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A type of youth-onset type1 diabetes mellitus patients by psychological characteristics in the eating behaviors

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ABSTRACT

This study was designed to investigate views and understandings about the eating behaviors of youth-onset type 1 diabetes mellitus (insulin-dependent diabetes mellitus; IDDM) patients. The data was obtained by means of qualitative analysis of subjects' narratives and by deducing themes that were expected to symbolize their episodes pertaining to eating experienced by young males and females with IDDM through the process of abstraction. No report characterizing the eating behaviors of youth onset IDDM patients has been published, and no analysis has been reported of episodes pertaining to eating experienced by young males or females with youth-onset IDDM.

As a result, 19 themes were extracted from the subjects' episodes pertaining to eating. Moreover, twenty-three variables, i.e., 19 extracted themes and 4 background variables (gender, age, age upon disease onset and duration of diabetes) were analyzed by dual scaling on the basis of the categorization method adopted for each variable. Our analysis yielded three solutions, and the resultant characteristics unveiled in Solutions 1, 2 and 3 were named "awareness about the extraordinary nature of oneself associated with the stage of development", "discomfort due to anxiety and an unsatisfied desire due to diabetes mellitus" and "balance between dependence on parents and self-responsibility related to dietary control", respectively. Furthermore, the weight of the 18 individuals was plotted on a two-dimensional graph, with the X-axis indicating Solution 1 and the Y-axis indicating Solution 2. The subjects were thus grouped by the location of their plotted points. In this way, the subjects were divided into 8 groups, and a different characteristic was suggested for each group.

These results proved that their thoughts on eating behavior were closely influenced by growth development and diabetic medical treatment itself. We believe that the findings of this study will not only facilitate better understanding of young patients with IDDM, but will also serve as a basis for the future development and application of nursing intervention specifically tailored to the patient.

KEY WORDS

youth-onset type1 diabetes mellitus patient, eating behavior,
psychological characteristics, quality of life, nursing intervention

Introduction

There has recently been a rise in the prevalence of abnormal eating behaviors (negative attitudes, bulimia, etc.) among young women with diabetes mellitus. A number of domestic and foreign studies have been conducted on the eating behaviors of

diabetic patients, with emphasis on similarities between the abnormal eating behaviors of type I diabetes patients and those in the category of eating disordered individuals. This kind of study has been conducted by many investigators in Western countries, starting around 1980¹⁻³⁾. Close attention has recently

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begun to be paid to this theme in Japan, and many of the studies conducted in Japan pertain to women with type I diabetes mellitus (insulin-dependent diabetes mellitus; IDDM)⁴⁻⁶⁾.

It has also been reported that inappropriate use of insulin to reduce body weight has been found in 37% of the women with IDDM, although no male patients with the same disease⁷⁾ seem to be practicing the same abuse of the medication. That is, it is not uncommon for women with IDDM to be preoccupied with a desire to be slim or attain an ideal physical image, feel a sense of guilt after eating, feel compelled to exercise excessively or engage in binge eating, or fail to take insulin as instructed by their physicians while at the same time following extreme diets or weight control regimens at their own discretion. These young women are prone to becoming depressed, probably leading to an inability to take their prescribed daily level of energy due to anorexia associated with depression, reduction in physical activity and poor control of blood glucose due to noncompliance with the therapeutic instructions.

The percentage of youth-onset patients is much higher among patients with IDDM than among patients with NIDDM (non-insulin-dependent diabetes mellitus or type II diabetes mellitus). The etiological factors for IDDM differ from those for NIDDM, which is a chronic disease associated with daily habits. Patients with IDDM require intervention with methods different from those used in the management of patients with NIDDM. To date, however, the diet regimen for patients with IDDM has often been viewed as being identical to the dietary restrictions imposed on patients with NIDDM. As a result, individuals developing youth-onset IDDM at an early age can be exposed to various unfavorable factors like social prejudice, etc. during their years of growth and

development, and these factors may adversely affect the psychology of these young patients. This issue is also associated with the recent problematic eating behaviors of young people in general. However, no intervention into this kind of problem has been suggested, and no report characterizing the eating behaviors of youth-onset IDDM patients has been published. Furthermore, no analysis has been reported of episodes pertaining to the eating experienced by youth-onset males or females with IDDM.

This study was designed to investigate views and understandings about the eating behaviors of youth-onset patients with IDDM. The data was obtained by means of qualitative analysis of the subjects' narratives and by deducing themes that were thought to symbolize their episodes through the process of abstracting their episodes. The study was also aimed at analyzing the psychological characteristics revealed by individual patients, in comparison with the deduced themes using the scaling method, with the ultimate goal of classifying the psychological features of young patients with IDDM. We believe that the findings from this study will facilitate better understanding of many youth-onset patients with IDDM and serve as a basis for the future development of methods of nursing intervention specifically tailored to the type of given patient.

Overview of design

This study was conducted in two stages, i.e., extraction of themes and classification of subjects.

1. Extraction of Themes

Methods

1) Subjects (Table 1)

The subjects (informants) were 18 patients with youth-onset IDDM who satisfied all of the following requirements: (1) onset of disease at an early age

Table1. Background variables
(n=18)

Gender	Male	6
	Female	12
Age	27.1 ± 7.3	(18 ~ 40) year
Age upon disease onset	9.9 ± 4.1	(2 ~ 8) year
Duration of diabetes	17.2 ± 7.2	(9 ~ 31) years

Mean ± SD (range)

(below 18), (2) 18 years or older at the time of the interview, and (3) having given informed consent to the study while they were attending the Hokuriku Summer Camp for Diabetic Children in Japan either as post-campers or volunteers.

2) Data Collection

First, each subject (informant) was asked to talk about episodes related to eating, from the onset of IDDM to the time of the interview. The interviewer (the author) had become familiar with each subject by the time of the interview. Each subject was asked to talk about his/her experiences and views in detail during the approximately one hour to one and a half hour interview. Furthermore, all the narratives during the interview were tape-recorded with the prior consent of each subject and later carefully transcribed.

3) Data Analysis

The data collected was subjected to qualitative analysis. The ethnonursing approach⁸⁾, developed by Madeleine Leininger on the basis of cultural anthropology, was employed.

The ethnonursing method was designed with enablers (or aids) to get into people's innermost world and learn from them what they know, understand, and experience about caring, health, wellness and survival. Observing and learning from the informants as if using their eyes, ears, and experiences, is a central feature of the methods.

In our study, we used the ethnonursing method to enter the clients' world and learn from them or their emic (insiders) view and how these data may differ from or be similar to the professional nurses' etic (largely outsiders) views and experiences.

During each interview, we continuously endeavored to confirm what the subject said, to ensure the truth and accuracy of the interview.

When classifying the data in line with the purposes of the study, we first attempted to identify the overall components constituting the data, while keeping the raw expressions unchanged. Then, these components were subjected to correction, unification and modification in order to identify patterns underlying the repeated content. The patterns thus identified were subjected to some degree of abstraction to deduce themes symbolizing the episodes.

2. Classification of the Subjects

Methods

1) Variables and Category Identification

The data (responses of subjects during the interview) were cut into sentences. For each theme extracted, every episode was rated as to the intensity of the subject's feeling about the theme on a five-category scale (all related episodes were analyzed for each theme). The score for each episode in the theme was totaled for each subject, and the total score for each theme for each subject rated on a five-category scale. Because the number of episodes related to a given theme varied among different subjects, and the intensity of the subject's feeling about a given episode also varied from individual to individual, the total score differed among different subjects.

2) Analysis by Dual Scaling

Through statistical analysis of the variables and the categorical data, the subjects were classified into several types. The characteristics of each type were then determined.

Dual scaling⁹⁾, a method for analyzing categorical data, was employed for our statistical analysis. This analysis was conducted by FORTRAN program DUAL3 written Nishisato. In this method, analyses are given deep significances to by positive or negative weights. It does not require the data to be analyzed to be normally distributed or consist of continuous variables. This method is applicable both to linear and nonlinear data. Dual scaling is thus expected to allow: (1) relatively simplified analysis of data structure, (2) detection of nonlinear relationships of data, (3) simultaneous analysis of row variables and column variables, (4) clear-cut graphic representation of data structure, (5) extraction of total information from a given set of data at any time, (6) analysis of diverse data, (7) placing of full reliance on existing data, and (8) meaningful analysis of variables with inter-individual variances retained. Because of these features, we judged that dual scaling would be the most suitable method for this study.

Results

1. Extraction of Theme

The subjects' episodes pertaining to eating were analyzed, and 19 themes extracted (Table 2).

Table 2. Extracted themes and related episodes

Theme	Episode
Stress due to forced food ingestion or diet restriction	Healthy people can easily refuse it, but, for me, the thought that I have to eat it even though I don't want it causes stress. This kind of stress, causing gastric pain, is experienced frequently.
	I cannot remember the exact time, but little time was left and we had to complete eating soon. At that time, I did not feel like eating but was aware that I had been instructed to take three meals a day. All around me said that they did not like eating it, but I knew I had to eat it. I was at a loss to know what to do.
Always having evident or latent anxiety about the possible onset of hyperglycemia or complications	Although I did not intend to resist controlling my disease, I was obsessed by the idea that failure to perform self-injection could lead to a serious outcome.
	I cannot free myself from the anxiety of complications and possible loss of consciousness. Not only disorders associated with hypoglycemia, but also complications caused by continued hyperglycemia, make me anxious.
Hardness and difficulty in keeping blood glucose at a moderate level	Hyperglycemia makes me feel languid and anxious about complications. To avoid hyperglycemia, I always attempt to keep my blood glucose as low as possible. But, (in an excited voice,) it inevitably caused hypoglycemia. It would be easier if diabetic patients were only required to avoid either hyperglycemia or hypoglycemia, instead of taking care of both.
	Blood glucose level is indeed associated with eating, but I don't know how. For example, eating excessively can elevate blood glucose level, but blood glucose does not always rise after excessive eating. The outcome varies from time to time.
Pain or discomfort about the concern of surrounding people about my eating behavior	I felt resistance when carrying a lunchbox to school, because my diet differs from that of other pupils. They look upon me as if I were a stranger. Some pupils asked why my lunch differed so much from theirs. My teacher had to explain my situation to such pupils. I was ill-treated by some pupils for this reason.
	School lunch was a difficult time. Sometimes, miso soup or Chinese noodles, which I could not take, was served. At such times, I feared someone might criticize me for having left the dish unfinished.
Resistance to parents who believe that I should not eat sweets or take large-volume meals	When mother found me while I was eating something I brought into my room, I was severely scolded. At such times, I felt only that I was sick.
	Though I want to eat, but I will receive scolding. If such possibility is high, I choose not eating for fear of being scolded.
I have got accustomed to self-injecting insulin after eating	I don't dislike insulin. It is like toothbrushing.
	I have no resistance to self-injecting insulin. When I need an injection, I often go to the toilet and carry out the injection there. Many of my friends know about this habit of mine. I sometimes inject insulin into my foot. It has become an activity of daily living.
Resistance to the necessity of continued insulin injection	Even when I am busy working, I cannot forget my self-injection. It is sometimes troublesome. Now, I don't mind the pain caused by the injections or feel fear of injections. But, self-injection is troublesome. It is not welcomed.
	When I was in the third year of junior high school or the first and second years of senior high school, I often felt it unreasonable that only I had to self-inject insulin at school.
I feel troubled that I have to do something that is not needed by healthy people	If transplantation succeeds, I will no longer have to do this. This will be a great change. No need for injections, no anxiety about hypoglycemia, and no worries about the volume of food. That's enough.
	When I was a junior high school student, my teacher told me that I should self-inject in the school nurse's office. I was slow in eating and had no time to get to the school nurse's office after finishing lunch. I told my teacher that if I developed hypoglycemia and died due to failure to take insulin, it would be his fault. The teacher then said that I could take insulin in the classroom.
Unpleasant feelings of being treated differently due to the disease, diabetes mellitus	Probably I will not talk about insulin injections unless asked. If I am asked what I am doing, I will answer that I am self-injecting. If asked why I inject, I will answer that I have type I diabetes. If I simply say "diabetes", they will misunderstand that my disease is associated with my daily habits. So, I avoid using the term "diabetes" but simply say that I am taking insulin because of a shortage of hormones. It will be OK. I don't need to say "diabetes".
	When I was absent from school, my teacher explained my condition (diabetes) inaccurately to my classmates. He said that my blood was abnormal rather than contaminated.
I think there is no way other than making the effort by myself	(Who supports you or who is the key person for you?) That's me. (You cannot rely on anyone?) No, I cannot rely on anyone. I control myself. I will continue with it. My parents don't know how to inject.
	(Who supports you now?) Maybe, myself. My parents sometimes encourage me, but they do not follow me so closely, and I keenly recognize the necessity that I take care of myself well.
Knowing how to deal with episodes of hypoglycemia has become a part of my daily life	In my case, hypoglycemia develops very slowly. If some signs of hypoglycemia are noted, then I take countermeasures. This is not so troublesome.
	I always carry glucose (this powder). It's commercially available. I seldom have to use it. In towns, I often drink juice bought from an automatic vending machine. If I need glucose while driving a car on the highway or in a similar situation, I use this powder. In addition, I always keep juice in my car to prepare for emergency situations. Anyway, prevention is best.
I have some days when I can eat as I want	Once a month, I eat as I want (for example, eating the entire dish served at a hot spring hotel. Of course, I check my blood glucose after the meal to confirm the absence of elevation in blood glucose. Eating so much once a month does not affect my condition (body weight, A1c, etc.). Too strict a self-control will not lead to good results. This kind of escape is indispensable (of course, care needs to be taken to avoid excessive escape).
	After each live music concert, there is a party. I am also invited to such parties and I cannot refuse. I cannot say I am a poor drinker so I drink heavily once a month.
Eating behind my parents' back	When I was a junior high school student, I used to eat cakes or sweets (which were abundant at home) behind my family's back. My mother often scolded me for such conduct.
	When my parents were not at home, I used to eat something, saying, "this is a good opportunity to eat." Probably I thus managed to avoid excessive mental stress.
Pleasure in taking supplementary food to deal with hypoglycemia	This pleasure is characteristic of small children. Small children want to eat cakes or sweets. When I was a child, there were many things I wanted to eat, but I was sometimes unable to eat cakes when others were eating. So, I felt that if hypoglycemia developed, I could eat cakes to replenish glucose.
	But, I did not want to intentionally induce hypoglycemia just to eat anything. I felt that it would be lucky if it developed.
Desire to eat	It was not that I wanted to eat bread. I wanted to eat anything. That was my desire.
	Until that time, I did not know very well what complication would develop if I ate excessively. Anyway, I had a strong desire to eat.
Anxiety about the possibility of hypoglycemia	When I was in emergency, I called my parents over the interphone. At present, I live alone and I must avoid losing consciousness while asleep. To this end, I measure my blood glucose level before going to bed to assess my condition. This necessity serves as a pressure or stress for me. It is troublesome.
	I don't like to become anxious. So I manage risks adequately. That is, I take all necessary steps to avoid trouble. If I do so, I don't need to feel anxious. I keep insulin in various places (e.g., bag).
Blood glucose control is more important than becoming slim	For me, complications are more dreadful than becoming obese. I don't mind that I am slightly obese.
	I heard that repeated injections of insulin makes us obese. But, I may die if I don't inject insulin.
I have a reliable person who I can inform about my disease and from whom I can receive mental support when needed	Our family is frank. I tell everything that has occurred during the day to my mother before going to bed or after returning home from my part-time job. This opportunity serves as support for me. Even when something unfavorable has occurred, I can receive advice from my mother.
	I had many good friends. This was good luck. Everyone knew of my disease (and insulin injections) but did not speak about it in front of me.
Type I rather than Type II has a way of escape	Type I diabetes mellitus is difficult to treat and requires frequent injections. However, patients with type II diabetes mellitus are required to control various aspects of daily living. Although type I patients also face some difficulties, there is a way of escape for them.
	I think type I is easier to endure than type II. What is needed for type I patients is to take certain drugs (e.g., certain number of tablets or certain volumes of injection). Type I patients can eat more freely than type II patients. I think so.

2. Classification of the subjects

1) Variable and category identification

The 23 variables (19 extracted themes, gender, age, age upon disease onset and duration of diabetes) were classified. In particular, the 19 themes were classified into five categories, gender into two categories, age and duration of diabetes into three categories, and age upon disease onset into four categories (Table 3).

2) Analysis by Dual Scaling

Twenty-three variables, i.e., 19 extracted themes and four background variables (gender, age, age upon disease onset and duration of diabetes) were analyzed by dual scaling on the basis of the categorization method adopted for each variable. The following results were obtained.

(1) Percent Accountability in Solutions

Our analysis yielded three solutions. The percent accountability was 12.0% for Solution 1, 10.0% for Solution 2 and 9.5% for Solution 3.

(2) Characteristics of Each Solution

Variables with high significance in Solution 1 were: Th9 (Th indicates Theme.) "unpleasant feelings of

being treated differently due to the disease, diabetes mellitus" and Th11 "knowing how to deal with episodes of hypoglycemia has become a part of my daily life". In addition, the variable age had high significance in Solution 1. Highly significant variables in Solution 2 were Th15 "desire to eat" and "duration of diabetes". In Solution 3, the following variables were spotted to be highly significant: Th5 "resistance to parents who believe that I should not eat sweets or take large-volume meals", Th18 "I have a reliable person who I can inform about my disease and from whom I can receive mental support when needed", Th13 "eating behind my parents' backs" and Th14 "pleasure in taking supplementary food to deal with hypoglycemia". Th12 "I have some days when I can eat as I want" and Th8 "I feel troubled that I have to do something that is not needed by healthy people" were variables of high significance in both Solution 1 and Solution 2. Th2 "Always having evident or latent anxiety about the possible onset of hyperglycemia or complications" was a variable of high significance in both Solution 2 and Solution 3.

Table 3. Classification of the characteristics of subjects and themes

Classification of the characteristics of subjects		Classification of the themes	
Variable	Category	Variable	Category
Gender	1. Male	Theme 1 : Stress due to forced food ingestion or diet restriction	<div> 1. Not applicable 2. Relatively not applicable 3. Neutral 4. Relatively applicable 5. Fully applicable </div>
	2. Female	Theme 2 : Always having evident or latent anxiety about the possible onset of hyperglycemia or complications	
Age	1. 18 ~ 24years	Theme 3 : Hardness and difficulty in keeping blood glucose at a moderate level	
	2. 25 ~ 34years	Theme 4 : Pain or discomfort about the concern of surrounding people about my eating behavior	
	3. 35 ~ years	Theme 5 : Resistance to parents who believe that I should not eat sweets or take large-volume meals	
Age upon disease onset	1. 2 ~ 5years	Theme 6 : I have got accustomed to self-injecting insulin after eating	.
	2. 6 ~ 9years	Theme 7 : Resistance to the necessity of continued insulin injection	.
	3. 10 ~ 12years	Theme 8 : I feel troubled that I have to do something that is not needed by healthy people	.
	4. 13 ~ years	Theme 9 : Unpleasant feelings of being treated differently due to the disease, diabetes mellitus	.
Duration of diabetes	1. ~ 10years	Theme 10: I think there is no way other than making the effort by myself	.
	2. 11 ~ 20years	Theme 11: Knowing how to deal with episodes of hypoglycemia has become a part of my daily life	.
	3. 21 years	Theme 12: I have some days when I can eat as I want	.
		Theme 13: Eating behind my parents' backs	.
		Theme 14: Pleasure in taking supplementary food to deal with hypoglycemia	.
		Theme 15: Desire to eat	.
		Theme 16: Anxiety about the possibility of hypoglycemia	.
		Theme 17: Blood glucose control is more important than becoming slim	.
		Theme 18: I have a reliable person who I can inform about my disease and from whom I can receive mental support when needed	.
		Theme 19: Type I rather than Type II has a way of escape	.
			*Note: 5 categories/theme 5 categories x 19 themes

In analyzing the categories with high weights, we found that high age caused a high negative load, a strong feeling of Th11 "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" caused a positive weight, and a strong Th15 "desire to eat" caused a slightly higher negative weight in Solution 1. In Solution 2, a strong feeling of Th11 "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" caused a high negative weight, unlike the positive weight seen in Solution 1, and "10-years or less duration of diabetes" caused a slightly high positive weight. Furthermore, Th8 "I feel troubled that I have to do something that is not needed by healthy people" and Th12 "I have some days when I can eat as I want" caused a high positive weight in Solution 1 and a high negative weight in Solution 2. In Solution 3, weakness of the feeling Th18 "I have a reliable person who I can inform about my disease and from whom I can receive mental support when needed" and a strong feeling of Th14 "pleasure in taking supplementary food to deal with hypoglycemia" caused slightly high positive weights, and a strong desire of Th13 "eating behind parents' backs" caused slightly high negative weights.

Thus, in Solution 1, the intensity of the feeling of accepting what is needed for diabetic patients (i.e., dealing with episodes of hypoglycemia and receiving periodical checks of blood glucose level and injections of insulin) as natural and the habit of the patients of incorporating some days of free eating in daily life were found to be in inverse proportion to the severity of the pain associated with dietary restrictions. It was also suggested in Solution 1 that age was an important variable characterizing individual subjects. In Solution 2, factors other than those extracted in Solution 1 were extracted. It is noteworthy that in Solution 2, the intensity of the feeling of accepting the necessity of dealing with hypoglycemic episodes and to receive periodical checks and insulin injections characterized the subjects in a direction opposite to the direction found in Solution 1. It is also suggested in Solution 2 that a shorter duration of diabetes is a significant factor characterizing the individual subjects. Prior to the present study, we had anticipated that the age of onset of the disease would be closely associated with

characteristics of the patients. The aforementioned result, contradictory to our anticipation, indicates the necessity of paying due attention to the duration of diabetes when dealing with diabetic patients. In Solution 3, factors other than those extracted in Solution 1 and 2 have been extracted. In Solution 3, the relationship of patients to the people surrounding them (such as parents, friends) and the intensity of the awareness of self-responsibility for diet control were found to have association with the characteristics of individual subjects. Thus, it is suggested that the dietary activity of the patients is determined not only by the patients themselves but also by their relationship to people around them.

The variables, categories and characteristics of the subjects which had high weights were combined. In addition, the resultant characteristics unveiled in Solutions 1, 2 and 3 were named as "awareness about the extraordinary nature of oneself associated with the stage of development", "discomfort due to anxiety and unsatisfied desire due to diabetes mellitus" and "balance between dependence on parents and self-responsibility related to dietary control", respectively.

(3) Two-dimensional Characterization of Subjects on the Basis of the Solutions

The weights of the 18 individuals were plotted on a two-dimensional graph, with the X-axis indicating Solution 1 and the Y-axis indicating Solution 2. The subjects were thus grouped by the location of their plotted points. In this way, the subjects were divided into eight groups (Fig. 1). Of the 19 themes, six were reflected in such grouping (Table 4).

① Group 1: Patients A, F and O

Solution 1 was plotted at a point with high negative weight. Solution 2 was located intermediate between positive and negative weights.

When the variables in Solution 1 were analyzed, age was relatively high, and themes 8, 11 and 12 (themes with high weights) were rated as low-score categories. This means that the feeling "I feel troubled that I have to do something that is not needed by healthy people" was not strong, and the feelings "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" and "I have some days when I can eat as I want" were weak. Of the variables in Solution 2, the duration of diabetes was long, and themes 8, 12

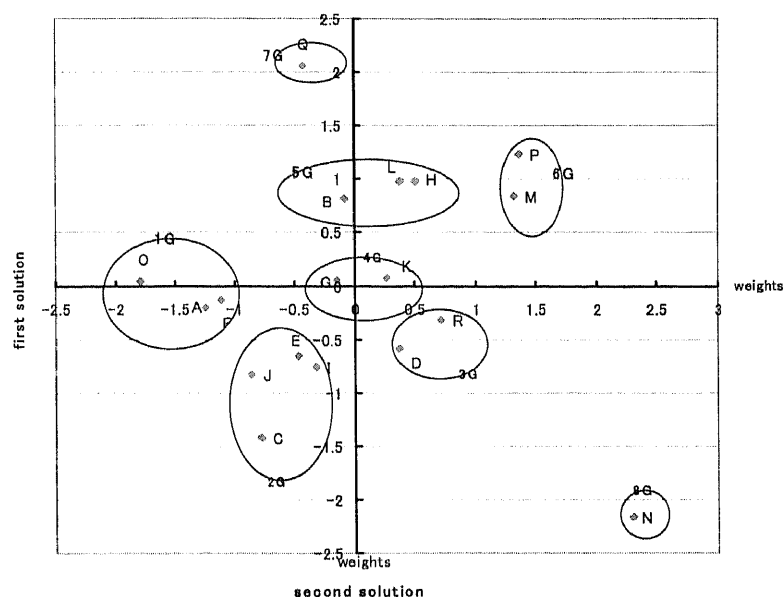


Fig.1. Scattergram of subjects' scores using first and second solutions
A – R indicate subjects
1G – 8G indicate group 1 ~ 8

Table 4. Themes possibly in common with those reflected into the classification

Themes reflected into classification	Possibly common themes
Theme 2: Always having evident or latent anxiety about the possible onset of hyperglycemia or complications	Theme 1 : Stress due to forced food ingestion or diet restriction
Theme 8: I feel troubled that I have to do something that is not needed by healthy people	Theme 3 : Hardness and difficulty in keeping blood glucose at a moderate level
Theme 9: Unpleasant feelings of being treated differently due to the disease, diabetes mellitus	Theme 4 : Pain or discomfort about the concern of surrounding people about my eating behavior
Theme 11: Knowing how to deal with episodes of hypoglycemia has become a part of my daily life	Theme 5 : Resistance to parents who believe that I should not eat sweets or take large-volume meals
Theme 12: I have some days when I can eat as I want	Theme 6 : I have got accustomed to self-injecting insulin after eating
Theme 15: Desire to eat	Theme 7 : Resistance to the necessity of continued insulin injection
	Theme 10: I think there is no way other than making the effort by myself
	Theme 13: Eating behind my parents' backs
	Theme 14: Pleasure in taking supplementary food to deal with hypoglycemia
	Theme 16: Anxiety about the possibility of hypoglycemia
	Theme 17: Blood glucose control is more important than becoming slim
	Theme 18: I have a reliable person who I can inform about my disease and from whom I can receive mental support when needed
	Theme 19: Type I rather than Type II has a way of escape

(factors other than those removed in Solution 1) were found.

Thus, patients assigned to this group seem to be characterized as follows: (1) These patients have a strong desire to control diet by themselves, and their dietary habits are little affected by their parents. (2) These patients think that their view of dietary restrictions and other necessities associated with diabetes mellitus differs from those of other

diabetic patients, and so do not find such differences problematic.

② Group 2: Patients C, E, I and J

In both Solution 1 and 2, the negative weight was high or slightly high.

Of the variables of Solution 1, age was slightly high. Themes 8 and 12 (variables with high weight) were rated as low-score categories. These results suggest that as in Group 1, the patients assigned to

Group 2 can be characterized by relatively weak feelings shown in their words such as "I feel troubled that I have to do something that is not needed by healthy people" and "I have some days when I can eat as I want". Of the Solution 2 variables, the duration of diabetes was long, and theme 2 (a variable with high weight) was rated as a high-score category. Thus, in Group 2, the feeling of "always having evident or latent anxiety about the possible onset of hyperglycemia or complications" was strong.

Group 2 had several similarities to Group 1, but differed markedly from Group 1 in that the feeling of "always having evident or latent anxiety about possible onset of hyperglycemia or complications" was strong in Group 2. This suggests that control of blood glucose is not very favorable in Group 2. Irritation and discomfort due to poor control of blood glucose were also characteristic in this group.

③ Group 3: Patients D and R

In both Solutions 1 and 2, the weight was approximately intermediate between positive and negative. The weight in Solution 1 was slightly biased to the positive range, while that in Solution 2 was biased to the negative range.

Of Solution 1 variables, theme 9 (a variable with high weight) was rated as a high-score category. This means that the patients in this group had the "unpleasant feelings of being treated differently due to the disease, diabetes mellitus", and they were potentially anxious about the possible onset of hyperglycemia or complications.

In other words, the patients in this group had two different desires, namely, a desire for strict self-control and a desire to behave as if they were free of diabetes mellitus despite the presence of anxiety.

④ Group 4: Patients G and K

In both Solutions 1 and 2, the weight was approximately intermediate between positive and negative (the weight in Solution 1 was slightly biased to the negative range in Patient G). The weight in Solution 2 was slightly biased to the positive range.

Of Solution 1 variables, age was relatively low, and themes 8, 9, 11 and 12 (variables with high weights) were rated as low-score categories. This suggests that the feelings symbolized by the words "I feel troubled that I have to do something that is not needed by

healthy people", "unpleasant feelings of being treated differently due to the disease, diabetes mellitus", "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" and "I have some days when I can eat as I want" were not strong in this group. In the analysis of Solution 2 variables, themes 8 and 12 were found as factors other than those eliminated in Solution 1. Thus, in Group 4, age tended to be lower and the patients showed a tendency to consider their daily life with diabetes mellitus as an ordinary life rather than an extraordinary life. In addition, the patients in this group were free of "unpleasant feelings of being treated differently due to the disease, diabetes mellitus".

⑤ Group 5: Patients B, H and L

In Solution 1, the weight was approximately intermediate between positive and negative (it was biased to the negative range in Patient B and to the positive range in Patients L and H). In Solution 2, the weight was positive (slightly high to high).

Of Solution 1 variables, themes 8, 9 and 11 (variables with high weights) were rated as low-score categories. This means that the feelings "I feel troubled that I have to do something that is not needed by healthy people", "unpleasant feelings of being treated differently due to the disease, diabetes mellitus" and "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" were weak in this group. Solution 2 variables tended to have high positive weights. However, the variables with high weights were not rated as high-score or low-score categories. (Theme 8 was rated as a low-score category.)

The age of onset of the disease was higher in Group 5 than in Group 4. The patients assigned to this group thought that it was possible to control their diet by themselves. Thus, they were not exposed to high stress and were leading their daily lives relatively quietly, without showing any particular posture of refusal.

⑥ Group 6: Patients M and P

In Solution 1, the weight was high in the positive range. In Solution 2, the weight was positive (slightly high to high).

Of Solution 1 variables, age was relatively low. Of the variables with high weights, Theme 9 was

rated as a high-score category. This indicates that the patients assigned to this group could be characterized by "unpleasant feelings of being treated differently due to the disease, diabetes mellitus". Of Solution 2 variables with high weights, Theme 15 was rated as a low-score category, indicating that the "desire to eat" was absent.

Patients in Group 6 experienced "unpleasant feeling of being treated differently due to the disease, diabetes mellitus" at low age, and, for this reason, they had the feeling that "we have to do something extra just because of diabetes mellitus although we are not different from ordinary people."

⑦ Group 7: Patient Q

In Solution 1, the negative weight was slightly high. In Solution 2, the positive weight was high.

Of Solution 1 variables, age was relatively low. Of the variables with high weights, Theme 8 was rated as a high-score category. This indicates that patients in this group had a strong feeling that "I feel troubled that I have to do something that is not needed by healthy people". Of the Solution 2 variables with high weights, Theme 15 was rated as a low-score category and Theme 2 as a high-score category. The "desire to eat" was not strong, but the feeling "always having evident or latent anxiety about the possible onset of hyperglycemia or complications" seemed to be strong.

The patients assigned to this group always had anxiety about the possible onset of hyperglycemia or complications. At the same time, the patients felt troubled about doing what is not needed by healthy people. Patients in this group are therefore likely to follow their own style of home treatment of their disease.

⑧ Group 8: Patient N

In Solution 1, the positive weight was high. In Solution 2, the negative weight was high.

Of Solution 1 variables, age was relatively low. Theme 8, 9, 11 and 12, which are variables with high weights, were rated as high-score categories. This means that the feelings "I feel troubled that I have to do something that is not needed by healthy people", "unpleasant feelings of being treated differently due to the disease, diabetes mellitus", "knowing how to deal with episodes of hypoglycemia has become a part of my daily life" and "I have some days when I can eat

as I want" are strong in this group. In the analysis of Solution 2 variables, Theme 8 and 12 (factors other than those eliminated in Solution 1) were found.

Thus, the patients assigned to this group felt troubled about doing what is not needed by healthy people and had unpleasant feelings about being treated differently due to the disease, diabetes mellitus. However, the patients were leading daily lives in a considerably loose manner, without imposing many restrictions on daily activity. This group makes a good contrast to Group 7 (Patient Q) as far as Solution 2 is concerned.

3. Ensuring the Reliability and Validity of the Data

- 1) In the data collection and analysis, we set the goal of collecting or analyzing the data to the maximal possible degree.
- 2) The reliability and validity of the data analysis were ensured by conducting data analysis under the guidance of a study leader with experience in ethnonursing and a pediatrician involved in the Hokuriku Summer Camp for Diabetic Children who is familiar with the subjects.
- 3) Evaluation of the intensity of the subject's feeling on a five-category scale was conducted by several examiners experienced with qualitative research to elevate the consistency of evaluation among examiners and to increase the reliability of the data.

4. Ethical Considerations

This study was authorized in advance by the Medical Ethics Committee of the Kanazawa University School of Medicine (No. Ho-34).

We showed the following information in writing to each subject: (1) the interview will be tape-recorded but the records will not be stored after data processing is completed; (2) the results of the study will be published, but no identifiable personal information will be disclosed; (3) the data will be used solely for research purposes; and (4) the subject can terminate his/her contribution to the study any time after its start. The candidates were asked to sign the form of informed consent if they consented to the study.

Discussion

Prior to the present study, we had anticipated that abnormal eating behaviors seen among patients with IDDM would involve factors different from those

involved in previously reported eating disorders (disorders satisfying the diagnostic criteria¹⁰⁾ for anorexia nervosa or bulimia nervosa). The results of the present study, however, indicate that the former have many similarities to the latter, which are the attachment to food, eating behind my parents' back, resistance to binge eating, etc., and that patients with IDDM are prone to developing eating disorders if triggered by certain factors. Considering the previous report that complication by eating disorders greatly affects the course of diabetes mellitus¹¹⁾, intervention to prevent the onset of eating disorders seems to be essential in the management of IDDM.

In the present study, we analyzed a total of 23 variables, i.e., four background variables (gender, age, etc. of the patients) and the 19 themes extracted from the interviews. We obtained three solutions as well as variables with high weights for each solution. Furthermore, we succeeded in classifying the subjects into eight groups by the high weight variables of Solutions 1 and 2.

These results seem to be valuable when developing an appropriate method of nursing intervention for each group of young patients with IDDM. In the past, only approaches based on psychological characteristics of patients were available for nursing for IDDM patients. If nursing tailored to the characteristics of the eight groups of patients can be provided on the basis of the results of this study, it will lead to better patient satisfaction. For example, we perform that we take a stand watching a current state for Group 1, and we support unstable mental state for Group 2 by performing help to establish glycemic control skills. Furthermore, in the present study, it was possible to classify individual patients according to a combination of their basic feelings or views about eating behaviors and their background. Each patient was thus assigned to one of the eight groups. According to Abraham H. Maslow¹²⁾, humans desire to obtain a certain position within the group to which they belong. If this need of belonging is satisfied, it may be easier to make individual patients mentally stable. Furthermore, youth-onset patients with IDDM often show behaviors which are not found in healthy individuals, although these behaviors are not always abnormal eating behaviors. These

behaviors are associated with the sensation or feeling of diabetic patients that they are treated differently from other healthy individuals, i.e., the sensation of solitude or uncommonness. This sensation is expected to make the patients psychologically unstable. However, if patients are grouped on the basis of their characteristics, they can have sympathy with other members of the group, which possibly contributes to their psychological stabilization.

In the present study 19 themes were extracted by the qualitative research method. When these themes were analyzed by dual scaling, six themes (theme 2, 8, 9, 11, 12, 15) with high weights in solutions were identified. These include "always having evident or latent anxiety about the possible onset of hyperglycemia or complications", "I feel troubled that I have to do something that is not needed by healthy people", "unpleasant feelings of being treated differently due to the disease, diabetes mellitus", "knowing how to deal with episodes of hypoglycemia has become a part of my daily life", "I have some days when I can eat as I want" and "desire to eat". We consider that these six themes represent the characteristics useful in classifying young patients with IDDM; for the other 13 themes, it was not possible to evaluate the weight for the solutions. These results suggest that the 13 themes extracted in this study are common to the patients studied. We will study these themes further in additional cases.

A limitation of this study lies in that the fact that the accountability was only about 30% when Solutions 1, 2 and 3 from the analysis of interview data were totaled. This low rate seems to be attributable to large inter-individual variance in data. This may also be associated with a difference in age (a background variable) and changes in the method of treatment following advances in the method of insulin injection. Our interviews revealed that these factors could also affect the patients psychologically. If these aspects are also analyzed in more detail, problems may be illustrated more clearly.

However, we think that data are saturated by having taken qualitative procedure before dual scaling in this study. Therefore, we would like to point out that numbers of group classified according to type will not increase even if more subjects add to the present

ones. We think that the numbers of group classified according to type will increase when the method of treatment for IDDM changes dramatically in the future. The problems awaiting to be solved for the future are as following; we must give further study how to take care of patients with IDDM classified in groups observed in this study, and develop better suitable care skills.

Conclusion

1. The results of the interviews with 18 patients with youth-onset IDDM were analyzed and 19 themes were extracted from their episodes related to eating behaviors.
2. Analysis of the 19 themes together with the background variables of the subjects yielded three solutions by means of Dual scaling. The percent accountability was 12.0% with Solution 1, 10.0% with Solution 2 and 9.5% with Solution 3.
3. The characteristics unveiled in Solutions 1, 2 and 3 were named as "awareness about the extraordinary nature of oneself associated with the stage of development", "discomfort due to anxiety and unsatisfied desire due to diabetes mellitus" and "balance between dependence on parents and self-responsibility related to dietary control".
4. The weights of Solutions 1 and 2 for the subjects, calculated through the analysis, were plotted on a two-dimensional graph. The subjects were thus grouped by the location of their plots. In this way, the subjects were divided into eight groups with different characteristics.

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「食行動における心理的特徴による若年発症1型糖尿病患者の類型化」

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要 旨

本研究の目的は若年発症1型糖尿病患者が食行動に対してどのような思いを抱いて生きてきたのかについて、彼らによって語られた内容を質的手法を使って分析し、そこから抽出されたエピソード（自分たちの食行動に関する体験）を抽象化することによってそのエピソードを象徴するもの（テーマ）を導き出すことである。過去に若年発症1型糖尿病患者の食行動の特徴を明らかにした報告はなく、男性女性を含めて若年発症1型糖尿病患者が食行動に関する体験を意味づけて示したことの報告もない。本研究では18人の被験者の食行動に関するエピソードから19のテーマが抽出された。さらに、抽出された19のテーマおよび被験者の4つの背景（性別、年齢、発症年齢、糖尿病歴）の23変数と変数毎のカテゴリをもとに双対尺度法による解析を行った結果、3個の解を得ることができた。解1は「発達段階と関係する普通ではないことに対する思い」解2は「糖尿病であることへの不安や欲求が満たされないことへの不満」解3は「食事制限に関する親への依存と自己責任のバランス」と命名された。また導き出された解1をX軸、解2をY軸として18人の被験者の重みを2次元のグラフにプロットし、類似した位置にある被験者をグループにまとめたところ、8グループに類型化され、それぞれのグループにより異なる特徴が示された。この知見は、食行動に関する思いが成長発達や糖尿病療養そのものとも深く関係していることを明確にしたと言える。このことは若年発症1型糖尿病患者を理解する手助けとなり、また類型別の看護介入方法の開発の基礎研究として位置づけられるものと我々は考える。