Bull Yamaguchi Med School 54(3-4):37-46, 2007

Why Do Diabetic Patients Use Complementary and Alternative Medicine?

Kazuhiko Okita,[1] *Junko Date*[2] *and Noritoshi Tanida*[1]

[1] Medical Humanities, Graduate School of Medicine, Yamaguchi University, 1-1-1, Minami-Kogushi, Ube, Yamaguchi 755-8505, Japan
[2] Project for Human Resource Development of Co-medicals in Cambodia, Japan International Cooperation Agency, c/o JICA Cambodia Office, House No. 448AEO, Monivong Blvd, Sangkat Tonle Bassac, Khan Chamkarmon, Phnom Penh Cambodia
(Received May 22, 2007, accepted September 13, 2007)

Abstract The purpose of this study was to investigate the trends for complementary and alternative medicine (CAM) use by diabetic patients and to identify the characteristics of these patients. The subjects included 800 type 2 diabetic outpatients from four hospitals and two clinics. A written questionnaire was conducted, and the valid response rate was 39.6%. Approximately 30% of the patients used CAM at the present or in the past. The most commonly used CAM was health food/drinks and the major aims for using CAM were to lower the blood glucose level and to maintain/improve general health condition. The following psychosocial predictors were identified by a stepwise logistic regression analysis: 1) gender (female) (odds ratio = OR 2.37; 95% confidence interval = 95% CI 1.38-4.09), 2) higher internal health locus of control (OR 1.09; 95% CI 1.01-1.17), 3) ability for self-evaluation of blood glucose level (OR 2.88; 95% CI 1.68-4.95), and 4) emotional distress concerning lack of social support (OR 1.67; 95% CI 1.26-2.21). No biomedical factor was predicted. Therefore, it could be considered that the more patients wrestle with controlling their diabetes the more they try CAM and that this situation causes great emotional distress for them.

Key words: type 2 diabetes mellitus, complementary and alternative medicine, conventional medicine, predictors, psychosocial factors

Introduction

Since Eisenberg et al.[1] reported in 1993 that 34% of American adults used complementary and alternative medicine (CAM) for their heath care, numerous surveys for CAM use were conducted. Those results indicated that general predictors of using CAM were gender (female), middle age, higher education and higher income.[2] Moreover, it was found that CAM was used frequently in conjunction with conventional medicine (CM).[3] White[4] reviewed studies that compared the groups of patients who used CAM with those who used only CM, and suggested the following reasons for CAM use by patients: dissatisfaction with CM, lack of holism, greater sense of self-control and support with chronic disease. However, Astin[5] reported that only 4% of those using CAM were dissatisfied with CM. Therefore, at the present, it is not yet clear why patients use CAM.[6]

In recent studies, the psychosocial factors for using CAM were the main foci. Langmead et al.,[7] for example, found that patients with inflammatory bowel disease who used CAM had a significantly poorer quality of life (QOL) score for emotional and social factors than did nonusers. As a result of the survey on patients with rheumatoid arthritis, Jacob

et al.[8] suggested that the higher impact of rheumatoid arthritis on some domains of life, even in the absence of severe pathological conditions, could be the reason for their CAM use. Patients with type 2 diabetes mellitus (T2DM) may easily get distressed or anxious because the therapy for diabetes includes: 1) lifetime blood glucose control, 2) continuous dietary and exercise control, and 3) almost no subjective symptom to monitor the degree of control unless a complication occurs.[9][10] We, therefore, considered T2DM an appropriate disease to analyze why CAM is used, focusing on psychosocial factors.

The purpose of this study was to investigate the trends of CAM use by patients with T2DM and to identify the characteristics of the patients, including psychosocial factors.

Methods

1. Data and sample

Between 17th October and 28th December 2005, we conducted a questionnaire survey on 800 outpatients diagnosed with T2DM by physicians in four hospitals and two clinics in Hiroshima and Kyoto Prefectures, Japan. When the medical staff, doctors or nurses, handed the written questionnaire to a patient, they explained the purpose and outline of the survey and emphasized that the recent levels of fasting blood sugar (FBS) and glycosylated hemoglobin A1C (HbA1C) from the patient's diabetes daily planner or blood test result tablet had to be entered on the form. Questionnaires were returned to us by mail after each patient answered it at his/her home.

For ethical consideration, questionnaires were unsigned to protect patients' privacy, and the document, which explained the purpose of this study and stated that the data was to be used for only research, was attached to each questionnaire. This study was approved by the Research Ethics Board in the Prefectural University of Hiroshima in 2005.

There was a response rate of 57.6% (461 patients). Since 144 responses had a conspicuous lack of answers and/or no entries of the FBS and HbA1C, they were rejected, and 317 responses were used for analysis (39.6% valid response rate).

2. Questionnaires

The questionnaire included the following: 1) Demographic characteristics: gender, age, employment status, community area, education level, marital status, household composition and the number of household members. 2) Health behavior and beliefs; degree of attention to health before and after diabetes was diagnosed (4-point scale for each), degree of requirements for scientific proof of health care (4-point scale), and scores from Japanese Version of the Health Locus of Control scale (JHLC) by Horike,[11] which consists of 25 items for five subscales; "Internal" (*e.g.* "I take care of myself for my health."), "Family" (*e.g.* "Recovering from illness depends on cooperation of the family."), "Profession" (*e.g.* "When I get sick, I can feel relieved if there is even a doctor."), "Chance"(*e.g.* "Good health is a matter of good luck.") and"Supernatural" (*e.g.* "Staying healthy is under grace of God"). There are five items in each subscale, and each item is scored on a 1 ("strongly disagree") to 6 ("strongly agree") points scale. 3) Medical and clinical status of DM; duration since diagnosis (months), height (cm), weight (kg), FBS (mg/dl), HbA1C (%), source of diagnosis, complications, and subjective symptoms. Based on the data of height and weight, we calculated the Body Mass Index (BMI= weight (kg)/height $(m)^2$). 4) Treatment and control: type of therapy (dietary, exercise, oral agents, insulin injection), ability for self-evaluation of blood glucose level, experience of education for patient (instruction with hospitalization, school for diabetes care training), experience of hypoglycemia and knowledge of diabetes (eight simple questions on pathology, therapy and self-care, 0-8 points).[12] 5) CAM use; past or present use of CAM. For users of CAM, details were asked about type, sources, aim and effects of using CAM and reduction or interruption of CM. We defined CAM in this survey as "approaches for diabetes care except those prescribed or instructed in a medical institution." 6) Psychological status; Japanese version of "Problem Areas in Diabetes" (PAID) by Polonky et al.[13] PAID is a measure of diabetes-specific emotional distress, and consists of 20 items that cover various emotional problems of diabetic patients; For

example, "feeling discouraged with your diabetes regimen," "feeling of deprivation regarding food and meals," "feeling unsatisfied with your diabetes physician"). Each item is scored on a 1 ("not a problem") to 5 ("serious problem") points scale. The total score from PAID was recommended to use for analysis, because the principal component analysis identified a large factor for emotional distresss.[14] However, in a recent study in Holland, Snoek et al.[15] performed an exploratory factor analysis and identified the following new subdimensions for PAID: negative emotions, treatment problems, food-related problems, and lack of social support. Therefore, we used PAID items for our analysis.

3. Statistical analysis

For statistical analyses, we used the SPSS for Windows, Japanese version 13.0. After calculating the CAM use data, a Chi-squared (χ^2) test, unpaired t-test, and Mann-Whitney test were used for the univariate analysis of variables between CAM users and nonusers. To identify factors related to using CAM, significant variables in the univariate analysis were entered in a multivariate model for a logistic regression analysis. The significance level was accepted at < 0.05.

Results

1. Characteristics of subjects and trends of CAM use

Demographic characteristics of the subjects in this study are shown in Table 1. Fifty-five subjects (17.4%) used CAM at the time of the study, and thirty-seven subjects (11.7%) had used it in the past for their diabetes. Sixty-nine subjects (21.8%) had not used it yet but would like to try it in the future. The remaining 156 subjects (49.2%) had not used it nor

Table 1 Demographic characteristics of the study subjects

	Categories	Sample(%)/mean±SD n=317
Gender	Male	208 (65.6)
	Female	109 (34.4)
Age (years)		65.7±9.6
Employment	Student	0 (0)
	Housewife	66 (20.8)
	Self-employment	41 (12.9)
	Employment	67 (21.1)
	Civil Servant	10 (3.2)
	Teacher	2 (0.6)
	Health Profession	1 (0.3)
	Others	23 (7.3)
	Inoccupation	107 (33.8)
Educational Level	Elementary School	23 (7.3)
	Junior High School	49 (15.5)
	High School	144 (45.4)
	Technical/Vocational School	26 (8.2)
	College/University	72 (22.7)
	Graduate School	3 (0.9)
Residental Area	Prefectural Capital	165 (52.1)
	Others	152 (47.9)
Marital State	Single	20 (6.3)
	Married	248 (78.2)
	Divorced/Widowed	49 (15.5)
Household Composition	Solitude	37 (11.6)
	Multiple Members	280 (88.3)
Number of Household Members[a)]		1 (1-2)

a) Median (Interquartile Range)

would they like to try it. Therefore, ninety-two subjects (29.0%) were users (past and current users) and 225 subjects (71.0%) were nonusers of CAM.

The most commonly used CAM was health food and/or drinks (89.1%). All the other types of CAM were used only 15% or less (Table 2). Approximately 60% of the subjects started to use CAM on their own, and the most common information resource was mass media, such as TV, radio, and newspapers. Only two subjects (2.2%) used CAM on advice from their health professionals (Table 3). The most common aims for using CAM were to lower one's level of blood glucose (58.7%) and to maintain or improve one's general health condition (46.7%). Only seven (7.6%) subjects used CAM for their anxiety from having diabetes (Table 4).

Concerning the effects of CAM, more than half of the subjects found certain positive effects, while one subject reported aggravation of some of the diabetic symptoms (Table 5). Nevertheless, only eight subjects (8.7%) reported a reduction or interruption of CM while using CAM.

2. Characteristics of CAM users

The demographic characteristics of users and nonusers of CAM are shown in Table 6. Differences in gender and household conditions are statistically significant. Women and people living with others showed a higher rate of CAM use. Table 7 shows the characteristics related to health behavior and beliefs for both users and nonusers. CAM users required a significantly higher degree of scientific proof for health care. For the subscales on the JHLC, only the "Internal" sum score for users was significantly higher than that of nonusers.

The medical and clinical status of the subjects is shown in Table 8. CAM users had significantly more complications than nonusers. All other medical factors, including the level of FBS and HbA1C, were not significant. Table 9 shows the characteristics related to the treatment and control of diabetes. CAM users showed a significantly higher use of insulin injection, ability for self-evaluation of blood glucose level, and experience of hypoglycemia than did nonusers.

Table 2 Types of CAM

	Sample(%) n=92
Health Food/Drink	82(89.1)
Commercial Herbs	14(15.2)
Accessories/Bedding for Health	12(13.0)
Hot Spring and Spa	10(10.9)
Massage	8(8.7)
Acupuncture/Moxibusion	5(5.4)
Commercial Dietary Methods	3(3.3)
Chiropractic	3(3.3)
Religions/Spiritual Practice	3(3.3)
Drinking Mineral Water at Springhea	2(2.2)
Others	8(8.7)

Table 3 Opportunities to start CAM use

	Sample(%) n=92
Found by Oneself [a)]	55 (59.8)
Recommended by Friends	27 (29.3)
Recommended by Family	15 (16.3)
Recommended by Other Patients	12 (13.0)
Recommended by Chemists	4 (4.3)
Recommended by Pharmacy Staff	2 (2.2)
Others	3 (3.3)

a) Information Resources (n=55): TV/Radio 27 (49.1), Newspaper 9 (16.4), Leaflet 9 (16.4), Magazine 7 (12.7), Pharmacy 3 (5.5), Internet 3 (5.5), Others 2 (3.6)

Table 4 Aims of CAM use

	Sample(%) n=92
Lower Level of Blood Glucose	54 (58.7)
Maintain/Improve General Health Condition	43 (46.7)
Cure Diabetes	27 (29.3)
Prevent/Improve Complications	24 (26.1)
Improve Mental Anxiety	7 (7.6)
Others	1 (1.1)

Table 5 Effect of CAM

	Sample(%) n=92
Effective	8 (8.7)
Rather effective	43 (46.7)
Rather Ineffective	31 (33.7)
Ineffective	9 (9.8)
Aggravating	1 (1.1)

Table 6 Demographic characteristics of CAM users and nonusers

	categories	Sample(%)/Mean±SD		p*
		Users n=92	Nonusers n=225	
Gender	Male	48 (52.2)	160 (71.1)	<0.01
	Female	44 (47.8)	65 (28.9)	
Age		64.8±9.4	66.1±9.7	n.s.
BMI		23.5±3.1	23.7±3.9	n.s.
Employment[a)]	Employed	67 (72.8)	143 (63.6)	n.s.
	Unemployed	25 (27.2)	82 (36.4)	
Educational Level[b)]	College/University >	67 (72.8)	143 (63.6)	n.s.
	College/University ≦	25 (27.2)	82 (36.4)	
Residental Area	Prefectural Capital	54 (58.7)	111 (49.3)	n.s.
	Others	38 (41.3)	114 (50.7)	
Marital Status	Single[c)]	23 (25.0)	46 (20.4)	n.s.
	Married	69 (75.0)	179 (79.6)	
Household Composition	Solitude	17 (18.5)	20 (8.9)	<0.05
	Multiple Members	75 (81.5)	205 (91.1)	
Number of household members[d)]		1 (1-2)	1 (1-2)	n.s.

a) Recategorized student, housewife and no-occupation to "Employed", and others to "Unemployed".

b) Recategorized to lower than College/University and others.

c) Included "Divorced" and "Widowed".

d) Median (Interquartile Range)

* X^2 test for nominal variables, Mann-Whitney test for d) and unpaired t-test for other variables.

Table 7 Characteristics related to health behavior and belief of CAM users and nonusers

	Median (Interquartile Range)	
	Users n=92	Nonusers n=225
Attention for Health Before Diagnosis of Diabetes	2 (1-2)	2 (1-2)
Attention for Health After Diagnosis of Diabetes (1: almost no -4: much)	3 (3-4)	3 (3-4)
Requiring Scientific Proof for Health Care (1: seldom -4: always)	3 (3-3) *	3 (3-3)
JHLC _ Internal	25 (23-27) *	25 (22-26)
_Family	20 (16-24)	22 (19-24)
_Profession	19 (17-22)	20 (16-22)
_Chance	13 (10-15.75)	12 (10-15)
_Supernatural	11 (9-15)	10 (8-13)

* = p <0.05, Mann-Whitney test

Table 8 Characteristics of medical and clinical status of CAM users and nonusers

	Categories	Sample(%)/Mean±SD		p*
		Users n=92	Nonusers n=225	
Duration after Diagnosis		152.1±117.0	173.8±101.5	n.s.
Opportunity to be diagnosed	Medical Check-up	54 (58.7)	128 (56.9)	n.s.
	Subjective Symptoms	18 (19.6)	30 (13.3)	
	Influence of Mass Media	0 (0)	3 (1.3)	
	Recommended by Others	3 (3.3)	8 (3.6)	
	Others	17 (18.5)	56 (24.9)	
BMI		23.5±3.1	23.7±3.9	n.s.
FBS		140.1±43.6	134.0±47.8	n.s.
HbA1C		7.1±1.1	7.0±1.3	n.s.
Complications	Negative	62 (67.4)	185 (82.2)	<0.01
	Positive	30 (32.6)	40 (17.8)	
Subjective Symptoms	Negative	43 (46.7)	127 (56.4)	n.s.
	Positive	49 (53.3)	98 (43.6)	

* χ^2 test for nominal variables and unpaired t-test for other variables.

Table 9 Characteristics related to treatment and control of CAM users and nonusers

	Categories	Sample(%)/Median (Interquartile Range)		p*
		Users n=92	Nonusers n=225	
Type of Therapy	Dietary	81 (88.0)	188 (83.6)	n.s.
	Exercise	74 (80.4)	159 (70.7)	n.s.
	Oral Agents	24 (26.1)	46 (20.4)	n.s.
	Insulin Injection	31 (33.7)	47 (20.9)	<0.05
Education for Patients	None	38 (41.3)	116 (51.6)	n.s.
	Hospitalization or Training	43 (46.7)	81 (36.0)	
	Hospitalization and Training	11 (12.0)	28 (12.4)	
Self-evaluation of Blood Glucose Level	Impossible	44 (47.8)	162 (72.0)	<0.001
	Possible[a)]	48 (52.2)	63 (28.0)	
Hypoglycemia	Negative	48 (52.2)	156 (69.3)	<0.01
	Positive	44 (47.8)	69 (30.7)	
Knowledge of Diabetes (0-8)		5 (4-7)	5 (4-7)	n.s.

a) Resource of self-evaluation (n=111): self-monitoring of blood glucose 77 (69.4), calorie calculation for meal and/or exercise 20 (18.0), appearance of subjective symptoms 10 (9.0), change of life style 7 (6.3),change of psych-state 1 (0.9), Others 2 (1.8)

* χ^2 test for nominal variables and Mann-Whitney test for others.

Table 10 PAID score for CAM users and nonusers

	Median (Interquartile Range)	
	Users n=92	Nonusers n=225
PAID Total	47 (36-59) *	42 (30-54)
_1	2 (1-3)	2 (1-3)
_2	2 (1-3)	2 (1-3)
_3	3 (2-4)	3 (1-3.5)
_4	2 (1-3)	1 (1-2)
_5	2 (2-4) *	2 (1-4)
_6	2 (2-4)	2 (1-3)
_7	2 (1-3)	2 (1-3)
_8	2 (1-3)	2 (1-3)
_9	2 (1-3)	2 (1-3)
_10	2 (1-3)	2 (1-3)
_11	3 (2-4) **	3 (2-4)
_12	4 (3-5) **	3 (2-4)
_13	3 (2-4) *	3 (2-4)
_14	3 (1.25-3.75)	3 (1-3)
_15	1 (1-2)	1 (1-2)
_16	2 (1-3) **	2 (1-3)
_17	1 (1-2)	1 (1-2)
_18	2 (1-3) **	1 (1-2)
_19	2 (1-3) *	2 (1-3)
_20	1 (1-2.75)	1 (1-2)

* = p <0.05, ** = p <0.01, Mann-Whitney test

Table 11 Result of logistic regression analysis[a)]

Independent variables[b)]	OR	95% CI	p
Gender[c)]	2.37	1.38-4.09	<0.01
JHLC_Internal	1.09	1.01-1.17	<0.05
Complications[d)]	1.78	0.97-3.27	n.s.
Self-evaluation of Blood Glucose Level[e)]	2.88	1.68-4.95	<0.001
PAID_18	1.67	1.26-2.21	<0.001

a) Dependent variable was CAM use: nonuse = 0, use = 1, Hosmer-Lemeshow test: $\chi^2 = 5.46$, p = 0.71

b) The independent variables that remained after the backward elimination method was completed. The other variables were eliminated in steps.

c) Entered as a dummy variable: male = 0, female = 1

d) Entered as a dummy variable: negative = 0, positive = 1

e) Entered as a dummy variable: impossible = 0, possible = 1

The result of PAID is shown in Table 10. The total score of CAM users was significantly higher than nonusers. Among the items, the scores of PAID_5 ("Feeling of deprivation regarding food and meals"), _11 ("Feeling constantly concerned about food and eating"), _12 ("Worrying about the future and the possibility of serious complications"), _13 ("Feeling guilty or anxious when you get off track with your diabetes manage ment"), _16 ("Feeling that diabetes is taking up too much mental and physical energy"), _18 ("Feeling friends/family are not supportive of diabetes management efforts") and _19 ("coping with complications of diabetes") were significantly higher in CAM users.

3. Predictors of CAM use

The significant variables in the univariate analysis between CAM users and nonusers were examined in the model for multiple logistic regression analysis as dependent variables. There was a significant correlation between the score of "degree of requiring scientific proof for health care" and the "Internal" score of JHLC ($r=0.21$, $p<0.01$). There were also significant correlations among the scores of the seven significant items of PAID ($r=0.28$-0.66, $p<0.01$-0.001). We, therefore, performed a stepwise logistic regression analysis using the backward elimination method. The result is shown in Table 11. Gender (female), JHLC "Internal", ability for self-evaluation of blood glucose level and PAID_18 (lack of social support) were possible predictors of CAM use.

Discussion

This study showed that approximately 30% patients with T2DM used CAM, although the results of previous studies reported 8-57%.[16-18] It is not appropriate to compare those results simply because methods of sampling and categories of CAM were considerably different among the studies. The most commonly used CAM in this study was also different from those in previous studies. Health food and drinks were the most frequently used CAM in this study, while other various types, such as herbs, spiritual practices and commercial diets, were also reported.[16-18] It is, however, impossible to simply compare these results, since the definition of CAM and the research design were quite different in the various studies. Moreover, it must be considered that the difference in cultural and ethnical values for CAM can affect on its use and result in different outcomes.[19]

A remarkable result of this study, however, was that some possible predictors for CAM use by diabetic patients could be identified. Few studies demonstrated predictors other than demographics factors, such as gender, age, education and income, which are common predictors in various health conditions.[4] Ito et al.[20] reported that significant medical factors influencing CAM use by patients with diabetic retinal disease were a higher level of HbA1C (>7.0) and lack of instruction with hospitalization. However, those results were derived from a univariate analysis. In this study, using a multivariate analysis, a significant psychosocial, not medical, predictor was found.

Heath Locus of Control (HLC) is an individual's belief in personal control over health. The domains of HLC are broadly divided into "Internal" and "External". Whereas "Internal" HLC is an individual's belief that he/she has control over his/her own health or illness, "External" HLC is the belief that other factors except oneself, such as chance and powerful others, control his/her health or illness.[11] JHLC used in this survey is one of multidimensional HLC scales in which "External" domain was divided into four subscales such as "Family", "Profession", "Chance" and "Supernatural". Stenstrom et al.[21] found that diabetic patients with a high "Internal" score and a low "Chance" score had better control of their blood glucose level than did patients with other score patterns. That result is reasonable, because the control of blood glucose depends on the self-management of diet and exercise by the patient. In this study, however, there was no significant difference of the mean value of HbA1C between CAM users and nonusers, though the "Internal" score of JHLC of the users is significantly higher than that of the nonusers.

The relationship between HLC and CAM use is not clear.[22][23] However, at least for the diabetic patients, it is considered that CAM

was not used by patients with an "External" locus of control, which is also supported by the fact that many CAM users in this study found information by themselves. Another predictor of CAM use, self-evaluation of blood glucose level mainly by self-monitoring of blood glucose, was found in patients. This may also indicate that patients with an "External" locus of control most likely would not use CAM. Therefore, it is very likely that the more a patient struggles intensely with controlling his/her diabetes, the more he/she is likely to use CAM and to use more of it. The principal purpose of CAM use, lowering the level of blood glucose, most probably supports this hypothesis. And the PAID_18 predictor, emotional distress for lack of social support, may be more of a result of such efforts, including the use of CAM, because the patients seem to feel that the other people around them do not accept or recognize their efforts to control their disease. In general, we medical professionals tend to have negative viewpoints for CAM use by patients. However, if the present model indicates that the reasons for using CAM are appropriate, we may have to change our viewpoints about CAM and how we react towards our patients, because the patients' use of CAM may be the result of what we require from them in the CM scene.

Further research is necessary, because this study was based on a cross-sectional study. Longitudinal and more qualitative research is needed to further clarify the reasons for using CAM. Further research for younger subjects, such as patients with Type 1 diabetes mellitus, may also be needed because relatively low valid response rate of this survey, which mainly due to lack of biomedical data, could depend on higher mean age of the subjects with T2DM. In addition, this study was performed on diabetic patients who have no or few subjective symptoms. Further research for various medical conditions that focus on psychosocial factors is also needed to see if a specific model can be applied for other medical conditions, as well.

Acknowledgment

We would like to acknowledge the medical staff in the institutions in Hiroshima and Kyoto Prefectures for their cooperation on distributing questionnaires, and thank all patients who participated in this study. We also thank Dr. Michele Eisemann Shimizu (Department of Physical Therapy, Prefectural University of Hiroshima) for her kind proof reading on English of our manuscript.

References

1) Eisenberg, D.M., Kessler, R.C., Foster, C., Norlock, F.E., Calkins, D.R. and Delbanco, T.L.: Unconventional medicine in the United States; prevalence, costs and pattern of use. *N. Engl. J. Med.*, **328**：246-252, 1993.
2) Zollman, C. and Vickers, A.: ABC of complementary medicine; users and practitioners of complementary medicine. *BMJ*, **319**：836-838, 1999.
3) Eisenberg, D.M., Kessler, R.C., Van Rompay, M.I., Kaptchuk, T.J., Wilkey, S.A., Appel, S. and Davis, R.B.: Perceptions about complementary therapies relative to conventional therapies among adults who use both; results from a national survey. *Ann. Intern. Med.*, **135**：344-351, 2001.
4) White, P.: What can general practice learn from complementary medicine? *Br. J. Gen. Pract.*, **50**：821-823, 2000.
5) Austin, J.A.: Why patients use alternative medicine; result of a national study. *JAMA*, **279**：1548-1553. 1998.
6) Barrett, B., Marchand, L., Scheder, J., Appelbaum, D., Chapman, M., Jacobs, C., Westergaard, R. and St Clair, N.: Bridging the gap between conventional and alternative medicine. *J. Fam. Pract.*, **49**：234-239, 2000.
7) Langmead, L., Chitnis, M. and Rampton, D.S.: Use of complementary therapies by patients with IBD may indicate psychosocial distress. *Inflamm. Bowel Dis.*, **8**：174-179, 2002.
8) Jacobs, J.W.G., Kraaimaat, F.W. and Bijlsma, J.W.: Why do patients with rheumatoid arthritis use alternative treatments? *Clin. Rheumatol.*, **20**：192-196, 2001.
9) Bradley, C. and Speight, J.: Patient per-

ceptions of diabetes and diabetes therapy; assessing quality of life. *Diabetes Metab. Res. Rev.*, **18**：S64-S69, 2002.
10) Ukigaya, S.: *Illness or not Illness; the world living with diabetes* (in Japanese). Seishin Shobou, Tokyo, 2004, pp.101-114.
11) Horike, Y. and Yoshida, Y.: Health Locus of Control. *In* Kamisato, I. (ed.), *Handbook of psychological assessment*. 2nd ed., Chapter 35 (in Japanese). Nishimura Shoten, Tokyo, 2001, pp. 405-415.
12) Lifestyle-related Disease Room, Department of General Administration, Division of Health, Ministry of Health, Labor and Welfare: *Report of national trends of diabetes* (in Japanese). http://www.mhlw.go.jp/shingi/2003/08/s0806-4.html.
13) Polonsky, W.H., Anderson, B.J., Lohrer, P.A., Welch, G., Jacobson, A.M., Aponte, J.E. and Schwartz, C.E.: Assessment of diabetes-related distress. *Diabetes Care*, **18**：754-760, 1995.
14) Welch, G.W., Jacobson, A.M. and Polonsky, W.H.: The problem areas in diabetes scale; an evaluation of its clinical utility. *Diabetes Care*, **20**：760-766, 1997.
15) Snoek, F.J., Pouwer, F., Welch, G.W. and Polonsky, W.H.: Diabetes-related emotional distress in Dutch and U.S. diabetic patients: cross-cultural validity of the problem areas in diabetes scale. *Diabetes Care*, **23**：1305-1309, 2000.
16) Ryan, E.A., Pick, M.E. and Marceau, C.: Use of alternative medicines in diabetes mellitus. *Diabet. Med.*, 18：242-245, 2001.
17) Yeh, G.Y., Eisenberg, D.M., Davis, R.B. and Phillips, R.S.: Use of complementary and alternative medicine among persons with diabetes mellitus; results of a national survey. *Am. J. Public Health*, **92**：1648-1652, 2002.
18) Egede, L.E., Ye, X., Zheng, D. and Silverstein, M.D.: The prevalence and pattern of complementary and alternative medicine use in individuals with diabetes. *Diabetes Care*, **25**：324-329, 2002.
19) Jacintha, S.C. and Pharm, D.: The psychological aspects of complementary and alternative medicine. *Pharmacotherapy*, **20**：1289-1294, 2000.
20) Ito, I., Watanabe, N. and Miyabe, Y.: Use of folk remedies by patients with diabetic retinal diseases (in Japanese). *Ganka Care,* **4**：973-977, 2002.
21) Stenstrom, U.: Relationship between locus of control beliefs and metabolic control in insulin-dependent diabetes mellitus. *Br. J. Health Psychol.*, **31**：15-25, 1998.
22) Lloyd, R.S. and Verhoef, M.J.: Why do patients seek a second opinion or alternative medicine? *J. Clin. Gastroenterol.*, **19**：194-197, 1994.
23) Furnham, A.: The health beliefs and behaviors of orthodox and complementary medicine clients. *Br. J. Clin. Psychol.*, **35**：49-61, 1996.