Family support and conflict among adults with type 2 diabetes

Development and testing of a new measure

*CAM Paddison**

Introduction

Family relationships can be an important source of support for people with diabetes,[1–6] and a family-centred approach to diabetes care has been advocated.[7] Family members may provide practical help; for example, they might assist with blood glucose testing or footcare, or by identifying the signs of an oncoming hypoglycaemic episode. The family may also act as a psychological resource, encouraging people with diabetes to view themselves as healthy and normal.[8] Many adults with diabetes identify their spouse as very important in buffering the emotional impact of diabetes, and preventing depression or elevated distress about diabetes.[8,9]

However, it is important to recognise that the family environment may not always have a health-promoting impact on diabetes self-management.[8,10,11] While family friction has been associated with poor metabolic control among young

Abstract

Background: Family relationships can be a source of support for people with diabetes and may influence self-management behaviour. Research examining diabetes-related family support and conflict to date has focused on children and adolescents with type 1 diabetes.

Aims: To develop a short (≤10-item) measure of diabetes-related family support and family conflict suitable for use among adults with type 2 diabetes, and to evaluate the psychometric properties of this measure in a pilot study.

Methods: Participants were randomly selected from a database of primary care records in New Zealand. Data were collected through a mailed questionnaire (n=629).

Results: A principal components analysis identified two latent factors that supported the theoretically derived subscales assessing diabetes-related family support and conflict. These subscales showed good evidence of internal consistency (Cronbach's α, 0.84 and 0.75 respectively).

Conclusion: The Diabetes Family Support and Conflict (DFSC) scale is a 10-item measure suitable for use among adults with type 2 diabetes. We encourage researchers and clinicians to consider this instrument when a brief measure of diabetes-related family support and family conflict is required. Further testing of the DFSC scale is recommended to help establish normative data for different populations and clinical settings.

Eur Diabetes Nursing 2010; 7(1): 29–33

Key words

Type 2 diabetes; family; support; conflict; measures; psychology; Diabetes Family Support and Conflict (DFSC) scale

Author

CAM Paddison, PhD, ESRC Postdoctoral Fellow

*Correspondence to:
Dr Charlotte Paddison, Institute of Public Health, Forvie Site, Robinson Way, University of Cambridge, Cambridge CB2 0SR, UK
e-mail: camp3@medschl.cam.ac.uk

people, diabetes-related familial tension can also arise in adult relationships.[5,12] Stress within the family may compromise metabolic control through the impact of stress on the physiological processes that underpin glucose homeostasis, or because dealing with a difficult family situation interferes with the lifestyle aspects of self-management (for example, regular meals and blood glucose testing).[9]

Studies have examined the influence of family dynamics on the self-management of type 1 diabetes among children and adolescents.[13–16] Analyses controlling for demographic characteristics show that family support accounts for variations in self-care behaviour, including glucose testing, insulin injecting, and diet among adolescents.[13] However, few empirical studies among adults with diabetes have described levels of diabetes-related family support or conflict, or explored the relationships between family environment and diabetes self-management, as noted by others.[17,18]

To assist future research we required a short (≤10-item) measure of the diabetes-related family environment. This instrument needed to include items measuring both family support and family conflict, and to be suitable for use

among adults with type 2 diabetes. Our review of relevant literature did not identify a suitable instrument. Although some existing measures of the diabetes-specific family environment were found, these were not used because they: were developed for children and adolescents[14] or adults[19] with type 1 diabetes; measured conflict,[14,16,20] but not support; had modest reported internal consistency[4,18] and were longer than desired.

The aims of this pilot study were to develop a short (≤10-item) measure of diabetes-related family support and conflict suitable for use among adults with type 2 diabetes, and to evaluate the psychometric properties of this measure.

Methods

Initial development

Before the main study, a series of small studies were used to generate and pilot item content for the proposed measure. Expert advice from patient representatives (n=28) and healthcare professionals (including diabetes physicians, dieticians, and diabetes nurse specialists) was sought through public meetings (n=3) and personal interviews (n=8). This information was used to generate the initial item content in conjunction with a review of the relevant published literature. Item content was designed to assess two theoretically derived dimensions, family support and family conflict, and to cover the behavioural and emotional aspects of diabetes self-management.

A small quantitative pilot study collected data from 113 adults with type 2 diabetes using a questionnaire that contained 15 items pertaining to diabetes-related family support and conflict. The questionnaire was mailed to members of a regional diabetes society who had previously given consent for researchers to contact them. Data

were used to assess the acceptability and face validity of the measure, and to refine the item content where necessary. This process of initial measure development and piloting provided 11 items for inclusion in a larger pilot study that is the focus of this paper.

Research design and participants

The main pilot study employed a cross-sectional research design. Self-reported data were collected using a mailed questionnaire. Patients aged >18 years with type 2 diabetes, diagnosed by a physician in accordance with national guidelines,[21] were eligible to take part. A database of primary care records for people with diabetes (n=4857) was used to randomly select the research sample (n=1015) using a computer-generated algorithm. A 62% response rate to the mailed survey provided 629 usable questionnaires.

Ethics

Approval for this research was obtained from the Massey University Human Ethics Committee, Protocol 02/140. Participation was voluntary and no financial reward was offered. Potential participants were mailed a letter of introduction informing them of the study and inviting their participation; two weeks later they received an information sheet, a consent form, and a copy of the research questionnaire. For participants who gave written permission at the time of the questionnaire survey (n=615, 98%), clinical data including glycosylated haemoglobin (HbA$_{1c}$) values were obtained from electronic medical records, and released to the researcher in a non-identifiable form. Clinical and questionnaire data were linked by unique identifier codes; patient anonymity was protected at all times during the research period.

Measures

Demographic information collected in the mailed questionnaires included age, gender, ethnicity, educational qualifications, and living arrangements (namely, with spouse/partner; extended family or relatives; friends; living alone). To describe participants in this study accurately, prescribed treatment, length of diagnosis and HbA$_{1c}$ (most recent value recorded by a primary care physician in the last 12 months) for consenting participants (n=615) were extracted from electronic medical records held on a primary care database.

Diabetes-related family support and conflict were measured using 11 items developed as part of this study; 10 items were retained for inclusion in the final measure. The Diabetes Family Support and Conflict (DFSC) scale assesses the frequency of supportive (six items) and unsupportive (four items) diabetes-related family interactions. Table 1 displays the item content, which includes: diet (three items); exercise (three items); medication (two items); psychological support (one item); and conflict (one item). Response options were: (1) yes, always; (2) yes, often; (3) sometimes; (4) no, not usually; and (5) no, never.

Two summary scores, family support and family conflict, were computed by separately calculating the average score across the items included in each subscale, after reverse-scoring all 11 items. This produces a single score for each subscale (range, 1–5), with higher scores representing greater support or conflict.

Instructions to participants defined the family, for the purposes of this study, as 'anyone who you consider to be part of your immediate or extended family. This can include for example your spouse, partner, son/daughter, parents, in-laws, niece, nephew, or grandchild.'

Participants who did not have contact with any family members were instructed not to complete the DFSC scale items. In total, 50 participants (8% of the 629 who returned questionnaires) did not complete these items.

Statistical analyses

Descriptive statistics, means and SD for each item in the DFSC scale were computed. After assessing suitability for factor analysis, a principal components analysis was used to explore the latent factor structure, and select items to be retained in the final measure. In the final 10-item measure Cronbach's α for each of the two subscales (support, conflict) were computed to assess their internal consistency.

Results

Participants

The mean age of participants was 63 years (SD 11.6); 47% were female and the majority were of New Zealand European ethnicity (57%). Most participants (76%) lived with family members, although a substantial minority (22%) lived alone. The average time since diagnosis was 8.1 years (SD 5.8), and 9% of respondents were insulin treated. The mean HbA_{1c} recorded by primary care physicians in the last 12 months for participants in this study was 7.5% (SD 1.5).

Principal components analysis

Suitability for factor analysis was examined and the Kaiser-Meyer-Oklin value (0.84) exceeded the recommended value of 0.6.[22] Bartlett's Test of Sphericity reached statistical significance ($p<0.001$). Eleven items were then entered into a principal components analysis and the results showed two components with eigenvalues >1. Varimax rotation was applied to aid interpretation; the results are presented in Table 1. All items loaded (>0.50) exclusively onto one of the two factors, and together these factors accounted for 54.5% of the total variance. The first factor in the rotated solution, labelled family support, consisted of six items; the second factor, labelled family conflict, contained five items.

The content of the two factors, as defined by the item loadings, supported the theoretically derived constructs labelled diabetes-related family support and family conflict, which this measure was specifically designed to assess.

Further analysis of the conflict subscale highlighted one item, 'my family seem embarrassed about my diabetes', that did not fit well. This item had low correlations with other items in the conflict subscale (range 0.18–0.32) and was the only item with an item-total correlation <0.50 (r=0.32). This item also exhibited low variance and was subsequently removed from all further analyses. Ten items were retained for inclusion in the final measure (Table 1).

Internal consistency and distribution of scores

Family support and family conflict subscales showed good internal consistency (Cronbach's α, 0.84 and 0.75, respectively). Participants utilised the full range of possible scores (1–5) for each item, although the distribution was skewed as shown by the mean scores for individual items, which ranged between 3.7 and 4.2 (SD 0.95–1.3) for the family support subscale, and 1.8 and 2.3 (SD 1.1–1.4) for the family conflict subscale. There was a weak positive correlation between the family support and family conflict subscales (r=0.21; p<0.01).

Discussion

The main outcome of this study is the 10-item Diabetes Family Support and Conflict scale. This measure demonstrates acceptable psychometric properties, and has high practical utility in a clinical or research context where a brief measure suitable for use among adults with type 2 diabetes is required. The inclusion of items assessing both diabetes-related family support and family conflict is a particular strength of this instrument.

Psychometric properties of the DFSC scale

In comparison with existing measures, the two subscales assessing family support and family conflict showed good evidence of internal consistency, equal to or better than that reported for subscales in other measures, such as the Diabetes Family Support Behaviour Checklist-II.[18] An exploratory principal components analysis supported the two theoretically derived components of this measure (diabetes family support and conflict). The DFSC scale has good face validity and the item content, including items assessing family conflict, appears acceptable to adults with diabetes.

A weak positive relationship between the family support and conflict subscales suggests that these subscales should not be conceptualised as polar opposites within a single unified construct. Further research is needed to help explain this association, which could be the result of measurement error. An alternative is that participants whose families are highly engaged and interact frequently may report both higher levels of support and conflict over diabetes self-management. There is some support for this in our study, in that participants living with family reported both greater diabetes-related support and conflict, than those living alone.

Future research could consider assessing the frequency of contact and level of engagement with family members, in addition to the type of interactions (i.e., supportive or non-supportive).

	Factor I	Factor II
Family support (α=0.84)		
I feel my family understand why diet is important to people with diabetes	0.72	–0.14
My family encourage me to eat foods that are healthy for my diabetes	0.81	0.17
I feel my family understand why exercise is important to people with diabetes	0.84	0.07
My family encourage me to get exercise and keep active	0.70	0.27
I feel my family understand why my diabetes medicines are important	0.71	–0.03
My family support me emotionally if I feel frustrated or down about my diabetes	0.71	0.09
Family conflict (α=0.75)		
My family nag me about taking my diabetes medications	0.21	0.67
My family complain about eating the kinds of foods that are good for people with diabetes	–0.05	0.73
My family argue with me about how I choose to take care of my diabetes	0.14	0.78
My family hassle me about getting more exercise	0.23	0.70
My family seem embarrassed about my diabetes*	–0.18	0.57
Variance explained (%)	31.3	23.3
*Item not included in the final measure		

Table 1. Principal components analysis of the Diabetes Family Support and Conflict items showing Cronbach's α for each subscale (n=480)

Use of the DFSC scale in clinical practice and research

The DFSC scale is a very brief measure that could be useful to diabetes clinicians, including nurse practitioners, who require a screening tool to assess levels of diabetes-related family support and family conflict among adults with type 2 diabetes. Where high levels of family conflict over diabetes self-management are identified, this could prompt appropriate follow-up; for example, professional support in the form of family therapy or individual counselling could be used to discuss and help to resolve any ongoing conflict over diabetes, particularly where this appears to have an adverse impact on self-management behaviour, or causes significant psychological distress.

The DFSC scale could also be used in evaluating the impact of family-based interventions to improve diabetes self-care. It may help to elucidate mechanisms of causal influence in such interventions: for example, by determining whether any observed improvements in self-care are mediated by a reduction in family conflict or an increase in perceived family support.

Additional research using the DFSC scale will help to establish normative data for different populations and clinical settings.

Strengths, limitations, and directions for further research

Strengths of this study include the development of a new measure with substantial input from people with type 2 diabetes and healthcare professionals, and testing of this measure using a sample (n=629) of adults with diabetes. The final measure demonstrated good internal consistency, and exploratory analysis showed support for the two theoretically derived dimensions (support and conflict).

One important limitation of this study is the cross-sectional research design. There are also limits to external validity, for example, we cannot know whether similar results would be evident among adults with type 1 diabetes or people of a different nationality, as all of the participants in this study had been diagnosed with type 2 diabetes, and were New Zealand residents. Further research is required to better understand the weak positive relationship between family support and family conflict, as observed in this study.

We purposefully limited the number of items included in the DFSC scale, to minimise the response burden and maximise the practical utility of this measure. As a result it is not possible to examine, for example, levels of indirect versus direct family support for diabetes

self-management. Where the research context affords a longer measure, additional items could be developed and added to the core 10-item measure. For example, when the population of research interest includes people with type 1 and type 2 diabetes, the addition of items focusing on family support for blood glucose testing may be useful.

Further testing of the psychometric properties of the DFSC scale is encouraged. This should include the assessment of reliability over time, and the use of confirmatory factor analysis to establish evidence of construct validity. It would be useful to know if the family support and conflict subscales are related to diabetes self-management behaviours. This would provide some evidence of criterion-related validity. Prospective studies are strongly encouraged, as these enable the assessment of causal relationships, and could help to establish whether higher levels of diabetes-related family support or lower family conflict have a positive influence on self-management behaviour and glycaemic control over time.

We encourage researchers and clinicians to consider the 10-item DFSC scale when a brief measure assessing diabetes-related family support and family conflict is needed. Further testing of this scale is recommended, to help establish normative data and to provide information on the external validity of this measure.

Conflict of interest statement
None declared.

References
1. Fisher L, Chesla CA, Skaff MM, *et al.* The family and disease management in Hispanic and European-American patients with type 2 diabetes. *Diabetes Care* 2000; **23**: 267–272.
2. Albright TL, Parchman M, Burge SK. Predictors of self-care behavior in adults with type 2 diabetes: An RRNeST study. *Family Medicine* 2001; **33**: 354–360.
3. Garay-Sevilla ME, Nava LE, Malacara JM, *et al.* Adherence to treatment and social support in patients with non-insulin dependent diabetes mellitus. *J Diabetes Complications* 1995; **9**: 81–86.
4. Glasgow RE, Toobert DJ. Social environment and regimen adherence among type II diabetic patients. *Diabetes Care* 1988; **11**: 377–386.
5. Samuel-Hodge CD, Headen SW, Skelly AH, *et al.* Influences on day-to-day self-management of type 2 diabetes among African-American women – Spirituality, the multi-caregiver role, and other social context factors. *Diabetes Care* 2000; **23**: 928–933.
6. Wang C, Fenske MM. Self-care of adults with non-insulin-dependent diabetes mellitus: Influence of family and friends. *Diabetes Educ* 1996; **22**: 465–470.
7. Fisher L, Chesla CA, Bartz RJ, *et al.* The family and type 2 diabetes: A framework for intervention. *Diabetes Educ* 1998; **24**: 599–607.
8. Kelleher D. Diabetes. London: Routledge, 1988.
9. Scott D, Brown EP. Stories of life with diabetes. Palmerston North, New Zealand: Dunmore Press, 1989.
10. Jones RA, Utz SW, Williams IC, *et al.* Family Interactions Among African Americans Diagnosed With Type 2 Diabetes. *Diabetes Educ* 2008; **34**: 318–326.
11. Rubin RR. Counselling and psychotherapy in diabetes mellitus. In: Snoek FJ, Skinner TC, eds. *Psychology in diabetes care.* 2nd ed. Chichester, UK: John Wiley 2005:171–193.
12. Edelwich J, Brodsky RA. Diabetes: Caring for your emotions as well as your health. New York: *Perseus Books*, 1986.
13. Skinner TC, Hampson SE. Social support and personal models of diabetes in relation to self-care and well-being in adolescents with type I diabetes mellitus. *J Adolesc* 1998; **21**: 703–715.
14. Hood KK, Butler DA, Anderson BJ, Laffell LMB. Updated and revised diabetes family conflict scale. *Diabetes Care* 2007; **30**: 1764–1769.
15. Anderson BJ, Miller JP, Auslander WF, Santiago JV. Family characteristics of diabetic adolescents: relationship to metabolic control. *Diabetes Care* 1981; **4**: 586–594.
16. Laffel LMB, Connell A, Vangsness L, *et al.* General quality of life in youth with type 1 diabetes. *Diabetes Care* 2003; **26**: 3067–3073.
17. Glasgow RE. Social-environmental factors in diabetes: Barriers to diabetes self-care. In: Bradley C, ed. Handbook of psychology and diabetes. Chur, Switzerland: Harwood Academic 1994:335-49.
18. Wen LK, Shepherd MD, Parchman ML. Family support, diet, and exercise among older Mexican Americans with type 2 diabetes. *Diabetes Educ* 2004; **30**: 980–993.
19. Schafer LC, McCaul KD, Glasgow RE. Supportive and nonsupportive family behaviors: Relationships to adherence and metabolic control in persons with type 1 diabetes. *Diabetes Care* 1986; **9**: 179–185.
20. Chesla CA, Fisher L, Mullan JT, *et al.* Family and Disease Management in African-American Patients With Type 2 Diabetes. *Diabetes Care* 2004; **27**: 2850–2855.
21. New Zealand Guidelines Group. Best practice evidence-based guideline: Management of type 2 diabetes. Wellington: Ministry of Health 2003.
22. Tabachnick BG, Fidell LS. Using Multivariate Statistics. 4th ed. MA: Allyn & Bacon, 2001.