ORIGINAL ARTICLE

UDC: 159.944.4:616.379-008.64
https://doi.org/10.2298/VSP160814022P

Evaluation of emotional distress in people with diabetes mellitus

Procena emocionalnog distresa kod osoba obolelih od šećerne bolesti

Verica Petrović *†, Vesna Vidaković ‡, Ornela Jelisavac †

***Health Center Banja Luka, Banja Luka, Republic of Srpska, Bosnia and Herzegovina; University of Banja Luka, †Faculty of Medicine, Banja Luka, Republic of Srpska, Bosnia and Herzegovina; ‡Health Center Prijedor, Prijedor, Republic of Srpska, Bosnia and Herzegovina**

Abstract

Background/Aim. Despite the modern ways of treating diabetes mellitus (DM), a half of the patients do not achieve the optimal metabolic control, which increases a risk of complications and occurrence of emotional "burnout" of patients. The goal of the research was to determine the level of emotional distress of patients with diabetes, and the association of the level of emotional distress with sociodemographic traits and the disease characteristics. **Methods.** The research was conducted from 01.01.2016. to 04.30.2016. in the Comunity Health Center in Banja Luka. The research was conducted in a group of 113 randomly selected patients (63 men, 50 women) with diabetes, with an average age of 63.93 years. A majority of respondents have type 2 DM (91.12%). The Problem Areas in Diabetes Questionniare (PAID) was used in the research. Another questionnaire used contained questions related to sociodemographic traits (sex, age, education), and disease traits (type of DM, duration of the illness, types of therapy that the patient uses in the treatment of DM, the value of hemoglobin A1c (HbA1c) over the last three months, the presence of microvascular complications). **Results.** According to the total score of the PAID questionnaire, 64 (56.6%) respondents had a moderate level of emotional distress. The level of emotional distress is higher in the group with a higher HbA1c values, but without a statistically significant difference compared to the group with the achieved goal HbA1c values. Two-thirds of respondents with microvascular complications manifest a moderate level of distress. The association between occurrence of distress with the occurrence of microvascular complications was confirmed. **Conclusion.** More than a half of patients with DM have an elevated level of distress of a moderate degree, and two-thirds of patients with DM with the microvascular complications have an elevated level of distress of a moderate degree, which indicates the importance of interdisciplinary cooperation of endocrinologists, vascular surgeons and psychiatrists.

Key words:
diabetes mellitus; stress, psychological; glycated hemoglobin a; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Uprkos savremenom načinu lečenja dijabetes melitusa (DM), polovina bolesnika ne postiže optimalnu metaboličku kontrolu, što povećava rizik od komplikacija i pojave emocionalnog "sagorevanja" obolelih. Cilj ovog istraživanja bio je da se utvrdi nivo emocionalnog distresa obolelih od dijabetesa i povezanost nivoa emocionalnog distresa sa sociodemografskim karakteristikama i karakteristikama bolesti. **Metode.** Istraživanje je sprovedeno od 01.01.2016. do 30.04.2016. u Domu zdravlja u Banja Luci. Istraživanje je rađeno na grupi od 113 slučajno odabranih bolesnika (63 muškarca, 50 žena) obolelih od dijabetesa, prosečne starosti 63,93 godine. Dominirali su ispitanici sa DM tip 2 (91,12%). U istraživanju je korišćen *Problem Areas In Diabetes Questionare* (PAID) upitnik o problematičnim područjima u šećernoj bolesti. Korišćen je i Upitnik koji sadrži pitanja koja se odnose na sociodemografske karakteristike [(pol, dob, stepen obrazovanja) i karakteristike bolesti (tip DM, dužina trajanja bolesti, vrsta terapije koju bolesnik koristi u liječenju DM, vrijednosti hemoglobina A1c (HbA1c) rađenog unazad tri mjeseca, prisustvo mikrovaskularnih komplikacija)]. **Rezultati.** Prema ukupnom skoru PAID upitnika 64 (56,6%) ispitanika imalo je umeren nivo emocionalnog distresa. Nivo emocionalnog distresa bio je veći u grupi sa većim vrednostima HbA1c, ali bez statistički značajne razlike u odnosu na grupu sa postignutim ciljnim vrednostima HbA1c. Dve trećine ispitanika sa mikrovaskularnim komplikacijima ispoljavalo je umeren nivo distresa. Potvrđena je povezanost pojave distresa sa pojavom mikrovaskularnih komplikacija. **Zaključak.** Više od polovine bolesnika sa DM imalo je povišen nivo distresa umerenog stepena, a 2/3 osoba sa DM sa mikrovaskularnim komplikacijama imalo je povišen nivo distresa umerenog stepena, što

Correspondence to: Verica Petrović, Bana Lazarevića 9, 78 000 Banja Luka, Republika Srpska, Bosnia and Herzegovina.
E-mail: drverica@hotmail.com

ukazuje na značaj interdisciplinarnarne saradnje endokrinologa, vaskularnih hirurga i psihijatara.

Ključne reči:
dijabetes melitus; stres, psihički; hemoglobin a, glukozilovan; ankete i upitnici.

Introduction

Diabetes mellitus (DM) represents a group of metabolic diseases, which manifest itself with a systematic disorder of metabolism of carbohydrates, fats, and proteins, due to an absolute or relative lack of biologically active insulin [1, 2].

Knowledge of the long-term, lifelong disease affects people suddenly, usually in full health, and requires the mobilization of all adaptive psychological mechanisms to help them to overcome the disease and integrate it into their daily life. Diabetes requires daily responsibility and patients' self-care by using insulin, pills, diet, exercise, and checking blood glucose levels every day for the rest of their lives. Each type of emotional response serves a purpose, but can be harmful if it is too intense or too long. The most common types of response during the adjustment to diabetes are: denial and disbelief, fear and helplessness, anger, guilt, sadness and depression. Due to the chronic nature of this disease, it is important to constantly monitor changes in physical health, and also the psychological changes [1–3].

Research indicates that the distress shortly after the diagnosis of diabetes is usually low, especially in asymptomatic individuals that are not in the intensive treatment regimen. Their distress increases after 2–3 years, which is likely correlated with the progression of the illness. People with type 2 diabetes who are treated with insulin, which implies a greater disease progression and a more demanding treatment regimen, have a higher distress level caused by diabetes than those treated with lifestyle change and/or oral medication. Significant predictors of distress increase from non-clinical to a clinical level during one year are female sex, presence of major depressive disorder in the medical record, a large number of acute stressful events in the given time period, a large number of complications of diabetes and poor self-treatment with diet and physical activity [3].

The guidelines of the American Diabetes Association (ADA) state specific directions for psychosocial assessment and monitoring of patients with diabetes. The general principle of this approach is that the assessment of the psychosocial needs of patients should be a part of the regular medical monitoring of patients. The assessment of psychological illnesses is particularly important for the patients with unsatisfactory treatment results. These guidelines emphasize that psychosocial testing should be performed at the time of diagnosis, during routine controls, and especially in the cases when complications arise or if a more intensive treatment regimen is required [3].

There are many instruments used for measuring the psychosocial aspects in diabetes treatment. The Problem Areas in Diabetes Questionnaire – PAID, is one of the recent questionnaires, which was developed in 1995 by G. Welch, as a measure of emotional adaptation to life with diabetes, consists of 20 questions. Each question is connected with the five-point Likert scale, which reflects a degree which a certain statement is perceived as a current problem [4, 5].

The aim of this study was to determine the level of emotional distress in the patients with diabetes and its association with sociodemographic characteristics (gender, age, education) and the characteristics of the disease [type of diabetes, duration of diabetes, treatment regimen and hemoglobin (Hb)A1c level].

Methods

This is a prospective study, conducted in the period from 01.01.2016 to 04.30.2016 in the Educational Centre of Family Medicine in Banja Luka.

All patients with diabetes registered in two randomly selected family medicine teams were the target group. Of the total of 120 registered patients, 7 patients did not participate in the survey, while 113 questionnaires were correctly completed and used for further statistical analysis.

The survey instrument was a custom-made questionnaire containing two parts. The first part of this questionnaire contained questions related to gender, age, education level, type of DM, disease duration, therapy regimen used in the treatment of DM, HbA1c-made in the past three months and the presence of microvascular complications of DM. The second part was related to the PAID. With 20 items. Each item had five possible answers, with the values from 0 to 4, where 0 represented the answer "not a problem" and 4 indicated "a serious problem". The values were added together and multiplied by 1.25, so the total score possible was from 0–100. The respondents with a score of 40 or more had a high level of emotional distress and require special attention. The PAID scores in these patients might be reduced by 10 to 15 points, if they underwent the medical interventions and educational programs [4]. Extremely low scores (0–10) combined with a poor glycemic control may be indicative for denial [5].

The study included 113 subjects (the patients with diabetes type 1 (DT1) and type 2 DT2), 63 (55.8%) men and 50 (44.2%) women, divided into three age categories. There were 5 (4.4%) patients at the age of 40 years, 56 (49.6%) from 41–65 years, and 52 (46%) over 65 years. As to the qualifications 21 (18.6%) respondents had primary school education, 73 (64.6%) had secondary school education and 19 (16.8%) had a university degree. According to the type of diabetes, there were 10 (8.8%) patients with DT1, and 103 (91.2%) with DT2. According to the therapy used for diabetes treatment, 69 (61.1%) patients were treated with oral antidiabetic drugs (OAD), 17 (15%) used the combination therapy (OAD + insulin), and 27 (23.9%) used insulin only. In our study, 34 (30.1%) patients had a good glycemic control (HbA1c $\leq$ 6.5/7.0%), while the number of patients with a

poor glycemic control (HbA1c ≥ 6.5/7.0%) was larger and counted 79 (69.9%). According to the duration of disease, 49 (43.4%) respondents had DM up to 5 years, 38 (33.6%) had it in a range of 6–10 years and 26 (23%) the disease lasted 11 years and over. Of all respondent 39 (34.5%) had microvascular complications.

To determine the distribution of respondents by the categories of socio-demographic variables and the examined characteristics of the disease, the descriptive statistics was applied, i.e., frequencies and percentages. To determine the relationship of socio-demographic variables and characteristics of the disease to the level of emotional distress, the χ^2 test was applied. In cases where the frequency response in the individual categories was less than 5, the χ^2 test was not precise, and instead, the Fisher's exact index of probability was applied.

Results

According to the presence of emotional distress, a majority of respondents, 64 or 56.6% had a moderate level of distress. A high level of emotional distress was present in 24 (21.3%) patients, while 25 (22.1%) patients had no emotional distress (Table 1).

A moderate level of distress was the most common in both sexes. A high level of distress was equally present both in men (22.6%) and women (22.0%). A slightly higher proportion of women (26%) expressed no distress compared to men (19.1%). These differences were not statistically significant ($\chi^2 = 974$, df = 2, $p = 0.614$).

Several sub-groups according to the distress level and three different age groups had fewer than 5 respondents, so the χ^2 square test was not reliable ($\chi^2 = 3.015$, df = 4, $p = 0.555$), and the Fisher's Exact Test = 2.658, $p = 622$, was applied. There were no statistically significant differences in the level of distress among the different age categories.

Comparing the level of emotional distress among respondents with different levels of education, over a half (63%) of the respondents with secondary education had a moderate level of distress. No statistically significant differences in the level of distress was found among the patients with different levels of education (Fisher's Exact Test = 4.237, $p = 0.375$).

Table 1

Presence of emotional distress in the patients with diabetes

Patients		Not expressed distress (0–9.99)	Moderate level of distress (10–39.99)	Pronounced level of distress (≥ 40)	*p*
Total number, n (%)	113 (100)	25 (22.1)	64 (56.6)	24 (21.3)	
Gender, n (%)					
men	63 (55.8)	12 (19.1)	38 (60.3)	13 (20.6)	$\chi^2 = 0.974$, df = 2, $p = 0.614$
females	50 (44.2)	13 (26.0)	26 (52.0)	11 (22.0)	
Age (years), n (%)					
< 40	5 (4.4)	0 (0.0)	4 (80.0)	1 (20)	Fisher's Exact Test – 2.658, $p = 0.622$
40–65	56 (49.6)	12 (21.4)	34 (60.7)	10 (17.9)	
≥ 66	52 (46)	13 (25.0)	26 (50.0)	13 (25.0)	
Education, n (%)					
primary school	21 (18,6)	7 (33.3)	9 (42.9)	5 (23.8)	Fisher's Exact Test = 4.237, $p = 0.375$
secondary school	73 (64.6)	13 (17.8)	46 (63.0)	14 (19.2)	
higher and university	19 (16.8)	5 (26.3)	9 (47.4)	5 (26.3)	
Type of diabetes, n (%)					
DT1	10 (8.8)	0 (0)	9 (90)	1 (10)	Fisher's Exact Test = 4.616, $p = 0.069$
DT2	103 (91.2)	25 (24.3)	55 (53.4)	23 (22.3)	
Therapy, n (%)					
OAD*	69 (61.1)	19 (27.5)	38 (55.1)	12 (17.4)	Fisher's Exact Test = 5.679, $p = 0.216$
OAD + insulin	17 (15)	4 (23.5)	9 (53)	4 (23.5)	
insulin	27 (23.9)	3 (7.4)	17 (63.0)	7 (29.6)	
Level of HbA1c, n (%)					
good-regulated (≤ 6.5/7.0%)	34 (30.1)	7 (20.6)	21 (61.8)	6 (17.6)	$\chi^2 = 0.573$, df = 2, $p = 0.751$
poorly regulated (> 6.5/7.0%)	79 (69.9)	18 (22.8)	43 (54.4)	18 (22.8)	
Duration of diabetes (years), n (%)					
≤ 5	49 (43.4)	16 (32.6)	24 (49.0)	9 (18.4)	$\chi^2 = 6.980$, df = 4, $p = 0.137$
6–10	38 (33.6)	6 (15.8)	25 (65.8)	7 (18.4)	
≥ 11	26 (23)	4 (11.5)	15 (57.7)	8 (30.8)	
Microvascular complications, n (%)					
no	74 (65.5)	23 (31.1)	36 (48.6)	15 (20.3)	Fisher's Exact Test - 11.215, $p = 0.012$
yes	39 (34.5)	2 (5.1)	28 (71.8)	9 (23.1)	

***OAD – oral antidiabetic drugs; DT1 – diabetes mellitus type 1; DT2 – diabetes mellitus type 2; HbA1c – hemoglobin A1c.**

There was no statistically significant difference in the level of emotional distress among the respondents with type 1 diabetes and type 2 (Fisher's Exact Test = 4.616, p = 0.069). Given the small number of cases of type 1 diabetes, these two categories of diabetes could not be compared in percentage.

There was no significant difference in the level of emotional distress among the respondents who used different types of therapy (Fisher's Exact Test = 5.679, p = 0.216).

In most cases, the respondents with both good and poorly controlled HbA1c levels had expressed a moderate level of distress. A slightly higher proportion of subjects with poorly controlled HbA1c (22.8%) had a pronounced level of distress as compared to the subjects with well controlled HbA1c (17.6%). These differences were not statistically significant (χ^2 = 573, df = 2, p = 0.751).

About a third of respondents who suffered from the disease up to 5 years (32.6%) did not have an expressed distress. The number of respondents that did not have expressed distress reduced with the duration of the disease (32.6%; 15.8%; 11.5%). Comparing the level of emotional distress depending on the duration of the disease, a statistically significant difference was not determined (χ^2 = 6.980, df = 4, p = 0.137).

There was a statistically significant difference in the prevalence of the emotional distress between the patients who did not and patients who did have microvascular complications (Fisher's Exact Test – 11.215, p = 0.012). It was found that one third of respondents who did not have microvascular complications did not have pronounced distress (31.3%), while the respondents with present microvascular complications, in most cases, had moderate levels of distress (71.8%). The aforementioned differences were statistically significant.

Discussion

The PAID questionnaire showed that most of our respondents had moderate levels of emotional distress. In the Republic of Srpska (RS) in 2015, the presence of psychological distress was assessed in the adults with diabetes using the vitality scale of the questionnaire short form (SF) 36, recommended by the European Health Interview Survey (EUROHIS) and the European Community Health Indicators Monitoring (ECHIM) project. The study showed that the highest percentage of respondents (74.4%) in the month preceding the survey had a negative emotional state, such as sadness, depression, etc., (score ≤ 58), a quarter of respondents (24.9%) had a score of between 58 and 78, while a very small number of respondents (0.6%) had a more positive mental health (score ≥ 78) [2]. Although we used a different questionnaire (PAID), it can be stated that the results of our research are a little better when it comes to the mental health of our patients. Around one-quarter of our respondents (22.1%) had no distress which was significantly higher than the mentioned study in the RS. Unlike the mentioned study where a majority of respondents had a negative emotional state (74.4%), in our study 21.3% of respondents had a high level of emotional distress. The largest percentage of our respondents had a moderate distress (56.6%). The results of a research in France, from the second multinational DAWN study by Reach et al. [6], conducted on 500 diabetic patients (420 with type 2 and 80 with type 1 DM), showed that about a half of participants (44%) had a high level of distress in the PAID 5 scale. The Diabetes Attitudes, Wishes and Needs (DAWN2) multinational study included 8596 patients with diabetes in 17 countries. The study results showed that 44% of participants had a high level diabetes-related distress on the PAID scale, the lowest number of participants with a high level of distress (20%) were in the Netherlands, and the highest (about 60%) in Algeria [7].

In our research, an association between the level of emotional distress with sociodemographic variables (gender, age, education) was not confirmed, however, some studies had confirmed this relationship. The study conducted by Lee et al. [8] in the Republic of Korea on 440 patients with DT2, with equal representation by gender (51.4 : 41.6%), found, like in our study, that the total score of the PAID 5 scale was significantly higher for females than for males. When it comes to age, in contrast to our study, the survey by Reddy et al. [9], on 184 participants with DT1 and DT2 showed that the DM-related distress negatively correlates with age. A study about diabetes-related distress and depression, conducted on 700 patients with DT2 in Malaysia, showed that younger people had a higher level of distress [10].

In our research, we did not find a statistically significant correlation between the level of emotional distress with the type of diabetes, duration of disease, nor the type of therapy used for diabetes treatment. Due to the small number of patients with DT1 it was not possible to compare the percentage of emotional distress by type of diabetes. Most of the study did not confirm a difference of emotional distress among the respondents with DT1 and DT2 [7].

The level of emotional distress was higher in the group with the higher HbA1c levels, but without statistically significant differences compared to the group with the target levels for HbA1c.

About a third of respondents (32.7%) who had the disease up to 5 years did not have a pronounced distress. The number of respondents did not have the distress reduction due to the duration of the disease. A high level of stress was present in the patients who had the disease up to 10 years (18.4%); this percentage rises to 30.8% with the patients who had the disease for 11 years and more, but there was not a statistically significant difference. As in our study, Stoop et al. [11], in their study which included 526 patients with type 2 diabetes, showed no significant association between diabetes duration and the total level of emotional distress.

With the patients using insulin, moderate distress level was higher (63%) than in other two groups, but with no statistically significant difference. In a Dutch Diacource study conducted on 590 people with type 2 diabetes, Kasteleyn et al. [12] found that the participants with insulin treatment had a higher score on the PAID scale than participants on the OAD therapy.

An association between the occurrence of distress and occurrence of microvascular complications was confirmed. There was a statistically significant difference in the prevalence of emotional distress among respondents who had and those who did not have some microvascular complications. Approximately a half of our respondents without microvascular complications had a moderate level of distress (48.6 %), which was a statistically significantly less compared to those with microvascular complications (71.8%).

As in our research, Kasteleyn et al. [12], established a correlation between the total score on the PAID scale and present microvascular complications.

Conclusion

More than a half of patients with DM have an elevated level of distress of a moderate degree, and two-thirds of patients with DM with the microvascular complications have an elevated level of distress of a moderate degree. The results indicate the need to assess the emotional distress of all patients with diabetes in the family health centers, as well as the importance of an interdisciplinary approach to the treatment of patients with diabetes. In addition to the endocrinologists and vascular surgeons, involving the psychiatrists would be significant.

R E F E R E N C E S

1. *Savić S*. Diabetes mellitus In: *Tešanović G,* editor. Family medicine. Banja Luka: School of Medicine; 2014. p. 319–41 (Serbian)
2. *The Ministry of Health and Social Protection of the Republic of Srpska*. Assessment of the quality of glycemic control and the presence of vascular complications in people with diabetes in the Republic of Srpska. The Ministry of Health and Social Protection of the Republic of Srpska. Banja Luka: Institute of Public Health of the Republic of Srpska; 2015. (Serbian)
3. *American Diabetes Association*. 3. Foundations of Care and Comprehensive Medical Evaluation. Diabetes Care 2016; 39 Suppl 1: S23–35.
4. *Snoek F, Welch G*. Problem Areas in Diabetes Questionnaire (PAID). Adapted from DAWN Interactive 2. Novo Nordisk 2006. Available from: http://www.dawnstudy.com/content/dam/Dawnstudy/AFFILIATE/www-dawnstudy-com/Home/TOOLSAND-RESOURCES/Documents/PAID_problem_areas_in_ diabetes_questionnaire.pdf [cited 2016 Feb 12].
5. *Ajduković D*. Checking the biopsychosocial model in behavioral approaches to diabetes. [dissertation]. Zagreb: University of Zagreb, Faculty of Philosophy; 2013. (Croatian)
6. *Reach G, Consoli SM, Halimi S, Colas C, Duclos M, Fontaine P,* et al. The multinational second Diabetes, Attitudes, Wishes and Needs study: results of the French survey. Patient Prefer Adherence 2015; 9: 289–97.
7. *Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H,* et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2™): cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. Diabet Med 2013; 30(7): 767–77.
8. *Lee EH, Lee YW, Lee KW, Kim YS, Nam MS*. Measurement of diabetes-related emotional distress using the Problem Areas in Diabetes scale: psychometric evaluations show that the short form is better than the full form. Health Qual Life Outcomes 2014; 12: 142.
9. *Reddy J, Wilhelm K, Campbell L*. Putting PAID to diabetes-related distress: the potential utility of the problem areas in diabetes (PAID) scale in patients with diabetes. Psychosomatics 2013; 54(1): 44–51.
10. *Chew BH, Vos R, Mohd-Sidik S, Rutten GE*. Diabetes-Related Distress, Depression and Distress-Depression among Adults with Type 2 Diabetes Mellitus in Malaysia. PLoS One 2016; 11(3): e0152095.
11. *Stoop CH, Nefs G, Pop VJ, Wijnands-van Gent CJ, Tack CJ, Geelhoed-Duijvestijn PH,* et al. Diabetes-specific emotional distress in people with Type 2 diabetes: a comparison between primary and secondary care. Diabet Med 2014; 31(10): 1252–9.
12. *Kasteleyn MJ, de Vries L, van Puffelen AL, Schellevis FG, Rijken M, Vos RC,* et al. Diabetes-related distress over the course of illness: results from the Diacourse study. Diabet Med 2015; 32(12): 1617–24.

Received on December 15, 2016.
Revised on September 12, 2017.
Accepted on October 03, 2017.
Online First November, 2017.