

Cross-cultural comparison of predictors for self-care behaviors in patients with type 2 diabetes

Kaori Ikeda^{1*}, Shimpei Fujimoto^{1,2}, Beth Morling³, Shiho Ayano-Takahara¹, Shin-ichi Harashima¹, Yukiko Uchida⁴, Nobuya Inagaki¹

¹Department of Diabetes, Endocrinology and Nutrition, Graduate School of Medicine, Kyoto University, Kyoto, ²Department of Endocrinology, Metabolism and Nephrology, Kochi Medical School, Kochi University, Kochi, Japan, ³Department of Psychological and Brain Sciences, University of Delaware, Newark, Delaware, USA, and ⁴Kokoro Research Center, Kyoto University, Kyoto, Japan

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*Correspondence

Kaori Ikeda
 Tel.: +81-75-751-3560
 Fax: +81-75-751-4244
 E-mail address:
 krikeda@kuhp.kyoto-u.ac.jp

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ABSTRACT

The aim of the present study was to evaluate how culture moderates the behavioral and psychosocial predictors of diabetes self-care activities. Patients with type 2 diabetes were recruited in the outpatient department at two sites: Kyoto University hospital in Japan and the Christiana Care Health System in the USA. The data were collected by survey using questionnaires including questions on the frequency of self-care activities, behavioral and psychosocial predictors, and other background information from 149 Japanese patients and 48 American patients. The cultural impact was observed by multiple regression analyses with interaction terms on the association between emotional support and self-care activities in diet in female patients. The findings of the present study serve as an example of how cultural context can affect patients with diabetes, and lead to a better understanding of culturally sensitive behavioral intervention.

INTRODUCTION

Diabetes self-management education and support should be individualized to support patients' behavior change effectively¹. The context in which each patient lives includes culture and society. Culturally sensitive behavioral/psychosocial strategies might have a positive impact on patients' motivation and emotions, but there have been few studies on these to date^{2,3}.

Recent studies in social and cultural psychology show that people in different cultural contexts exhibit different ways of thinking, feeling and behaving. Accumulating research findings have formed a theoretical framework comparing Western cultures with Eastern cultures⁴. Whereas Western cultures tend to put higher value on independence, self-direction or autonomy, Eastern cultures tend to value interdependence, harmony or connection with others. Western cultures are exemplified by North American culture; Eastern cultures are exemplified by East Asian cultures⁵. In addition, many southern European cultures and Latin American cultures are known to emphasize interdependence⁵. In such interdependent cultures, emotional support is experienced more positively, and is more effective at improving subjective well-being than in it is in independent cultures^{6,7}.

In diabetes care, emotion-focused support and problem-focused support are the two types of behavioral and psychosocial strategies in diabetes⁸. Several studies suggest that empathic assurance is more effective in interdependent cultural contexts^{6,7,9,10}. We also found that Japanese patients with type 2 diabetes who perceive more emotional support tend to report less diabetes-related distress, whereas American patients do not¹¹. We hypothesized that emotional support could be effective not only in alleviating diabetes-related distress, but also in enhancing diabetes self-care.

METHODS

Participants

Potential participants were identified in the Kyoto University Hospital in Kyoto, Japan, and the Christiana Care Health System in Delaware, USA. Adult patients with type 2 diabetes for >1 year were eligible. Participants who reported having depression were excluded from the following analyses.

Procedure

The study protocol was approved by the Kyoto University Graduate School and Faculty of Medicine Ethics Committee and Christiana Care Health System Institutional Review Board. The approval numbers were E745 and CCC# 30051,

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respectively. Participants were recruited at the diabetes outpatient department of each hospital. Written informed consent was obtained from all participants. The survey using questionnaires was administered to the participants during the period of November 2009 through October 2010 in Japan, and the period of April 2010 through April 2012 in the USA. More detailed information about the survey was described elsewhere¹¹. The questionnaires measured diabetes self-care activities, self-esteem, diabetes-related distress, perceived emotional support, sociodemographic factors and clinical factors in this order. Recent glycemic control (glycated hemoglobin [HbA1c]) was obtained from medical records.

Measurements

Diabetes self-care behavior frequencies were assessed with the Summary of Diabetes Self-Care Activities (SDSCA)^{12,13}. Respondents rate how many days of the previous week they had engaged in self-care behaviors. In the analyses, we used the average score of four items regarding diet (SDSCA diet) and the average score of two items regarding exercise (SDSCA exercise). Self-esteem was assessed with the Self-Competence scale, a well-established scale in English and Japanese¹⁴. Diabetes-related distress was assessed with the Problem Areas in Diabetes scale (PAID), a well-validated 20-item questionnaire^{15,16}. Perceived emotional support was assessed with a well-

Table 1 | Clinical and demographic characteristics of participants

| | Japanese | Americans | <i>P</i> |
|-----------------------------|------------------------|-------------------------------------|----------|
| <i>n</i> | 149 | 48 | |
| Female | 58 (39) | 24 (50) | 0.183 |
| Age (years) | 60.6 ± 8.6 (36–81) | 60.1 ± 10.3 (33–82) | 0.722* |
| Education (years) | 14.0 ± 2.9 (9–23) | 14.7 ± 2.4 (10–21) | 0.046** |
| Occupation | | | |
| Full-time job | 66 (44) | 22 (46) | 0.869 |
| Part-time job | 20 (13) | 1 (2) | 0.029 |
| Without job or retired | 63 (42) | 25 (52) | 0.247 |
| BMI (kg/m ²) | 25.3 ± 4.9 (15.1–53.0) | 32.5 ± 6.6 (21.0–51.4) [†] | <0.001** |
| HbA1c (mmol/mol) | 60 ± 13 (36–99) | 60 ± 18 (38–111) | |
| HbA1c (%) | 7.6 ± 1.2 (5.4–11.2) | 7.5 ± 1.6 (5.6–12.3) | 0.221** |
| Years with diabetes (years) | 10.1 ± 8.4 (1–38) | 12.3 ± 7.5 (2–35) | 0.023** |
| Treatment | | | |
| Diet alone | 21 (14) | 2 (4) | 0.072 |
| OHA alone | 82 (55) | 25 (52) | 0.742 |
| Insulin alone | 17 (11) | 6 (13) | 0.800 |
| Insulin and OHA | 29 (19) | 15 (31) | 0.111 |
| Diabetes education history | 74 (50) | 26 (54) | 0.621 |
| Diabetes complication | | | |
| Retinopathy | 24 (16) | 2 (4) | 0.047 |
| Nephropathy | 4 (3) | 4 (8) | 0.101 |
| Neuropathy | 14 (9) | 11 (23) | 0.023 |
| Stroke | 6 (4) | 2 (4) | 1.000 |
| CHD | 15 (10) | 8 (17) | 0.299 |
| Foot ulcer | 1 (1) | 2 (4) | 0.148 |
| No. complications | 0.4 ± 0.6 (0–3) | 0.6 ± 0.9 (0–4) | 0.543** |
| Major comorbidity | | | |
| Hypertension | 20 (13) | 8 (17) | 0.635 |
| Heart disease | 10 (7) | 4 (8) | 0.748 |
| Malignant tumor | 1 (1) | 2 (4) | 0.148 |
| SDSCA | | | |
| Diet | 4.3 ± 1.5 (0.5–7.0) | 4.7 ± 1.3 (1.0–6.75) [‡] | 0.176** |
| Exercise | 3.4 ± 2.2 (0.0–7.0) | 3.2 ± 2.2 (0.0–7.0) [‡] | 0.561** |
| Self-esteem | 24.5 ± 4.3 (14–38) | 28.7 ± 6.0 (17–40) | <0.001* |
| PAID | 29.8 ± 18.7 (0–92.5) | 24.5 ± 22.5 (0–85) | 0.026** |
| Perceived emotional support | 3.8 ± 0.6 (1.9–5.0) | 4.3 ± 0.6 (3.0–5.0) | <0.001** |

Data are *n* (%) or mean ± standard deviation (range). **P*-values are of group differences by independent samples *t*-tests for normally distributed variables, **Mann–Whitney *U*-tests for non-normally distributed variables, and Fisher exact test for categorical data. [†]*n* = 45. [‡]*n* = 47. BMI, body mass index; CHD, coronary heart disease; HbA1c, glycated hemoglobin; OHA, oral hypoglycemic agent; PAID, the Problem Areas in Diabetes scale; SDSCA, Summary of Diabetes Self-Care Activities.

Table 2 | Multiple regression models for self-care activities in diet (SDSCA diet) in each country in female patients

| Predictors | Japanese (<i>n</i> = 58) | | | Americans (<i>n</i> = 24) | | |
|----------------------------|---------------------------|----------|--------------------------------|----------------------------|----------|--------------------------------|
| | Standardized coefficient | <i>P</i> | Adjusted <i>R</i> ² | Standardized coefficient | <i>P</i> | Adjusted <i>R</i> ² |
| | | | 0.18 | | | 0.34 |
| PAID | 0.10 | 0.451 | | −0.51 | 0.012 | |
| Emotional support | 0.35 | 0.008 | | −0.13 | 0.495 | |
| Self-esteem | 0.27 | 0.038 | | 0.38 | 0.103 | |
| Full-time job [†] | −0.24 | 0.061 | | −0.20 | 0.329 | |

[†]Full-time job; yes = 1, no = 0.

established English and Japanese version of a 16-item scale. Respondents think about close others and then indicate the extent to which these close others provide each of 16 types of emotional support including encouragement and compassion (Cronbach's α 0.91, 0.92 and 0.91 for Americans, Filipinos and Japanese, respectively)⁶. HbA1c levels of Japanese participants were expressed as the National Glycohemoglobin Standardization Program equivalent value¹⁷.

Statistical analysis

Independent samples *t*-tests and Mann–Whitney *U*-tests were used, as applicable, to check group differences. The Fisher exact test was used for categorical data. We carried out multiple regression analyses using identified predictors in stepwise selection and interaction terms (i.e., emotional support*country) to see the cultural influence. In these analyses, we used centered continuous variables to avoid multiple collinearity. All analyses were carried out with STATA 11.0 (Stata Corporation, College Station, TX, USA). Two sided *P* < 0.05 was considered statistically significant. A maximum of two missing values of PAID were estimated using the mean of their remaining items¹⁸. Other missing data were not imputed.

RESULTS

The numbers of participants who completed the surveys were 152 in Japan and 64 in the USA. The detailed ethnicity of the participants was described elsewhere¹¹. Three of the Japanese participants were excluded from analyses because of missing data, two for occupation and one for education. Two of the 64 participants in the USA were excluded because of depression. A total of 14 were excluded because of missing data, one for HbA1c, one for education, three for SDSCA, one for emotional support and eight for self-esteem. In this study, these 48 participants comprised the USA group. Finally, 149 Japanese and 48 American participants were included in the analyses.

No significant differences were observed between the two groups in sex, age, HbA1c, treatment or diabetes education history (Table 1). There was no significant difference between the two groups in SDSCA. The Japanese participants reported a lower score of self-esteem and perceived emotional support, and a higher score of PAID than the American participants.

Among female participants, cultural influence was significant. Multiple regressions in each country showed that emotional support was the strongest predictor for SDSCA diet in Japanese female participants, and that PAID was the strongest predictor for SDSCA diet in American female participants (Table 2). Multiple regressions with interaction terms showed that country influenced the association between emotional support and SDSCA diet (β = 0.38), and also the association between PAID and SDSCA diet (β = −0.35; Table 3). No cultural influence was observed on SDSCA exercise in female participants.

In male participants, no significant cultural influence was observed on both SDSCA diet and exercise.

DISCUSSION

We found a difference in significant predictors for diabetes self-care activities between Japan and the USA. In our previous

Table 3 | Multiple regression models for self-care activities in diet (SDSCA diet) with interaction terms in female patients (*n* = 82)

| Predictors | Standardized coefficient | <i>P</i> | Adjusted <i>R</i> ² |
|------------------------------|--------------------------|----------|--------------------------------|
| Model 1 | | | 0.24 |
| Country (Japan = 1, USA = 0) | 0.03 | 0.803 | |
| Emotional support | −0.13 | 0.460 | |
| Emotional support*country | 0.38 | 0.030 | |
| PAID | −0.50 | 0.006 | |
| PAID*country | 0.48 | 0.008 | |
| Self-esteem | 0.37 | 0.039 | |
| Self-esteem*country | −0.02 | 0.892 | |
| Full-time job | −0.24 | 0.036 | |
| Model 2 | | | 0.24 |
| Country (Japan = 0, USA = 1) | −0.03 | 0.803 | |
| Emotional support | 0.36 | 0.008 | |
| Emotional support*country | −0.33 | 0.030 | |
| PAID | 0.09 | 0.475 | |
| PAID*country | −0.35 | 0.008 | |
| Self-esteem | 0.33 | 0.035 | |
| Self-esteem*country | 0.02 | 0.892 | |
| Full-time job [†] | −0.24 | 0.036 | |

Emotional support*country, PAID*country, and self-esteem*country are interaction terms. All continuous variables are centered. [†]Full-time job; yes = 1, no = 0.

report, we showed that Japanese patients who perceive more emotional support tended to report less diabetes-related distress¹¹. In the present study, emotional support was a stronger predictor of diabetes self-care activities than diabetes-related distress in Japanese patients, suggesting the possibility that the contribution of emotional support was not only through diabetes-related distress, but also a direct one.

Emotional support assessed in the present study reflected the perception of receiving general encouragement, compassion and empathic assurance, which was not limited to practical advice in diabetes self-care. Thus, the association between this emotional support and self-care activities implies that relatedness and psychological connection with others can have a significant influence on diabetes self-care activities, particularly in an interdependent culture.

In contrast, in American female patients, diabetes-related distress was the strongest predictor of self-care activities in diet. Diabetes-related distress is one of the major psychosocial factors in self-care behavior¹⁹, and is a predictor of future glycemic control. Therefore, in American female patients, it might be more effective to focus on diabetes-related distress in order to improve self-care activities in diet than it is in other groups.

The findings of the present study might lead to a better understanding of culturally sensitive behavioral intervention for the disease.

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DISCLOSURE

The authors declare no conflict of interest.

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