Influence of Health Status on the Association Between Diabetes and Depression Among Adults in Europe: Findings From the SHARE International Survey

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Abstract

Objective. The association between diabetes and depression, a common health comorbidity in people with diabetes, has been recognized but not well understood. The purpose of this study was to explore the association between diabetes and depression in a large international sample of adults, adjusting for demographics, socioeconomic status, behavioral risks, and current health status.
Methods. The association between diabetes and depression was assessed in a sample of 57,004 Europeans ≥50 years of age from 15 European countries using data from the fifth wave of SHARE (the Survey of Health, Ageing, and Retirement in Europe). Multiple logistic regression models of the association between diabetes and depression were conducted, adjusting for potential confounders.
Results. Analyses showed that, despite diabetes being associated with depression in crude and partially adjusted models, further adjustment for self-perceived health made the association between diabetes and depression no longer statistically significant (odds ratio 1.0, 95% CI 0.9–1.0).
Conclusion. Adjustment for a variety of demographic, socioeconomic, behavioral risk, and health status variables reduced the estimated association between diabetes and depression until it was no longer significant. Further research should explore the specific symptoms of distress characterized in people with diabetes.

Diabetes is a prevalent metabolic disease that, according to the International Diabetes Federation, affects 415 million people, or 6.7% of the worldwide adult population (1). Depression is one of the most common health comorbidities associated with diabetes (2,3). People with chronic physical illness such as diabetes are two to three times more likely to suffer from depression (4). Depression is of particular concern in diabetes because it is associated with poor self-care, poor glycemic control, more long-term diabetes complications, and decreased quality of life (5–8).

The association between diabetes and depression has been recognized in previous studies (6,9); however, exactly how diabetes and depression affect each other is not well understood (10). A recent meta-analysis (11) found a significant hazard ratio for and a greater cumulative incidence of depression associated with

diabetes. However, another study (12) found similar incidences of new-onset depression among people with and without diabetes (6.5 vs. 6.6 per 1,000 people) and little evidence that type 2 diabetes increased the risk of depression once comorbid diseases and the burden of diabetes complications were accounted for. A cross-sectional population-based study (13) assessing the relationship between depression, diabetes, and metabolic variables such as insulin concentration found a significant association between diabetes and depression but reported similarly low rates of depression in people with and without type 2 diabetes (5.0 vs. 3.8%).

The association between diabetes and depression can be confounded by several factors. Women with diabetes have been found to have higher rates of depression compared to men (14,15). Several studies reported an increased prevalence of depression among young people with diabetes (14,16), although another study reported older age as a risk factor for diabetes (17). Additionally, when considering both age and sex together, Zhao et al. (18) found that diabetes was significantly associated with depression only in women aged 20–39 years. Factors such as living alone, poor social support, and low socioeconomic status can also increase the prevalence of depression among people with diabetes (10). People with depression are more likely in lower socioeconomic status levels in which rates of deprivation, obesity, and smoking are higher (19), which may help to explain part of the association between depression and diabetes. Health factors such as other comorbidities are also influential. A study based on World Health Organization (WHO) survey data (4) showed a higher rate of depression among people with multiple physical comorbidities, among them diabetes, compared to people with diabetes but without physical comorbidities. Another study of depression among people with diabetes reported that depression remained associated with diabetes after adjustment of several possible confounders, including the presence of cardiovascular disease as a comorbidity (20).

The main purpose of the current study was to explore the association between diabetes and depression in a large, international sample of adults, adjusting for potential confounding variables such as demographics, socioeconomic status, behavioral risks, and current health status.

Materials and Methods

Population Target and Data Collection

The study population was composed of noninstitutionalized adults ≥50 years of age from 15 European countries who participated in the fifth (2015) wave of SHARE (the Survey of Health, Ageing, and Retirement in Europe). The survey was carried out in representative samples of people residing in these 15 countries and encompassed sociodemographic, physical, mental, and economic variables, among others (21–24). The sample in the current study included 65,281 respondents.

Data were collected during face-to-face interviews, which took place in the respondents' home and were conducted by trained interviewers using computer-assisted personal interviewing programs. Further details on SHARE can be found in a report edited by Malter and Börsch-Supan (23).

Variables

Main Exposure Variable: Diabetes

Self-reported diagnosis of diabetes was determined based on two survey questions: *1*) "Has a doctor ever told you that you had any of the conditions on this card?" (with option for diabetes or high blood sugar selected) and *2*) "Do you currently take drugs at least once a week for problems mentioned on this card?" (with option for diabetes drugs selected). Respondents were considered to have diabetes if they answered "yes" to either of the two questions with regard to diabetes.

Main Outcome (Dependent) Variable: Depression

Depression was measured using the EURO-D instrument, a scale of depression symptoms validated for the European population. The EURO-D scale covers 12 symptom domains: depressed mood, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and tearfulness.

Each item is scored zero (symptom not present) or one (symptom present), and item scores are summed to produce a scale with a minimum score of 0 and a maximum score of 12 (25). A EURO-D score >3 is indicative of a depressive symptomatology (26) and was used to dichotomize this variable for the current analysis. In the current sample, EURO-D was internally consistent with a Cronbach's α of 0.79 for the pooled sample.

Other Independent Variables

Several other variables used for descriptive or adjustment purposes were considered in this study. These included basic demographics, including age (continuous and age-squared), sex, and marital status (married or living together with significant other or other), and socioeconomic status, as measured by years of education, job status (working, retired, or other, which included unemployed, permanently sick or disabled, and homemaker), and economic strain (a subjective indicator of financial distress; ability to make ends meet with great difficulty, with some difficulty, fairly easily, or easily). We also considered the following behavioral risk variables: smoking status (former smoker, current smoker, or never smoked) and frequency of sport or vigorous activities (less than once per week or at least once per week). In addition, we measured height and weight, which allowed for the calculation of BMI and division into four BMI categories: underweight (<18.5 kg/m^2), normal weight (<25.0 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (>30 kg/m^2). We considered the respondents current health status with a question asking them to report the number of comorbidities they had (≥2 or <2 chronic diseases). This cut-off was used based on the definition of multiple chronic conditions noted in a previous study (27). Finally, we considered the respondents' self-perceived health status with a question asking them to assess their health status as excellent, very good, good, fair, or poor. In the analyses, these were grouped into three categories: excellent/very good, good, and fair/poor).

Statistical Procedure

We first performed descriptive analyses to describe the samples by country. Then, to assess the relationship between diabetes and depression, we performed multiple crude and adjusted logistic regressions. We began by estimating a model with diabetes as the sole predictor of depression. Next, we introduced the confounders in blocks: demographic variables first, followed by socioeconomic variables, and then behavioral risks. We then added the chronic diseases variable to see the effect of a clear physiological factor on the association between diabetes and depression. Finally, self-perceived health was added to the model. The driving motivation for this analytical design was primarily to test hypotheses about the relationship between diabetes and depression adjusting for known confounders and was not to achieve optimization of the prediction by variable selection.

The data source also offered calibrated sampling weights that were designed to adjust for the complex sampling design and nonresponse. In our study, we used these weights only in the descriptive statistics presented in Tables 1–4 to estimate population distribution. However, these weights were not considered for hypothesis testing (28). All models included national dummy variables such that the other coefficients were estimated for an average benchmark country. SAS-JMP 11 software (SAS Institute, Cary, N.C.) was used for data analysis.

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TABLE 1.
Self-Reported Diabetes and EURO-D Caseness: Predicted Prevalence Rate for the General Sample and for Each Country (Population Estimates)

	Sample Size (*n*)	Self-Reported Diabetes (%)	EURO-D Caseness (%)
All	65,281	13	28

	Sample Size (*n*)	Self-Reported Diabetes (%)	EURO-D Caseness (%)
Austria	4,252	12	19
Belgium	5,614	11	27
Czech Republic	5,698	18	26
Denmark	4,136	8	17
Estonia	5,735	12	36
France	4,445	11	34
Germany	5,690	14	25
Israel	2,332	23	19
Italy	4,703	11	34
Luxembourg	1,610	14	28
Netherlands	4,129	10	19
Slovenia	2,948	13	24
Spain	6,450	17	29
Sweden	4,531	10	20
Switzerland	3,008	7	18

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TABLE 2.
Demographic and Socioeconomic Characteristics for the General Sample and for Each Country (Population Estimates)

	Years of Age (mean [SD])	Female (%)	Married or Living Together With Significant Other (%)	Years of Education (Mean [SD])	Job Status			Making Ends	
					Working (%)	Retired (%)	Other (%)	With Great Difficulty (%)	With Some Difficulty (%)
All	66 (10.7)	54	68	11 (4.5)	32	49	19	11	24

	Years of Age (mean [SD])	Female (%)	Married or Living Together With Significant Other (%)	Years of Education (Mean [SD])	Job Status			Making Ends	
					Working (%)	Retired (%)	Other (%)	With Great Difficulty (%)	With Some Difficulty (%)
Austria	66 (10.4)	54	60	9 (5.1)	26	61	13	3	13
Belgium	66 (11.1)	54	65	13 (3.8)	31	48	21	7	18
Czech Republic	65 (9.6)	55	64	12 (3.1)	29	63	8	11	35
Denmark	65 (10.2)	52	70	13 (3.6)	42	49	9	2	9
Estonia	66 (10.2)	60	50	12 (3.4)	38	51	11	20	40
France	66 (10.6)	55	65	12 (3.9)	30	58	12	7	23
Germany	66 (10.8)	53	69	13 (3.7)	36	51	13	5	18
Israel	65 (10.4)	54	77	13 (3.9)	48	29	23	19	32
Italy	67 (10.9)	55	71	9 (4.5)	26	48	26	22	37
Luxembourg	65 (10.3)	52	74	12 (4.3)	27	46	27	4	14
Netherlands	65 (10.5)	52	69	12 (3.7)	36	41	23	4	13
Slovenia	65 (10.4)	54	65	10 (3.5)	23	61	16	14	45
Spain	66 (11.1)	54	70	9 (5.1)	25	36	39	18	30

	Years of Age (mean [SD])	Female (%)	Married or Living Together With Significant Other (%)	Years of Education (Mean [SD])	Job Status			Making Ends	
					Working (%)	Retired (%)	Other (%)	With Great Difficulty (%)	With Some Difficulty (%)
Sweden	66 (10.3)	52	66	12 (4)	43	53	4	2	11
Switzerland	66 (10.3)	53	62	9 (5.6)	45	44	11%	2	11

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TABLE 3.
Behavioral Risks and Health Factors for the General Sample and for Each Country (Population Estimates)

	Current Smoker (%)	Physically Active at Least Once Per Week (%)	BMI Category		At Least Two Chronic Diseases (%)	Self-Perceived Health				
			Overweight (%)	Obese (%)		Poor (%)	Fair (%)	Good (%)	Very Good (%)	Excellent (%)
All	19	48	41	19	47	11	26	39	17	7
Austria	22	55	40	21	41	8	23	35	27	8
Belgium	19	43	39	18	49	5	21	43	22	8
Czech Republic	25	42	44	28	52	14	28	39	14	4
Denmark	20	64	39	16	48	5	17	23	31	23
Estonia	23	54	38	29	47	21	48	25	4	2
France	17	44	39	18	45	10	23	44	16	7
Germany	19	57	40	23	53	10	31	39	14	6
Israel	18	62	44	21	47	12	21	28	30	9
Italy	18	36	40	14	41	13	28	36	15	8

	Current Smoker (%)	Physically Active at Least Once Per Week (%)	BMI Category		At Least Two Chronic Diseases (%)	Self-Perceived Health				
			Overweight (%)	Obese (%)		Poor (%)	Fair (%)	Good (%)	Very Good (%)	Excellent (%)
Luxembourg	16	55	38	25	60	10	24	38	19	10
Netherlands	19	67	41	16	39	5	23	42	16	14
Slovenia	18	60	46	25	46	12	25	44	13	6
Spain	19	38	44	22	53	16	28	37	15	4
Sweden	13	62	40	16	44	5	18	31	26	19
Switzerland	24	60	36	15	30	3	14	42	29	12

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TABLE 4.
Adjusted Multiple Logistic Regression Models of the Association Between Diabetes and Depression

Term	Model A: Demographics (OR [95% CI])	Model B: Model A + Socioeconomic Status (OR [95% CI])	Model C: Model B + Behavioral Risks (OR [95% CI])	Model D: Model C + Chronic Diseases (OR [95% CI])	Model E: Model D + Health Status (OR [95% CI])
Self-reported diabetes	**1.73 (1.64–1.83)**	**1.52 (1.43–1.60)**	**1.42 (1.34–1.50)**	**1.09 (1.03–1.16)**	**0.96 (0.90–1.02)**
Age	1.01 (1.01–1.01)	1.01 (1.00–1.01)	1.00 (1.00–1.01)	1.00 (1.00–1.01)	0.99 (0.99–0.99)

Term	Model A: Demographics (OR [95% CI])	Model B: Model A + Socioeconomic Status (OR [95% CI])	Model C: Model B + Behavioral Risks (OR [95% CI])	Model D: Model C + Chronic Diseases (OR [95% CI])	Model E: Model D + Health Status (OR [95% CI])
Sex: female	1.98 (1.90–2.06)	1.85 (1.77–1.93)	1.88 (1.80–1.97)	1.84 (1.76–1.93)	2.03 (1.94–2.13)
Marital status: married or living together	0.75 (0.72–0.79)	0.84 (0.81–0.88)	0.87 (0.83–0.91)	0.87 (0.83–0.91)	0.87 (0.83–0.91)
Job status: working[1]		0.77 (0.72–0.83)	0.83 (0.77–0.89)	0.89 (0.83–0.96)	1.01 (0.93–1.09)
Job status: other[1]		1.38 (1.29–1.47)	1.34 (1.26–1.43)	1.32 (1.23–1.40)	1.17 (1.09–1.25)
Making ends meet: with great difficulty[2]		3.56 (3.30–3.84)	3.37 (3.12–3.64)	3.18 (2.94–3.44)	2.42 (2.23–2.63)
Making ends meet: with some difficulty[2]		2.00 (1.89–2.12)	1.94 (1.83–2.05)	1.87 (1.76–1.98)	1.58 (1.48–1.68)
Making ends meet: fairly easily[2]		1.24 (1.18–1.31)	1.22 (1.16–1.29)	1.22 (1.15–1.28)	1.13 (1.07–1.19)

Term	Model A: Demographics (OR [95% CI])	Model B: Model A + Socioeconomic Status (OR [95% CI])	Model C: Model B + Behavioral Risks (OR [95% CI])	Model D: Model C + Chronic Diseases (OR [95% CI])	Model E: Model D + Health Status (OR [95% CI])
Years of education		0.97 (0.97–0.98)	0.97 (0.97–0.98)	0.98 (0.97–0.98)	0.99 (0.98–1.00)
Smoking: current smoker[3]			1.26 (1.19–1.33)	1.26 (1.19–1.33)	1.17 (1.10–1.24)
Smoking: former smoker[3]			1.14 (1.09–1.20)	1.11 (1.05–1.16)	1.08 (1.03–1.14)
Physical activity: at least once per week			0.61 (0.59–0.64)	0.65 (0.62–0.68)	0.84 (0.81–0.89)
BMI: overweight[4]			1.01 (0.96–1.05)	0.94 (0.89–0.98)	0.95 (0.90–1.00)
BMI: obese[4]			1.14 (1.08–1.21)	0.99 (0.94–.05)	0.90 (0.85–0.95)
Chronic diseases: at least two				2.30 (2.19–2.40)	1.53 (1.46–1.61)
Self-perceived health: excellent[5]					0.07 (0.06–0.08)

Term	Model A: Demographics (OR [95% CI])	Model B: Model A + Socioeconomic Status (OR [95% CI])	Model C: Model B + Behavioral Risks (OR [95% CI])	Model D: Model C + Chronic Diseases (OR [95% CI])	Model E: Model D + Health Status (OR [95% CI])
Self-perceived health: very good[5]					0.08 (0.08–0.09)
Self-perceived health: good[5]					0.15 (0.13–0.16)
Self-perceived health: fair[5]					0.35 (0.33–0.38)

- *n* = 57,004. All models include national dummy variables such that the other coefficients were estimated for an average benchmark country. The models also include the second polynomial term for age.
- ↲1 Reference category for job status: retired.
- ↲2 Reference category for making ends meet: easily.
- ↲3 Reference category for smoking: never smoked daily.
- ↲4 Reference category for BMI: normal/underweight.
- ↲5 Reference category for self-perceived health: poor.

Results

Table 1 shows the prevalence of EURO-D caseness and self-reported diabetes by country and in the full sample. The overall prevalence of EURO-D caseness across all 15 countries was 28%, ranging from 17 to 36% for individual countries. The parallel figure for self-reported diabetes was 13%, varying from 7 to 23%. The highest prevalence rates of EURO-D caseness were found in Estonia, Italy, and France, whereas Denmark, Switzerland, and the Netherlands had the lowest prevalence rates. Israel had the highest prevalence of self-reported diabetes (23%).

Demographic and socioeconomic characteristics of the general sample and by country are presented in **Table 2**. The average age across the countries was 66 years and 54% were women, with small differences in individual countries. Educational levels were lowest in Austria, Italy, Spain, and Switzerland, and, in most countries, approximately half of those in the sample were retired, with the exceptions of respondents from Israel (29%) and Spain (36%). The overall percentage of working respondents was 32%

across all 15 countries. In terms of financial distress, 35% of respondents across all 15 countries reported that they make ends meet easily, although this ranged from 9% in Estonia to 75% in Denmark.
The prevalence of behavioral risks and health factors are reported in **Table 3**. Nineteen percent of respondents indicated that they currently smoked. Regarding physical activity, large differences were found among the countries. The most active respondents came from the Netherlands and Denmark, whereas the least active were from Italy and Spain. Finally, the prevalence of overweight and obesity was 60% overall. The countries with the highest prevalence of obesity (>25%) were Estonia, the Czech Republic, Luxembourg, and Slovenia, whereas those with the lowest prevalence (<15%) were Switzerland and Italy. Across all countries, 47% of respondents had at least two chronic diseases. This ranged from 30% in Switzerland to 60% in Luxemburg). Among all respondents, 39% rated their self-perceived health as "good," which ranged from 23% in Denmark to 44% in France and Slovenia.
The crude odds ratio (OR) estimation of EURO-D caseness across the multinational sample for those with and without self-reported diabetes was 1.73 (95% CI 1.64–1.83). Multiple logistic regression models of the association between diabetes and depression are presented in **Table 4**. Each column presents a separate model with added independent variables from left to right, starting with model A, which presents the demographic variables. In this model, sex was positively associated with depression (OR 1.98, 95% CI 1.90–2.06, for women), whereas marital status was negatively associated with depression (OR 0.75, 95% CI 0.72–0.79, for those who are married or living together with a significant other).
Model B also included the socioeconomic variables of job status and making ends meet, which were positively associated with depression (OR 1.38, 95% CI 1.29–1.47, for the "other" category of job status [unemployed, permanently sick or disabled, and homemaker]; OR 3.56, 95% CI 3.30–3.84, for those having great difficulty making ends meet), and years of education, which was negatively associated with depression (OR 0.97, 95% CI 0.97–0.98). In addition, the coefficients of the demographic variables in model B maintained stability.

Next, model C included variables of behavioral risks, not all of which were found to be associated with depression. The different categories of smoking and the "obese" category of BMI were positively associated with depression (OR 1.26, 95% CI 1.19–1.33, for respondents currently smoking; OR 1.14, 95% CI 1.08–1.2, for obese). In addition, physical activity reduced the risk for depression (OR 0.61, 95% CI 0.59–0.64).

Model D included the chronic diseases variable into the equation, which was positively associated with depression (OR 2.30, 95% CI 2.19–2.40) while not changing the other parameter estimates much, although the OR of self-reported diabetes decreased to 1.09 (95% CI 1.03–1.16).

Model E included all previous variables in addition to self-perceived health to present the fully adjusted model. Unlike the initial estimations (models A–D), this model predicted no difference in the probability of EURO-D caseness between self-reported diabetes and no self-reported diabetes (OR 0.96, 95% CI 0.9–1.0). In this model, it is clear that controlling for self-perceived health diminishes the effect of diabetes as a predictor for depression.

Discussion

In this study, we examined the association between diabetes and depression, accounting for several potential confounders using the large SHARE international population-based sample. The findings showed that diabetes is associated with depression in crude and partially adjusted models, which included demographic variables, socioeconomic variables, behavioral risks, and comorbidities. These adjustments progressively reduced the estimated association between diabetes and depression until further adjustment for self-perceived health made the association no longer statistically significant (OR 0.96, 95% CI 0.90–1.02).

These findings are in line with several previous international reports (**12**,**29**). Talbot and Nouwen (**29**) examined the relationship between depression and diabetes in adults by conducting a review of primarily electronic databases. They found that prevalence of depression in type 2 diabetes was similar to prevalence of depression in the general population. They further noted that the common hypotheses claiming that the occurrence of depression is a result of type 2 diabetes or its psychosocial demands did not seem to be

supported. Brown et al. (12) found little evidence that diabetes was associated with the risk of depression once comorbid diseases were accounted for in a large population-based cohort study. A study that analyzed WHO surveys from 60 countries (4) reported that, for respondents with diabetes on a worldwide level, 9.3% also had depression, but for respondents who had comorbidity of two or more chronic physical conditions, 23% also had depression in addition to their existing comorbid conditions. Furthermore, respondents who had two or more chronic conditions in addition to depression showed a mean health score of 56 (scale 0–100), which was lower than respondents who had diabetes and depression (mean health score of 59). These findings suggest that having two or more chronic diseases is strongly associated with depression. Multi-morbidity is common among older adults; therefore, when considering the psychological well-being of older people with diabetes, it may be crucial to look into multi-morbidity.

As noted previously, our findings showed that when self-rated health was accounted for, there was no evidence of association between diabetes and depression. Both depression and self-rated health have been associated with increased risk of mortality in people with diabetes (30,31). A longitudinal study by Kosloski et al. (32) found that self-rated health had a consistent effect on depressive symptoms in the older general population. Additionally, self-rated health alone was found to be a strong predictor of depression among people with diabetes in a study by Badawi et al. (33). Our results may imply that having more than one chronic illness raises the risk for depression regardless of the type of the disease. This is also true for self-perceived health; self-rating of health status as poor or fair raises the risk for depression regardless of the presence of diabetes.

Our study did not confirm the hypothesized association between diabetes and depression. The association between the two is a complex phenomenon resulting from multiple relationships among different psychological, social, and biological factors (29). Nevertheless, our findings may also reflect the essence of deeply examining the specific characteristics and symptoms of depression in people with diabetes.

In a recent longitudinal study, Fisher et al. (34) assessed 506 people with type 2 diabetes for major depressive disorder, depressive symptoms, and diabetes distress (distress linked specifically to diabetes and its management). They found no association between major depressive disorder or depressive symptoms and glycemic control. However, they did find an association between diabetes distress and glycemic control. They suggest that diabetes distress should be differentiated from depression and assessed separately in people with diabetes. This suggested difference between depression and diabetes distress may be a possible explanation for the current study results. The adjustments made progressively reduced the association between diabetes and depression from an OR of 1.42 in model C to an OR of 1.09 in model D, and from an OR of 1.09 in model D to an OR of 0.96 in model E. In model E, further adjustment for self-perceived health made the association no longer statistically significant. Another related study found that diabetes distress was twice as prevalent as major depressive disorder among people with diabetes and was significantly and independently associated with diabetes-related variables such as BMI, comorbidities, and self-management behaviors (35).

The main strength of the current study was the use of a large, international, representative sample of people ≥50 years of age from 15 countries. Despite this strength, the results of our study need to be interpreted considering several limitations. First, its cross-sectional design limited the ability to determine a causal relationship between diabetes and depression. Second, the study relied on self-reports of diabetes and a self-reported scale to define depression caseness. Similar to studies using self-reported depression, our data may have included respondents who did not meet the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (36). In addition, a single measure of depression, a mental health status that may vary with time, may underestimate depression over a prolonged period (13). Nevertheless, the EURO-D and its cut-point have been validated against relevant clinical assessments in previous studies of European data, which demonstrated its strong validity and high internal consistency (26). Regardless of the use of self-reported diabetes in our study, diabetes was screened by definition of either a physician's diagnosis or evidence of diabetes drug use. Self-reported physician's diagnosis of diabetes has been shown to have reasonable validity in identifying people with a diagnosis of diabetes (37).

Conclusion

This study examined the unique and complex association between diabetes and depression. Adjustment for a variety of demographic and socioeconomic factors, as well as behavioral risk and health status variables, reduced the estimated association until it was no longer statistically significant. Further research should look into the specific symptoms of distress characterized by people with diabetes and examine the unique

variables that may increase the risk for onset of depression symptoms among people diagnosed with diabetes. Exploring the symptoms of distress and the conditions in which people with diabetes may be at greater risk of suffering from these symptoms can aid diabetes professionals in screening for specific risk factors and considering suitable treatment to improve the outcomes and well-being of people with diabetes.

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Duality of Interest

No potential conflicts of interest relevant to this article were reported.

Author Contributions

O.B. was responsible for the research in general, researched data, and wrote the manuscript. R.H. researched data. I.P.B. contributed to the discussion and reviewed the manuscript. O.B. is the guarantor of this work and, as such, had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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