https://doi.org/10.22365/jpsych.2022.093 / Psychiatriki 2023, 34:269–278

Research article

Investigating predictors of well-being in type 2 diabetes mellitus patients: The role of undiagnosed depression

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ARTICLE HISTORY: Received 7 July 2022/Revised 2 September 2022/Published Online 11 November 2022

ABSTRACT

Type 2 diabetes mellitus (T2DM) is a common metabolic disorder with various medical and psychological adverse effects. Well-being in patients with T2DM is often compromised. The aim of the present study was to investigate clinicodemographic predictors of well-being in patients with T2DM with no known psychiatric history and explore the mediatory role of undiagnosed anxiety and depression. We recruited 175 outpatients with T2DM (54.3% males, aged 34–79 (mean 59.9) years) followed up at the Diabetes Center of the General Hospital of Nikaia-Peiraeus in Athens. Patients included had no severe diabetes-related complications or known psychiatric history. Well-being was measured with the Mental Health Continuum Short-Form (MHC-SF), a novel 14-item tool measuring the emotional (EWB), social (SWB), and psychological (PWB) dimensions of well-being, as well as a total score of well-being (WBT). Hospital Anxiety and Depression Scale (HADS) was used for screening for undiagnosed anxiety (HADS-A) and depression (HADS-D). Patients' demographics, Body Mass Index (BMI), glycemic control (HbA1c), T2DM duration, comorbid hypertension or dyslipidemia, and type of antidiabetic medication were investigated as predictors of well-being or its dimensions in stepwise linear regression models, also including or excluding HADS-A and HADS-D. Mediational effects of HADS-A and HADS-D were explored in structural equation models through path analyses. Results showed that 21.1% of participants had comorbid depression (HADS-D≥11) and 5.1% comorbid anxiety disorder (HADS-A≥11). In the models without HADS, higher WBT as well as EWB and PWB were significantly predicted by lower HbA1c (all p=0.001) and lower BMI (p=0.015, 0.019, and 0.030, respectively). After being included in the model, HADS-A and HADS-D significantly predicted WBT and every dimension of well-being, but the effects of HbA1c and BMI were no longer statistically significant. In path analyses, the indirect effects of HbA1c and BMI on well-being via HADS-D were statistically significant, while the direct and indirect effects via HADS-A were not. Therefore, the effects of HbA1c and BMI on EWB, PWB, and WBT were completely mediated by HADS-D. Concludingly, this is the first study using MHC-SF to measure well-being in patients with T2DM. High levels of undiagnosed depression were recorded, in agreement with other studies. Depression was predicted by HbA1c and BMI and finally predicted well-being. Undiagnosed depression fully explained the effects of HbA1c and BMI on well-being. The interplay of glycemic control and positive mental health should be further investigated.

KEYWORDS: Anxiety, depression, HbA1c, glycemic control, BMI, type 2 diabetes mellitus, HADS, MHC-SF, well-being.

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Introduction

Diabetes mellitus (DM), a chronic metabolic disorder characterized by various severe long-term complications, is one of the most common diseases worldwide. In 2021, DM's prevalence in adults was 10.5%, but by 2045 it is projected to be 12.2%.[1] DM has often been the focus of psychological research. Patients with diabetes have 20% higher rates of lifetime anxiety-related diagnoses in the USA.[2] Comorbid anxiety leads to an increased likelihood of developing diabetes-related complications, ineffective glycemic control, and higher BMI.[2,3] The two-way relationship between DM and depression is also well-known. Depression affects 20% of patients with type 2 diabetes mellitus (T2DM) and it is 15–24% more likely for these patients to develop a major depressive disorder;[4] at the same time, depression is associated with a 60% increased risk of developing T2DM.[5] Therefore, depression is a risk factor for DM's onset and vice versa. Patients with T2DM and comorbid depression are at a higher risk of developing medical complications and have higher mortality rates than those without.[6] Yet, despite its impact, comorbid depression is often underdiagnosed in T2DM. About 45% of patients with diabetes and depression were undiagnosed in the USA.[7]

However, not only depression and anxiety have been studied with respect to DM; since 1986 researchers have studied the role of mental well-being in patients with T2DM.[8] The World Health Organization (WHO) defined positive mental health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".[9] This definition indicates that mental health is not characterized only by the absence of psychopathology, but by positive attributes, as well, like optimism, coping with life stress and contributing to the society. Various questionnaires exist for the evaluation of well-being, many of which have been used in populations with T2DM.[10–12]

The roots of the modern conceptualization of well-being can be traced back to Aristotle's philosophy, hence a great number of researchers nowadays focus on its hedonic and eudemonic aspects. Specifically, hedonic well-being denotes a person's feelings of happiness and satisfaction with life [emotional well-being (EWB)]. In contrast, eudemonic well-being refers to overall positive functioning both at the individual level [psychological well-being (PWB)] and in societal contexts [social well-being (SWB)].[13,14] The model that approaches most WHO's definition of well-being and positive mental health is the three-dimensional model suggested by Keyes, including all three aforementioned dimensions.[13,15,16] Adults with high levels of well-being are flourishing in life, i.e., have positive emotions and are socially and psychologically functional. Flourishing has been correlated with greater resilience against mental illness, fewer workdays lost, and reduced all-cause mortality.[15] Adults with lower levels of well-being are languishing in life. Languishing has been correlated with a higher incidence of depressive disorders, more workdays lost, and more limitations in everyday activities.[15] The three dimensions of well-being are measured by a novel tool developed by Keyes in 2008 named "Mental Health Continuum- Short Form" (MHC-SF).[13] Well-being in patients with T2DM has never been studied in the past using the MHC-SF.

The aim of the current study is to investigate clinicodemographic predictors of well-being, as measured with the MHC-SF, in patients with T2DM, the far most prevalent form of DM, and no known psychiatric history as well as the potential mediatory role of undiagnosed anxiety and depression.

Materials and Method

Participants and procedures

A total number of 180 patients with T2DM were recruited from the Diabetes Center of the 3rd Internal Medicine Department, General Hospital of Nikaia – Piraeus, Attica. All participants were informed in writing about the aim of the study and provided signed consent to participate, but due to important missing data, 5 patients were excluded from the study. No patient refused to participate. The study has been approved by the local Ethics Committee and has been carried out in accordance with the Declaration of Helsinki.

Inclusion criteria for the study were age 18–80 years old, speaking Greek and being able to understand the informed consent sheet, having a diagnosis of T2DM for at least six months according to the American Diabetes Association's guidelines,[17] and having a full medical record at the Diabetes Center. Patients with previously diagnosed comorbid psychopathology, as evidenced by their medical records and/or the use of psychiatric medication lifetime, were excluded. Patients with type 1 DM or chronic and serious comorbid medical conditions, such as cancer, HIV infection, dementia, multiple sclerosis, and other neurological and endocrine disorders, as well as patients with severe disabilities or complications caused by DM, were also excluded.

Demographic data and clinical variables were extracted from patients' medical records including the most recent HbA1c levels, T2DM duration, BMI, comorbid dyslipidemia or hypertension, and type of therapy. Dyslipidemia and hypertension were defined by the use

of hypolipidemic and anti-hypertensive drugs, respectively.

Measures

Well-being

Well-being was measured by the MHC-SF, which is a 14-item questionnaire measuring three dimensions of well-being: EWB, SWB, and PWB.[15] Each item is rated on a 6-point Likert scale, representing the frequency of the experiences linked with well-being during the past month (0=never–5=every day). In our sample, Cronbach's alphas were adequate for both the total scale (WBT) and the subscales (WBT α=0.89, EWB α=0.87, SWB α=0.70 and PWB α=0.85). Equally satisfactory results have been reported in the literature, with α=0.70 - 0.88 for WBT and α=0.67–0.82 for the subscales.[13,14,16] The MHC-SF has been recently validated in the Greek population.[18]

Anxiety and depression

Anxiety and depression were evaluated with the 14-item self-reported Hospital Anxiety and Depression Scale (HADS).[19] It is rated on a 4-point Likert scale, where higher scores indicate more frequent and more intense symptoms of anxiety and depression. It consists of two subscales, HADS-A for anxiety and HADS-D for depression, measured with 7 items each. HADS-A or HADS-D scores ≥8 or ≥11 suggest that it is possible or highly probable, respectively, that patients suffer from an anxiety disorder or depression.[19] The scale has been validated in the Greek population and shows satisfactory psychometric properties (Cronbach's alpha >0.80 for both subscales and the total scale).[20]

Statistical analysis

The sample's sociodemographic characteristics, clinical and treatment-related features, as well as well-being, anxiety, and depression scores were explored with descriptive statistics; the normality of continuous variables was checked with the Kolmogorov-Smirnov test. Comparison between binary groups on continuous variables was conducted with Student's t-test. Pearson's correlations were performed between all self-report measures. Statistical analyses were implemented using the statistical software STATA 14.0 and significant were values with $p<0.05$.

Four backward stepwise multiple linear regressions were then performed, using WBT, EWB, SWB, and PWB as dependent variables and clinical and demographical characteristics as independent variables. Subsequently, four new multiple linear regressions were performed adding anxiety (HADS-A) and depression (HADS-D) as independent variables to significant predictors from the previous sets of regressions. A comparison of the results of these two sets of models informed us whether it would be useful to further proceed to path analyses in order to explore the mediatory effect of HADS-A and HADS-D in the relationship between significant clinicodemographic predictors with WBT and its dimensions.

To this end, structural equation models (SEM/path analyses) were constructed using Mplus v.721 (with a maximum likelihood estimator and bias-corrected confidence intervals by performing bootstrapping in 1000 samples to calculate standard errors), allowing us to decompose the total effect of significant predictors of well-being and its dimensions into direct and indirect (via HADS-A and HADS-D) effects.

Results

The socio-demographic and clinical data of the participants are shown in table 1. No statistically significant difference regarding well-being between sexes was noticed. 24% of our sample were considered as possible cases of anxiety disorder and 5.1% as probable cases. Possible and probable cases of depression were found in 20.6% and 21.1% of the sample, respectively. Anxiety levels were higher in women (6.97±3.46) than in men (4.88±2.50) ($p<0.001$). Depression levels were also higher in women (7.08±4.57) than men (6.09±4.14), but this difference was not statistically significant ($p=0.137$).

Pearson's correlations of WBT and its dimensions with HADS-A and HADS-D are displayed in the correlation matrix of table 2 (all $p<0.0001$). Among well-being dimensions, PWB had the strongest correlation with WBT, as expected (PWB included 6/14 items of the scale). In intercorrelations among well-being dimensions, SWB and PWB had the highest one while EWB and SWB had the lowest. Correlations of all well-being measures were stronger with HADS-D than with HADS-A. Among all well-being measures, EWB had the strongest correlation with HADS-D while SWB was the weakest.

Multiple linear regression models

A backward stepwise multiple linear regression was performed using sex, age, marital status, education level, BMI, HbA1c levels, T2DM duration, type of medication and comorbid hyperlipidemia and hypertension as independent variables, while WBT was used as dependent variable. Model 1 (table 3) showed that only HbA1c ($p=0.001$) and BMI ($p=0.015$) significantly predicted (lower) WBT. However, in a new regression model including HbA1c, BMI as well as HADS subscales (Model 2, table 3), HADS-D was the strongest predictor

Table 1. Clinicodemographic characteristics and well-being, anxiety and depression scores of patients with T2DM (N = 175).

	Subgroups	Mean±SD (range) or N (%)
Sex	Males	95 (54.3%)
Age (years)		59.9±8.45 (34–79)
Education	Primary school	48 (27.4%)
	Secondary/High-school	107 (61.1%)
	University	20 (11.4%)
Marital status	Single	10 (5.7%)
	Married with children	133 (76.0%)
	Divorced/Widowed	32 (18.3%)
Occupation	Unemployed	60 (34.3%)
	Employed	41 (23.4%)
	Retired	74 (42.3%)
T2DM duration (years)		10.43±7.63 (1–35)
BMI		32.48±6.07 (20.18–53.35)
Hypertension		120 (68.6%)
Dyslipidemia		137 (78.3%)
Antidiabetic medication	Oral	81 (46.3%)
	Insulin	8 (4.6%)
	GLP-1	2 (1.1%)
	Oral and insulin	40 (22.9%)
	Oral and GLP-1	33 (18.9%)
	Oral, insulin and GLP-1	11 (6.3%)
HbA1c (%)		7.59±1.68 (5.30–14.0)
MHC-SF WBT		3.16±0.85 (0.64–4.71)
MHC-SF EWB		2.92±1.22 (0–5)
MHC-SF PWB		3.81±0.91 (0.33–5)
MHC-SF SWB		2.52±0.95 (0–4.40)
HADS-A		5.84±3.15 (0–17)
Possible anxiety cases (HADS-A ≥8 and <11)		42 (24%)
Probable anxiety cases (HADS-A ≥11)		9 (5.1%)
HADS-D		6.54±4.36 (0–17)
Possible depression cases (HADS-D ≥8 and <11)		36 (20.6%)
Probable depression cases (HADS-D ≥11)		37 (21.1%)

T2DM= Type 2 diabetes mellitus, BMI= Body Mass Index, GLP-1= Glucagon-like peptide-1 analogues, HbA1c= glycated hemoglobin, MHC-SF= Mental Health Continuum – Short Form, MHC-SF WBT= MHC-SF well-being total score, MHC-SF EWB= MHC-SF emotional well-being subscale, MHC-SF PWB= MHC-SF psychological well-being subscale, MHC-SF SWB= MHC-SF social well-being subscale, HADS= Hospital Anxiety and Depression Scale, HADS-A= HADS Anxiety subscale, HADS-D= HADS Depression subscale
For MHC-SF subscales (EWB, PWB, and SWB), mean scores are presented after being divided by the total number of items of each subscale. The mean MHC-SF total score (WBT) is presented after being divided by the total number of items (n=14)

(ω^2=0.306) of WBT followed by HADS-A (ω^2=0.074; both $p<0.001$) while HbA1c and BMI were no longer significant, suggesting that the effects of HbA1c and BMI on WBT were probably completely mediated by HADS-A or HADS-D or both. A similar pattern was followed for EWB (Models 1a, 2a; Suppl. table 1) and PWB (Models 1b, 2b; Suppl. table 2). SWB was an exception (Suppl. table 3), since HbA1c and BMI were the strongest but non-significant predictors of SWB in the backward stepwise model without HADS (Model 1c); HADS-A and HADS-D

Table 2. Pearson's correlations of well-being and its dimensions with HADS-A and HADS-D (N=175).

	WBT	EWB	SWB	PWB	HADS-A
EWB	0.794				
SWB	0.859	0.534			
PWB	0.899	0.596	0.642		
HADS-A	–0.620	–0.585	–0.517	–0.508	
HADS-D	–0.751	–0.788	–0.553	–0.626	0.635

MHC-SF= Mental Health Continuum – Short Form, WBT= MHC-SF well-being total score, EWB= MHC-SF emotional well-being subscale, SWB= MHC-SF social well-being subscale, PWB= MHC-SF psychological well-being subscale, HADS= Hospital Anxiety and Depression Scale, HADS-A= HADS Anxiety subscale, HADS-D= HADS Depression subscale
All correlations were statistically significant with $p<0.0001$

Table 3. Results of multiple linear regressions using WBT as dependent variable and excluding (Model 1) or including HADS-A and HADS-D as predictors (Model 2) (N=175).

	Model 1 (stepwise)		Model 2		
	beta	p	beta	p	ω^2
HbA1c	–0.249	0.001	– 0.020	0.695	0
BMI	–0.179	0.015	0.009	0.859	0
HADS-A	–	–	– 0.242	<0.001	0.074
HADS-D	–	–	– 0.593	<0.001	0.306
Adjusted R^2	0.089		0.589		

WBT= Mental Health Continuum – Short Form well-being total score, HADS= Hospital Anxiety and Depression Scale, HADS-A= HADS Anxiety subscale, HADS-D= HADS Depression subscale, HbA1c= glycated hemoglobin, BMI= Body Mass Index
Standardized estimates (betas) are presented
Age, marital status, education level, type 2 diabetes mellitus duration, type of medication, and comorbid hyperlipidemia and hypertension were included as additional independent variables in backward stepwise regression Model 1

Table 4. Investigation of the direct, indirect (with the mediation of HADS-A and HADS-D) and total effect of HbA1c and BMI on WBT (N=175).

	Direct effect (D)		Indirect effect (I)		I/T	Total effect (T)	
	SE	p	SE	p		SE	p
HbA1c → (HADS-A) → WBT			–0.036	0.161	0.14		
HbA1c → (HADS-D) → WBT	–0.020	0.715	–0.192	0.001	0.77	–0.249	0.003
HbA1c → (HADS-A + HADS-D) → WBT			–0.228	0.001	0.91		
BMI → (HADS-A) → WBT			–0.037	0.055	0.21		
BMI → (HADS-D) → WBT	0.009	0.863	–0.151	<0.001	0.84	–0.179	0.011
BMI → (HADS-A + HADS-D) → WBT			–0.188	<0.001	1.05		

WBT= Mental Health Continuum – Short Form well-being total score, HADS= Hospital Anxiety and Depression Scale, HADS-A= HADS Anxiety subscale, HADS-D= HADS Depression subscale, BMI= Body Mass Index, HbA1c= glycated hemoglobin
Standardised estimates (SE) are presented

significantly predicted SWB when included in the model (Model 2c). In summary, HADS-D was the strongest predictor of WBT and its dimensions. Among well-being dimensions, EWB was most strongly predicted by HADS-D (ω^2=0.408), followed by PWB (ω^2=0.164) and SWB (ω^2=0.101) (Suppl. tables 1–3).

Mediation analyses (Structural Equation Models)

For the investigation of the potential mediatory effects of anxiety and depression in the pathways from HbA1c and BMI to well-being, we proceeded to build Structural Equation Models (SEMs). As a first step, HADS-A and HADS-D were regressed on HbA1c and

BMI. HADS-D was significantly predicted (adj. R^2=0.170) by both HbA1c (beta=0.324, p<0.001) and BMI (beta=0.255, p<0.001); HADS-A was less strongly predicted (adj. R2=0.037) by HbA1c (beta=0.150, p=0.046) and BMI (beta=0.152, p=0.042), as well (figure 1). Then, we calculated the direct, indirect - via HADS-A and HADS-D - and total effects of HbA1c and BMI on WBT. Results showed that the effects of both HbA1c and BMI on WBT were completely mediated by HADS-D, since their indirect effects were statistically significant (p=0.001 and p<0.001, respectively), while their direct effects were not (p=0.715 and p=0.863, respectively). Their indirect effects via HADS-A were not significant (p=0.161 and p=0.055, respectively) (table 4, figure 1). A similar pattern was found for EWB and PWB, as well. Specifically, the effects of both HbA1c and BMI on EWB or PWB were completely mediated by HADS-D but not by HADS-A (Suppl. tables 4 and 5). Investigation of HADS mediatory effects was not performed for SWB since the total effects of HbA1c and BMI on SWB were non-significant (Model 1c, Suppl. table 3).

Discussion

The MIDUS study, the first study investigating the relationship between hedonic and eudemonic well-being with metabolic syndrome in an adult population, found that several dimensions of well-being predicted a lower risk of metabolic syndrome.[22] Moreover, positive affect has been linked with lower mortality rates in patients with T2DM, especially those over 65 years old.[23] Multiple guidelines of international diabetes associations refer to psychological well-being and quality of life as important factors in the effective management of blood glucose levels.[24] Therefore, the study of well-being and its predictors in patients with T2DM is highly important.

To the best of our knowledge, our study is the first to evaluate the well-being of patients with T2DM using the MHC-SF questionnaire. This tool has been used in the past for assessing well-being mainly in non-clinical samples but also in patients with mental disorders, such as schizophrenia, mood and personality disorders,[18,25,26] and physical illnesses, such as chronic subdural hematoma, psoriasis, and chronic pain.[27–29] In our sample, the sizes and intercorrelations of MHC-SF dimensions were very similar to other non-clinical samples, including the Greek MHC-SF validation sample.[18]

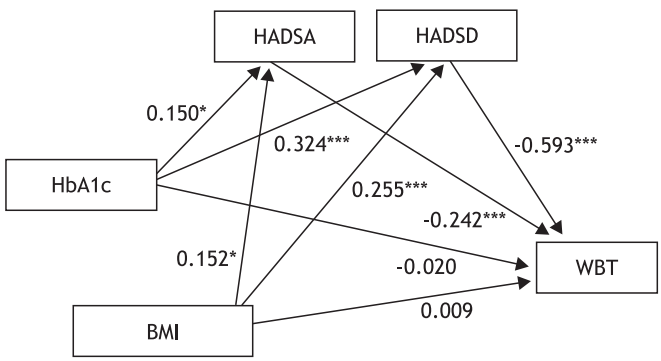

Figure 1. Structural Equation Model for the investigation of the mediatory effects of HADS-A and HADS-D in the relationship between HbA1c and BMI with WBT.

Our results showed that glycemic control (HbA1c) and BMI are predictors of the well-being and affective (especially depressive) symptoms of patients with T2DM. Our findings on HbA1c agree with previous studies using different well-being questionnaires. Specifically, a Greek study found a negative correlation between HbA1c and well-being, as measured by the WHO-5.[30] In the BENCH-2 study, a higher HbA1c was correlated with a lower WHO-5 score and higher levels of depression.[31] Moreover, difficulty in effective blood glucose level regulation was associated with diabetes-related distress and more depressive and anxiety symptoms.[24,32]

On the other hand, findings in the literature are conflicting regarding the effect of obesity on well-being and their relationship has not been examined thoroughly in DM. Studies have shown that overweight people have lower levels of PWB,[33,34] while adolescents and adults with high BMI have lower levels of life satisfaction, a dimension of EWB.[35,36] However, other studies have not found a statistically significant correlation between well-being and BMI.[37,38] Obese patients with T2DM often have more depressive symptoms and lower levels of quality of life.[39,40]

To the best of our knowledge, previous studies recording well-being and self-reported depression in samples of patients with T2DM have either not reported previous psychiatric diagnoses or included subjects of mixed status. Diagnosed depression and other mental illnesses were exclusion criteria in our study but mental illness was determined by patients' medical history and the use of psychiatric medication. Therefore, we used a self-report questionnaire, such as the HADS, in order to evaluate the prevalence of undiagnosed anxiety and depression symptoms. Our study recorded high rates of undiagnosed affective (especially depressive) symptoms in a nominally 'mentally healthy' sample of patients with T2DM, in line with previous findings.[7]

Depressive symptoms are twice more common in patients with diabetes than in the general population.[41,42] A study in Greek patients with T2DM found 33.4% more depressive symptoms than in the general population.[43] Depression has been correlated with

compromised well-being, lower quality of life, lower diabetes self-care and glycemic control, and higher risk of complications and mortality.[44,45] In line with our findings, a study investigating the complex relationship between well-being, anxiety, and depression in patients with T2DM using HADS and WHO-5, showed that high levels of anxiety and depression negatively correlated with PWB.[12] Undiagnosed depression was a crucial predictor of total well-being in our supposedly 'mentally healthy' sample, much stronger than undiagnosed anxiety and other usual suspects (HbA1c, BMI). Among well-being dimensions, EWB was most strongly predicted by HADS-D, as expected, followed by PWB and SWB. Therefore, a major implication of our study is that, in patients with T2DM, MHC-SF might serve as an efficient surrogate marker of undiagnosed depression and subthreshold depressive symptoms.

Finally, path analyses showed that the effects of HbA1c and BMI on well-being were completely mediated by undiagnosed depressive symptoms. Undiagnosed depression was strongly predicted by HbA1c and BMI and, in turn, strongly predicted well-being. Therefore, undiagnosed depression fully explains the effects of HbA1c and BMI on well-being. Depression has repeatedly been shown to mediate the effect of physical symptoms, such as pain or fatigue, on quality of life or well-being outcomes in various diseases, such as fibromyalgia or multiple sclerosis.[46,47] Of note, undiagnosed anxiety symptoms had no significant mediatory effect in our study since they were less strongly associated with HbA1c, BMI, and well-being, and possibly because they were endorsed by a smaller proportion of the sample than depressive symptoms.

Concerning limitations, we did not perform formal diagnostic procedures with standard clinician-administered tools but only recorded depressive and anxiety symptoms with the HADS self-report questionnaire, which should not be used as a substitute for a validated diagnostic interview.[48] Finally, our cross-sectional study was not designed to investigate causal effects between variables. Future research (e.g., longitudinal studies) should focus on finding causal relationships and other potential predictors of well-being in patients with T2DM.

Concludingly, this is the first study using MHC-SF to measure well-being and investigate its predictors in patients with T2DM. We found that glycemic control (HbA1c) and BMI negatively correlated with well-being. Our study highlighted the problem of undiagnosed depression in this patient group; when taken into consideration, it was identified as the strongest predictor of well-being, suggesting that MHC-SF might serve as an efficient surrogate marker of undiagnosed or subthreshold depression. HbA1c and BMI were also associated with undiagnosed depressive symptoms, which fully explained the effect of HbA1c and BMI on well-being. Therefore, healthcare providers treating patients with T2DM should be vigilant for screening symptoms of depression. Finally, the interplay of glycemic control and positive mental health warrants further investigation in longitudinal studies.

Acknowledgments

We express our gratitude to all study participants.

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Ερευνητική εργασία

Διερεύνηση προβλεπτικών παραγόντων της ευεξίας σε ασθενείς με σακχαρώδη διαβήτη τύπου 2: Ο ρόλος της αδιάγνωστης κατάθλιψης

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ΙΣΤΟΡΙΚΟ ΑΡΘΡΟΥ: Παραλήφθηκε 7 Ιουλίου 2022/Αναθεωρήθηκε 2 Σεπτεμβρίου 2022/Δημοσιεύθηκε Διαδικτυακά 11 Νοεμβρίου 2022

ΠΕΡΙΛΗΨΗ

Ο σακχαρώδης διαβήτης τύπου 2 (ΣΔΤ2) αποτελεί μία συχνή μεταβολική νόσο με ποικίλες δυσμενείς σωματικές και ψυχολογικές επιπτώσεις. Η ευεξία των ασθενών με ΣΔΤ2 συχνά υποβαθμίζεται. Σκοπός της παρούσας μελέτης ήταν η αναζήτηση κλινικοδημογραφικών προβλεπτικών παραγόντων της ευεξίας ασθενών με ΣΔΤ2 χωρίς γνωστό ψυχιατρικό ιστορικό και η διερεύνηση του διαμεσολαβητικού ρόλου τυχόν αδιάγνωστου άγχους και κατάθλιψης. Συμμετείχαν 175 εξωτερικοί ασθενείς με ΣΔΤ2 (54.3% άνδρες, ηλικίας 34-79 (μέση τιμή 59.9) έτη) που παρακολουθούνταν στο Διαβητολογικό Κέντρο του Γενικού Νοσοκομείου της Νίκαιας-Πειραιά. Οι ασθενείς που συμπεριλήφθηκαν στη μελέτη δεν είχαν σοβαρές επιπλοκές οφειλόμενες στον ΣΔΤ2 ούτε γνωστό ψυχιατρικό ιστορικό. Η ευεξία των ασθενών αποτυπώθηκε με το εργαλείο Mental Health Continuum Short-Form (MHC-SF), ένα ερωτηματολόγιο 14 λημμάτων, το οποίο μετρά τόσο τη συνολική ευεξία, όσο και την κοινωνική, ψυχολογική και συναισθηματική διάστασή της. Η Hospital Anxiety and Depression Scale (HADS) χρησιμοποιήθηκε για την μέτρηση αδιάγνωστης αγχώδους (HADS-A) και καταθλιπτικής συμπτωματολογίας (HADS-D). Τα δημογραφικά χαρακτηριστικά των ασθενών, ο Δείκτης Μάζας Σώματος (ΔΜΣ), η γλυκοζυλιωμένη αιμοσφαιρίνη (HbA1c), η διάρκεια της νόσου, η παρουσία συννοσηρής υπέρτασης ή δυσλιπιδιαιμίας, καθώς και ο τύπος της αντιδιαβητικής αγωγής διερευνήθηκαν ως προβλεπτικοί παράγοντες της συνολικής ευεξίας και των επιμέρους διαστάσεών της σε πολλαπλές γραμμικές παλινδρομήσεις με ή χωρίς την ταυτόχρονη επίδραση των HADS-A και HADS-D. Οι διαμεσολαβητικές επιδράσεις του άγχους και της κατάθλιψης διερευνήθηκαν μέσω μοντέλων δομικών εξισώσεων. Τα αποτελέσματα έδειξαν ότι το 21.1% των συμμετεχόντων παρουσίαζε συννοσηρή κατάθλιψη (HADS-D≥11) και το 5.1% συννοσηρή αγχώδη διαταραχή (HADS-A≥11). Στα μοντέλα παλινδρόμησης χωρίς την HADS, υψηλότερη βαθμολογία της συνολικής, συναισθηματικής και ψυχολογικής ευεξίας προέβλεπαν στατιστικώς σημαντικά η χαμηλή HbA1c (p=0.001) και ο χαμηλός ΔΜΣ (p=0.015, 0.019 and 0.030, αντίστοιχα). Όταν προστέθηκαν στα μοντέλα, η HADS-A και η HADS-D προέβλεπαν στατιστικώς σημαντικά τη συνολική ευεξία, καθώς και κάθε διάστασή της, αλλά η HbA1c και ο ΔΜΣ έπαυσαν να είναι στατιστικώς σημαντικοί παράγοντες. Στα μοντέλα δομικών εξισώσεων, η έμμεση επίδραση της HbA1c και του ΔΜΣ στην ευεξία μέσω της HADS-D ήταν στατιστικώς σημαντική, ενώ η άμεση και η έμμεση επίδραση μέσω της HADS-A δεν ήταν. Επομένως, η επίδραση της HbA1c και του ΔΜΣ στη συναισθηματική, την ψυχολογική και τη συνολική ευεξία διαμεσολαβείται πλήρως από την HADS-D. Συμπερασματικά, η μελέτη μας είναι η πρώτη που χρησιμοποιεί το MHC-SF για την αξιολόγηση της ευεξίας των ασθενών με ΣΔΤ2. Παρατηρήθηκαν υψηλά επίπεδα αδιάγνωστης κατάθλιψης, η οποία εξηγεί πλήρως την επίδραση της HbA1c και του ΔΜΣ στην ευεξία. Κρίνεται σκόπιμη η περαιτέρω διερεύνηση της αλληλεπίδρασης του γλυκαιμικού ελέγχου και της θετικής ψυχικής υγείας.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Άγχος, ευεξία, γλυκοζυλιωμένη αιμοσφαιρίνη, γλυκαιμική ρύθμιση, δείκτης μάζας σώματος, κατάθλιψη, MHC-SF, σακχαρώδης διαβήτης τύπου 2.

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