

ANXIETY AND DEPRESSION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS, DEPENDING ON SEX AND BODY MASS INDEX.

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Abstract

Objective: The purpose of this survey was the study of the occurrence of anxiety and depression symptoms in patients with Type 2 Diabetes Mellitus with regard to sex and body mass index (BMI).

Material and method: 310 individuals with type 2 Diabetes mellitus participated in the study. Their demographic and clinical features were examined. The self-completed questionnaire HADS was used for anxiety and depression level evaluation.

Results: 56% of the participants were women (n=174), while men percentage was 44% (n=136). Percentages of anxiety symptoms in women were three times higher in comparison to men, 62% (n=136) of women were presented with HADS-A>8 in contrast to 21% (n=29) of men (p<0,001). Women had a twofold percentage of depression symptomatology than men, as 41.4% (n=72) of women were presented with a HADS-A>8 in comparison to men's 17,8 % (n=24). When the relation between sex, age and Body Mass Index (BMI) and depression-anxiety symptoms was examined, it was shown that high BMI favors the occurrence of modest or severe symptomatology, as risk increases for any additional BMI unit.

Conclusion: The occurrence of anxiety and depression symptoms is strongly related to the sex of individuals with Type 2 Diabetes mellitus, as well as with the Body Mass Index.

Keywords: diabetes mellitus II, anxiety, stress, depression, BMI

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Introduction

Diabetes mellitus is a chronic metabolic disease, characterized by a disorder in the metabolism of carbohydrates, lipids and amino acids, either as a result of decreased insulin secretion, or due to a reduction to insulin sensitivity of the cells of the body cells¹. It is a disease that acquires

epidemic form, as its prevalence has five folded during the last fifteen years and constitutes one of the major threats to human health in 21st century.²⁻⁶

Anxiety disorders are common and most frequent among all other psychiatric disorders. They bear a substantial "risk" and

inability load, comparable to what is observed in chronic diseases, such as diabetes mellitus.^{7,8} Research has shown that the relation between depression, anxiety disorders and diabetes is bound to hyperglycaemia, diabetes complication and restraints imposed by the disease.^{9,10} The occurrence of depression in individuals with diabetes mellitus seems to be related to socio-economic status,^{11,12} family status,^{12,13} obesity,^{13,14} smoking habits,^{14,15} physical activity,¹⁵ and sedentary life.¹⁶

Surveys and meta-analyses conducted on diabetes mellitus and depression have shown that the existence of diabetes mellitus doubles the probabilities of depression occurrence and that depressive symptoms were significantly more in women, than in men.¹⁷⁻¹⁹ A proclivity of female sex in anxiety and depressive disorders is observed in general population as well.^{18,20}

In the present study, the relation between the occurrence of depressive and anxiety symptoms in patients with diabetes mellitus type II was explored. Demographic, social and clinical factors, such as sex and body mass index, and the role they play in the occurrence of symptoms of anxiety and depression were examined as well.

Material and method

Demographic, social and clinical factors

Demographic and social characteristics were recorded from information relevant to family status, hereditary predisposition, smoking habit and body mass index. The body mass index, which is produced by dividing the body weight in kilos with the square of height in meters is a reliable index for the assessment of obesity, according to instructions of National Health Institute (NHI) of the USA and the Greek Obesity Association. This index was selected and used for the sample evaluation in regard to obesity.^{21, 22}

Psychological factors

Mood disorders (anxiety and depression) were traced using the Hospital, Anxiety and Depression Scale Questionnaire (HADS).²³ HADS questionnaire consists of 14 items (sentences-questions) with answers in four grades on a Likert scale. It has seven

questions regarding anxiety and seven for depression. Each item had four possible answers and results range from 0 to 3. Maximum sum was 21 for each scale.

HADS measures the level of symptoms within the last 10 days. One of its main features is that the items, that could be relegated to problems such as insomnia, unemployment, eating disorders, headache and fatigue have been excluded, in order to avoid false positive cases among persons with somatic diseases.^{24, 25}

The HADS-D (Depression) covers mostly anhedonia and loss of interest, which form the core of depression symptoms, whereas HADS-A (Anxiety) covers mainly the fields of tension and worry. HADS uses >8 as a "cut-off" score, that is in accordance with the suggestions of its creators^{23,26}, but also with the results of many studies.²⁷ A score below 8 indicates that the individual is free of symptoms and a score beyond 8 that symptomatology of anxiety or depression is present.

Data were collected from the 2nd to the 5th month of the year 2008 in diabetic medical centers of Attica basin. 330 questionnaires were filled in and 310 of them were included in the study.

20 questionnaires, in which patients reported that they suffered from type I diabetes mellitus or gestational diabetes, were excluded from the study.

Before data were collected, individuals were briefed about the purpose of the survey and the way of completing the questionnaires. They were given the assurance of anonymity and that their content was absolutely confidential. In addition they were informed that the results would be used in the service of science evolution. The sample was collected according to the rules of random sampling.

Statistics

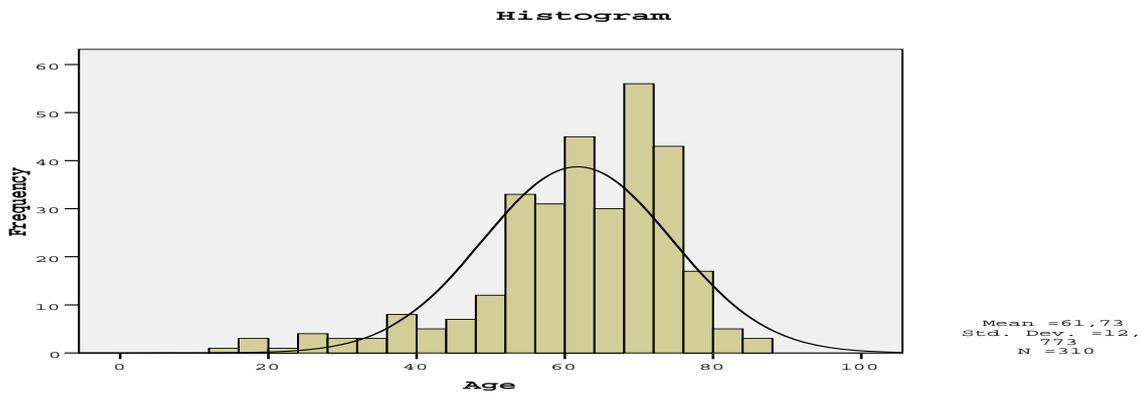
Statistics was processed with SPSS 15.0 (Statistical Package for the Social Sciences) Pearson Chi-square and Fischer's exact tests were used to test the frequency distribution of two categorical variables, using odds ratio (for 2 x 2 contingency tables). Significance was set at $p < 0.05$.

Results

In the present study, 310 persons with Diabetes Mellitus II were studied, from which 56 % were women and 44% were men. 44% of our sample were 45-64 years old, 35% were 65-74

years old, 12% were >75 years old and 9% were 20-44 years old. The mean age of the participants was 61.73 years. (histogram 1)

Histogram 1. Distribution of the sample according to age



78 % of the sample were married, 11% widowed/divorced and 10.3% were unmarried. A positive family medical history for diabetes mellitus (at least one member of the family suffering from the disease) was present in 63.2% of the subjects while the

36.8 % were free of any hereditary predisposition. 61.6% of the participants were no smokers, while the 38.4 % of them were smokers. (table 1)

Table 1. Demographic characteristics of the sample

	N	%
<i>Sex</i>		
Women	174	56
Men	136	44
<i>Family Status</i>		
Married	243	78,4
Divorced, widowed	34	11
Unmarried	33	10,6
<i>Positive family history for DM</i>		
Yes	196	63,2
No	114	36,8
<i>Smoking</i>		
No	191	61,6
Yes	119	38,4

The correlation between anxiety symptomatology (Anxiety symptoms HADS-A >8), depression symptomatology (Depression symptoms HADS-D

>8) and demographic and somatic features is shown in table 2.

Table 2. Symptoms of Anxiety and Depression in relation to sex, family status and Body Mass Index.

Variables	Anxiety symptoms HADS-A <8	Anxiety symptoms HADS-A >8	Depression symptoms HADS-D <8	Depression symptoms HADS-D >8	P
<i>Sex</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<0.001
Women	66 (37.9)	108 (62.1)	102 (58.6)	72 (41.4)	
Men	106 (78.5)	29 (21.5)	111 (82.2)	24 (17.8)	
<i>Family status</i>					0.234
Married	135(55.8)	107(44.2)	167(69)	75(31.0)	
Divorced, widowed	15(44)	19(56)	21(64)	12(36)	
Unmarried	22 (66.7)	11(33.3)	24(72.7)	9(27.3)	
<i>Body Mass Index</i>					0.268
25-29,9	58(61,7)	36(38,3)	72(76,6)	22(23,4)	
30-35	54(56,8)	41(43,2)	61(64,2)	34(35,8)	
>35	37(46,8)	42(52,2)	51(64,6)	28(35,4)	

We observe that women presented three times higher percentages of anxiety 62 % in comparison to men 21.5%. At the same time, there is a preponderance of evidence pointing that women in symptomatology of depression have a doubled percentage 41.4% than men 17.8%.

Regarding family status, widowed and divorced individuals occur higher percentages of anxiety 56% and depression 36% in relation to married and unmarried people.

Extremely obese individuals with a BMI > 35 exhibit more anxiety 52.5 % and depression 35.4 % in comparison to overweight and obese people.

The study of the relationship between anxiety, depression and age, sex and Body Mass Index using Odds Ratio showed that women have a 6 times higher probability of moderate or severe anxiety symptomatology and 3.3 times higher probability of moderate or severe depression symptomatology. (Table 3)

Table 3. Relation of anxiety and depression to sex, age and BMI, using Odds Ratio

Odds Ratio (95% C.I.)	Anxiety symptoms (moderate-severe)	Depression symptoms (Moderate-severe)
Women vs Men	5.981* (3.583-9.984)	3.265* (1.913-5.571)
Age	1.008 (0.990-1.026)	1.009 (0.989-1.029)
BMI	1.039* (1.003-1.077)	1.040* (1.001-1.079)

Discussion

Anxiety and depression disorders belong to the commonest psychiatric disorders worldwide and they usually occur to individuals who suffer from chronic diseases, such as diabetes mellitus, a disease spreading quickly throughout the world and often co-exists with anxiety and depression.^{18, 19, 28-34}

The results of the present study showed that sex is strongly related to the occurrence of anxiety and depression symptoms with women appearing to have three times the percentages of anxiety 62 % in comparison to men 21.5 %. In addition, there is a preponderance of evidence pointing that women in symptomatology of depression have a doubled percentage 41.4% than men 17.8%.

Women exhibited higher percentages of anxiety symptoms (almost three times higher), as shown in the surveys of Lloyd CE et al. Ali S et al. και Katon W et al.^{17,35,14} while the rates of depressive symptomatology were almost two times higher than those in men. This was also concluded in the studies of Zhang CX, et al. Skilton MR et al., Xu L et al. and many more.³⁶⁻⁴⁴

Regarding to family status, it was observed that the symptomatology of anxiety prevailed and was higher than the depressive one in all the studied groups. Widowers and divorced seem to have more anxiety, a finding which coincides with a similar study of Everson SA et al. a fact supporting that loneliness is a serious risk factor for mood disorders, while marriage and companionship exerts a protective action on anxiety and depression.¹²

A possible explanation for the above findings is that women play many roles, which expose them to increased responsibilities. It is also possible for a woman to seek more easily psychological support when she is depressed. As a consequence, this fact is more often recorded in the registers of the authorized health services. Another aspect of the interpretation of our findings, is the social role attributed to women (passivity, dependence and emotional expression), which possibly allows them to be more emotional and extroversive. Because of that, they externalize the difficulties they

experience, in comparison to men. This could probably mean that difference between sexes are rather due to a disclosure of the problem to a greater extent on behalf of the women, and not to actual evaluation of depression problem. It could also be attributed to the phenomenon of “learned inability”, as supported by Adamson Abramson et al.⁴⁵ Mc Grath E. et al. claims that the health scientists is probably biased towards female population, giving forth the diagnosis of depression more easily, than in men and the preponderance of women is thus stressed.⁴⁶ In an analogous research, Engum did not observed any differences between anxiety and depression symptoms, depending on sex.⁴⁷

Not only was anxiety higher in individuals with a Body Mass Index of 30-35 and 35, but also rates of depression were higher too in obese persons. Obesity constitutes the most powerful factor predisposing to the manifestation of diabetes mellitus type II⁴⁸⁻⁵⁰ and as it is shown in this study, the highest percentage of anxiety 53.2 % and the highest percentage of depression 35.8 % was observed in individuals with extreme obesity >35 and obese, BMI 30-35. These data are in accordance with those of Katon et al. και Bjerkeset O. et al. that the relation between anxiety and depression symptoms is influenced by factors, as obesity.^{14,51}

The investigation of the association of sex, age and Body Mass Index with anxiety and depression symptomatology showed that women have approximately six times greater probability of occurring a moderate or severe anxiety symptomatology.

A high BMI also favors the occurrence of a modest-severe symptomatology of anxiety, as the relative risk increases of 3.9 % per one BMI unit increase as for depression parameter, women were presented with a 3.3 times higher probability of occurring a depression of modest-severe symptomatology with the risk increasing 4% for any further BMI unit. The Nurse Health Study has shown that the risk for diabetes Mellitus higher as the BMI increases and when these two factors co-exist, the person is even further burdened with the occurrence of anxiety and depression

symptoms.⁵² These findings are in accordance with the respective ones of the present study.

Gortmaker et al., suggests that obesity is often associated with a reduction in self-esteem, with economical, social and psychological problems, while in the study of Krook et al. the participants reported an improved psychological status and reduced anxiety, which significantly contribute to the improvement of clinical parameters.⁵³⁻⁵⁶

Conclusion

In conclusion, the present study showed that individuals with Diabetes Mellitus are burdened with personal socio-demographic and behavioral factors, which contribute to the manifestation of anxiety and depression symptoms. Women with Diabetes Mellitus are presented with higher percentages of anxiety and depression in comparison to men. Persons who live alone are more vulnerable and face greater risks than persons who live with significant others. Family acts in a protective manner, offering a better social incorporation, practical and emotional support, but also a sense of responsibility against other members. The high BMI favors the occurrence of anxiety and depression symptomatology, with the relative risk rising for any further increase in BMI.

The presence of staff specialists in psychiatric-mental health at diabetic offices, should be a positive step towards recognition and treatment of emotional disorders. This way patients suffering from psycho-stressful events and in need of supportive care (either medical or counseling) could be identified.

The further study of the fore-mentioned factors can lead to beneficial results in supporting patients with diabetes mellitus by the scientists-health professionals.

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