Journal of Psychosomatic Research 77 (2014) 174–179

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Relationships of diabetes-specific emotional distress, depression, anxiety, and overall well-being with HbA_{1c} in adult persons with type 1 diabetes

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ARTICLE INFO

Article history:
Received 1 April 2014
Received in revised form 27 June 2014
Accepted 30 June 2014

Keywords:
Depression
Anxiety
Diabetes-specific emotional distress
HbA_{1c}
Type 1 diabetes

ABSTRACT

Objective: Emotional problems are common in adults with diabetes, and knowledge about how different indicators of emotional problems are related with glycemic control is required. The aim was to examine the relationships of diabetes-specific emotional distress, depression, anxiety, and overall well-being with glycosylated hemoglobin (HbA_{1c}).

Methods: Of the 319 adults with type 1 diabetes attending the endocrinology outpatient clinic at a university hospital in Norway, 235 (74%) completed the Diabetes Distress Scale, the Problem Areas in Diabetes Survey, the Hospital Anxiety and Depression Scale, and the World Health Organization-Five Well-Being Index. Blood samples were taken at the time of data collection to determine HbA_{1c}. Regression analyses examined associations of diabetes-specific emotional distress, anxiety, depression, and overall well-being with HbA_{1c}. The relationship between diabetes-specific emotional distress and HbA_{1c} was tested for nonlinearity.

Results: Diabetes-specific emotional distress was related to glycemic control (DDS total: unstandardized coefficient = 0.038, $P < .001$; PAID total: coefficient = 0.021, $P = .007$), but depression, anxiety, and overall well-being were not. On the DDS, only regimen-related distress was independently related to HbA_{1c} (coefficient = 0.056, $P < .001$). A difference of 0.5 standard deviation of baseline regimen distress is associated with a difference of 0.6 in HbA_{1c}. No significant nonlinearity was detected in the relationship between diabetes-specific distress and HbA_{1c}.

Conclusions: To stimulate adequate care strategies, health personnel should acknowledge depression and diabetes-specific emotional distress as different conditions in clinical consultations. Addressing diabetes-specific emotional distress, in particular regimen distress, in clinical consultation might improve glycemic control.

Introduction

Type 1 diabetes is a chronic disease where the insulin-producing pancreatic beta cells are destroyed [1,2], which makes a lifetime treatment of exogenous insulin replacement necessary [3]. Diabetes is a growing public health burden across the world [4], with consequences for the individuals' daily lives [5], and substantial economic burden on the society [6]. Maintaining an appropriate glycemic control is important to prevent late complications of diabetes, such as diabetic retinopathy, nephropathy and neuropathy [7]. The American Diabetes Association guidelines [8] recommend that persons with type 1 diabetes should have an HbA_{1c} level of <7%. Despite the growing knowledge about what might improve glycemic control, many persons do not meet the treatment recommendation [9,10]. Emotional problems might complicate the required self-management of the disease [11], and limit the persons' management of self-care activities necessary to achieve an adequate glycemic control [12]. The recent DAWN2 study showed that emotional problems are a challenge of concern in persons with diabetes across cultures [13]. Further it was reported that although the health care providers acknowledged the importance of addressing emotional problems in persons with diabetes [14], there was a gap between persons' needs and current health care strategies [13].

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http://dx.doi.org/10.1016/j.jpsychores.2014.06.015

The presence of depression or diabetes-specific emotional distress, or a combination of these, might comprise barriers to adequate self-management in persons with type 1 diabetes [15]. The underrecognition of emotional problems, such as depression, anxiety, and diabetes-specific emotional distress, has been reported [16], and when such concerns are recognized, problems might be identified as depression, even in patients whose problems are directly related to diabetes and its treatment [17]. Diabetes-specific emotional distress can be defined as a range of emotional responses and reactions to life with diabetes, especially those related to the treatment regimen and self-care demands. It is part of a person's experience of managing diabetes and its treatment in the social context of family and health-care personnel [18–20]. In contrast, depression is more strongly related to an anhedonic state, in which an individual is markedly affected by feelings of sorrow and hopelessness [21,22], and anxiety is predominantly related to fear, worry, and dread [21].

Gonzales et al. [23] suggested that depression and diabetes-specific emotional distress are independent constructs in type 2 diabetes, and later proposed that there can be confusion regarding what is actually addressed [17]. Hermanns et al. [24] showed that despite some overlap, people with depression and those with diabetes-specific emotional distress did not constitute identical groups in patients within type 1 or type 2 diabetes. It has been shown that depression and diabetes-specific emotional distress are differently associated with diabetes-specific indicators, but this is mainly examined in persons with type 2 diabetes [25–27].

Fisher et al. [18] found nonlinear relationships of diabetes-specific emotional distress with HbA_{1c}, diet, self-efficacy, and physical activity in two samples of persons with type 2 diabetes, with stronger relationships for lower levels of diabetes-specific emotional distress. The authors suggested that distress should be recognized at a lower level than previously recommended, and further suggested that to split the DDS scores into three groups (low, moderate and high distress) would better accommodate to the significant nonlinear relationship. Little knowledge about a potential nonlinear association is available in persons with type 1 diabetes, and it is not appropriate to assume that emotional problems are similarly manifested and have the same clinical consequences in persons with type 1 and type 2 diabetes. Therefore, the main aim of this study was to examine the relationships of diabetes-specific emotional distress, anxiety, depression, and overall well-being with HbA_{1c}, and to determine whether there is a nonlinear relationship between diabetes-related emotional distress and HbA_{1c} in individuals with type 1 diabetes.

Materials and methods

Sample and settings

Of the 319 persons with type 1 diabetes, aged 18–69 years, attending an adult outpatient clinic between October 2008 and January 2009 who were invited to participate in this study, 235 persons agreed to participate (74%). Some information was available to compare participants with nonparticipants: age (39.0 versus 37.9 years, respectively; $P = .535$), sex distribution (male 57% versus 66%, respectively; $P = .244$) and HbA_{1c} level (8.1% (65 mmol/mol) versus 8.4% (68 mmol/mol), respectively; $P = .285$). Sociodemographic and clinical information about the study subjects are presented in Table 1. To determine HbA_{1c} levels, blood samples were taken at the time of data collection, and analyzed with DCA-2000 Analyzer (Bayer, Elkhart, IN, USA).

Table 1
Person characteristics of the 235 persons with type 1 diabetes.

Total, n	235
Male, n (%)	135 (57.4)
Female, n (%)	100 (42.6)
Age	
Mean (SD)	39.0 (13.7)
Min–max, years	18–69
Diabetes duration, years	
Mean (SD)	18.6 (12.0)
Min–max	1–58
HbA_{1c}, %[a] mean (SD)	8.1 (1.6)
Presence of one or more late complication[b] yes (%)	81 (40.3)
Education, n (%)	
University, more than 4 years	30 (13.2)
University, up to 4 years	67 (29.4)
College/high school	104 (45.6)
Primary school, 9 years	27 (11.8)
DDS total mean[c] (SD)	19.5 (15.8)
DDS EB[d] (SD)	26.3 (22.4)
DDS RD[d] (SD)	23.6 (20.9)
DDS ID[d] (SD)	12.9 (17.3)
DDS PD[d] (SD)	10.7 (15.8)
PAID total mean[c] (SD)	23.6 (18.6)
WHO-5 total mean[c] (SD)	60 (19.8)
HADS-A mean[c] (SD)	5.6 (3.7)
HADS-D mean[c] (SD)	3.6 (3.5)

[a] Mmol/mol: 65.
[b] n = 201.
[c] DDS, PAID and WHO-5: 0–100 scale, HADS-A and HADS-D: 0–21 scales.
[d] The DDS subscales: the Emotional Burden subscale, the Regimen-related Distress subscale, the diabetes-related Interpersonal Distress subscale, and the Physician-related Distress subscale.

Measures

The following questionnaires were included in the study. The Problem Areas in Diabetes Survey (PAID) consists of 20 items and was developed to gain insight into the breadth of emotional responses to diabetes. It was initially based on a six-point Likert scale, ranging from 1 to 6 [19], but has been modified to a five-point Likert scale ranging from 0 (not a problem) to 4 (a serious problem) [28]. The questionnaire has been translated into Norwegian [29], and is considered internationally to have good psychometric properties [28–30]. A total score of 0–100 was computed, where higher scores represent higher levels of distress [28].

The Diabetes Distress Scale (DDS) was developed to address some of the limitations in earlier instruments that measured disease-specific emotional distress, and consists of 17 items divided into four subscales: the Emotional Burden subscale (EB, five items), Physician-related Distress subscale (PD, four items), Regimen-related Distress subscale (RD, five items), and diabetes-related Interpersonal Distress subscale (ID, three items). The DDS is based on a six-point Likert scale, ranging from 1 (no problem) to 6 (a serious problem) [20], and the measure has been translated into Norwegian [29]. It has shown good psychometric properties across different countries and cultures [18,20,29]. A total score of 0–100 was computed, where higher scores indicate greater emotional distress [20]. For the nonlinearity analyses, scales scored 1–6 were computed to enable this part of the analysis to be more easily compared with the Fisher et al. [18] results for nonlinearity in persons with type 2 diabetes.

The Hospital Anxiety and Depression Scale (HADS) was designed for clinicians as a screening test for psychiatric disorder in non-psychiatric hospital departments [22]. It consists of two subscales, HADS-A (anxiety) and HADS-D (depression), each with seven items with four-point Likert scales, ranging from 0 to 3 [31], and 0–21 scales were computed for HADS-A and HADS-D, where higher score indicates worse anxiety or depression state. In a review study, Bjelland et al. [32] found that the HADS performed well cross-culturally, and that its

validity was good to very good. The psychometric properties of the Norwegian version of the HADS showed to be satisfactory [33].

The World Health Organization-Five Well-Being Index (WHO-5) was developed to measure well-being [34], and consists of five positively worded items that assess well-being during the preceding 14 days, with six-point Likert scales ranging from 0 (not present) to 5 (constantly present). A total score of 0 (worst thinkable well-being) to 100 (best thinkable well-being) was computed [35].

As recommended by Fayers and Machin [36], each scale score was based on the mean of the valid items within each score if at least half the items were valid, except for HADS, where at least 5 of 7 items had to be valid. Cronbach's alphas for the respondents with type 1 diabetes were DDS total 0.92, PAID total 0.95, WHO-5 0.89, HADS-A 0.81, HADS-D 0.81, DDS RD subscale 0.84, DDS EB subscale 0.88, DDS PD subscale 0.83, and DDS ID subscale 0.81.

Statistical analysis

Respondents that had any missing values on any of the explanatory variables were excluded from regression analysis, giving a sample size of n = 185.

HbA_{1c} was the dependent variable in all analyses. To determine whether there was any relationship of all indicators with HbA_{1c}, bivariate regression analyses of HbA_{1c} with DDS total, PAID total, each of the four DDS subscales, HADS-A, HADS-D, WHO-5 and each of the adjustment variables age, sex, education and late complication were performed (results for adjustment variables not shown). Next, separate regression analyses were performed, one for each of the total diabetes distress scales, each of the two HADS scales and the overall well-being total scale, in addition to each of the four DDS subscales, all adjusted for age, sex, education and late complications. In the last phase, three models were estimated with multiple regression analyses adjusted for age, sex, education, and late complications as well as HADS-A, HADS-D and WHO-5. The DDS total and PAID total scales were analyzed in separate regression models because these instruments measure parallel constructs. Because the DDS subscales measure quite different areas of diabetes-specific emotional distress [20] the four subscales were analyzed together in the last regression model. Multicollinearity in the multiple regression models was checked by variance inflation factor (VIF). A sensitivity analysis using multiple imputation (200 imputed data sets) was performed to test whether the results from the complete case regression analyses described above were biased.

The potential nonlinear relationship between diabetes-specific emotional distress and glycemic control in the 185 persons with type 1 diabetes was addressed using regression analysis with restricted cubic splines with four knots (requiring 3 degrees of freedom) to incorporate possibly nonlinear relationships [37]. Because Fisher et al. [18] used quadratic regression analyses in their study, supplementary analyses of nonlinearity were performed with quadratic regression analysis to assure that potential differences between our study and the Fisher et al. study were not a consequence of methodological differences. As done in the linear analysis, the DDS total (1–6 scale) and PAID total were analyzed in separate regression models. Even though the four DDS subscales were integrated into one model in the linear analysis, the lower number of degrees of freedom in the nonlinear analysis made it necessary to analyze the four DDS subscales in four separate models when testing for nonlinearity. The nonlinear analyses were adjusted for the WHO-5 score, HADS scores, sex, age, education, and late complications.

Significance was defined as $P < .05$ in all analyses. The linear regressions were analyzed with SPSS version 19/20 (IBM, Armonk, NY), the nonlinear analysis were performed in the R (The R Foundation for Statistical Computing, Vienna, Austria) package rms and multiple imputation in the R package mice.

Ethical considerations

The study was approved by the Western Norway Committee for Medical and Health Research Ethics (19580/865). Participants got written and oral information about the study, and were informed that they could withdraw at any point of time.

Results

Linear regression analysis

The following variables were significantly related with HbA_{1c} in the bivariate regression analysis (Table 2): PAID and DDS total scores (unstandardized coefficient 0.020, $P = .001$, and 0.033, $P < .001$, respectively); regimen-related distress DDS subscale and the emotional burden DDS subscale (0.039, $P < .001$ and 0.014, $P = .005$, respectively); HADS-A, HADS-D and WHO-5 were not. Further, the presence of one or more late complications (0.621, $P = .010$) and lower level of education were significantly associated with higher HbA_{1c} ($P = .025$). Age and gender were not significantly related with HbA_{1c} in the bivariate regression.

When analyzing the indicators in separate analyses, all controlled for age, sex, education and late complications, results were similar to the bivariate regression results for PAID total and DDS total (significant) and HADS-A, HADS-D and WHO-5 (not significant). For the DDS subscales, the regimen-related distress and emotional burden were significant (0.038, $P < .001$ and 0.011, $P = .036$, respectively).

In the fully adjusted multiple regression analyses, both the DDS total score (0.038, $P < .001$) and PAID total score (0.021, $P = .007$) were significantly associated with glycemic control. In the model including the four DDS subscales, only the RD subscale was significantly associated with HbA_{1c} (0.056, $P < .001$). The model including DDS total explained 20.3% (R^2), and the model including PAID total explained 15.0% (R^2), of the variation in HbA_{1c}. The DDS subscale model explained 38.6% (R^2) of the variation in HbA_{1c}. Overall well-being, depression or anxiety was not significantly related to HbA_{1c} in any of these models. The maximum VIF was 2.92, and the results from the sensitivity analysis using multiple imputation showed only minor differences.

Peyrot et al. [38] suggested the use of 0.5 standard deviation (SD) as the minimum detectable difference (MDD), an estimate of the smallest change that can be subjectively realized by individuals [39]. A difference of 0.5 SD (of baseline mean, Table 1) in PAID total and DDS total is associated with a difference of 0.2 and 0.3 in HbA_{1c}, respectively. A difference of 0.5 SD in the regimen-related emotional distress (RD subscale) is associated with a difference of 0.6 in HbA_{1c}. Thus, persons who perceived that their regimen related distress had noticeably increased might be expected to experience an increase of 0.6 in their HbA_{1c}.

Nonlinear analyses

No significant nonlinear relationship was found between diabetes-specific emotional distress and glycemic control; P for nonlinearity = 0.317 in the model based on the DDS total and P for nonlinearity = 0.309 in the model based on the PAID total. Also, graphs of the estimated relationships did not indicate deviations from linearity. Moreover, no significant nonlinear relationships were found between the four DDS subscales and HbA_{1c}; P for nonlinearity = 0.322 (RD), 0.464 (EB), 0.505 (ID) and 0.186 (PD). Results from the supplementary analysis with quadratic regression analysis showed similar results, where no significant nonlinear relationships between diabetes-specific emotional distress and HbA_{1c} were apparent, with P for nonlinearity of 0.126 (DDS total), 0.112 (PAID total), 0.162 (RD subscale), 0.215 (EB subscale), 0.579 (ID subscale) and 0.060 (PD subscale).

Discussion

This study appears to be the first to demonstrate that among adults with type 1 diabetes, depression, anxiety, and overall well-being were not significantly related with glycemic control but there were significant associations between diabetes-specific emotional distress and HbA_{1c}. The Diabetes Distress Scale total score was more strongly associated than the PAID total score, and regimen-related DDS subscale showed the strongest relationship with HbA_{1c} (regression coefficients and R^2). There was no significant nonlinearity in the relationship between diabetes-specific emotional distress and HbA_{1c}.

Fisher et al. [27] and Gonzales et al. [17] expressed concern that diabetes-specific emotional distress might be interpreted as depression and addressed with care strategies based on the depression literature. The associations of depression or diabetes-specific emotional distress with glycemic control have been examined predominantly in persons with type 2 diabetes, where Fisher et al. [25,26] found a significant relationship of glycemic control with diabetes-specific emotional

Table 2
Associations of diabetes-specific emotional distress, anxiety, depression and overall well-being with HbA_{1c}.

	Bivariate regression				Regression with partial adjustment[c]				Regression with full adjustment[d]			
	Coefficient[a]		CI	*P*	Coefficient[a]		CI	*P*	Coefficient[a]	CI	Coefficient[b]	*P*
PAID total	0.020		0.008–0.032	.001	0.017		0.004–0.029	.009	0.021	0.006–0.036	0.244	.007
WHO-5									−0.003	−0.021–0.015	−0.035	.759
HADS-A									−0.028	−0.115–0.059	−0.064	.527
HADS-D									−0.032	−0.133–0.070	−0.069	.540
R^2/adjusted R^2	5.4%/4.9%				14.3%/11%				15.0%/10.1%			
DDS total	0.033		0.019–0.047	<.001	0.030		0.015–0.044	<.001	0.038	0.021–0.055	0.374	<.001
WHO-5									0.001	−0.017–0.018	0.011	.920
HADS-A									−0.048	−0.133–0.036	−0.112	.261
HADS-D									−0.025	−0.123–0.073	−0.054	.618
R^2/adjusted R^2	10.8%/10.3%				18.6%/15.4%				20.3%/15.7%			
DDS EB	0.014	4.2%/3.7%[e]	0.004–0.025	.005	0.011	13.2%/9.7%[e]	0.001–0.021	.036	−0.013	−0.027–0 .001	−0.188	.067
DDS RD	0.039	26.9%/26.5%[e]	0.030–0.049	<.001	0.038	32.6%/29.9%[e]	0.028–0.048	<.001	0.056	0.043–0.069	0.734	<.001
DDS ID	0.010	1.2%/0.6%[e]	−0.003–0.023	.140	0.009	11.9%/8.4%[e]	−0.004–0.022	.191	−0.010	−0.024−0.004	−0.108	.161
DDS PD	0.007	0.4%/−0.1%[e]	−0.009–0.024	.370	0.006	11.3%/7.8%[e]	−0.010–0.022	.431	0.000	−0.017–0.017	−0.002	.976
WHO-5	−0.010	1.4%/0.9%[e]	−0.021–0.002	.106	−0.005	11.3%/7.8%[e]	−0.017–0.008	.455	0.007	−0.009–0.023	0.085	.392
HADS-A	0.027	0.4%/−0.1%[e]	−0.036–0.091	.392	0.014	11.1%/7.6%[e]	−0.051–0.079	.673	−0.018	−0.094–0.058	−0.042	.635
HADS-D	0.014	0.1%/−0.4%[e]	−0.052–0.081	.672	0.010	11.0%/7.5%[e]	−0.058–0.079	.772	−0.012	−0.099–0.075	−0.026	.785
R^2/adjusted R^2										38.6%/34%		

[a] Unstandardized regression coefficients.
[b] Standardized regression coefficients.
[c] PAID total, DDS total, EB, RD, ID, PD, HADS-A, HADS-D and WHO-5 in separate regression models, each adjusted by age, sex, education and late complications.
[d] Multiple regression analysis of PAID total, DDS total in separate models, adjusted for age, sex, education, late complications, HADS and WHO-5, then the four DDS subscales in one separate model adjusted with the similar control variables.
[e] R^2 and adjusted R^2 in the bivariate regression and the partly adjusted regression.

distress, but not with depression. The findings of our study with type 1 diabetes showing similar relationships support that diabetes-specific emotional distress and depression should be recognized as different conditions in clinical consultation in type 1 diabetes [11]. Fisher et al. [40] proposed that emotional distress is a core construct underlying diabetes-specific emotional distress and depression (from depressive symptoms to major depressive disorders), and emphasized that health care providers should acknowledge the difference between the severity and content of emotional distress in clinical consultations. Our study cannot determine whether depression and diabetes-specific emotional distress are different entities, or whether the differing relationships of glycemic control with depression or diabetes-specific emotional distress are due to differences in severity or content of emotional problems, but both possibilities are worth considering.

Aikens [11] suggested that diabetes-specific emotional distress (measured with the PAID), rather than depression, might derive from activities strongly related to diabetes and its treatment, and disrupt self-care activities that are directly linked to the disease, whereas depression might disrupt more lifestyle-oriented behaviors. Using the DDS creates an opportunity to examine the role of specific domains of diabetes-related emotional distress. Regimen-related distress was the only distress domain associated with HbA_{1c} in the fully adjusted analysis. In the bivariate regression and the partly adjusted regression analysis, the EB subscale was also significantly related to HbA_{1c} although not when controlling for the RD subscale and the other indicators. Therefore, we suggest that it may be distress related to the self-care demands of the treatment regimen that actually drives the relationship between diabetes-specific emotional distress and HbA_{1c}. Hessler et al. [41] showed that reductions in regimen distress were associated with improved glycemic control over time for persons with type 2 diabetes, and emphasized the importance of addressing regimen distress as part of diabetes care. Reddy et al. [42] suggested that the PAID might be useful as a screening tool of diabetes-specific emotional distress in clinical consultation, but results from our study suggest that the DDS might be more appropriate to capture distress regarding the self-management behaviors of diabetes, as the PAID does not provide a validated measure of regimen distress which seems to be the most important component of diabetes-specific distress.

In our study, the positively worded measure of overall well-being was not significantly related to glycemic control. Moskowitz et al. [43] showed that positive affect was a unique predictor of mortality in persons with diabetes, and argued for the value of addressing positive affect in clinical consultation. Indeed the literature review of Robertson et al. [44] suggested that positive emotional health might facilitate better self-management and improved health outcomes. A systematic review of qualitative research studies of factors influencing ability to self-management in type 1 and type 2 diabetes concluded that the wider picture beyond the physical manifestation of diabetes must be taken into consideration [45]. Nevertheless, results from our study suggest that a measure of overall well-being is too generic to reveal an association with the particular outcome of glycemic control, and that well-being must integrate some disease-specific elements if relationships to specific biomedical outcomes are to be discovered. A recent study of severe hypoglycemia and psychological well-being supports this interpretation [46]. The authors found that neither generic overall well-being, nor diabetes-specific emotional distress (measured by the PAID) was significantly related to hypoglycemia, whereas diabetes-specific positive well-being was significantly related to hypoglycemia. Moreover, Snoek et al. [47] found that individual care strategies for people with type 1 and type 2 diabetes improved the scale scores of diabetes-specific emotional distress but not overall well-being.

A significant nonlinear relationship between diabetes-specific emotional distress and glycemic control was not found in this study, similar to results shown in the recent cross-sectional study of Joensen et al. [48]. That such a relationship was not identified in these studies of adults with type 1 diabetes, in conjunction with its presence in adults with type 2 diabetes [18], might indicate that emotional problems have different implications for persons with type 1 and type 2 diabetes. The findings of a significant relationship between distress and glycemic control, and the lack of significant nonlinearity, suggest that interventions addressing diabetes distress might be applied at any non-zero level of diabetes distress, although this should be further investigated in larger samples.

There were some limitations to this study. First, because it was a cross-sectional study, no inferences about a causal effect between diabetes-related emotional distress and HbA_{1c} can be drawn. We do not know whether the association between diabetes-specific emotional distress and HbA_{1c} is a direct causal relationship, nor which direction a causal relationship might take, nor whether there might be an underlying mechanism that influences both diabetes-specific emotional

distress and HbA_{1c} other than those controlled for in this study. Longitudinal studies of the relationship between glycemic control and diabetes-specific emotional distress in type 1 diabetes are warranted. As the regimen-related emotional distress seems to be an active ingredient in the relationship between diabetes-specific distress and HbA_{1c}, potential underlying mechanisms of this association (especially regimen adherence behavior) need to be further examined in future studies.

A second limitation is that all the information about symptoms of depression and anxiety were self-reported because no diagnostic information was available, and few respondents reported the highest scores on the HADS. The study may therefore have underestimated the potential impact of these factors among persons with more severe depression and anxiety. In addition, the HADS has been criticized as a measure of depression [49,50]. However, a study investigating the cross-sectional and longitudinal relationship between depression and glycemic control using a diagnostic interview (CIDI) based on the DSM-IV criteria also did not find a significant relationship between depression and glycemic control [26].

We have shown that glycemic control in adults with type 1 diabetes was not significantly associated with depression, anxiety, and overall well-being, but was significantly associated with diabetes-specific emotional distress, especially that regarding the treatment regimen. Gonzales et al. [17] argue that the recognition of the content of diabetes-specific emotional distress in clinical consultations might require only a small shift in the perspective of the clinician. A recent systematic review of emotional health and diabetes self-care emphasized that talking about the persons' thoughts and understanding of the disease in clinical consultation might make it easier for health care providers to recognize those in poor emotional health [51]. Yet Beverly et al. [52] showed that 30% of their sample of persons with type 1 and type 2 diabetes were reluctant to discuss self-care in clinical consultation, and that reluctant persons reported less frequent self-care, higher diabetes-specific emotional distress and more depressive- and anxiety symptoms; these findings illustrate the complexity of the interaction between the clinician and the persons with diabetes in clinical consultation. Our study highlights that addressing distress related to the disease during clinical consultation would enable greater insight into whether such distress is apparent, and what specifically this distress might be constituted of for the individual person. In particular, addressing distress related to the treatment regimen and self-care demands might give health care providers information necessary to assist the person in bettering their diabetes self-management. If change in glycemic control is targeted, focusing on diabetes-specific emotional distress may yield greater improvement than focusing solely on attaining overall well-being.

Conflict of interests

The authors declare that they have no conflict of interest.

Acknowledgments

The authors would like to thank the respondents in this study, as well as the nurses and physicians at the university hospital endocrinology unit, who participated in the data collection.

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