Published in final edited form as:
Diabet Med. 2008 November ; 25(11): 1316–1323. doi:10.1111/j.1464-5491.2008.02574.x.

Quality of Life in Children with Type 1 Diabetes: A Comparison of General and Diabetes-Specific Measures, and Support for a Unitary Diabetes Quality of Life Construct

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Abstract

Aims—To assess the factor structure of the PedsQL Diabetes Module, and to compare the PedsQL general and diabetes-specific quality of life (QOL) measures regarding psychometric properties and relations to relevant outcomes.

Methods—The instruments were completed by 447 children age 9 to 15.5 with type 1 diabetes >1 year from four US paediatric diabetes clinics; parents completed the parallel parent-proxy measures. Principal components factor analysis was used to examine the factor structure of the PedsQL diabetes module. Analyses of the generic and diabetes QOL measures included psychometric properties, parent-child correlations, and correlations with depression, adherence, and A1c.

Results—The factor structure of the PedsQL diabetes module did not support the original 5 subscales. Both one and two factor models were supported; however parallel parent and child subscales did not emerge. While the generic and diabetes-specific measures of QOL were moderately to highly correlated with each other, the constructs were differentially associated with relevant diabetes outcomes. Generic QOL was more highly associated with depression than diabetes QOL. Conversely, diabetes QOL was more highly associated with adherence and A1c, though this was seen to a greater extent for parent-proxy report than for child report.

Conclusions—Factor analysis of the PedsQL diabetes module supports the use of a total diabetes QOL score. Findings regarding the associations of the generic and diabetes modules with diabetes outcomes underscore the unique contribution provided by both generic and diabetes QOL.

Keywords

Quality of life; Children; Type 1 diabetes; Measurement

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For the Steering Committee of the Family Management of Diabetes Study

Declaration of Competing Interests: None to declare.

Introduction

Quality of life (QOL) is a frequently employed construct in studies of children with diabetes, and is critical for evaluating health outcomes in clinical trials and for decision-making in health care [1]. Measurement of the construct varies in specific dimensions but includes aspects of physical, emotional, and social well-being [2]. When assessing QOL among children with diabetes, either a generic or a disease-specific approach may be employed. A generic approach allows for comparisons between children with diabetes and healthy children or children with other conditions. However, a disease-specific approach allows for the assessment of dimensions that are uniquely relevant to the lives of children with diabetes, and therefore may be more sensitive to change or between-group differences. As such, assessment of both generic and diabetes-specific dimensions of QOL is often advocated [3-5]. While this represents the ideal, time and cost limitations may force researchers or clinicians to chose between approaches.

Both generic and diabetes-specific QOL measures have demonstrated utility in previous research. For example, using a generic QOL measure, children with diabetes and other chronic illness have been shown to exhibit poorer QOL than general population samples [6-8]. Research using a diabetes-specific measure of QOL has demonstrated improvement in QOL following intensification of insulin therapy [9,10]. Both generic [11] and diabetes specific [12,13] measures have linked the construct to lower A1c, though this is not consistently seen across studies [14-16]. Both generic QOL [17-19] and diabetes-specific QOL [14,18,20] have shown relations to various dimensions of family functioning in children with diabetes.

Conceptual preferences may direct the choice of generic versus diabetes-specific QOL; however, there are little comparative data to inform the selection of which construct to assess. The Pediatric Quality of Life Inventory (PedsQL) measurement model [7,21] includes both generic core scales as well as disease-specific modules [8]. As such, it is well-suited for a direct comparison between generic and disease-specific aspects of QOL among children with diabetes. Despite widespread use, however, validation of the PedsQL diabetes module did not include calculation of a total score, nor has previous research examined whether the conceptually-based subscales represent statistically distinct measurement factors. To determine whether analysis of the PedsQL diabetes module should be conducted using subscales or a total score, the factor structure of the PedsQL Diabetes Module was assessed to 1) determine whether the five subscales are supported by the measure's factor structure and 2) determine whether the factor structure supports calculation of an overall QOL score. The PedsQL general and diabetes-specific measures were then compared along the following dimensions: 1) psychometric properties; 2) parent-child concordance; 3) relationship to general emotional distress; 4) relationship to adherence and A1c.

Patients and Methods

Design

Cross-sectional data were obtained from parent-child dyads from four paediatric endocrinology clinics in different US geographic regions. Participants were part of either the pilot study or the main randomized clinical trial of a behavioural intervention. Use of the two cohorts allowed for a sufficient number of participants for examination of the factor structure of the PedsQL diabetes module, and allowed for comparison of the measures across both cohorts to determine consistency of the findings. Assessments were conducted prior to group assignment or clinical intervention. Baseline data for the pilot study were collected from December 2004 to May 2005. Baseline data for the main trial were collected from April 2006 to January 2007.

Sample

A total of 122 parent-child dyads were recruited for the pilot study, and 390 for the main trial. Child eligibility criteria included diagnosis of type 1 diabetes mellitus, age 9.0 to 14.5, insulin dose at least 0.5 u/kg/day, mean HbA1c over the last eight months less than 13.0%, and no other major chronic disease, cognitive disability, or psychiatric diagnosis. Additional parent/family eligibility criteria included geographically stable home with telephone access, able to speak and understand English, history of at least two clinic visits within the previous 12 months, and participating parent has no major psychiatric diagnosis. For the pilot study, participants had to be diagnosed with type diabetes for at least one year. In the main trial, newly-diagnosed children were also included. For comparability across cohorts, those diagnosed for less than one year were excluded from these analyses.

For the pilot study, 132 families enrolled in the study; however, 10 withdrew prior to baseline assessment, resulting in a sample of 122, with 29-31 from each site. For the main trial, a total of 424 families enrolled; 392 completed baseline assessment and 32 withdrew prior to baseline assessment. Four children completing baseline assessment were two-sibling pairs, so only the sibling with the longest duration of diabetes was included in the study data; 65 had been diagnosed for less than one year, and were excluded. Thus, 325 families from the main trial are included, with 66-97 from each site.

Procedures

Medical record data was screened to identify eligible families with upcoming clinic visits. For the pilot study, participants were recruited both in-clinic and by telephone. For participants recruited in-clinic, a brochure and letter signed by the patient's endocrinologist or other primary medical staff was sent to the family one week prior to their clinic visit, providing information about the study and inviting their participation. During the clinic visit, research staff met individually with interested families, verified eligibility, answered questions, and obtained informed parent consent and child assent. For participants recruited by telephone, the letter and brochure were sent six weeks prior to the clinic visit. Families were then contacted by telephone to verified eligibility, answer questions, and obtain verbal informed parent consent and child assent. For the main trial, participants were recruited in-clinic only, using the same procedures as for the pilot study.

Following enrolment, contact information was provided to the study coordinating centre, which scheduled the baseline assessment prior to the family's next clinic visit. For families enrolled by telephone, written informed consent and child assent was obtained by study staff at the time of the baseline assessment. Assessments were conducted in-person concurrently with parent and child in the families' homes or other convenient location by two-person interviewing teams not affiliated with the clinics. Parents and children completed assessments simultaneously, but with different interviewers and in different areas to allow for privacy of responses. Study procedures were approved by the Institutional Review Boards of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and each of the clinical sites.

Measures

Quality of life—The PedsQL Generic Core Scales [7] and the PedsQL Diabetes Module [8] were administered to children and parents. The measures consist of child-report and parent-proxy versions. Scores on the Generic Core Scales reliably differentiate between healthy children and those with acute or chronic conditions, are related to indicators of morbidity and illness burden, and display a factor-derived solution consistent with a priori conceptually driven scales [7].

A1c—Blood samples were obtained by finger-stick and frozen for shipment as whole blood to the Joslin Diabetes Center Laboratory. The samples were processed using the Tososh 2.2 device (Tososh Corporation, Foster City, CA). Joslin is a reference laboratory for this assay which has been standardized against the DCCT reference laboratory; the reference range is 4-6%.

Treatment adherence—Diabetes self-management behaviour was measured with the Diabetes Self Management Profile [22], using either the conventional or flexible regimen version [23] as appropriate. Trained interviewers completed these structured interviews with parents and with children ages 11 and older. The measure has demonstrated adequate internal consistency (alpha=.76), parent-child agreement (r=.61), 3-month test-retest reliability (r=.67), and inter-interviewer agreement (r=.94).

Depression—Only children enrolled in the main trial completed the Children's Depression Inventory [24], a 27-item self-report measure designed to measure the extent and severity of depressive symptoms in children aged 7-17.

Analyses

Because there were no prior data supporting a specific factor structure of the PedsQL diabetes module, exploratory factory analysis was used. Preliminary analyses indicated that measurement properties in each cohort were consistent with previously-reported findings [7, 8]. Therefore, to provide an adequate sample size for factor analysis, the two study cohorts were combined for this analysis. As the measure indicates 5 conceptually-based related subscales, the first analysis was a principal components factor analysis with promax rotation, extracting 5 factors. Item loadings on the 5 factors were examined to determine whether the subscales loaded distinct factors. A cutoff value of .30 was used to classify an item as loading on a factor. Next, the scree plot and the factor eigenvales were examined to determine the number of factors that best represented the data. Principal component factor analyses extracting each of the candidate number of factors were then conducted. Because the factors would be expected to correlate, promax rotation was used for analyses of greater than one factor. The component matrix (for single factor solutions) or pattern matrix (for multiple factor solutions) was analyzed to determine whether a clear and interpretable solution emerged. Based on findings from the factor analysis, a total diabetes quality of life score was included in subsequent analyses.

PedsQL generic and diabetes scale properties and associations with relevant constructs were assessed separately for each study cohort. Internal consistency of each scale and subscale was assessed using Cronbach's alpha. Correlation of the two measures, and correlations between parent and child reports were assessed. Correlations between the QOL scales and depression, adherence, and A1c were then assessed.

Results

Among the pilot study cohort (n=122), the mean age was 11.5 years, mean age at diagnosis was 6.7 years, and mean A1c was 8.4%. The study participants were 71.1% white, 9.9% Hispanic, 11.6% Black, and 7.4% other race. Most participants (91.1%) were from families with two or more adults in the home, 45.4% of parents had a college degree, and 77.4% of families reported an annual income of $50,000 or greater. Among the main study cohort (n=325), the mean age was 12.5 years, mean age at diagnosis was 6.8 years, and mean A1c was 8.5%. The study participants were 76.5% white, 10.3% Hispanic, 7.1% Black, and 6.1% other race. Most participants (90.4%) were from families with two or more adults in the home,

46.9% of parents had a college degree, and 76.9% of families reported an annual income was of $50,000 or greater.

Principal components factor analysis extracting five factors did not result in the diabetes QOL items loading the specified diabetes QOL subscales for either child or parent report. For the child report, items within each subscale loaded across multiple factors, and the resulting factors did not represent conceptually meaningful distinct constructs (Table 1). For the parent-proxy report, items from the diabetes symptoms subscale loaded two different factors. Items in the treatment adherence, worry, and communication subscales formed individual factors; however, items from the treatment barriers subscale also loaded two of these factors. Analysis of the child-data scree plot suggested that either a one- or two-factor solution would best represent the data (eigenvalues of 6.79 and 2.07); analysis of the parent-data scree plot indicated a two-factor solution (eigenvalues of 6.02 and 2.28). As such, both one-factor and two-factor solutions were tested. Loadings of the items on the factors for each solution are presented in Table 2. In the one-factor solution, most items loaded for both parent-proxy and child data. Reported problems with hypoglycaemia did not load for children or parents, and problems wearing identification did not load for parents. In the two-factor solution with child data, all items on the symptom subscale loaded one factor, and all remaining items except worry about hypoglycaemia loaded the second factor. For parent-proxy data, all items on the symptoms and worry subscales loaded one factor, and all but two of the remaining items (problems with needle pain and problems wearing identification) loaded the other. Correlation between the two factors was .49 and .45 for child and parent data respectively.

Psychometric properties of the generic and diabetes QOL scales and subscales are provided in Table 3. There were no significant differences in means, and internal consistency of the measures was similar across the two cohorts, with total score alphas ranging from .84 to .90. Alphas for parent and child treatment barriers, treatment adherence, and worry subscales were less than .70. Correlations between parent and child report of quality of life were modest, ranging from nonsignificant to .43 (Table 4). Generic and diabetes QOL were moderately to highly related. Among children, the correlation between generic and diabetes QOL was .71 for cohort 1 and .74 for cohort 2. Among parents, the two measures were correlated .65 for cohort 1 and .56 for cohort 2.

Bivariate relations of the QOL total scores and subscale scores with depression, adherence, and A1c are presented in Table 5. Both generic and diabetes QOL were associated with depression, though more strongly for child report of QOL (r = -.63 generic and -.54 diabetes-related) than parent report (r = -.37 generic and -.24 diabetes-related). Parent report of diabetes QOL was most strongly associated with parent report of adherence (r = .42 cohort 1 and .36 cohort 2), while child report of both generic and diabetes QOL were associated with child report of adherence (r ranging from .21 to .37). Associations of all the QOL measures with A1c were small and less consistent across the two cohorts.

Discussion

QOL is increasingly being recognized as an important clinical outcome; however, assessment must incorporate the multidimensional nature of the construct [2]. In addition to generic dimensions of physical, emotional, and social well-being, a diabetes-specific measure of QOL offers unique perspectives not captured by a generic measure. Psychometric properties of each measure and relations with relevant outcomes support the utility of the PedsQL generic and diabetes modules for assessment of QOL.

Factor analysis of the PedsQL diabetes module supports the use of a total diabetes QOL score. While the original validation of the PedsQL diabetes module included only subscale scores,

findings from this study indicate that a total score may the most psychometrically appropriate use of the measure. The alphas of several of the original subscales were lower than desirable, and the five subscales did not represent statistically distinct measurement factors. However, all but two of the items loaded a single factor for both child and parent report, supporting the appropriateness of calculating a total diabetes QOL score. Use of a total score offers greater utility to researchers, minimizing the number of analyses required when examining QOL as an outcome. The analyses did provide some evidence for two subscales, with one representing medical issues and the other representing behavioural factors. However, parallel child and parent-proxy subscales did not emerge. For child report, the worry items loaded the behavioural subscale, while for parent-proxy report, they loaded the medical subscale. As such, findings from this analysis cannot definitively identify distinct subscales in the PedsQL diabetes module. Future research to replicate these findings and to address the potential development of subscales would be useful.

Psychometric properties of both the PedsQL generic and diabetes modules were similar to those reported previously [7,8] and were consistent across the 2 cohorts, lending credibility to the findings. Correlations between child and parent-proxy report were modest, suggesting that perceptions regarding quality of life may differ substantially between children and their parents, underscoring the importance of measuring both reporters. Child report of generic and diabetes QOL tended to be more highly correlated with one another than was parent-proxy report of generic and diabetes QOL, and child report of both constructs was moderately to highly correlated with depression. This may indicate that children are more apt to perceive their well-being in a more global manner; while parents may be more able to differentiate between well-being across various domains. Greater correlations within-reporter may also be attributable to shared-method variance; potentially accounting to some degree for the greater correlation of depression, a child-report measure, with child report of QOL than with parent report of QOL. While the generic and diabetes-specific measures of QOL were moderately to highly correlated with each other, the constructs were differentially associated with relevant diabetes outcomes. Generic QOL was more highly associated with depression than diabetes QOL. Conversely, diabetes QOL was more highly associated with adherence and A1c, though to a greater extent for parent-proxy report than for child report.

To our knowledge, this is the largest analysis to date assessing the psychometric properties of the PedsQL generic and diabetes modules, and the first to examine the factor structure of the PedsQL diabetes module. Participants were recruited from 4 geographically diverse US paediatric diabetes centres, and represent a range of socioeconomic and ethnic backgrounds. However, certain limitations are important to acknowledge. These analyses were conducted with families enrolled in intervention studies. Since participants had to meet the eligibility criteria and be willing to participate in an intervention study, they may not be representative of the broader population of children and adolescents with diabetes. Likewise, the study eligibility criteria limited the age range of participating children. Insufficient numbers of ethnic minorities were available for analysis by subgroup, and there were insufficient numbers of recently diagnosed children for separate analysis among this group. As newly diagnosed families may perceive their adaptation to diabetes substantially differently from those who have dealt with the disease over a longer period, they were necessarily excluded from this analysis.

Findings are instructive for clinicians and researchers who must decide between use of a generic and a diabetes-specific measure of QOL. A generic measure provides the least overlap with other diabetes-related outcomes that are likely to be assessed and so offers a relatively unique contribution to assessment of outcomes. Conversely, while diabetes-related QOL may overlap to a degree with the construct of adherence, it is also more likely to be sensitive to interventions targeting adaptation to the demands of the disease. Clearly, selection of a generic or diabetes-

specific measure must be guided by the specific study objectives. Findings also indicate that child report of QOL may be highly influenced by depressive affect, suggesting the importance of assessing both child and parent-proxy report.

This study provides new data regarding the factor structure of the PedsQL diabetes module and a comparison of the PedsQL generic and diabetes modules. Results may guide researchers and clinicians in their choice and use of assessment measures. Findings add to the body of literature supporting the relevance of QOL as an important outcome for children with type 1 diabetes.

Acknowledgements

The following institutions and investigators comprised the steering committee of the Family Management of Diabetes multi-site trial. This research was supported by the intramural research program of the National Institutes of Health, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development.

Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, Maryland: Tonja R. Nansel, PhD., Bruce Simons-Morton, EdD, Ronald J. Iannotti, PhD.

Joslin Diabetes Center, Boston, Massachusetts: Lori Laffel, MD MPH, Korey Hood, PhD. Debbie Butler, Lisa Volkening. Contract N01-HD-4-3364.

Nemours Children's Clinic, Jacksonville, Florida: Timothy Wysocki, PhD, Amanda Lochrie, PhD. Contract N01-HD-4-3361.

Texas Children's Hospital, Houston, Texas: Barbara Anderson, PhD. Contract N01-HD-4-3362.

Children's Memorial Hospital, Chicago, Illinois: Jill Weissberg-Benchell, PhD, Grayson Holmbeck, PhD. Contract N01-HD-4-3363.

James Bell Associates, Arlington, Virginia; Cheryl McDonnell, PhD, MaryAnn D'Elio, Contract N01-HD-3-3360.

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Abbreviations

QOL

Quality of Life

PedsQL

Pediatric Quality of Life Inventory

Table 1

Factor pattern of the diabetes quality of life measure; 5-factor solution (n=447)

Original Subscale		Factor Structure; Child Report					Factor Structure; Parent Report				
	Item	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Diabetes Symptoms	Problems with feeling hungry	.01	-.18	**.65**	.05	-.02	.04	.03	-.03	**.68**	.03
	Problems with feeling thirsty	.08	.04	**.68**	.01	-.08	.04	-.10	-.03	**.82**	.13
	Problems having to go to the bathroom often	.02	.20	**.63**	-.19	.07	.11	-.02	-.06	**.73**	.07
	Problems with stomach aches	-.19	-.09	.26	**.59**	.04	**.61**	-.11	.11	.14	-.15
	Problems with headaches	-.02	-.00	.22	**.46**	.16	**.61**	.04	.07	-.07	.02
	Problems with going low	-.08	-.07	.12	-.03	**.78**	**.61**	-.16	-.06	-.16	.23
	Problems with feeling tired or fatigued	-.07	.06	**.49**	**.32**	.17	**.58**	.04	-.01	.25	-.05
	Problems getting shaky	.06	-.17	.16	-.03	**.65**	**.71**	.01	-.10	-.07	.06
	Problems getting sweaty	-.06	-.03	**.58**	.11	.08	**.64**	.01	-.12	.18	.02
	Problems sleeping	.01	.01	.22	**.43**	.04	**.62**	.00	.14	.00	-.12
	Problems getting irritable	.01	.20	.24	.14	.22	**.47**	.18	.12	.19	-.02
Treatment Barriers	Problems with needle pain	**.69**	-.29	-.04	.20	.01	.26	**.36**	.03	-.24	.26
	Problems getting embarrassed about diabetes	.10	.07	-.14	**.70**	-.11	-.08	.24	**.38**	.02	.26
	Problems arguing with parents/child about diabetes care	-.08	**.58**	.24	.08	-.17	-.01	**.53**	.06	.27	.02
	Problems sticking with diabetes care	.12	**.58**	**.33**	-.01	-.17	-.18	**.31**	.01	**.38**	.06
Treatment Adherence	Problems taking blood glucose tests	**.71**	.13	-.02	-.03	-.01	-.02	**.69**	-.07	.05	-.02
	Problems taking insulin	**.86**	-.26	.12	-.03	-.03	.10	**.67**	-.03	-.17	-.04
	Problems with exercise	**.30**	.17	.23	.15	-.14	.04	**.51**	-.13	.02	-.10
	Problems tracking carbohydrates	**.33**	**.36**	.16	-.11	.10	-.04	**.58**	-.07	.20	-.13
	Problems wearing ID	-.18	**.70**	-.03	-.15	.02	-.15	**.30**	.02	.03	.10
	Problems carrying fast-acting carbs	.29	**.56**	-.01	-.28	.09	-.01	**.55**	.14	.01	-.18
	Problems eating snacks	**.48**	.11	-.08	-.12	.24	.00	**.58**	-.05	-.25	.18
Worry	Worry about going low	.03	.25	-.25	.07	**.60**	.09	-.05	-.05	-.07	**.81**
	Worry about whether medical treatments are working	-.13	**.62**	-.18	.29	.11	.01	.00	.06	.23	**.69**
	Worry about long-term complications of diabetes	-.14	**.76**	-.12	.18	-.03	-.12	-.10	.02	.21	**.78**
Communication	Problems telling doctors how I feel	**.41**	.13	-.01	**.37**	-.09	.06	-.05	**.88**	.01	-.07
	Problems asking doctors questions	**.46**	.11	-.18	**.37**	.07	.04	-.13	**.94**	-.04	-.05
	Problems explaining illness to other people	.25	-.05	-.07	**.59**	-.03	-.02	.01	**.79**	-.08	.12

Table 2

Factor pattern of the diabetes quality of life measure; 1-factor and 2-factor solutions (n=447)

Original Subscale	Item	Child Report Single Factor	Parent Report Single Factor	Child Report Factor 1	Child Report Factor 2	Parent Report Factor 1	Parent Report Factor 2
Diabetes Symptoms	Problems with feeling hungry	**.30**	**.46**	**.61**	-.16	**.42**	.12
	Problems with feeling thirsty	**.49**	**.51**	**.57**	.06	**.55**	.04
	Problems having to go to the bathroom often	**.45**	**.50**	**.57**	.03	**.55**	.04
	Problems with stomach aches	**.39**	**.43**	**.48**	.03	**.53**	-.04
	Problems with headaches	**.44**	**.48**	**.45**	.10	**.50**	.06
	Problems with going low	.27	.29	**.62**	-.22	**.56**	-.24
	Problems with feeling tired or fatigued	**.60**	**.57**	**.68**	.10	**.60**	.06
	Problems getting shaky	**.34**	**.47**	**.53**	-.07	**.60**	-.06
	Problems getting sweaty	**.41**	**.53**	**.64**	-.08	**.67**	-.06
	Problems sleeping	**.48**	**.48**	**.36**	.22	**.45**	.11
	Problems getting irritable	**.51**	**.65**	**.41**	.21	**.48**	.27
Treatment Barriers	Problems with needle pain	**.42**	**.44**	-.09	**.52**	.26	.25
	Problems getting embarrassed about diabetes	**.51**	**.48**	-.001	**.54**	.07	**.50**
	Problems arguing with parents/child about diabetes care	**.53**	**.60**	.16	**.43**	.12	**.60**
	Problems sticking with diabetes care	**.68**	**.43**	.18	**.58**	.04	**.48**
Treatment Adherence	Problems taking blood glucose tests	**.60**	**.47**	-.15	**.76**	.04	**.53**
	Problems taking insulin	**.49**	**.39**	-.07	**.57**	-.04	**.41**
	Problems with exercise	**.55**	**.33**	.12	**.49**	.09	**.30**
	Problems tracking carbohydrates	**.60**	**.42**	.13	**.53**	.01	**.49**
	Problems wearing ID	**.30**	.18	-.03	**.34**	-.06	.27
	Problems carrying fast-acting carbs	**.49**	**.39**	-.08	**.59**	-.14	**.61**
	Problems eating snacks	**.42**	**.33**	-.03	**.47**	.03	**.37**
Worry	Worry about going low	**.37**	**.37**	.18	.25	**.58**	-.15
	Worry about whether medical treatments are working	**.54**	**.57**	.02	**.56**	**.58**	.07
	Worry about long-term complications of diabetes	**.54**	**.37**	-.05	**.61**	**.48**	-.06
Communication	Problems telling doctors how I feel	**.65**	**.55**	-.02	**.70**	-.06	**.72**
	Problems asking doctors questions	**.62**	**.51**	-.08	**.72**	-.08	**.69**
	Problems explaining illness to other people	**.53**	**.49**	.06	**.51**	-.08	**.67**

Table 3

Quality of life scale and subscale properties

Construct	Variables	Cohort 1 (n=122)			Cohort 2 (n=325)		
		Alpha	Mean†	SD	Alpha	Mean†	SD
Generic QOL	Child:						
	Total Score	.88	79.67	12.20	.90	79.39	12.94
	Physical health	.78	85.44	12.71	.80	84.11	13.58
	Psychosocial health	.84	76.58	13.84	.86	77.13	14.02
	Emotional Functioning	.74	73.86	18.23	.74	73.34	18.11
	Social Functioning	.74	84.53	16.26	.76	86.56	14.94
	School Functioning	.68	71.36	16.48	.71	71.62	16.90
	Parent:						
	Total Score	.88	76.31	11.89	.88	75.99	11.61
	Physical health	.74	84.74	12.05	.80	82.18	13.89
	Psychosocial health	.88	71.82	14.78	.85	72.96	12.60
	Emotional Functioning	.81	69.98	17.56	.80	68.30	16.57
	Social Functioning	.78	80.42	16.53	.76	82.95	14.49
	School Functioning	.82	66.00	18.82	.79	67.54	17.56
Diabetes QOL	Child:						
	Total score	.87	72.02	12.19	.88	69.97	12.68
	Diabetes symptoms	.75	62.53	13.14	.77	60.27	13.95
	Treatment barriers	.61	76.01	18.34	.63	74.50	18.66
	Treatment adherence	.68	82.29	14.86	.65	79.19	14.78
	Worry	.62	73.45	19.06	.60	70.29	21.35
	Communication	.72	75.99	23.40	.73	75.69	22.31
	Parent:						
	Total score	.87	66.68	11.78	.84	65.64	11.22
	Diabetes symptoms	.83	62.27	13.29	.78	60.18	12.52
	Treatment barriers	.64	63.88	19.15	.58	65.05	17.71
	Treatment adherence	.61	75.10	14.92	.60	74.08	14.38
	Worry	.69	61.16	19.53	.73	58.58	20.87
	Communication	.87	72.60	22.78	.83	72.43	25.52

† No means significantly different between the two cohorts.

Table 4

Parent-child correlations for quality of life scales and subscales

	Cohort 1 (n=122)	Cohort 2 (n=325)
Generic QOL		
Total Score	.34**	.41**
Physical health	.07	.35**
Psychosocial health	.40**	.37**
Emotional Functioning	.37**	.33**
Social Functioning	.22*	.37**
School Functioning	.44**	.39**
Diabetes QOL		
Total score	.15	.43**
Diabetes symptoms	.17	.42**
Treatment barriers	.36**	.34**
Treatment adherence	.13	.37**
Worry	.23*	.25**
Communication	-.03	.21**

* p<.05

** p<.01

Table 5

Correlation of quality of life scales with general emotional functioning and diabetes-related outcomes

Construct	Variables	Depression	Adherence Parent Report		Adherence Child Report		A1c	
		Cohort 2	Cohort 1	Cohort 2	Cohort 1	Cohort 2	Cohort 1	Cohort 2
Generic QOL	Child:							
	Total Score	-.63**	.04	.15**	.21*	.32**	-.09	-.08
	Physical health	-.43**	.03	.07	.12	.26**	-.06	-.00
	Psychosocial health	-.66**	.05	.17**	.22*	.31**	-.10	-.11
	Emotional Functioning	-.59**	.00	.12*	.19*	.23**	-.10	-.06
	Social Functioning	-.55**	-.06	.12*	.10	.20**	.04	-.09
	School Functioning	-.50**	.19*	.19**	.24*	.33**	-.17	-.12*
	Parent:							
	Total Score	-.37**	.17	.23**	-.02	.11	-.06	-.12*
	Physical health	-.24**	.16	.18**	.06	.14*	-.18	-.12*
	Psychosocial health	-.37**	.14	.21**	-.04	.08	.01	-.09
	Emotional Functioning	-.30**	.10	.19**	-.09	.01	.03	-.03
	Social Functioning	-.26**	.04	.11	-.11	.06	.06	-.06
	School Functioning	-.30**	.21*	.20**	.09	.11	-.08	-.12*
Diabetes related QOL	Child:							
	Total score	-.54**	.12	.22**	.32**	.37**	-.26**	-.12*
	Diabetes symptoms	-.44**	.06	.11	.28**	.22**	-.24*	-.11
	Treatment barriers	-.48**	.26**	.29**	.36**	.41**	-.23*	-.19**
	Treatment adherence	-.38**	.16	.23**	.36**	.37**	-.23*	-.09
	Worry	-.36**	-.04	.16**	-.01	.19**	-.07	-.05
	Communication	-.43**	.002	.08	.12	.24**	-.13	-.05
	Parent:							
	Total score	-.24**	.42**	.36**	.13	.13*	-.14	-.09
	Diabetes symptoms	-.28**	.22*	.19**	-.05	.05	-.02	-.10
	Treatment barriers	-.20**	.36**	.31**	.14	.12	-.23*	-.10
	Treatment adherence	-.10	.55**	.38**	.36**	.24**	-.13	-.06
	Worry	-.08	.03	.10	-.12	.02	.04	-.10
	Communication	-.12*	.26**	.24**	.09	.03	-.21*	-.03

* p<.05

** p<.01