Original Article

Association between family behaviors and self-care activities among type-II diabetes mellitus patients at a teaching hospital in Kathmandu, Nepal

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Abstract:

BACKGROUND: Self-care activities are associated with prognosis of type-II diabetes mellitus patients and include medication adherence, dietary adherence, physical activity, self-monitoring of blood glucose (SMBG), and appropriate foot care. The behaviors of a patient's family members can influence the patient's self-care activities, but little data exist on this association. The objective of this study was to assess the extent of the association between behaviors of family members of Type-II diabetes patients and the patients' self-care activities.

MATERIALS AND METHODS: We conducted a cross-sectional study at a teaching hospital in Kathmandu, Nepal, and interviewed 411 outpatients with Type-2 diabetes mellitus. We used exploratory factor analysis to group family members' behaviors into 3 domains ("authoritarian," "supportive," and "planning" behaviors) and graded the level of the behavior into 3 categories ("high" vs. "medium" vs. "low") according to its ranking distribution in each domain. We assessed the association between domains of family behavior and self-care activities using multivariate logistic regression with Bonferroni correction.

RESULTS: High (vs. low) level of supportive behavior was associated with compliance to SMBG (58% vs. 11%; adjusted odds ratio [OR] =7.44; 95% confidence interval [CI] =2.41, 23.01). High (vs. low) level of planning behavior was associated with high level of foot care adherence (64% vs. 21%; adjusted OR = 6.03; 95% CI = 3.01, 12.11).

CONCLUSIONS: We found associations between behaviors of diabetes patients' family members and the patients' own self-care behaviors. However, the incongruence between the family behavior measurement questions and the self-care of interest limited the implications of the findings.

Keywords:

Family behaviors, health behaviors, Nepal, self-care activities, type-II diabetes

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Introduction

Type-2 diabetes mellitus (T2DM) accounts for approximately 90% of 425 million people with diabetes worldwide.[1,2] Diabetes caused around 1.6 million deaths in 2016 and is a leading cause of stroke, cardiac arrest, kidney failure, blindness, and amputation of the lower limbs.[3]

Glycemic control (control of blood glucose level) helps to avert diabetes-related complications and mortality.[4] A major strategy to promote glycemic control in T2DM patients is the promotion of self-care activities,[5,6] including medication adherence, dietary adherence, physical activity, self-monitoring of blood glucose (SMBG), and appropriate foot care,[7] all of which are shown to lead to better health outcomes.[8,9]

However, it is difficult for patients with diabetes mellitus to continuously adhere to self-care behaviors due to a wide set of determinants, including social determinants.[10] One important social determinant of self-care is the behavior of each patient's family members. Family members can create a favorable home environment and reduce the patients' anxiety and stress.[11,12] Family behavioral support refers to moral, instrumental, or emotional support from one family member to another.[13] Family behavioral support can provide a cushion for the effect of psychosocial stress, although it can also harm the patients by becoming the primary source of stress itself.[14] The effect of family members' behaviors on self-care activities depends on the type of behavior[15,16] as well as the cultural context of the patient.[17-19] Previous studies on family behaviors and self-care were conducted in high-income countries,[11,12,20] thus the findings may not be generalizable to low-income countries such as Nepal. Information on how family behavior influences self-care activities in Nepal can contribute to improvement in diabetes health promotion program design and planning in the country and other low- and middle-income countries. The objective of this study is to assess the extent that family behavior is associated with self-care activities among T2DM attending outpatient services at a tertiary hospital in Kathmandu, Nepal.

Materials and Methods

Study design and setting
We conducted a hospital-based cross-sectional study among outpatients with T2DM at Tribhuvan University Teaching Hospital (TUTH) in Kathmandu, Nepal. The participants were consecutively sampled from October to December 2019.

Study participants and sampling
This analysis was part of a larger research project, and the study's sample size was based on the project's primary objective: to assess the prevalence of self-care activities among T2DM patients. No previous data existed on such prevalence, so we assumed that 50% of T2DM patients had a high (vs. low) level of compliance to self-care activities. Using a confidence level of 95%, a 5% margin of error, and assuming a 10% nonresponse rate, we obtained the final sample size of 428 patients for the main research project.

After receiving ethical approval from relevant institutional review boards, we contacted the administrator of the study hospital and heads of the Departments of Endocrinology and General Practice for permission to access the outpatients' medical records. We identified potential participants from the outpatients of each department who were scheduled to return to the hospital for follow-up visits for diabetic care. The study's inclusion criteria were: (1) age 18 years or older; (2) diagnosis with T2DM for 3 months or longer at the time of the study; and (3) ability to communicate unassisted in the Nepali language. We excluded patients who were reliant on other family members for daily living, patients who were living alone, and patients with cognitive impairment. Data collectors approached patients who met the inclusion criteria, informed them about the study, and inquired about their interest in participation, and obtained their written informed consent. Data collectors then interviewed the participant using a structured questionnaire. Interviewing one patient took approximately 20 min.

Data collection tool and technique
We used modified versions of the diabetes family behavior checklist (DFBC),[21] and a summary of diabetes self-care activities (SDSCA)[22] to measure family members' behaviors and self-care activities, respectively. We asked one expert to translate the tools from English to Nepali, then asked another expert (without exposure to the source document) to back-translate the tool to English. Inconsistencies between both English versions were observed and used as indicators for possible errors in the Nepali translation. The researchers and experts deliberated and resolved the possible errors to achieve the final version of the study instrument.

Outcome measurement
Diabetes self-care activities comprised of five domains: (1) medication adherence; (2) dietary behaviors; (3) physical activity; (4) SMBG, and; (5) foot care. We retained items on medication adherence, physical activity, SMBG, and foot care as per the original SDSCA, and modified items pertaining to dietary behaviors to suit the local context.

With regard to dietary adherence, we assessed whether the participants: (1) had five or more small meals every day during the past 7 days, or; (2) consumed at least 2 bowls of vegetables every day during the past 7 days, or; (3) consumed 1 or more bowls of fruit every day during the past 7 days, or; (4) consumed fatty food or red meat once or not at all during the past 7 days, or; (5) had refused sweets offered to them within the past month. We assigned the score of 1 for adherence to each behavior and 0 for the otherwise, summed the score to create a total dietary adherence score with range from 0 to 5 points, and arbitrarily categorized 3 levels of dietary compliance based on the score's distribution: (1) low (0–1 point); (2) medium (2–3 points) and (3) high (4–5 points). Regarding physical activity, we asked the participants whether they: (1) performed physical activity related to work/household chores, and; (2) had recreational physical activity. We

considered participants to be physically active if they performed both chores-related and recreational physical activity on all 7 days of the week, and created physical activity adherence score in a similar manner to that of dietary adherence with range from 0 to 2 points, and arbitrarily classified physical activity compliance into three levels: (1) low (0 point); (2) medium (1 point); and (3) high (2 points). With regard to SMBG, we considered participants who did not monitor their blood glucose level as having low level of adherence, those who monitored blood glucose levels 1–2 times per week as having medium-level adherence, and those who monitored blood glucose level three or more times during the last 7 days as having high adherence.[23] Regarding foot care, we defined foot care behavior adherence according to whether the participant: (1) checked his/her feet, and; (2) checked the inside of his/her shoes, every day in the last seven days. We assigning a score in a similar manner to that of dietary compliance and physical activity with a range of 0–2 points and arbitrarily assigned participants into 3 level of compliance: (1) low (0 point); (2) medium (1 point); and (3) high (2 points). Nearly all participants reported that they consumed or injected his/her medication/insulin every day within the last 7 days. We excluded medication adherence from analysis because of the lack of those who were nonadherent.

Exposure measurement
Behavior of family members was measured by modifying the DFBC scale[21] to allow patients to self-report the behavior of their family members related to their diabetes self-care in the Nepali context. Using exploratory factor analysis, we classified the behaviors of family members into three domains: (1) "Authoritarian" behaviors (family members nagging the patients or being controlling); (2) "Supportive" behaviors (praising or congratulating the patients for compliance), and; (3) "Planning" behaviors (planning family activities or preparing things for the patients). For each domain, we ranked the participants into levels of behavior based on tertile of the domain ranking score: participants in the first, second, and third tertiles were those who reported "Low," "Medium," and "High" level of the domain's behaviors among their family members, respectively.

Measurement of potential confounders
The literature shows that socioeconomic status, self-efficacy, and family functioning are independent predictors of diabetes self-care behaviors,[24-27] so we consider these characteristics to be potential confounders in the assessment of the association between family support and diabetes self-care.

We considered the respondents to be of "high socioeconomic status" if he/she earned more than 40,000 Nepalese rupees (more than USD 350) per month and had at least a university degree. Respondents with income between 10,000 and 40,000 Nepalese rupees (more than USD 90 to USD 350) per month with at least a higher secondary education were labeled as "mid socioeconomic status." All other respondents were considered as "low socioeconomic status."

The respondent's self-efficacy was measured using the diabetes management self-efficacy scale (DMSES-UK),[28] which consisted of 18 items. Each item had an 11-point numerical scale from 0 to 10 which indicated the ascending level of self-efficacy. We included three additional questions on whether participants were able to "eat 5 small meals per day," "refuse sweets offered to them," "have more vegetables than rice in each meal" to adapt the study instrument to the local context.

We measured family functioning using the Family APGAR questionnaire,[29] where APGAR represents adaptability, partnership, growth, affection, and resolve. The original questionnaire consisted of 5 items, each with 3 choices: "almost always" (2 points), "some of the time" (1 point), or "hardly ever" (0 point). A score of 7–10 suggested a highly functional family, 4–6 suggested a moderately dysfunctional family and 0–3 suggested a severely dysfunctional family.

Data management and analysis
We assessed the questionnaires for completeness before data entry. Data were entered using EpiData version 3.1. We performed univariate descriptive analysis to identify the distribution of basic characteristics of respondents, self-care activities, and family behaviors. We then performed bivariate analysis using cross-tabulation to assess the extent to which family behavior was associated with each level of self-care, and also performed unadjusted logistic regression analyses. We then performed multivariate logistic regression analyses with adjustment for potential confounders, with Bonferroni correction for multiple comparisons. To comply with the limit on the number of tables in this journal, we decided to show only the behaviors with significant associations in the results section.

Ethical considerations
Our study was approved by the Human Research Ethic Committee of the Faculty of Medicine, Prince of Songkla University (REC.62-204-19-9) and the Nepal Health Research Council (Reg. No. 588/2019). We obtained written informed consent from each respondent prior to data collection. Participants were informed that their participation was completely voluntary, that they could refuse to answer any question, and that they could stop the interview at any time.

Results

We approached 428 eligible patients in the outpatient departments of TUTH, 411 of whom agreed to participate (response rate = 96.0%). Most of the study participants were female and over four-fifth were below 65 years of age [Table 1]. Brahmin was the most common ethnicity. Less than half of the respondents had not received any formal education, and over two quarters earned <10,000 Nepalese Rupee ($90 United States dollar) per month.

The prevalence of certain self-care activities was very high [Table 2]. Nearly all respondents who were prescribed daily medication adhered to the regimen. More than four-fifths of the participants were engaged in work/household-related chores daily and less than half performed recreational physical activity every day during the past 7 days. The consumption of vegetables at least 2 bowls per day were relatively common than consuming at least one bowl of fruit per day over the past 7 days and eating frequent but small meals. Over two-thirds of the participants refused offered sweets within the past month. SMBG was not a common practice. Half of the participants checked their feet every day whereas less than a third checked the inside of their shoes every day within the last 7 days.

No family behavior was significantly associated with dietary compliance after adjusting for one another and potential confounders with Bonferroni correction (data not shown). The dose-response pattern of supportive behavior is visible with medium (vs. low) level of dietary adherence and the association is more evident in high (vs. low level) of diet compliance. However, none of the associations was significant after adjusting for one another and potential confounders with Bonferroni correction.

Regarding family behaviors and physical activity compliance, none of the three behavioral domains (authoritarian, supportive, and planning) were significantly associated with physical activity after adjusting for one another and potential confounders with Bonferroni correction (data not shown). Family behaviors were also not significantly associated with a medium level of SMBG level (data not shown) but having a high (vs. low) level of SMBG was significantly associated with supportive behaviors [Table 3]. Study participants in the third tertile of reporting supportive behaviors among family members had 7.44 times (95% confidence interval [CI] =2.41, 23.01) higher odds of having a high level of SMBG compliance compared to participants in the first tertile.

Medium level (vs. low level) of foot care adherence was significantly associated with authoritarian and supportive

Table 1: Basic characteristics of type-2 diabetes mellitus patients (*n*=411 unless noted otherwise)

Characteristic	Frequency, *n* (%)
Gender: Female	234 (56.9)
Age group (years)	
21-35	47 (11.4)
36-50	119 (28.9)
51-65	177 (43.1)
>65	68 (16.6)
Ethnicity	
Brahmin	125 (30.4)
Chhetri	67 (16.3)
Newar	60 (14.6)
Janajati	107 (26.0)
Others	52 (12.7)
Education	
Illiterate (no formal education)	132 (32.1)
Literate (no formal education)	69 (16.8)
Primary school level (Grades 1-5)	28 (6.8)
Lower secondary and secondary (Grades 6-10)	32 (7.8)
School leaving certificate and higher secondary	100 (24.3)
University degree or higher	50 (12.2)
Income range (Nepali rupees per month)	
<10,000	216 (52.6)
10,000-20,000	96 (23.4)
20,000-30,000	55 (13.4)
30,000-40,000	27 (6.6)
>40,000	17 (4.1)

Table 2: Self-care activities of type-2 diabetes mellitus patients (*n*=411 unless stated otherwise)

Self-care activities	Frequency, *n* (%)
Medication adherence	
Oral medicine (*n*=340 patients)	334 (98.2)
Insulin (*n*=70 patients)	70 (100)
Physical activity	
Work or household-related chores*	345 (83.9)
Recreational physical activity*	198 (48.2)
Dietary behavior	
Ate ≥5 small meals[†]	63 (15.3)
Ate>2 bowls of vegetables[†]	322 (78.3)
Ate>1 bowl of fruits[†]	186 (45.3)
Ate fatty food or red meat[‡]	228 (55.5)
Refused offered sweets within the past 1 month	287 (70.0)
Self-monitoring of blood glucose	
Monitored blood glucose level[§]	59 (14.4)
Foot care	
Checked feet[†]	210 (51.1)
Checked inside of shoes[†]	135 (32.8)

*Performed chores or recreational physical activity every day in the past 7 days, [†]Every day in the last 7 days, [‡]At most once in the last 7 days, [§]At least three times in the last 7 days

behaviors after adjusting for one another and potential confounders with Bonferroni correction [Table 4]. Participants in the third tertile of reporting authoritarian behaviors among family members had 8.72 times (95%

Table 3: Logistic regression predicting high (versus low) level of self-monitoring of blood glucose compliance

Family Behavior	Frequency and prevalence of compliance, n (%)	Model 1 crude OR (95%CI)	Model 2 adjusted OR (95%CI)*	Model 3 adjusted OR (95%CI)**	Model 4 adjusted OR (95%CI)***
Authoritarian Behavior					
Low (reference) (n=51)	14 (27.5)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=56)	13 (23.2)	0.8 (0.33-1.91)	0.69 (0.25-1.91)	0.71 (0.24-2.12)	0.7 (0.23-2.11)
High (n=65)	32 (49.2)	2.56 (1.17-5.61)	1.26 (0.45-3.56)	1.17 (0.39-3.55)	1.05 (0.34-3.25)
Supportive behavior					
Low (reference) (n=56)	6 (10.7)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=48)	13 (27.1)	3.1 (1.07-8.93)	2.92 (0.94-9)	2.08 (0.64-6.71)	1.85 (0.57-6.04)
High (n=68)	40 (58.8)	11.9 (4.49-31.56	10.41 (3.58-30.23)	6.7 (2.2-20.39)	7.44 (2.41-23.01)
Planning behavior					
Low (reference) (n=55)	9 (16.4)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=62)	26 (41.9)	3.69 (1.54-8.85)	3.88 (1.39-10.84)	3.44 (1.18-10.07)	3.43 (1.16-10.19)[†]
High (n=55)	24 (43.6)	3.96 (1.62-9.65)	4.99 (1.83-13.6)	5.35 (1.85-15.5)	4.94 (1.71-14.32)[†]

*Model 2: Adjusted for authoritarian, supportive, or planning behaviors, **Model 3: Adjusted for all variables in Model 2, as well as self-efficacy and family functionality, ***Model 4: Adjusted for all variables in Model 3, as well as socioeconomic status, [†]Association was not significant after Bonferroni correction. Bolded numbers indicate statistical significance after Bonferroni correction. OR=Odds ratio, CI=Confidence interval

Table 4: Logistic regression predicting medium (vs. low) level of foot care compliance

Type of Family Behavior	Frequency and prevalence of compliance, n (%)	Model 1 crude OR (95%CI)	Model 2 adjusted OR (95%CI)*	Model 3 adjusted OR (95%CI)**	Model 4 adjusted OR (95%CI)***
Authoritarian behavior					
Low (reference) (n=75)	8 (10.7)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=103)	40 (38.8)	5.32 (2.31-12.24)	3.85 (1.57-9.47)	4.95 (1.80-13.60)	4.95 (1.80-13.64)[†]
High (n=104)	39 (37.5)	5.02 (2.18-11.57)	7.70 (3.07-19.27)	8.51 (3.03-23.91)	8.72 (3.07-24.74)
Supportive behavior					
Low (reference) (n=113)	47 (41.6)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=93)	27 (29)	0.57 (0.32-1.03)	0.55 (0.29-1.06)	0.30 (0.14-0.64)	0.30 (0.14-0.64)[†]
High (n=76)	13 (17.1)	0.29 (0.14-0.59)	0.19 (0.09-0.44)	0.08 (0.03-0.23)	0.08 (0.03-0.22)
Planning behavior					
Low (reference) (n=113)	23 (20.4)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (n=101)	35 (34.7)	2.08 (1.12-3.84)	1.38 (0.70-2.73)	1.10 (0.51-2.36)	1.07 (0.50-2.33)
High (n=68)	29 (42.6)	2.91 (1.50-5.65)	3.70 (1.70-8.05)	4.11 (1.71-9.87)	4.06 (1.69-9.76)[†]

*Model 2: Adjusted for authoritarian, supportive, or planning behaviors, **Model 3: Adjusted for all variables in Model 2, as well as self-efficacy and family functionality, ***Model 4: Adjusted for all variables in Model 3, as well as socioeconomic status, [†]Association was not significant after Bonferroni correction. Bolded numbers indicate statistical significance after Bonferroni correction. OR=Odds ratio, CI=Confidence interval

CI = 3.07, 24.74) higher odds of medium (vs. low) level of foot care adherence than participants in the first tertile. Participants in the third tertile of reporting supportive behaviors among family members had 0.08 times (95% CI = 0.03, 0.22) the odds of medium (vs. low) level of foot care compliance compared to participants in the first tertile. Planning behaviors were also found to have a positive association with a medium (vs. low) level of foot care, although this association lost its significance after Bonferroni correction.

High (vs. low) level of foot care compliance was significantly associated with planning behaviors after adjusting for one another and potential confounders with Bonferroni correction [Table 5]. Study participants in the third tertile of reporting planning behaviors had 6.03 times (95% CI = 3.01, 12.11) higher odds of having a high (vs. low) level of foot care compliance compared to participants in the first tertile. Although authoritarian behaviors were also significantly associated with foot

care compliance, this association became nonsignificant after Bonferroni correction.

Discussion

We assessed the extent of association between behaviors of family members and self-care activities among diabetes patients at a teaching hospital in Kathmandu, Nepal, and found positive associations between family behaviors and SMBG and foot care compliance. There were very few patients visiting General Practice for T2DM-related follow-up care, and more than 95% of our patients were from Endocrinology. The findings should be interpreted in this context.

Supportive behavior from family members was associated with high level of SMBG. This finding corresponds to that of other studies.[10,30-35] Encouragement and assistance from family members could have fostered further belief towards glucose monitoring.[10,36] On the other hand, the positive association between authoritarian behavior and

Table 5: Logistic regression predicting high (vs. low) level of foot care compliance

Type of Family Behavior	Frequency and prevalence of compliance, *n* (%)	Model 1 crude OR (95%CI)	Model 2 adjusted OR (95%CI)*	Model 3 adjusted OR (95%CI)**	Model 4 adjusted OR (95%CI)***
Authoritarian behavior					
Low (reference) (*n*=129)	62 (48.1)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (*n*=97)	34 (35.1)	0.58 (0.34-1.00)	0.45 (0.24-0.85)	0.58 (0.29-1.15)	0.52 (0.26-1.05)
High (*n*=98)	33 (33.7)	0.55 (0.32-0.94)	0.39 (0.19-0.84)	0.36 (0.16-0.80)	0.39 (0.17-0.89)†
Supportive behavior					
Low (reference) (*n*=89)	23 (25.8)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (*n*=111)	45 (40.5)	1.96 (1.07-3.59)	1.59 (0.82-3.10)	1.33 (0.63-2.80)	1.24 (0.58-2.64)
High (*n*=124)	61 (49.2)	2.78 (1.54-5.02)	2.98 (1.49-5.96)	2.42 (1.09-5.38)	2.22 (0.99-4.98)
Planning behavior					
Low (reference) (*n*=114)	24 (21.1)	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Medium (*n*=103)	37 (35.9)	2.1 (1.15-3.85)	3.33 (1.63-6.80)	2.83 (1.33-6.04)	2.71 (1.25-5.85)†
High (*n*=107)	68 (63.6)	6.54 (3.60-11.8)	6.91 (3.67-13.02)	5.82 (2.94-11.55)	6.03 (3.01-12.11)

*Model 2: Adjusted for authoritarian, supportive, or planning behaviors, **Model 3: Adjusted for all variables in Model 2, as well as self-efficacy and family functionality, ***Model 4: Adjusted for all variables in Model 3, as well as socioeconomic status, †Association was not significant after Bonferroni correction. Bolded numbers indicate statistical significance after Bonferroni correction. OR=Odds ratio, CI=Confidence interval

foot care adherence, and the negative association between supportive behavior and foot care adherence, contrasted the findings reported in previous studies.[37-39] However, the questions regarding family members' behaviors in this study pertained primarily to dietary adherence and physical activity, and there was no question regarding foot care. The study instrument also did not capture practices and family behaviors that were specific to the Nepali context of foot care. The Nepalese custom of visiting the holy places/temples barefoot, using inappropriate footwear (sandals with a rubber sole, supported by a strap in the first inter-digital space, but no backstrap), and ill-fitting footwear may influence the probability of foot trauma, which is particularly relevant for diabetics. In addition, the majority of Nepalese walk barefoot indoors, and a significant proportion of women do not wear socks, which may further escalate the chances of foot trauma. Unless, we assumed that there were strong correlations between family members' behaviors pertaining to dietary adherence and foot care, the observed associations in this study could have simply been spurious. Future studies should further modify the study instrument to obtain insights regarding this important behavior.

Limitation and recommendation
Several limitations should be taken into consideration when interpreting the study findings. First, we did not conduct the interviews in private due to the unavailability of a vacant room in the outpatient department building during the study period. However, we interviewed the respondents in an open area inside the hospital building while they were unaccompanied. Second, all responses were self-reported, thus social desirability bias could have influenced the study findings. Third, due to time constraints, we did not undergo multiple iterations to validate the questions that were tailored to the Nepali context, which might have then undermined the validity of the findings. Lastly, this study was a hospital-based cross-sectional study conducted at one tertiary hospital in the capital city of Kathmandu. The findings of this study cannot be generalized to the context of rural Nepal.

Recommendations based on our study findings are that intervention programs for diabetes management should consider developing and pilot-testing interventions that involve promoting supportive behaviors and discouraging authoritarian behaviors, and that intervention measures and target behaviors should also be tailored to suit the local contexts.

Conclusions

We assessed the extent that domains of family support were associated with diabetes self-care and found that family behaviors were associated with diabetes self-care activities and that there was a positive association between supportive behaviors and SMBG, and positive associations between all three behaviors and foot care compliance. However, the incongruence between the family behavior measurement questions and the self-care of interest, the influence of social desirability, and lack of generalizability suggested caveats in the interpretation of the study findings.

Conflicts of interest
There are no conflicts of interest.

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