

# Correlates and depression among married women outpatients with Type II diabetes: an exploratory study

## Tip 2 diyabeti olan evli kadınlarda depresyon ve ilişkili faktörler

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### SUMMARY

**Objective:** The purpose of this study was to examine correlates and depression among married women with Type II diabetes attended the diabetes outpatient clinic. We studied depression in women with Type II diabetes in relation to their demographic, medical and biochemical characteristics.

**Method:** The study sample included 351 women with Type II diabetes who presented to the diabetes outpatient clinic, were married, had no psychiatric diagnosis, and agreed to participate in the study. Their depression status was assessed with the General Health Questionnaire-28 (GHQ-28). The data on biochemical test results (fasting blood glucose, HbA1c, total triglycerides, total cholesterol, LDL, HDL), socio-demographic and disease characteristics were obtained from the patients' medical records or through interviews held with the patients.

**Results:** Of the participants 42.7% were found to be at a greater risk for depression. The logistic regression analysis revealed that the participants having three or more children were at risk of depression 1.848 times more than were those having two or fewer children (95% CI: 1.135-3.009,  $p < 0.05$ ). Depression risk was also higher in those married to a husband with primary school or lower education [0.471 times (95% CI: .279- .794,  $p < 0.05$ )], having insulin treatment [0.528 times (95% CI: .317-.879,  $p < 0.05$ )], having LDL levels higher than normal [2.366 times (95% CI: 1.069-5.238,  $p < 0.05$ )], having hypertension [1.642 times (95% CI: 1.012-2.665,  $p < 0.05$ )] and having high levels of triglycerides [0.543 times (95% CI: .324-.909,  $p < 0.05$ )]. In terms of HbA1c levels, there was no significant difference between the GHQ scores ( $p > 0.05$ ).

**Conclusions:** This study revealed that nearly half of the participants with Type II diabetes were at risk of depression, and that factors such as education level, the number of the children, duration of the disease, presence of hypertension, the treatment type and some of the biochemical indicators played an important part in diabetes-related health care.

**Keywords:** Depression, Correlates, Married woman, Type II diabetes

## ÖZET

**Amaç:** Bu çalışmada tip II diyabeti olan evli kadınlarda depresyon ve etkileyen faktörleri incelemek amaçlandı. Çalışmada tip II diyabeti olan evli kadınlardan depresyonla ilişkili olabilecek demografik, medikal ve biyokimyasal etmenler incelendi.

**Yöntem:** Diyabet polikliniğine başvuran, tip II diyabeti olan, evli, psikiyatrik bir tanısı olmayan, çalışmaya katılmayı kabul eden 351 kadın çalışmanın örneklemini oluşturdu. Depresyon durumu Genel Sağlık Anketi-28 (GSQ-28) ile değerlendirildi. Biyokimyasal durum ile ilgili veriler (AKŞ, HbA1c, total trigliserid total kolesterol, LDL, HDL), sosyodemografik özellikler ve hastalık özellikleri medikal kayıtlardan ve hastalarla yapılan görüşmelerden elde edildi.

**Bulgular:** Kadınların %42.7'si depresyon açısından riskli bulundu. Yapılan lojistik regresyon analizinde çocuk sayısı 3 ve üzerinde olan kadınların iki ve daha az çocuğu olanlara göre depresyon riski taşıma olasılığı 1.848 (%95 CI:1.135-3.009;p<0.05) kat yüksek bulundu. Eş eğitimi ilköğretim ve daha düşük olan kadınların depresyon riski 0.471 (%95 CI:.279- .794; p<0.05) kez daha yüksek, insülin tedavisi kullanan kadınların 0.528 (%95 CI:.317-.879;p<0.05) kat, LDL düzeyi normalden yüksek olanların 2,366 (%95 CI:1.069-5.238;p<0.05) kat, hipertansiyonu olanların 1,642 (%95 CI:1.012-2.665; p<0.05) kat ve trigliserit düzeyi yüksek olanların ise 0,543 (%95 CI:.324-.909; p<0.05) kat daha yüksek olduğu saptandı. HbA1c ye göre GHQ puanları arasında anlamlı bir fark bulunmadı (p>0.05).

**Sonuç:** Bu çalışma tip II diyabeti olan kadınların yarıya yakının depresyon açısından riskli olduğunu, eğitim düzeyi, çocuk sayısı, hastalık süresi, hipertansiyon varlığı, kullanılan tedavi tipi ve bazı biyokimyasal göstergelerin diyabet sağlık bakımında önemli faktörler olduğunu gösterdi.

**Anahtar sözcükler:** tip 2 diyabet, evli kadın, depresyon, etkileyen faktörler

## INTRODUCTION

At present, the world prevalence of diabetes among adults (aged 20–79 years) is 6.4%, affecting 285 million adults, it is expected to increase to 7.7%, and 439 million adults by 2030.<sup>1</sup> Type II diabetes is an increasingly prevalent chronic illness worldwide with the potential for debilitating complications. Type II diabetes contributes to increased morbidity and mortality and is the most common cause of end-stage renal disease, lower-extremity amputation, and new-onset blindness in adults 20-74 years of age.<sup>2</sup> Living with diabetes has been described as a difficult process whereby individuals attempt to find balance between the self-management demands and their preferred lifestyle. An increased for psychosocial distress and depression has been reported among persons with diabetes in comparison with the general population.<sup>3,4</sup> Psychosocial distress and depression have been associated with poor self-management and metabolic control, thus demonstrating a potential cyclical process of poor health outcomes.<sup>5-7</sup>

Diabetes is a psychologically challenging disease for patients and their family members.<sup>8</sup> Challenges accompanying

the diagnosis of diabetes include adjustment to the disease, adherence to the treatment regimen and psychosocial difficulties at both a personal and an interpersonal level.<sup>9</sup> Depression too has been a major public health problem with approximately 121 million people worldwide estimated to be affected.<sup>10</sup> Anderson et al. (2001) conducted a meta-analysis of 42 published studies that included 21,351 adults and found that the prevalence of major depression in people with diabetes was 11% and the prevalence of clinically relevant depression was 31%.<sup>11</sup> A study conducted in 2007 which looked at depression worldwide using the WHO World Health Survey (WHS) found that 9.3% of people with depression were also with diabetes.<sup>12</sup> The prevalence of major depression among persons with diabetes was lower in the general population than that suggested by prior studies of clinical samples.<sup>7</sup> Women with diabetes have an increased risk for psychosocial comorbidity compared with men with diabetes.<sup>11</sup> Compared with men, women struggle more with diabetes self-management, have poorer outcomes over a broad range of diabetes-related issues (quality of life, daily hassles, coping, and anxiety).<sup>5,13</sup> Other studies examining

gender differences with self-management in diabetes reported that men were more consistent with dietary and exercise behaviors than women, more confident in diabetes self-management, and had greater social support for making lifestyle changes related to diabetes self-management.<sup>14-16</sup> Yet, there is limited research on the relationship of the possible contributory factors to poor mental health outcomes in married women with Type II diabetes. Therefore, the purpose of this study was to examine depression and correlates among married women outpatients with Type II diabetes.

## MATERIAL AND METHODS

### *Participant*

The participants were 351 married women with Type II diabetes. They were recruited from the diabetes outpatient clinic of a university hospital in Istanbul (January-December 2013). The inclusion criteria were a known diagnosis of type-2 diabetes for at least one year and the absence of any psychiatric problem that would impair the conduct and understanding of the interview. The mean age of the participating women was  $52.43 \pm 08.23$  (min: 24, max: 65). Of the participants, 53.0% were primary school graduates, 90.6% were unemployed, 88.9% had a nuclear family and 82.1% had an income equal to expenses. The mean age of their husbands was  $56.79 \pm 8.93$  (min: 31, max: 8) and 48.6% of the husbands were primary school graduates. A great majority of the participants (94.9%) had children and the average number of the children was  $2.72 \pm 1.36$  (min: 1 max: 10) The mean duration of their diabetic condition was  $11.14 \pm 7.07$  (min:1, max: 35).

While 2.6% of the participants managed their diabetes only with diet, 43% took oral antidiabetics, and 16% had only insulin, 38.5% took both oral antidiabetics and insulin. In addition to diabetes, 45.1% of the participants had hypertension and 10% of them had the ischemic heart disease (IHD). While 20.8% of them developed neuropathy, 18.5% developed retinopathy, and 5.7% developed nephropathy. Diabetic foot

developed in 1.4 % of them and 0.6% underwent amputation.

### *Instrument*

Data on the participants' demographic characteristics (age, education level, employment status, family type, the number of the children, economic status, spouse's education, employment and health status) and disease characteristics (duration of diabetes, type of treatment, presence of any other physical disease, presence of complications) were collected with a questionnaire prepared by the researchers and through face-to-face interviews made with the patient.

The data on biochemical test results (fasting blood glucose, HbA1c, total triglycerides, total cholesterol, LDL, HDL) were obtained from measurements when the participants came to their routine controls.

Depression was assessed with the self-administered General Health Questionnaire (GHQ-28) which consists of a total of 28 items. The GHQ was developed by David Goldberg 1970. The scale has 12-, 28-, 30- and 60-item versions. Each item questions the symptoms having occurred within the last few weeks and has 4 options: never, as usual, more often than usual, very often. These four options are encoded as 0,1,2,3 by the respondent, or by the one who administers the questionnaire after reading the items aloud and getting the answers. For the scoring, the GHQ scoring was used. In this scoring, the first two options are scored as 0-0, and the last two options are scored as a 1-1. Respondents scoring 0-4 were considered "non-cases" and those scoring "5 or more", GHQ depression cases.<sup>17</sup>

HbA1c, a routine measure of the average blood glucose for a previous 3-month period, was estimated in samples of participants' venous blood using the Glyc-Affn Assay (Isolab, Inc., Akron, OH). This method measures all glycohemoglobin; thus, glycosylated hemoglobin variants, such as sickle cell, are deleted. Lipids measured included total cholesterol, triglycerides, low-

density lipoprotein (LDL), and high-density lipoprotein (HDL). This lipid profile was obtained from samples of venous blood after at least an 8-hour fast. Based on data released by the American Diabetes Association in 2011, HbA1c  $\geq$  6.5%, fasting blood glucose  $\geq$ 101, total triglyceride  $\geq$ 150 mg, total cholesterol  $\geq$ 201 mg, LDL cholesterol  $\geq$ 131, HDL cholesterol  $\geq$ 40 mg were considered to be high.

## RESULTS

Table 1 shows the mean GHQ scores of the participating women with Type II diabetes in terms of their socio-demographic characteristics. Statistically no significant differences were found between the mean GHQ scores of the participating women in terms of their age, employment status, family type, income status, spouse's education, employment and health status ( $p > 0.05$ ). However, the GHQ mean score of the participants with primary school or lower education was statistically significantly higher than was that of the participants with secondary school and higher education [(6.32  $\pm$  6.38) and (3.47  $\pm$  5.42) respectively] ( $p < 0.05$ ).

The GHQ mean score of the participants whose husband had primary school or lower education was statistically significantly higher than was that of the participants whose husbands had secondary school and higher education [(6.84  $\pm$  6.39) and (4.08  $\pm$  5.38) respectively] ( $p < 0.05$ ). On the other hand, the GHQ mean score of the participants having 2 or fewer children was 4.51  $\pm$  5.86, which was statistically significantly lower than was that of the participants having 3 or more children (6.85  $\pm$  6.16) ( $p < 0.05$ ). The mean GHQ score of all the participating women was 5.55  $\pm$  6.09. If the GHQ cut-off value is five 42.7% of the participating women are at risk for depression.

Table 2 shows the mean GHQ scores of the participating women with Type II

In the statistical analysis, the t-test, Kruskal-Wallis test, analysis of variance and logistic regression were used, and the data were presented as percentages and means.

The study subjects gave their informed written consent for the study, and the ethical approval was obtained from the Ethics Committee of the Hospital (Istanbul University Ethics Committee, 2011/1992-860 Number).

diabetes in terms of some of their diabetes-related characteristics. The mean GHQ score of those who had diabetes eleven years or more (6.33  $\pm$  6.31) was significantly higher than that of those who had diabetes 10 years or less (4.88  $\pm$  5.83) ( $p < 0.05$ ). The mean GHQ score of those who had insulin therapy (6.65  $\pm$  6.26) was also significantly higher than was that of those who took oral antidiabetics (4.24  $\pm$  5.62) ( $p < 0.05$ ). The differences between the mean GHQ scores of those with and without normal HbA1c, fasting blood glucose, total cholesterol and LDL cholesterol levels were statistically insignificant ( $p > 0.05$ ). However, the mean GHQ scores of those with higher total triglyceride level and of those with lower HDL cholesterol level were significantly higher than the mean GHQ scores of those with normal levels ( $p < 0.05$ ). The comparison of the mean GHQ scores of the participants in terms of experiencing diabetes-related complications revealed that those who developed retinopathy (7.47  $\pm$  7.00) or neuropathy (7.94  $\pm$  6.55) had significantly higher mean GHQ scores than those who did not develop retinopathy (5.11  $\pm$  5.79) or neuropathy (4.92  $\pm$  5.81). The mean GHQ scores of the participating women were similar in terms of IHD ( $p > 0.05$ ), those having hypertension had significantly higher GHQ scores (6.70  $\pm$  6.68) than did those not having hypertension (4.19  $\pm$  6.70) ( $p < 0.05$ ).

**Table 1. The Mean GHQ Scores of the Participating Women with Type II Diabetes in Terms of Their Socio-Demographic Characteristics**

Characteristics	n	GHQ Mean (SD)	Test
<b>Age</b>			
≥ 49 years	105	4.60 (5.84)	t=1.90
≤ 50 years	246	5.95 (6.16)	p=0.057
<b>Education</b>			
Primary school or lower education	257	6.31 (6.28)	t=3.94
Secondary school and higher education	94	3.47 (5.02)	<b>p=0.001</b>
<b>Employment</b>			
Employed	33	4.21 (5.23)	t=1.33
Unemployed	318	5.69 (6.16)	p=0.184
<b>Family type</b>			
Nuclear family	312	5.61 (6.18)	t=0.54
Large family	39	5.05 (5.34)	p=0.584
<b>Children number</b>			
2 or fewer children	177	4.51 (5.86)	t=3.60
3 or more children	167	6.85 (6.16)	<b>p=0.001</b>
<b>Income status</b>			
Income over expenses	25	6.28 (5.89)	KW=4.51
Income equal to expenses	288	5.20 (5.95)	p=0.104
Less than income and expenses	38	7.71 (6.89)	
<b>Husband education</b>			
Primary school or lower education	187	6.84 (6.39)	t=4.33
Secondary school and higher education	164	4.08 (5.38)	<b>p=0.001</b>
<b>Spouse's employment</b>			
Employed	130	5.78 (6.55)	t=0.53
Unemployed	221	5.42 (5.81)	p=0.590
<b>Spouse's health status</b>			
Yes	172	5.76 (6.02)	t=0.62
No	179	5.35 (6.17)	p=0.535
<b>GHQ*</b>	<b>351</b>	<b>5.55 (6.09)</b>	

\*Based on the GHQ cut-off value of 5 points or more, 42.7% of the participating women are at risk for depression

**Table 2. The mean GHQ scores of the participating women with Type II diabetes in terms of the characteristics of their disease**

Characteristics	n	GHQ Mean (SD)	Test
<b>Duration of diabetes</b>			
10 years or less	189	4.88 (5.83)	t=2.22
11 years or more	162	6.33 (6.31)	<b>p=0.027</b>
<b>Type of treatment</b>			
Oral antidiabetics	160	4.24 (5.62)	t=3.75
Insulin therapy	191	6.65 (6.26)	<b>p=0.001</b>
<b>HbA1c</b>			
<%6.5	53	4.66 (5.58)	t=1.16
≥%6.5	298	5.71 (6.17)	p=0.246
<b>Fasting blood glucose level *</b>			
70-100 mg	36	4.25 (5.14)	t=1.34
≥101 mg	314	5.68 (6.18)	p=0.181
<b>Total triglyceride level</b>			
<150 mg	164	4.65 (5.65)	t=2.62
≥150 mg	187	6.34 (6.36)	<b>p=0.009</b>
<b>Total cholesterol level</b>			
≤200 mg	178	5.56 (6.22)	t=0.03
≥201 mg	173	5.54 (5.97)	p=0.971
<b>LDL cholesterol level</b>			
99 ve altı	96	6.32 (6.37)	F=1.22
100-130	119	5.02 (5.98)	p=0.295
Yüksek (≥131 )	136	5.47 (5.97)	
<b>HDL cholesterol level</b>			
<40 mg	86	6.83 (6.62)	t=2.23
≥40 mg	264	5.15 (5.87)	<b>p=0.026</b>
<b>Retinopathy</b>			
Yes	65	7.47 (7.00)	t=2.84
No	286	5.11 (5.79)	<b>p=0.005</b>
<b>Neuropathy</b>			
Yes	73	7.94 (6.55)	t=3.83
No	287	4.92 (5.81)	<b>p=0.001</b>
<b>Ischemic heart disease (IHD)</b>			
Yes	35	7.37 (6.66)	t=1.86
No	316	5.35 (6.00)	p=0.063
<b>Hypertension</b>			
Yes	190	6.70 (6.68)	t=3.91
No	161	4.19 (5.00)	<b>p=0.001</b>

\* One participant whose fasting blood glucose level was 65 was excluded from the analysis.

**Table 3. The results of logistic regression related to the relationship between some socio-demographic characteristics of the participating women with Type II diabetes and their depression scores.**

Characteristics	B	SE	Wald	df	Sig.	Exp(B)	%95 ci for Exp (B)	
							Lower	Upper
Age	,604	,319	3,577	1	,059	1,830	,978	3,421
Education	,535	,339	2,495	1	,114	1,707	,879	3,315
employment	-,249	,462	,292	1	,589	,779	,315	1,926
Family type	,232	,386	,360	1	,548	1,261	,592	2,686
Children number	,614	,249	6,099	1	<b>,014</b>	1,848	1,135	3,009
Income status	-,634	,462	1,889	1	,169	,530	,215	1,310
Spouse's education	-,754	,267	7,992	1	<b>,005</b>	,471	,279	,794
Spouse's employment	-,541	,299	3,267	1	,071	,582	,324	1,047
Spouse's health status	,001	,253	,000	1	,998	1,001	,610	1,642
Constant	-,175	,707	,061	1	,805	,840		

Table 3 shows the results of the logistic regression related to nine variables likely to affect depression scores of the participating women with Type II diabetes. The table reveals a significant relationship between the depression scores of the participants and the variables such as the number of the children they had and their spouse's

education level. The participants with three or more children were found to be at risk of depression 1.848 times more than were those with two or fewer children (95% CI: 1135-3009,  $p < 0.05$ ). Depression risk was 0.471 times higher in those whose husbands had primary school or lower education (95% CI: .279-.794,  $p < 0.05$ ).

**Table 4. The results of logistic regression related to the relationship between disease characteristics of the participating women with Type II diabetes and their depression scores.**

Characteristics	B	SE	Wald	df	Sig.	Exp(B)	%95 ci for Exp (B)	
							Lower	Upper
Duration of diabetes	-	,252	,224	1	,636	,888	,542	1,454
Type of treatment	,119	,260	6,042	1	<b>,014</b>	,528	,317	,879
HbA1c level	-	,377	,208	1	,648	1,187	,568	2,484
Fasting blood glucose level	,639	,410	,205	1	,651	,831	,372	1,855
LDL cholesterol level	,172	,406	4,509	1	<b>,034</b>	2,366	1,069	5,238
HDL cholesterol level	-	,279	2,323	1	,127	1,529	,886	2,640
Retinopathy	,185	,359	1,295	1	,255	1,505	,744	3,043
Neuropathy	,861	,349	1,322	1	,250	,669	,337	1,327
Hypertension	,425	,247	4,038	1	<b>,044</b>	1,642	1,012	2,665
Total cholesterol level	,409	,326	1,877	1	,171	,640	,338	1,212
Total triglyceride level	-	,263	5,388	1	<b>,020</b>	,543	,324	,909
Constant	,402	,424	,067	1	,795	,896		
	,496							
	-							
	,446							
	-							
	,611							
	-							
	,110							

Table 4 shows the logistic regression results regarding disease-related variables likely to affect depression scores of the participating women with Type II diabetes. The data given in the table revealed a significant relationship between the participants' depression scores and type of treatment, LDL cholesterol, hypertension, and triglyceride levels. Depression risk was higher in those having insulin treatment [0.528 times (95% CI: .317-.879,  $p < 0.05$ )], having LDL levels higher than normal [2.366 times (95% CI: 1069-5238,  $p < 0.05$ )], having hypertension [1.642 times (95% CI: 1012-2665,  $p < 0.05$ )] and having high levels of triglycerides [0.543 times (95% CI: .324-.909,  $p < 0.05$ )].

## DISCUSSION

In this present study, based on the results of the general health survey, 42.7% of the participants were found to be at risk of depression. In Niraula et al.'s (2013) study, the prevalence of depression among people with diabetes was found as 40.3%.<sup>18</sup> In a systematic review designed to estimate the prevalence of clinically depressed patients with Type II diabetes, Ali et al. (2006) found that the prevalence of depression was significantly higher among patients with type 2 diabetes (17.6%) than those without diabetes (9.8%). They also found that the prevalence among females with diabetes (23.8%) was higher than their male counterparts with diabetes (12.8%).<sup>3</sup> Depression is more prevalent among females with diabetes than among males with diabetes<sup>19</sup> and among patients with Type II versus type I diabetes.<sup>20</sup> In the literature, there are no other studies investigating in which the prevalence of depression among married women with diabetes is investigated separately. However, in some studies, women and married people are reported to be at a higher risk of depression.<sup>18,21</sup>

In this study, those over 50 years of age, having low education level, unemployed, having three or more children and

married to a husband with lower education level were determined to be at a greater risk of depression. The participants with three or more children were found to be at risk of depression 1.848 times more than were those with two or fewer children. Studies show some evidence that the occurrence of depression among people with diabetes is associated with lower socio-economic status.<sup>22,23</sup> Age is a strong predictor of depression. Researchers reported a significant association of age with depression and other psychological disorders.<sup>24,25</sup> Raval et al. (2010) found depression to be strongly associated with age above 54 years.<sup>26</sup> It is well reported that older patients face many challenges including isolation, more diseases and disabilities; hence making them more prone to developing psychological conditions.<sup>27</sup> However, Goldney et al. (2004) did not find any association between age and depression among persons living with diabetes.<sup>28</sup> In this present study, those who had diabetes eleven years and more were found to have significantly higher mean GHQ scores. Increased duration of the disease is known to significantly increase the risk of developing diabetic complications and health care expenditures;<sup>29</sup> as a result, such patients are more prone to develop psychological illnesses. However, that those using insulin had higher GHQ scores than did those taking oral antidiabetics is another important point. Li et al. (2008) and Camera et al. (2014) found that the rate of depression was higher among patients using insulin.<sup>21,30</sup> Insulin administration is an invasive procedure, and thus those administering insulin should comply with certain rules. This may be difficult for patients and lead to exhaustion and hopelessness.

In addition, social and professional lives of these individuals who have to perform this invasive procedure at certain times may be adversely affected or be interrupted. These factors can be said to increase susceptibility to depression. Comparison of the GHQ scores in terms of HbA1c levels, an important indicator

of diabetes management, revealed no differences between the study groups. In other words, in our study, HbA1c levels, an important indicator of diabetes management, are not determined as the predictor of depression. This finding is noteworthy. Fisher et al. (2007) reported higher HbA1C among those scoring above a cutoff of 16 and greater on the CES-D, compared to those <16, but no relationship between major depressive disorder (MDD), using a diagnostic interview, and HbA1c.<sup>31</sup> The results of their study support those of our study. However, some studies found a relationship between depression and HbA1c. In their (2013) study, Niraula et al. employed multivariable analyzes and found that a 1-unit (%) increase in HbA1c led to a 2-point increase in depression scores.<sup>18</sup>

Camera et al. (2014) found that factors associated with depression were urban residence [2.13 (1.27–3.58)], older age [1.03 (1.01–1.06)], low socioeconomic status [2.21 (1.34–3.66)] and no previous measurement of HbA1c [12.45 (1.54–100.34)] in women, and insulin therapy [2.28 (1.05–4.92)] and HbA1c $\geq$ 9.0% [3.85 (1.02–14.48)] in men.<sup>21</sup> One of the reasons for the different results found in studies is that measuring instruments used may be different. However, the cultural characteristics of the group studied can be considered as a correlate. For instance, Turkish women refrain from expressing their feelings and consider that feeling hopeless, miserable or unsatisfied is just a natural part of life. Therefore, the high or low HbA1c levels may have not been associated with depression. In this present study, of the participants, those who had high total and HDL cholesterol levels, and hypertension, developed neuropathy or retinopathy had higher GHQ scores. A significant relationship was found between the participants' GHQ scores and factors such as the type of treatment, and LDL cholesterol, hypertension and triglyceride levels. It was found that those with hypertension were at risk of depression 1.642 times more than were those without hypertension. In their

multicenter study (2010), Khuwaja et al. found that patients with hypertension were at a greater risk of depression.<sup>32</sup>

Clinically significant depression and/or anxiety share several lifestyle risk factors (e.g. smoking, physical inactivity, obesity, and excessive alcohol drinking),<sup>33-35</sup> and often coexist with medical conditions (e.g. hypertriglyceridaemia and hypertension).<sup>33,36,37</sup> Associated with diabetes.<sup>15,38,39</sup> In a study conducted by Atlantis et al., the relative odds of developing diabetes within two years increased for persons with current depressive and/or anxiety disorders, which was partially explained by, but remained independent of, lifestyle cumulative risk factors.<sup>40</sup>

## CONCLUSIONS

The strength of the study is that we were able to access to medical and psychosocial data on the same group of patients. In this present study, those over 50 years of age, having low education level, unemployed, having three or more children and married to a husband with lower education level, having diabetes more than 11 years, having high total cholesterol and HDL cholesterol levels, having hypertension, neuropathy or retinopathy were determined to be at a greater risk of depression. That there were no differences in depression symptoms in terms of HbA1c, an indicator of disease management, suggests that not only medical outcomes but also the women's mental conditions should be taken into account when assessments are made. A woman may have normal HbA1c levels, but she may still suffer from depression. This result is believed to be important in detecting cases with depression particularly in practice. Professionals of health, women with diabetes are recommended evaluation of depressive symptoms.

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