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ORIGINAL ARTICLE

Determining the Prevalence of Retinopathy and Its Related Factors among Patients with Type 2 Diabetes in Kerman, Iran

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Abstract
Objectives: To determine the prevalence of retinopathy and its associated factors in diabetic patients referred to a diabetes center in an Iranian city.
Methods: This was a cross-sectional, descriptive—analytical study in which a researcher-made checklist was used to collect the data of patients with type 2 diabetes in 2015. The statistical population consisted of 11,770 health records of diabetic patients registered in a second-level diabetes center. Of the 11,770 health records, 206 records with the most complete data about patients with type 2 diabetes were selected through census method. Chi-square test and logistic regression through SPSS were used for data analysis.
Results: In this study, 93/206 diabetic patients (45.1%) had retinopathy. Female sex, age over 60, lower education level, being housewife, family history of having diabetes, longer years of having the disease, and higher level of hemoglobin A1c (HbA1c) were associated with higher risk of retinopathy. However, the association was statistically significant only for the HbA1c level ($p \geq 0.05$).
Conclusion: According to this study, HbA1c level is a predictor of diabetes complications. Therefore, it is necessary for health authorities to improve diabetes management through different strategies to prevent complications to control blood sugar effectively.

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1. Introduction

Type 2 diabetes is a complex disease in which several pathophysiological abnormalities are seen including decreased insulin secretion, increased glucose production in the liver, and increased insulin resistance. Type 2 diabetes epidemic is a major public health problem [1−3]. In 2003, the worldwide prevalence of diabetes among people aged 20−79 years was 5.1% and is estimated to reach 6.3% by 2025 [4]. The prevalence of diabetes among Iranian population between 20 years and 79 years of age was 8.43%, which accounted for 4.4 million of the total 20−79-year-old population in 2013 [5]. Some of the main causes of this growing trend can be attributed to population growth, aging, urbanization, the prevalence of obesity, and decreased physical activity [2].

Diabetes is associated with short- and long-term complications, which in many cases are irreversible [6]. One of the most important complications of diabetes is diabetic retinopathy, which is a specific complication of type 1 and 2 diabetes. This complication causes thousands of people to become blind annually. The risk of blindness from diabetic retinopathy in people with diabetes is 29 times higher than in those without diabetes [7]. In developed nations, diabetes-related eye diseases have been reported as the main cause of blindness in adults younger than 75 years of age. This disease accounts for approximately a quarter of registered blindness in the Western world. Visual impairment due to diabetic retinopathy will have a large impact on quality of life and imposes a heavy financial burden on society every year [7,8]. It is estimated that more than 75% of patients with a 15−20-year history of diabetes have retinopathy [9,10]. Many factors have been mentioned as risk factors in the development of retinopathy in diabetic patients. The most important ones include older age, higher hemoglobin A1c (HbA1c) level, duration of diabetes, hypertension, high body mass index, smoking, poor blood glucose control, pregnancy, and high blood cholesterol [11−13]. The most effective treatment to prevent the progression of diabetic retinopathy is “prevention”. Effective blood sugar control prevents the progression of the disease. Research has shown that for every 1% reduction in the HbA1c level, the risk of microvascular diseases such as retinopathy decreases by 37% [14].

After 20 years of having diabetes, nearly all patients with type 1 diabetes and 58% of patients with type 2 diabetes show symptoms of retinopathy, and the worsening of this problem may cause a loss of vision in 5−10% of the patients [15]. Considering the increasing prevalence of diabetes and its debilitating complications and the existence of multiple factors affecting the progression of the disease, this study was conducted to investigate the prevalence of retinopathy and its related factors among patients with type 2 diabetes attending a diabetes center in Kerman, Iran. A better understanding of this issue and related factors can help provide more disciplined and better ways to control this disease.

2. Materials and methods

This was a descriptive−analytical, cross-sectional study conducted in 2015. Health records of diabetic patients who were registered in a second-level diabetes care center in Iran were used. From 11,770 health records of diabetic patients, 206 health records with the most complete information about the patients with type 2 diabetes were selected. Inclusion criteria were having type 2 diabetes and having a full health record at the center where the patients undergo regular eye examination and have their HbA1c level recorded. Exclusion criteria were having type 1 diabetes and incomplete information related to retinopathy and HbA1c. For data collection, a researcher-made checklist was used from which data on variables such as age, sex, duration of diabetes, level of education, employment status, family history, and the level of HbA1c were extracted from the patients’ health records. Data analysis was carried out using Chi-square test and logistic regression through SPSS version 16 (SPSS Inc., Chicago, IL, USA). It should be noted that the severity of retinopathy was not examined in this study due to lack of access to required data.

3. Results

According to the study results, of the 206 patients with type 2 diabetes, 82.5% were women. The mean age of patients was 60.4 ± 8.3 years and their duration of diabetes was 13 years. In this study, 45.1% of patients (93/206) were diagnosed with retinopathy.

As shown in Table 1, a significant relationship between retinopathy and sex, age, disease history, family history, education, and duration of the disease was not observed. However, there was a significant relationship between the level of HbA1c and diabetic retinopathy ($p = 0.002$).

In Table 2, demographic characteristics associated with retinopathy were examined after adjusting for the confounding effect using multivariate logistic regression and no significant relationship was observed between retinopathy and sex, age, history of disease, family history, education, and duration of the disease. However, there was a significant relationship ($p = 0.006$) between the level of HbA1c and diabetic retinopathy.

4. Discussion

In this study, the prevalence of retinopathy among diabetic patients was 45.1%. Several studies about the

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