interpersonal relationships, however, is unclear.

Our attention was thus drawn to the idea of "social competence"[25]. "Social competence" refers to "a person's ability to link with other people and build society." This ability allows a person to build good relationships, and while maintaining those good relationships, see themselves as a member of society, willingly brandishing the knowledge they have learned and the skills they have acquired in the range of places in which they ordinarily conduct their lives. It also includes the desire to create a better society and the capacity to imagine and realize a better society. We examined "social competence" as an ability that encompasses the capability of diabetic dialysis patients to build, as support recipients, new interpersonal relationships with the people around them.

Accordingly, we aimed to create a scale for measuring the "social competence" in dialysis patients with type 2 diabetes and to test the reliability and validity of this scale. If we could understand "social competence" in dialysis patients with type 2 diabetes, it could be used to devise patient education for fostering their "social competence," enabling us to help them build relationships with the people close to them.

Methodology

1. Subjects

We sent our research plan and survey questionnaire to facility representatives, or met them directly, and asked to collect data on-site. In the end, we received permission to collect data from 13 facilities.

Our subjects were all patients with type 2 diabetes who visited the facilities to receive dialysis treatment. We excluded patients with impaired cognitive function and patients with difficulties responding to the survey. We also excluded patients who began dialysis treatment less than 5 months ago, and those who were hospitalized due to likely instability in their physical conditions. Participants were recruited from May to October 2019.

2. Conceptual framework

We used the "social competence" theory developed by Kadowaki[25] as the base for our scale. Social competence is not sociability, i.e., social adaptability, but the ability of people to connect with people and create a society. Originally, social competence as a concept focused on children, but it is thought to hold true even for adults. "Social competence" refers to the socialization ability of a child, i.e., the abilities a child must acquire during developmental years to become a fully-fledged member of a society composed of adults. The present study aims to measure the abilities that a patient with type 2 diabetes must acquire at the beginning of dialysis, to integrate with family members, fellow patients, staff in the dialysis unit, and local society as a recipient of diabetes and dialysis. Accordingly, we used social competence as our conceptual framework.

"Child social competence" has a 5-factor, 22-item structure: Factor 1: Trust and affinity towards adults; Factor 2: Consideration and sympathy towards others; Factor 3: Intellectual curiosity; Factor 4: Interest towards strangers; and Factor 5: Trust in people.

3. Draft scale creation process

First, two professors, who are both researchers and diabetes dialysis care specialists, and two diabetes dialysis care practitioners examined the contextual definition of "society" for dialysis patients with type 2 diabetes. Based on previous research[24], "society" for them was defined as the state in which the patient, i.e., the support recipient, and the people close to them,

i.e., the support givers, are positioned in a need-needed relationship, and are tied to each other as members of a mutually supportive group. We took the ability to build such ties as our definition of "social competence" in dialysis patients with type 2 diabetes.

We created the scale items using the social competence framework and also using survey results from existing research[23-25]. Based on these studies, we hypothesized that social competence in dialysis patients with type 2 diabetes might be divided into six constituent factors. These are Factor 1: Trust and affinity towards people close to them; Factor 2: Consideration and sympathy towards their family; Factor 3: Intellectual curiosity; Factor 4: Interest towards unfamiliar dialysis patients with diabetes; Factor 5: Trust in people; and Factor 6: Trust in their body.

Qualitative studies were conducted in Japan and involved interviewing patients having type 2 diabetes who began dialysis treatment no more than three years ago about how they thought of their families. Patients having type 2 diabetes with at least three years' treatment were also subject to an interview about how they thought of the people around them, such as medical practitioners and family members. The particulars of the interview were created on the basis of previous research, carefully consulted, in correspondence with the scale's constituent factors. We thus produced 42 items. We assessed these items to judge whether or not their content suited our conceptual framework. We repeated this process until we selected our final items. To check the validity of the content of these items, we asked two instructors with detailed knowledge and experience of diabetes dialysis care to assess how well suited the items were to our framework. We also conducted a pretest in which three diabetes dialysis care practitioners, including nurses qualified in diabetes care, and two patients with type 2 diabetes receiving dialysis visiting a test hospital, gave responses. We omitted one item that contained duplicate content and revised the expression of three items to convey our intended meaning better. In the end, our original draft of the scale included 41 items.

4. Scoring items

A four-step Likert scale rating was used for all our patients with type 2 diabetes receiving dialysis

social competence items. We instructed participants to respond using the following choices. 1: Not at all applicable; 2: Not very applicable; 3: Quite applicable; and 4: Very applicable. Total scores were calculated using the sum of the scores for all items. A higher total score indicates greater social competence in dialysis patients with type 2 diabetes.

5. Procedures

We presented the medical staff with our participant recruitment conditions and exclusion criteria. The medical staff helped us select potential subjects from existing patients. We explained, in writing and verbally, the purposes of the study, which involved the patients, and we requested their participation in our research. Patients who agreed to participate then completed and returned the questionnaire. Alternatively, some patients also took the questionnaire to their home and returned it on their next hospital visit for dialysis. If the researchers were unable to explain the research to a patient verbally, a nurse did so on our behalf. Specifically, the nurse would explain that we were conducting research and that patient participation in the research was voluntary. They also guaranteed that patients would see no negative impact on their treatment even if they decided not to participate in the research. Either the researchers or the medical staff explained that the questionnaire was anonymous and that individuals would not be identifiable, and asked to minimize any bias in patients' responses as much as possible. Questionnaires completed by patients were collected from the nurses by a researcher. This study was approved by the Kanazawa University Medical Ethics Committee (approval number: 903-1). The study received no special financial support from any public, commercial, or not-for-profit grant agencies.

6. Data analysis method

Data analysis was conducted using IBM SPSS Statistics for Windows version 24 (IBM Corp., Armonk, N.Y).

1) Item analysis

We checked the distribution of responses, ceiling effects (Mean±1SD>4), and floor effects (Mean±1SD<1). We also conducted item-total (I-T) analysis and good-poor (G-P) analysis in order to check internal consistency. An I-T analysis examines the correlation between the per-item score and the total score of the scale. We removed any item that showed no correlation between item score and total score ($|r|<0.2$) in these I-T correlation tests. Meanwhile, G-P analysis was used to separate the scale's total scores into upper (25%) and bottom (25%) groups, obtaining the average scores for each item for each group, to finally compare these values. Dates were classified based on the t-test for the average score of the upper and lower groups, and items with no significant differences were excluded from the analysis.

2) Evaluating construct validity

Kaiser-Meyer-Olkin measure of sampling adequacy was performed using the items extracted by the item analysis.

The validity of our scale's construct was tested using the principal factor method and Promax rotation to conduct exploratory factor analysis. We interpreted the sub-factors that were ultimately specified and gave names to each factor.

3) Approaches to criterion-related validity

We deemed that there were similarities between the ability of dialysis patients with type 2 diabetes to build relationships with the people close to them, and the generally and widely used Kikuchi's Scale of Social Skills: 18 items (KiSS-18) social skills required for facilitating smooth interpersonal relations[26]. Thus, if they have a higher social competence score, this indicates that they will also have a higher KiSS-18 scale score. KiSS-18 features 18 items as skills for smoothly building interpersonal relationships. All items are evaluated on a 5-step Likert scale. (1: Never; 2: Not usually; 3: Couldn't say either way; 4: Usually; 5: Always). A total score is calculated from the sum of the item scores. In addition, social competence in dialysis patients with type 2 diabetes is the ability to create better relationships as a support receiver with support givers and thus resembles the ability to build a social network around oneself. Sense of coherence (SOC) is composed of comprehensibility, manageability, and meaningfulness. The higher a person's SOC, the greater their ability to build a social network around themselves [28]. The social competence score positively correlates with the SOC scale score. The abridged version of the SOC evaluates all items on a 7-point scale. A total score is calculated from the sum of the item scores. A higher total score indicates a higher

SOC.

To measure the criterion-related validity of social competence scale in dialysis patient with type 2 diabetes, we assessed the relation between total scores on our draft scale and total scores on the KiSS-18 scale using Pearson correlation analysis. We also assessed the relation between total scores on our draft scale and total scores on the abridged version of the SOC scale using Pearson correlation analysis.

4) Content validity

We calculated a content validity index (CVI) to examine internal validity using Lynn's content validity quantification method[26]. We asked 6 specialists in diabetes nurses and dialysis unit nurses, a nephrology doctor. They were asked to evaluate each of the items based on relevance, clarity, and simplicity. The questions were evaluated on a 4-point Likert scale of 1 (Not relevant), 2 (Less relevant), 3 (More relevant), and 4 (Relevant). We divided the number of specialists who gave evaluations of 3 or 4 by the total number of specialists.

5) Reliability

In order to judge the internal coherence and reliability of the original draft scale, we evaluated Cronbach's α for the whole scale and all sub-scales.

Results

1. Participant attributes

The questionnaire was distributed to 200 dialysis patients with type 2 diabetes within a prefecture. The number of returned questionnaires was 176 (88%). The number of valid responses was 163 (93%). The study participant attributes are summarized in Table 1.

2. Item analysis

The average total score value was 108.50 (SD± 17.01), the score range was 59–141, and the average points for each item were 1.86–3.20. Two items showed ceiling effects, and one showed a floor effect. All three items were related to the family. Specifically, they were, avoiding death-related topics with family, always expressing thanks when receiving help from family with dialysis treatment, and not mentioning to family members that they did not want to go for dialysis. The analysis was performed without excluding any items.

We calculated I-T correlations and excluded the 3 items that had a Pearson correlation coefficient of

Table 1

Participant attributes (n=163)

Attribute		n	%
Age	40s	13	7.7
	50s	34	20.1
	60s	46	27.2
	70s	60	35.5
	80s and over	10	5.9
Gender	Male	121	74.2
	Female	42	25.8
Dialysis history	0.5–3 years	72	43.9
	3–10 years	58	35.4
	Over 10 years	30	18.3
Percentage of weight gain	less than 3%	32	19.6
	3% or more and 6% less than	67	41.1
	6% or more	36	22.1
Period of diabetic therapy	1-10 years	16	9.8
	11-20 years	39	23.9
	21-30 years	45	27.6
	31-40 years	34	20.9
	Over 40 years	13	8
Employment	Yes	61	37.4
	No	102	62.6
Household arrangement	Solo	23	14.1
	With spouse only	61	37.4
	With spouse and unmarried child	29	17.8
	Single parent and unmarried child	3	1.8
	Three generations	19	11.7
	Others	28	17.2
Recognition that there is a family	Yes	151	92.6
	No	12	7

under 0.2 (10, 11, 37). For the remaining 38 items, we sampled a top-scoring group (42 participants; 25%) and a bottom-scoring group (45 participants; 25%), and after conducting G-P analysis, we excluded only the one item (21) that showed no significant difference between the two groups. Thus, 37 items were selected for our social competence scale.

3. Construct validity

After selecting the 37 items, we performed Kaiser-Meyer-Olkin measure of sampling adequacy; as it was higher than 0.5 (0.79), it was considered as good. Bartlett's test of sphericity was significant (p < 0.01). There were some relations between variables.

Based on these results, we conducted a factor analysis using a principal factor method without stipulating the number of factors. The results show eigenvalues, i.e., a standard for deciding the number of factors, of over 1 until the 11th factor. The cumulative contribution ratio until the 11th factor was 65.8%. Checking a factor scree plot, however, allowed us to see that the curve levels off after the fifth factor (Figure 1). In light of the cumulative contribution ratio and scree plot in our initial interpretation, we narrowed down a total of 5 factors and used these for our analysis. We checked the correlation between all the items. Since the Pearson correlation coefficient confirmed a positive correlation between at least 80% of the items, we implemented the Promax rotation.
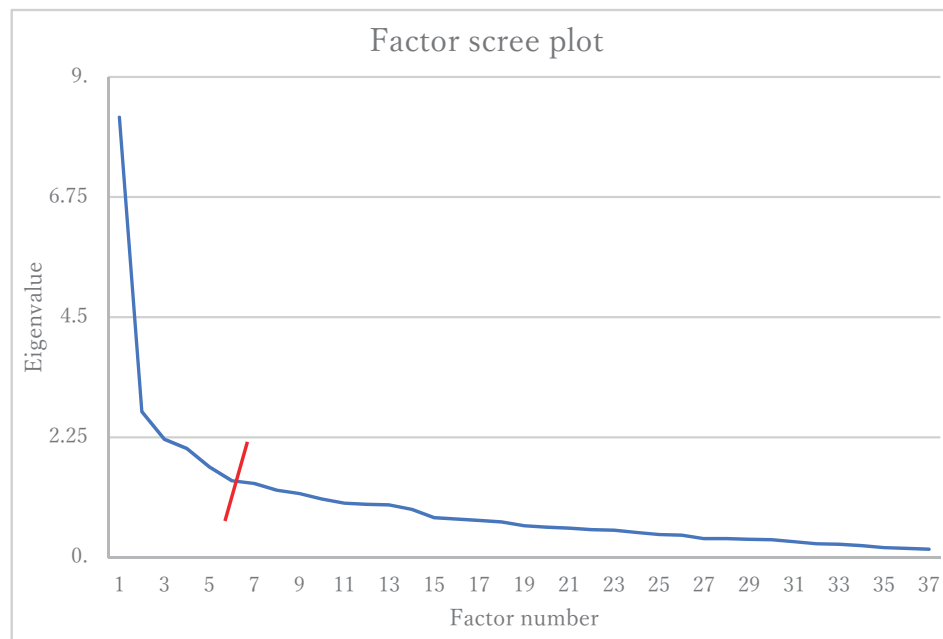
Figure 1: Factor numbers and eigenvalues for our scale for measuring social competency in dialysis patients with type 2 diabetes

We adopted items that satisfied the following criteria; has a factor loading of at least 0.3 and does not approximate multiple factors with a factor loading of at least 0.3. We also combined shared values in our checks. Using a 5-factor setting, we removed the four items (4, 20, 24, 25) that had a factor loading of under 0.3, and the one item (12) that presented factor loading of at least 0.3 and approximated multiple factors. This produced a 32-item, 5-factor structure. Each item's grouping was clear and now available for interpretation (Table 2). Using the 32 items and 5 factors, we then undertook the naming, and reliability and concurrent validity testing of our constituent factors. The 32-item and 5-factor structure resulted in a pre-rotation cumulative contribution ratio of 49.5%.

The constituent factors were defined as follows. The first factor was composed of the seven sub-items from a constituent factor of our original scale, "Consideration and sympathy towards their family." This factor includes items that query aspects such as: telling the family what specifically they would like help with, telling the family what specifically they can do by themselves, and feeling that they fulfill a role. These were the actions a patient could use to judge the limits of how much help they receive from their family, how much they can undertake autonomously, and how they communicate this to their family. We thus named this factor "Balancing

autonomy with dependence on their family."

The second factor was composed of a total of eight items from our original scale, including five items from "Trust and affinity towards people close to them," one item from "Intellectual curiosity," one item from "Consideration and sympathy towards their family," and one item from "Trust in people." This factor includes aspects such as the patient having trust in several medical practitioners, asking medical practitioners and other dialysis patients anything they do not understand about dialysis, having several people close to them (other than family) to talk about dialysis, and people showing more concern during their illness than when they are healthy. This factor expressed trust and affinity regarding the people close to the patient, and thus we named it "Trust and affinity towards people close to them."

The third factor was composed of five items from our original scale, including three items from "Trust and affinity towards people close to them," and two items from "Trust in people." These factors include aspects such as the patient immediately getting on well even with people they do not know, there being several patients in the dialysis unit that the patient knows well, and preference to socialize. We interpreted this as the degree to which a patient will trust people even if they are strangers, and we thus named this factor "Trust in

Table 2:Social competence scale for patients with type 2 diabetes receiving dialysis

Item number	Item content	Factor				
		1	2	3	4	5
First factor: Balancing autonomy with dependence on their family; Cronbach's alpha 0.82						
	contribution ratio 23.9%					
Q1_22	I like hearing my family talk	0.788	−0.079	0.068	−0.032	0.009
Q1_17	I am kind towards my family	0.759	−0.100	0.147	−0.105	−0.071
Q1_16	I tell my family what specifically I can do myself	0.614	0.231	−0.088	0.074	−0.191
Q1_18	I will endeavor to stay alive for the sake of my family	0.561	−0.105	−0.090	0.186	0.088
Q1_15	I tell my family what specifically I would like help with	0.544	0.166	0.064	0.167	−0.225
Q1_14	Despite undergoing dialysis treatment, I still fulfill a role in the family	0.544	0.003	0.097	−0.111	0.180
Q1_19	When my family do something for my dialysis treatment, such as accompanying me there, I always express my thanks	0.516	0.048	−0.065	−0.029	0.126
Second factor: Trust and affinity towards people close to them; Cronbach's alpha 0.75						
	contribution ratio 8.0%					
Q1_09	I talk variously about both dialysis and other things with the people who care about me	0.024	0.669	0.111	−0.125	0.010
Q1_08	There are several people in the area I live that know about being the dialysis patient	−0.184	0.570	0.258	−0.019	−0.097
Q1_27	I ask medical practitioners and dialysis patients to teach me about anything I don't understand about dialysis	0.015	0.544	0.027	−0.048	0.115
Q1_36	People show more concern when I'm ill than when I'm healthy	−0.045	0.479	−0.209	0.268	−0.040
Q1_03	There are several medical practitioners that I can trust	0.046	0.473	0.143	−0.209	0.037
Q1_07	There are several people close to me, who are not family, with whom I can speak about dialysis	0.014	0.454	0.112	−0.183	0.067
Q1_13	Managing my weight after returning home from the dialysis unit is my current duty as a family member	0.228	0.435	−0.179	0.059	−0.065
Q1_02	I like discussing my troubles with medical practitioners and working to solve them together	−0.001	0.418	0.103	0.054	0.202
Third factor: Trust in people; Cronbach's alpha 0.79						
	contribution ratio 6.4%					
Q1_06	There are several patients in the dialysis unit that I know well	−0.001	0.063	0.758	0.030	−0.189
Q1_05	I often speak with patients in the dialysis unit	0.029	0.092	0.670	0.161	−0.196
Q1_34	I immediately get on well even with people I don't know	0.209	−0.053	0.541	−0.131	0.347
Q1_01	I like speaking and doing things together with medical practitioners and dialysis patients	−0.023	0.255	0.490	0.122	0.062
Q1_35	I prefer to be with lots of people rather than by myself	0.050	−0.032	0.474	0.131	0.134
Fourth factor: Interest towards understunding diabetes; Cronbach's alpha 0.76						
	contribution ratio 6.1%					
Q1_30	If I hear dialysis patients with diabetes talk about feeling isolated, I really empathize	−0.029	−0.174	0.052	0.680	−0.170
Q1_29	I'm curious about any way to prevent complications from diabetes getting worse	0.140	−0.195	−0.070	0.623	0.055
Q1_31	Hearing news about diabetes dialysis can make me feel hopeful about my future	−0.087	−0.083	0.109	0.604	0.333
Q1_26	No matter what it is, I end up wanting to try doing whatever other dialysis patients are doing	−0.106	−0.052	0.284	0.451	0.006
Q1_33	Even if they're not an acquaintance, if a patient doesn't come to the dialysis unit I worry about them	−0.126	0.197	0.201	0.444	−0.076
Q1_23	I sometimes reflect with my family on my diabetic years before beginning dialysis	0.204	−0.005	0.094	0.364	−0.127
Q1_32	If it will be useful to patients with diabetes receiving dialysis , I want to talk about these experiences of mine	0.039	0.100	0.159	0.341	0.299
Q1_28	I want to hear thoroughly about complications accompanying dialysis	0.089	0.158	0.021	0.315	0.122
Fifth factor: Trust in their body; Cronbach's alpha 0.69						
	contribution ratio 5.0%					
Q1_40	I am physically strong enough to resolve to survive into the future	−0.063	−0.077	−0.141	0.087	0.764
Q1_39	I have the physical capability to maintain my current bodily functions	−0.018	0.036	0.111	−0.161	0.708
Q1_41	My body responds to self-management	0.010	0.339	−0.168	−0.092	0.440
Q1_38	I need this body, no matter what, in order to live and do things	0.148	0.178	−0.166	0.243	0.340
Overall Cronbach's alpha 0.89	cumulative contribution ratio					

Interfactor correlation

	1	2	3	4	5
	1.000	0.503	0.245	0.436	0.379
	0.503	1.000	0.416	0.485	0.312
	0.245	0.416	1.000	0.201	0.197
	0.436	0.485	0.201	1.000	0.358
	0.379	0.312	0.197	0.358	1.000

Response methods
1: Not at all applicable; 2: Not very applicable; 3: Quite applicable; and 4: Very applicable

people."

The fourth factor was composed of nine items from our original scale, including three items from "Intellectual curiosity," and six items from "Interest in unfamiliar dialysis patients." This factor includes aspects such as truly empathizing when they hear dialysis patients with diabetes talk about feeling isolated and being curious about ways to prevent complications from diabetes getting worse. We interpreted this as an intellectual curiosity that stems from the patient's underlying interest in diabetes itself, leading them to turn their attention to other patients with diabetes. Accordingly, we named this factor "Interest towards understanding diabetes."

The fifth factor was composed of all four "Trust in their body" sub-items from our original scale. We thus named this factor the same as in our original draft, i.e., "Trust in their body."

4. Criterion-related validity

We used KiSS-18 and SOC to investigate the extent to which the particulars measured by our scale corresponded when compared with external standards. The Pearson correlation coefficient of the total scores for social competence and for KiSS-18 was 0.496, showing a significant positive correlation. This confirmed a statistically-significant relation between the social competence scale and KiSS-18, thus supporting criterion related validity.

The Pearson correlation coefficient of the total scores for social competence and SOC was 0.160, indicating no correlation.

5. Content validity

To verify the content validity of the 32-item scale, a questionnaire survey was conducted on the relevance of the items with 6 specialists. The specialists were 2 diabetes nurses, 3 dialysis unit nurses, and a nephrology doctor. The final version of social competence scale had a total CVI of 0.96.

6. Reliability

Overall social competence had an α coefficient of 0.89, while for the sub-scales, it was 0.69–0.83, indicating overall high values. A 5-factor, 32-item scale was produced for social competence, with verified reliability, based on the above analysis.

Discussion

1. Scale reliability and validity

We think that the current target group statistics are not very different from the national average. The incidence of dialysis in patients with type 2 diabetes in Japan is shown as a male-female ratio; Male 5 : Female 2[4].

We used exploratory factor analysis to validate the construct of our scale. A total of 5 factors and 32 items were extracted. The scale's cumulative contribution ratio before the Promax rotation was 49.5%. Cronbach's alpha was no less than 0.69, and thus internal consistency was maintained. Further, the I-T analysis displayed a significantly higher Pearson correlation coefficient between all items. G-P analysis showed a significant difference between the two groups. The scale's internal consistency and construct validity were thus verified. For criterion-related validity, we concluded that there was a significant correlation with KiSS-18 at 0.496. The total CVI of the final version of social competence scale in dialysis patients with diabetes was 0.96. The results above supported the reliability and validity of social competence measurement scale in dialysis patients with diabetes.

2. Scale factor composition and characteristics

The first factor, "Balancing autonomy with dependence on their family," comprises 7 of the 14 "Consideration and sympathy towards their family" items in our original draft. The particulars of the items indicate a patient asking reliable family members for help while striking a balance between autonomy and reliance, by being sure of the range of their own abilities. It became clear that the patient needs to learn to balance autonomy from and dependence on their family to form ties with their family members, who have become support givers.

Next, from the particulars of their sub-scales, the second factor, "Trust and affinity towards people close to them," the third factor, "Trust in people," and the fifth factor, "Trust in their body," were given the same names as in our original draft. What is shared by all these factors is the ability to "trust." In particular, the fifth factor, "Trust in their body," is peculiar to social competence in dialysis patients with type 2 diabetes. In terms of the relationships surrounding the patient, trusting others, and improving the ability to trust

in one's current body may be considered essential elements in improving social competence in these patients.

The fourth factor, "Interest towards understanding diabetes," is composed of intellectual curiosity stemming from the very fact itself that the patient has diabetes and their awareness towards other patients with diabetes. Accordingly, making a patient conscious of their diabetic condition may also be linked to the cultivation of social competence in these patients.

3. Potential uses for the social competence scale

Issues faced by patients regarding relations with families and dialysis staff have previously been highlighted, and a suggested solution to these features is the need to cultivate relationships that enable medical staff to provide support[29]. This study has addressed relationship building abilities present on the patient's side and made it possible to measure these abilities, thereby facilitating future changes in the patient's care.

Some people can naturally improve social competence over the years of dialysis, while others do not. The latter can be educated to help them cultivate their ability to receive support from the people close to them fruitfully and to go on to build social networks around themselves. Not only does our scale enable the measurement of social competence in dialysis patients with type 2 diabetes, but the scale's constituent factors themselves could also be offered as learning objectives in patient education programs.

Research limitations

The study participants were from Japan, and it is not clear whether our results will generally apply to other cultures.

The scale created in this study showed a correlation between KiSS-18. However, this was examined only with cross-sectional data; therefore, we have not examined the effect on QOL. Therefore, we cannot determine the desirable point values on the scale.

Conclusion

We developed a scale for social competence in dialysis patients with diabetes, presenting 32 items composed of 5 factors, namely Balancing autonomy with dependence on their family, Trust and affinity towards people close to them, Trust in people, Interest towards understanding diabetes, Trust in their body. Internal consistency was maintained by α (0.8). Criterion-related validity was confirmed using KiSS-18, while content validity was confirmed using a content validity index. Our social competence assessment scale was valid and reliable and could be used by caregivers to provide better support to dialysis recipients.

Acknowledgments

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血液透析治療を受ける 2 型糖尿病患者の「社会力」を測定するための新しい尺度

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要　　旨

目的：

　2 型糖尿病患者は，透析導入をきっかけに，サポートを受ける側として，サポート提供側である身近な人々との新たな関係性を築く力が必要になる。人が人とつながり社会をつくる力である「社会力」をベースに，日本人である 2 型糖尿病透析患者用の社会力尺度を作成した。尺度の信頼性と妥当性を検討した。

方法：

　この研究は，日本人の 2 型糖尿病透析患者 163 名（男性 121 名，女性 42 名）を対象とした横断研究であった。患者の平均年齢は，65.1 ± 10.3 歳（44-91 歳）であった。患者の透析歴は，6.0 ± 4.7 年（0.5-25 年）であった。データは，探索的因子分析，基準関連妥当性，信頼性テストを介して分析された。

結果：

　2 型糖尿病の透析患者の社会力について得られた最終的な尺度は，32 項目の 5 因子構造で構成された。32 項目すべてのクロンバッハの α 係数は 0.89 で，全体の分散の 49.05％を説明した。この尺度は，KiSS-18 スケールとの間に有意な相関があった。

結論：

　日本人の 2 型糖尿病透析患者の社会力尺度は，2 型糖尿病患者の身近な人々との関係性を評価するため，看護師にとって重要なツールであることが示唆された。さらに，2 型糖尿病透析患者の社会力の構成因子が明らかになったことで，看護師は患者に対して，社会力を育むための教育プログラムを開発することが可能である。よって，看護師の臨床実践の場で，より良いケアを提供することができる。