ORIGINAL ARTICLE

Diabetes Mellitus

INTERNATIONAL JOURNAL OF BIOMEDICINE

Depression, Anxiety and Stress Among Patients with Type 2 Diabetes Mellitus in Primary Health Care in Kosovo

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Abstract

Background: At a global level, over 300 million people are estimated to suffer from depression, equivalent to 4.4% of the world's population. The presence of depression, anxiety, and stress (DAS) has major consequences for individuals with diabetes. The aim of this study was to determine the prevalence of DAS among adult patients with T2DM in primary health care (PHC) settings in Kosovo and to determine any association between DAS, sociodemographic characteristics, and other risk factors.

Methods and Results: This cross-sectional study was conducted in seven Main Family Medicine Centers in Kosovo (Prishtina, Mitrovica, Peja, Prizren, Ferizaj, Gjilan, and Gjakova) from November 2022 to February 2023. The study included 596 adult patients above 18 years of age who were diagnosed with T2DM at least one year ago. By gender, more respondents were female ((F 55.4% vs. M 44.6%); adults aged 30-59 accounted for 38.4%, aged 60+ – 57.7%. Anxiety was the most common type of psychological distress among the subjects (82.0%), depression was second with a prevalence of 74% and stress third with a prevalence of 43.0%. Females were predominant among respondents regarding the three forms of mental health problems: Depression (F 75.8% vs. M 71.8%), Anxiety (F 86.1% vs. M 77.1%), and Stress (F 48.5% vs. M 36.1%)

Subjects with only primary education were more likely to be depressed (79.6%, *P*=0.007; OR=1.689, 95% CI: 1.153 – 2.477). HbA1C >6.5% was found to be strongly associated with depression (76.4%, *P*=0.002; OR=2.071, 95% CI: 1.305 – 3.284). Female gender and the presence of comorbidities were found to be significantly associated with anxiety. Female gender, level of education, history of DM in the family, presence of comorbidities, and HbA1c >6.5% were significantly associated with stress.

Conclusion: Our study showed that the prevalence of DAS is high in patients with T2DM. Periodic screening of patients with diabetes in PHC settings for early signs of psychological distress using easy and inexpensive validated screening tools like the DASS-21 questionnaire is recommended.**(International Journal of Biomedicine. 2023;13(3):84-90.)**

Key words: depression • anxiety • and stress • diabetes mellitus • Kosovo adults

Abbreviations

DM, diabetes mellitus; **DAS**, depression, anxiety, and stress; **PHC**, primary health care; **T2DM**, type 2 diabetes mellitus.

Introduction

Diabetes is a common chronic disease worldwide. Its prevalence is increasing and is expected to be 783 million by 2045.[1] According to the Kosovo STEPS surveys, the prevalence of diabetes mellitus (DM) in 2011[2] among 15-64 year-olds was 7.7% (95% CI: 6.0% – 9.7%), and 7.9% (95% CI: 6.9% – 9.0%) among 18-69 year-olds. In 2019 the prevalence was higher among females than among males.[2,3]

Diabetes is the leading noncommunicable disease in Kosovo, according to annual reports from the Department of Statistics at the National Institute of Public Health of Kosovo.[4] Type 2 diabetes mellitus (T2DM) affects more than 90% of diabetics. After cardiovascular diseases and cancers, the most common cause of premature death among Kosovo residents is diabetes.[5] Several studies have suggested a complex and bidirectional association between depression, anxiety, and stress (DAS) and chronic diseases, especially T2DM.[6-8] Therefore, patients

with T2DM can be at greater risk for depression and anxiety.[9] Previous research has examined the prevalence and association of DAS among T2DM patients in different countries.[10-18] In Kosovo, we have no data on the prevalence of DAS in adults and even less in DM patients. The Republic of Kosovo has an area of 10,905.25km². Kosovo has 38 municipalities, with 1,469 settlements organized according to the country's laws. According to the estimate of the Statistics Agency of Kosovo (SAK) for 2021, the total population in Kosovo is 1,773,971. Kosovo is characterized by a new population structure, where the average age is 30.2 years.[19] Healthcare services in Kosovo are organized through a network of health institutions organized at three levels: Primary Health Care (PHC), Secondary Health Care, and Tertiary Health Care. PHC is the gateway for citizens of the Republic of Kosovo to the health system.[20,21]

The aim of this study was to determine the prevalence of DAS among adult patients with T2DM in PHC settings in Kosovo and to determine any association between DAS, sociodemographic characteristics, and other risk factors.

Materials and Methods

This cross-sectional study was conducted in seven Main Family Medicine Centers in Kosovo (Prishtina, Mitrovica, Peja, Prizren, Ferizaj, Gjilan, and Gjakova) from November 2022 to February 2023.

Inclusion criteria: adult patients above 18 years of age who were diagnosed with T2DM at least one year ago. Exclusion criteria: patients under 18 and those previously diagnosed with mental illness or cognitive impairment.

The sample size was calculated using Kish's formula: Sample size = $z^2 \times p \times (1-p)/c^2$, where z=1.96 for 95% confidence interval (CI), p=prevalence (the possible prevalence of DAS in patients with diabetes as 50% (as we do not have similar research in Kosovo), and c=desired level of precision (4%).

The response rate was expected to be 85%; the desired sample was 700 patients. Therefore, 700 questionnaires were distributed proportionally in seven Main Family Medicine Centers. From 700 questionnaires, we have reactive feedback from 596, or 85.1%.

Data were collected by distributing a self-administered questionnaire consisting of two parts. The first part contains the sociodemographic data of each patient and the current status of DM, indicated by findings such as duration of diabetes, regularity of follow-up (every 3 to 6 months based on the patient's condition), the most recent HbA1c, current regimen for diabetes management and diabetes complications. Factors affecting the severity of DM were also recorded, such as comorbidities, complications, and family history of DM. The second part contains questions about DAS using the DAS Scale (DASS-21) questionnaire.[22]

The DASS-21 is the short form of the DASS-42, a self-report scale designed to measure the negative emotional states of DAS. This scale is suitable for clinical settings for diagnosis and outcome monitoring and for non-clinical settings as a mental health screener.

Statistical analysis was performed using the statistical software package SPSS version 22.0 (SPSS Inc, Armonk, NY: IBM Corp). For descriptive analysis, results are presented as mean ± standard deviation (SD). Odds ratio (OR) with 95% confidence interval (CI) was also calculated. For data with normal distribution, inter-group comparisons were performed using Student's t-test. Differences of continuous variables departing from the normal distribution were tested by the Mann-Whitney U-test. Group comparisons with respect to categorical variables are performed using chi-square test. A probability value of $P<0.05$ was considered statistically significant.

Results

The distribution of respondents by socio-demographic characteristics and selected variables is presented in Table 1. This study included 596 patients with T2DM. By gender, more respondents were female (F 55.4% vs. M 44.6%); adults aged 30-59 accounted for 38.4%, aged 60+ – 57.7%. Rural residents accounted for 35.9%, and residents with primary school – 42.8%. unemployed – 72.5%, married – 77.7%, residents with three and more children – 66.5%. Family history of DM was found in 61.1%, and co-morbidity in 68.3%. HbA1C >6.5% was found in 84.1% of respondents.

Anxiety was the most common type of psychological distress among the subjects (82.0%), depression was second with a prevalence of 74% and stress third with a prevalence of 43.0%. The prevalence of the three forms of psychological distress based on severity is summarized in Table 2. Females were predominant among respondents regarding the three forms of mental health problems: Depression (F 75.8% vs. M 71.8%), Anxiety (F 86.1% vs. M 77.1%), and Stress (F 48.5% vs. M 36.1%) (Tables 3-5).

On bivariate analysis, depression was found to be significantly associated with levels of education and HbA1c. Subjects with only primary education were more likely to be depressed (79.6%, *P*=0.0072; OR=1.689, 95% CI: 1.153 – 2.477). HbA1C >6.5% was found to be strongly associated with depression (76.4%, *P*=0.002; OR=2.071, 95% CI: 1.305 – 3.284) (Table 3).

Female gender and the presence of comorbidities were found to be significantly associated with anxiety. Females appeared to have more anxiety (86.1%; *P*=0.004; OR=1.837 (95% CI: 1.204 –2.804). Of those with comorbidities, 84.5% of the respondents also scored positive for anxiety (*P*=0.022, OR=1.657, 95% CI: 1.076 – 2.55)) (Table 4).

Female gender, level of education, history of DM in the family, presence of comorbidities, and HbA1c >6.5% were significantly associated with stress. Females appeared to have more stress (48.5%, *P*=0.0024; OR=1.667, 95% CI: 1.198 – 2.320). Subjects with only primary education were more likely to be stressed (52.5%, *P*<0.0001; OR=1.988, 95% CI: 1.428 – 2.768). HbA1C >6.5% was found to be strongly associated with stress (45.3%, *P*=0.008; OR=1.885, 95% CI: 1.177 – 3.019) (Table 5).

Of those with comorbidities, 46.7% of the respondents also scored positive for stress (*P*=0.007, OR=1.632, 95% CI: 1.142 – 2.332). Subjects with a family history of DM were less likely to be stressed (39.6%, *P*=0.036; OR=0.701, 95% CI: 0.503 – 0.978).

Table 1.

Distribution of respondents by socio-demographic characteristics and selected variables.

Variable	Total number of patients (n=596)	
	n	%
Gender		
Male	266	44.6
Female	330	55.4
Age, years		
<30	23	3.9
30-59	229	38.4
60+	344	57.7
Mean ± SD	60.3 ± 13.0	
Residence		
City	382	64.1
Village	214	35.9
Level of education		
Primary school	255	42.8
Secondary school	211	35.4
University/College	130	21.8
Current Job status		
Employed	164	27.5
Unemployed	432	72.5
Marital status		
Married	463	77.7
Single	44	7.4
Widow(er)	80	13.4
Separated	9	1.5
Number of children		
1-2	141	23.7
3-4	245	41.1
5-6	128	21.5
>6	23	3.9
No children	59	9.9
History of DM in family		
Yes	364	61.1
No	232	38.9
Co-morbidity		
Yes	407	68.3
No	189	31.7
HbA1C		
> 6.5%	501	84.1
≤6.5%	95	15.9

Table 2.

Severity of depression, anxiety and stress symptoms among the participants

Mental disorder	n	%
Depression		
Normal	155	26.0
Mild	56	9.4
Moderate	168	28.2
Severe	115	19.3
Exetremely severe	102	17.1
Anxiety		
Normal	107	18.0
Mild	32	5.4
Moderate	129	21.6
Severe	71	11.9
Exetremely severe	257	43.1
Stress		
Normal	340	57.0
Mild	60	10.1
Moderate	70	11.7
Severe	94	15.8
Exetremely severe	32	5.4

Table 3.

Association between depression status and socio-demographic and other variables

Variable	Depression				Chi-square test OR (95% CI)
	Yes		No		
	n	%	n	%	
Total	441	74.0	155	26.0	
Gender					
F	250	75.8	80	24.2	*P*=0.274 1.227 (0.850 to 1.771)
M	191	71.8	75	28.2	
Age, years					
<30	15	65.2	8	34.8	*P*=0.399* 1.172 (0.810 to 1.695)
30-59	167	72.9	62	27.1	
60+	259	75.3	85	24.7	
Mean ± SD	60.3 ± 13.2		60.0 ± 13.8		
* 60+ vs. <60					
Residency					
City	288	75.4	94	24.6	*P*=0.298 1.222 (0.838 to 1.781)
Village	153	71.5	61	28.5	

Table 3 (continued).

Association between depression status and socio-demographic and other variables

Variable	Depression				Chi-square test OR (95% CI)
	Yes		No		
	n	%	n	%	
Total	441	74.0	155	26.0	
Level of education					
Primary school	203	79.6	52	20.4	P=0.007* 1.689 (1.153 to 2.477)
Secondary school	153	72.5	58	27.5	
University/College	85	65.4	45	34.6	
* Primary vs. Secondary + University					
Current job status					
Employed	122	74.4	42	25.6	P=0.892 1.029 (0.682 to 1.552)
Unemployed	319	73.8	113	26.2	
Marital status					
Married	346	74.7	117	25.3	P=0.445* 1.183 (0.769 to 1.82)
Single	34	77.3	10	22.7	
Widow(er)	54	67.5	26	32.5	
Separated	7	77.8	2	22.2	
* Married vs. Single + Widow(er) + Separated					
Having children					
Yes	396	73.7	141	26.3	P=0.674 0.874 (0.465 to 1.641)
No	45	76.3	14	23.7	
History of DM in family					
Yes	263	72.3	101	27.7	P=0.226 0.790 (0.540 to 1.157)
No	178	76.7	54	23.3	
Co morbidity					
Yes	311	76.4	96	23.6	P=0.049 1.470 (1.002 to 2.157)
No	130	68.8	59	31.2	
HbA1C					
> 6.5%	383	76.4	118	23.6	P=0.002 2.071 (1.305 to 3.284)
≤6.5%	58	61.1	37	38.9	

Table 4.

Association between anxiety status and socio-demographic and other variables

Variable	Anxiety				Chi-square test OR (95% CI)
	Yes		No		
	n	%	n	%	
Total	489	82.0	107	18.0	
Gender					
F	284	86.1	46	13.9	P=0.004 1.837 (1.204 to 2.804)
M	205	77.1	61	22.9	

Table 4 (continued).

Association between anxiety status and socio-demographic and other variables

Variable	Anxiety				Chi-square test OR (95% CI)
	Yes		No		
	n	%	n	%	
Total	489	82.0	107	18.0	
Age, years					
<30	20	87.0	3	13.0	P=0.628* 0.900 (0.588 to 1.378)
30-59	189	82.5	40	17.5	
60+	280	81.4	64	18.6	
Mean ± SD	60.1 ± 13.3		61.1 ± 13.7		
* 60+ vs. <60					
Residency					
City	318	83.2	64	16.8	P=0.308 1.249 (0.814 to 1.919)
Village	171	79.9	43	20.1	
Level of education					
Primary school	216	84.7	39	15.3	P=0.145* 1.38 (0.895 to 2.126)
Secondary school	171	81.0	40	19.0	
University/College	102	78.5	28	21.5	
* Primary vs. Secondary + University					
Current job status					
Employed	138	84.1	26	15.9	P=0.411 1.225 (0.755 to 1.987)
Unemployed	351	81.3	81	18.8	
Marital status					
Married	378	81.6	85	18.4	P=0.630* 0.881 (0.527 to 1.474)
Single	39	88.6	5	11.4	
Widow(er)	65	81.3	15	18.8	
Separated	7	77.8	2	22.2	
* Married vs. Single + Widow(er) + Separated					
Having children					
Yes	437	81.4	100	18.6	P=0.204 0.588 (0.259 to 1.334)
No	52	88.1	7	11.9	
History of DM in family					
Yes	293	80.5	71	19.5	P=0.217 0.758 (0.488 to 1.177)
No	196	84.5	36	15.5	
Co-morbidity					
Yes	344	84.5	63	15.5	P=0.022 1.657 (1.076 to 2.55)
No	145	76.7	44	23.3	
HbA1C					
> 6.5%	414	82.6	87	17.4	P=0.391 1.269 (0.736 to 2.188)
≤6.5%	75	78.9	20	21.1	

Table 5.

Association between stress status and socio-demographic and other variables

Variable	Stress				Chi-square test OR (95% CI)
	Yes		No		
	n	%	n	%	
Total	256	43.0	340	57.0	
Gender					
F	160	48.5	170	51.5	*P*=0.002 1.667 (1.198 to 2.320)
M	96	36.1	170	63.9	
Age, years					
<30	9	39.1	14	60.9	*P*=0.968* 1.007 (0.725 to 1.398)
30-59	99	43.2	130	56.8	
60+	148	43.0	196	57.0	
Mean ± SD	60.3 ± 13.6		60.2 ± 13.2		
* 60+ vs. <60					
Residency					
City	160	41.9	222	58.1	*P*=0.482 0.886 (0.632 to 1.241)
Village	96	44.9	118	55.1	
Level of education					
Primary school	134	52.5	121	47.5	*P*<0.0001* 1.988 (1.428 to 2.768)
Secondary school	81	38.4	130	61.6	
University/College	41	31.5	89	68.5	
* Primary vs. Secondary + University					
Current Job status					
Employed	64	39.0	100	61.0	*P*=0.233 0.800 (0.554 to 1.154)
Unemployed	192	44.4	240	55.6	
Marital status					
Married	195	42.1	268	57.9	*P*=0.442* 0.859 (0.583 to 1.266)
Single	19	43.2	25	56.8	
Widow(er)	37	46.3	43	53.8	
Separated	5	55.6	4	44.4	
* Married vs. Single + Widow(er) + Separated					
Having children					
Yes	228	42.5	309	57.5	*P*=0.462 0.817 (0.477 to 1.4)
No	28	47.5	31	52.5	
History of DM in family					
Yes	144	39.6	220	60.4	*P*=0.036 0.701 (0.503 to 0.978)
No	112	48.3	120	51.7	
Co-morbidity					
Yes	190	46.7	217	53.3	*P*=0.007 1.632 (1.142 to 2.332)
No	66	34.9	123	65.1	
HbA1C					
> 6.5%	227	45.3	274	54.7	*P*=0.008 1.885 (1.177 to 3.019)
≤6.5%	29	30.5	66	69.5	

Discussion

Many studies show that comorbid depression, anxiety and/or stress in diabetics not only increases disease severity, complications, work impairment, and poor quality of life, but it is also connected with greater use of medical services and much higher healthcare expenses. It is critical for developing nations to quantify the prevalence of DAS among patients with diabetes to commence early treatment, improve clinical outcomes, and reduce resource utilization and cost. Our study is the first in PHC in Kosovo with T2DM and has shown a high prevalence of DAS at 74.0%, 82.0%, and 43.0%, respectively. These values are higher than in many developed countries.[23-28] In a study by Khuwaja et al.,[24] 57.9% (95% CI: 54.7% – 61.2%) and 43.5% (95% CI: 40.3% – 46.8%) of study participants had anxiety and depression, respectively. Our study was done in the end stage of the pandemic, which can be one of the factors for the high prevalence of DAS among diabetic patients. In the study of Arenliu-Qosaj et al.[29] about the prevalence of perceived DAS in healthcare workers in Kosovo during the COVID-19 pandemic, most healthcare workers (71.6%) reported a mild, moderate, or severe mental health burden.

Some of the other reasons for the high prevalence of DAS in T2DM patients, compared to other countries, are (1) the lack of health insurance, which means that most of these patients cover the costs of services such as medications, laboratory tests, analysis of complications out of pocket – from the family budget; (2) the health system of Kosovo is not sufficiently developed: it lacks a health information system, databases for patients with diabetes and DAS, screenings for certain diseases, including diabetes and DAS, the capacity to treat the complications of diabetes as well as for regular 6-monthly or annual visits of these patients.

There are other factors that make life difficult for patients with diabetes: PHC is not developed enough to manage these patients successfully; the level of health education of patients in Kosovo is unsatisfactory; the general economic and social situation in the country is poor; the rate of unemployment is high. The nature of DM itself contributes to the problem: the chronicity of the disease, its duration, the presence of complications (acute and chronic but more chronic), the need to take insulin several times a day, every day (invasive methods of receiving therapy, piercing with a needle). Changes in the family structure in Kosovo have resulted in a lack of family care for patients, especially the elderly (migration of the population outside the country, a part of the family leaving the home for various reasons and leaving the elderly alone, without care), posttraumatic stress after the war, and more.

In a study by Bensbaa et al.[28] in Maroko, a low educational level was strongly correlated with depression in T2DM patients, with a threshold P-value of 0.01. Also, in our study depression was found to be significantly associated with level of education. Subjects with only primary education were more likely to be depressed (79.6%, *P*=0.007; OR=1.689, 95% CI: 1.153 – 2.477) and were more likely to be stressed (52.5%, *P*<0.0001; OR=1.988, 95% CI: 1.428 – 2.768) than those with secondary education + University. The prevalence of anxiety

in previous literature was higher than that of depression, and this is comparable to our study results.

A study by Mukrim et al.[23] in Northern Saudi Arabia showed that the prevalence reached approximately 45.6% for anxiety, 18.7% for stress, and 37.4% for depression.

In a study by Cardenas et al.[12] in Ecuador, the prevalence of depression, anxiety, and stress was 31.7%, 33.7%, and 25.0%, respectively. Male gender was associated with a decreased risk for DAS. A higher level of education was associated with low risk for DAS. The high prevalence of DAS was associated with major risk factors, such as female gender and low-level education, like our study. The presence of DAS has major consequences for individuals with diabetes. [32,33] However, several studies have shown that depression can be well treated in individuals with diabetes. Increased awareness of depression in diabetes care is needed. This can be achieved by including screening instruments for depression as part of regular diabetes care.[34]

Conclusion

Our study showed that the prevalence of DAS is high in patients with T2DM. Anxiety was the most common type of psychological distress among the subjects (82.0%), depression was second with a prevalence of 74% and stress third with a prevalence of 43.0%. Periodic screening of patients with diabetes in PHC settings for early signs of psychological distress using easy and inexpensive validated screening tools like the DASS-21 questionnaire is recommended.

Limitations of the study

The major limitation of the present study is that the data were cross-sectional, which does not allow for studying the cause-and-effect relationship.

Ethical considerations

Ethical Approval for this research was received from the Ethics Committee of Medical Faculty, University of Prishtina, number 2689. Written informed consent was obtained from all participants.

Competing Interests

The authors declare that they have no competing interests.

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