J Surg Med 2017;1(3):52-55.
DOI: 10.28982/josam.370527

Research article
Araştırma makalesi

Journal of Surgery and Medicine

Relationship of depression to diabetes, prediabetes and nondiabetics according to HbA1c classification: Retrospective study on 72,175 patients

Depresyonun HbA1c sınıflamasına göre diyabet, prediyabet ve nondiyabetiklerle olan ilişkisi: 72.175 hastadaki retrospektif çalışma

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Abstract

Aim: It is aimed to examine the relationship between HbA1c and the diagnosis of depression in patients who have been HbA1c measured at any time.

Material and Methods: The retrospective descriptive study was conducted by scanning the files of patients applying for any reason between the dates of January 1, 2016 and January 1, 2017 to hospital. The files of 72175 patients over 18 years of age who had measured HbA1c value during the admission were examined.

Results: The relationship between gender and depression was compared, depression was found to be significantly higher in women (p<0,001). All HbA1c values were divided into three groups: less than 5.7 (no diabetes), 5.7 to 6.5 (prediabetes), 6.5 and over (diabetes). When HbA1c classification was compared with depression, there was a significant relationship between HbA1c and depression (p<0,001). In patients with prediabetes, depression was significantly higher than non-diabetic and diabetic patients (p<0,001).

Conclusion: This study shows that health care professionals should also pay attention to mental health of the patients with prediabetes, one of the most at risk for the development of DM disease.

Keywords: Prediabetes, HbA1c, depression

Öz

Amaç: Herhangi bir zamanda hastalarda ölçülen HbA1c değeri ve depresyon tanısı arasındaki ilişkiyi incelemek hedeflenmiştir.

Materyal metod: Retrospektif tanımlayıcı çalışma, 01.01.2016-01.01.2017 tarihleri arasında herhangi bir nedenle başvuran hastaların dosyalarını tarayarak gerçekleştirilmiştir. HbA1c değeri ölçülen, 18 yaşından büyük 72175 hastanın dosyaları çalışmaya dahil edilmiştir.

Bulgular: Cinsiyet ile depresyon arasındaki ilişki karşılaştırıldığında kadınlarda depresyon anlamlı derecede yüksek olarak tespit edildi (p<0,001). Tüm HbA1c değerleri 5,7'nin altı (diyabet yok), 5,7 ile 6,5 arası (prediyabet), 6,5 ve üzeri (diyabet) olmak üzere üç gruba ayrıldı. HbA1c sınıflaması ile depresyon olup olmadığı karşılaştırıldığında HbA1c ile depresyon arasında anlamlı bir ilişki tespit edildi (p<0,001). Prediyabetli hastalarda depresyon, diyabeti olmayan ve diyabetli hastalara göre anlamlı olarak yüksek saptandı (p<0,001).

Sonuç: Bu çalışma, sağlık profesyonellerinin diyabet gelişme riskinin en yüksek olduğu durumlardan biri olan prediyabetik hastaların ruh sağlığına da özen göstermesi gerektiğini göstermektedir.

Anahtar kelimeler: Prediyabet, HbA1c, depresyon

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Ethics Committee Approval: Ethics committee approval was not received because the study was performed retrospectively.
Etik Kurul Onayı: Çalışmamız retrospektif olması nedeniyle etik kurul onayı alınmamıştır.

Informed Consent: Informed consent was not received because the study design was retrospective.
Hasta Onamı: Çalışmanın retrospektif olması nedeniyle hasta onamı alınmamıştır.

Conflict of Interest: No conflict of interest was declared by the authors.
Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this study has received no financial support.
Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

Received / Geliş Tarihi: 24.12.2017
Accepted / Kabul Tarihi: 27.12.2017
Published / Yayın Tarihi: 10.12.2017

How to cite / Atıf için : Atadag Y, Oksuz A Relationship of depression to diabetes, prediabetes and nondiabetics according to HbA1c classification: Retrospective study on 72,175 patients. J Surg Med. 2017;1(3):52-55.

Introduction

Diabetes mellitus (DM) is a metabolic disease caused by defects in insulin secretion or insulin action, which is accompanied by chronic hyperglycaemia and affects all systems. DM has psychiatric and psychosocial dimensions as well as organic findings. The DM patient is confronted with a number of problems related to physical, emotional and social situations [1].

Continuous education for healthcare professionals and patients is essential to reduce the risk of DM disease, acute complications, and to prevent long-term costly and chronic disruption of treatment. It has been accepted that hemoglobin A1c (HbA1c) is used as a diagnostic test for diabetes all around the world as a result of the efforts for standardization and the growing evidence of prognostic significance. The World Health Organization has recommended the use of HbA1c as a diagnostic test in the Consultation Report published in 2011, with the use of a reliable method and standardization regularly according to international reference values [2]. Since HbA1c is not affected by daytime fluctuations of blood sugar, it is chosen as a marker of blood sugar control [3]. Degree of glycemic control has a central role in preventing some type 2 diabetes-related complications [4].

Despite significant developments in the diagnosis, treatment and follow-up methods, failure to achieve treatment goals has led to an increase in studies on the investigation of different factors in diabetes cases [5-7].

Depression is a serious mental health / community health problem with intra-community prevalence. The description phase includes the identification of the clinical symptomatology and diagnosis according to a preferred classification system (ICD-10 or DSM-IV). Depression is defined as the diagnosis of the depressive syndrome. The diagnosis of depressive syndrome is a descriptive diagnosis based on clinical symptomatology, independent of etiology [8].

Psychiatric disorders in patients with DM are known to be seen frequently [9]. There are studies that indicate that depression is 3-4 times more frequent in DM patients than in general population [10]. Some investigators have found moderate to strong associations between depressive symptoms and HbA1c, although others have found no relationship [11,12]. Some other cross-sectional studies have found a significant positive correlation between depressive symptoms and HbA1c in patients with Type 1 diabetes but not in type 2 diabetes [13,14].

In this study, it is aimed to examine the relationship between HbA1c and the diagnosis of depression in patients who have been HbA1c measured at any time.

Material and methods

A retrospective descriptive study was planned. The study was conducted by the researchers in accordance with the Helsinki Declaration. This study was conducted by scanning the files of patients applying for any reason between the dates of 01.01.2016-01.01.2017 to the University of Health Sciences Umraniye Education and Research Hospital. The files of 72175 patients over 18 years of age who had measured HbA1c value during the admission were examined. Those that are missing and insufficient information in the scanned files are not included in the study.

In evaluating the findings obtained in the study, SPSS (Statistical Package for Social Sciences) for Windows 20.00 was used for statistical analysis. Descriptive statistics for data analysis mean and standard deviation for continuous variables, and number and percentage were used for categorical data. The Chi-squared test was used for comparisons. The semantics were evaluated in the confidence range of 95%, and $p<0.05$ was considered meaningful.

Results

The average age of 72175 individuals who were taken to study was 51.67±16.20. 68% (n=49109) of the participants were female and 32.0% (n=23066) were male. The mean HbA1c values of the participants were 6.40±1.66. While 3.2% of the participants (n=2339) had a diagnosis of depression, 96.8% (n=69836) did not have depression.

When the relationship between gender and depression was compared, depression was found to be significantly higher in women (p<0,001) (Table 1).

Table 1. Gender and depression relation

	Depression				Total		p
	Absent		Absent				
Gender	n	%	n	%	N	%	
Femala	47277	96.3	1832	3.7	49109	100	<0.001
Male	22559	97.8	507	2.2	23066	100	

All HbA1c values were divided into three groups: less than 5.7 (no diabetes), 5.7 to 6.5 (prediabetes), 6.5 and over (diabetes). When HbA1c classification was compared with depression, there was a significant relationship between HbA1c and depression (p<0,001) (Table 2).

Table 2. HbA1c and depression relation

	Depression				Total		p
	Absent		Available				
HbA1c level	n	%	n	%	n	%	
<5.7	26559	96.6	937	3.4	27496	100	<0.001
5.7-6.5	23897	96.1	976	3.9	24873	100	
≥6.5	19380	97.8	426	2.2	19806	100	

In order to find the group that caused the significant association, the HbA1c groups were grouped together in duplicate and the chi-square test was repeated until a meaningful result was obtained. In patients with prediabetes, depression was significantly higher than non-diabetic and diabetic patients (p<0,001) (Table 3).

Table 3. Diabetes relations

	Depression				Total		p
	Absent		Available				
HbA1c level	n	%	n	%	n	%	
5.7-6.5	23897	96.1	976	3.9	24873	100	<0.001
<5.7 ve ≥6.5	45939	97.1	1363	2.9	47302	100	

Discussion

Diabetes Mellitus (DM) and depression both are highly prevalent among the elderly population and are associated with increased risk for morbidity and mortality [15]. Depression and diabetes have individual, societaland economic effects, and they often co-occur [16]. In this study, we tried to determine the relationship between these two common and high-risk diseases.

Previous studies have reported conflicting results regarding the association between the construct of depression and metabolic outcomes. Depression has been frequently associated with elevated hemoglobin A1c (HbA1c) levels [l7-19]. HbA1c is likely a central mediator of the association between depression and long-term outcomes [20]. The frequency of blood glucose monitoring and the diabetes-specific sense of self-efficacy mediate the association between depression and HbA1c levels [18,21]. When we compared the presence of depression with the HbA1c classification in our study, we found a significant relationship between HbA1c classification and depression.

Even if they are smaller in quantity, there are also studies that have not reached like these conclusions. For example a study shows that major depression as measured by the Hamilton Depression Rating Scale (HAM-D) score is significantly correlated with duration of Type 2 diabetes and mean values of insulin injection, but there is no significant correlation between depression and HbA1c [22]. Fewer cross-sectional studies either found a significant correlation in univariate but not multivariate analysis or found no significant association at all [14,23-24]. It is well known that depression is more common in women than men [25]. A study's sample included a larger proportion of women (68.6%) consistent with the gender distribution for lifetime prevalence of major depression, which is almost twice as high in women as in men [22]. The results of Sevincok et al.'s [26] study suggest that depression in Type 2 DM was only associated with female gender. Current study, the relationship between gender and depression was compared and depression was found to be significantly higher in women.

Although it seems to be a limitation of the study to be done on retrospective records, it is more reliable that it is done on more than seventy-two thousands records.

In our study we found that in patients with prediabetes, depression was significantly higher than non-diabetic and diabetic patients. The literature has been searched, but a study has not been found, especially one in which prediabetes has been isolated like this current study.

This study shows that health care professionals should also pay attention to mental health of the patients with prediabetes, the most at risk for the development of DM disease.

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