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Research Article

Prevalence of Prediabetes and Type 2 Diabetes Mellitus in Patients with Increased Risk for T2D in Tijuana, Mexico

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Abstract

Background: Diabetes Mellitus is a highly prevalent chronic disease, affecting 8.8% of people worldwide. There are many factors related to the development of DM, the most important are modifiable related to lifestyle such as body weight, physical inactivity, smoking and consumption of alcohol.

Objective: To know the prevalence of Prediabetes and Type 2 Diabetes Mellitus in patients with increased risk for T2D.

Methods: A descriptive cross-sectional study was carried out in the family medicine unit 27, in patients with increased risk for T2D according to the FINDRISC test. The participants were recruited from a previous study titled "Risk assessment for Type 2 Diabetes Mellitus in adults from FMU 27". The patients with increased risk for T2D were evaluated with paraclinical studies in order to confirm alterations in blood glucose. Descriptive statistics were used, the qualitative variables were expressed in frequencies and percentages, and the quantitative variables in measures of central tendency and dispersion, the information obtained was analyzed in the statistical program SPSS version 25.

Results: 254 patient files were analyzed, selecting 139 patients for the study. Of all the participants with a score greater than 7 in the FINDRISC test, 24.01% were diagnosed with prediabetes and 30.70% with type 2 diabetes mellitus.

Conclusions: The prevalence of Diabetes and prediabetes was higher in our population at a short follow-up.

Keywords: FINDRISC; Type 2 Diabetes; Prediabetes; Risk Factors

Introduction

Diabetes mellitus (DM) is a chronic disease that occurs when the pancreas (the hormone responsible for regulating blood glucose levels) does not produce enough insulin, or when the body cannot use the insulin it produces effectively [1]. DM can be classified into 2 groups, type 1 DM and type 2 DM [2]. Type 2 is the most common, representing 90% of cases, typically occurring in patients who are overweight or obese; who have a family history of DM, or who meet certain criteria for metabolic syndrome [3]. There are many factors related to the development of DM, some not modifiable such as age, sex, family history of DM, region of origin. Others are modifiable related to lifestyle such as body weight, physical inactivity, smoking and consumption of alcohol [4].

Type 2 DM can be diagnosed based on plasma glucose criteria. The fasting plasma glucose value, the 2-hour plasma glucose value during a 75g glucose tolerance test, or the glycated hemoglobin (HbA1c) is considered diagnosis criteria. For the diagnosis of DM, a fasting blood glucose ≥126mg/dL, a blood glucose ≥200mg/dL 2 hours after the oral test with 75g of glucose, HbA1c values ≥6.5% or a random blood glucose ≥200mg/dL is required in patients with classic symptoms of hyperglycemia or hyperglycemic crisis [5]. DM is associated with a high number of complications that reduce the quality of life. These complications are due to the sustained effect of hyperglycemia and, therefore, its incidence increases in proportion to the time of evolution of the disease [6].

International Diabetes Federation (IDF) estimated in 2015 that the prevalence of DM in the world population aged 20 to 79 years was 8.8% [9]. Mexico ranked sixth in the world prevalence of diabetes, with an estimated 11.4 million Mexicans affected by the disease [10]. According to the World Health Organization (WHO) in its 2016 report, the related risk factors that were reported were overweight with a total prevalence of 69.6%, obesity with a prevalence of 35% and physical inactivity with 35% [11]. ENSANUT 2018, reports the percentage of the population aged 20 years and over with a previous medical diagnosis of T2D was 10.3%, which means more than 8.6 million Mexicans, predominantly female with 11.4%. The states with the highest percentage were Campeche, Tamaulipas, Hidalgo, CDMX and Nuevo León [12]. The objective of the research is to know the prevalence of Prediabetes and Type 2 Diabetes Mellitus in patients with increased risk for T2D.

Material and Methods

Study design and population

A descriptive cross-sectional study was carried out in Tijuana,

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Mexico between August to September 2021. The research was developed at the family medicine unit #27 of the Instituto Mexicano del Seguro Social (IMSS), a primary care center. The records of patients with high risk for T2D were included; this database was evaluated from the study "Risk assessment for Type 2 Diabetes Mellitus in adults from FMU 27". This previous study estimated the T2D risk in adults and our study evaluated the presence of this disease through fasting plasma glucose.

Variables

The medical records were reviewed to evaluate the follow-up of the risk assessment of the FINDRISC test carried out in the period from June to August 2019 by José Federico González Acosta MD in his research "Risk Assessment of Diabetes Mellitus type 2 in adults from FMU 27" [13]. Fasting central glucose was recorded from June 2020 to June 2021 in each included patient and the diagnosis of prediabetes or type 2 Diabetes Mellitus was identified. T2D was defined as glucose >126mg/dl and prediabetes as glucose between 100 and 125 mg/dl. Sociodemographic information was collected in a data collection form such as: sex, age, marital status and education.

Statistical analysis

Once the information was collected, the analysis was carried out using the SPSS version 25. Descriptive statistics were used; the qualitative variables were expressed as frequencies and percentages, and the quantitative variables as measures of central tendency and dispersion.

Ethics

The study was approved by the Local Committee for Ethics and Health Research number 204, with registration number R-2021-204-027. The research was conducted under the General Health Law on Health Research, the Declaration of Helsinki and bioethical principles.

Results

139 patients with high risk score (FINDRISC >7) were selected for the study. Of the 139 participants, the female gender was 52.5% (n=73) and the male gender was 47.5% (n=66). For age, they were divided into 5 groups, under 35 years with 25 participants (18%), 35 to 44 years with 44 participants (31.7%), 45 to 54 years with 46 participants (33.1%), 55 to 64 years with 19 patients (13.7%), and > 65 years with 5 participants (3.6%). In schooling found 51 (36.7%) patients with elementary school, 60 with secondary (43.2%), 25 with high school (18%) and 3 bachelor's degree (2.2%). In marital status, it was found that 25 of the participants were single (18%), 72 are married (51.8%), 31 in common law (22.3%), 7 are widowed (5 %) and 4 divorced (2.9%). Of the 139 participants, 43.9% (n=61) had a serum glucose between 100 to 125 mg/dL (prediabetes), and 56.1% (n=78) with serum glucose > 126 mg/dL (T2D). The complete baseline characteristics are described in Table 1.

Table 1: Baseline characteristics of participants.

Characteristic (n=139)	n (%)	95% CI
Age		
< 35 years	25 (18)	11-24
35-44 years	44 (32)	34-39
45-54 years	46 (33)	25-40
55-64 years	19 (14)	8-19
> 65 years	5 (3)	0-5
Sex		
Male	66 (48)	39-56
Female	73 (52)	43-60
Schooling		
Elementary	61 (37)	28-45
Secondary	60 (43)	34-51
High school	25 (18)	11-24
Bachelor	3 (2)	0-4
Marital Status		
Single	25 (18)	11-24
Married	72 (52)	43-60
Cohabitation	31 (22)	15-28
Widowed	7 (5)	1-8
Divorced	4 (3)	0-5
Prediabetes		
Yes	61 (44)	35-52
No	78 (56)	47-64
Type 2 Diabetes		
Yes	78 (56)	47-64
No	61 (44)	35-52

n: Frequency; %: Percentage; 95% CI: Confidence Interval.

Discussion and Conclusion

In this 2-year follow-up study, the FINDRISC tool was used to determine the prevalence of prediabetes and DM2. Our study showed that 54.72% (n=139) of the patients from the first study developed some alteration in serum glucose, of these 24.01% presented glucose levels of 100 to 125 mg/dL, which corresponds to prediabetes and 30.70% presented glucose levels higher than 126mg/dL, which corresponds to type 2 diabetes mellitus.

These results contrast from those obtained by González et al. (2018), where they found 39.2% of patients with prediabetes and only 9.6% with undiagnosed diabetes mellitus, at the time of the questionnaire [7]. The study by Mendiola et al. (2018) that evaluated 295 participants, found that the prevalence of prediabetes and DM2 at the time of performing the FINDRISC test was 25.42% for prediabetes, which is similar to our study, and 13.56% for DM2, a result that is different from our study [14] Ocampo et al. (2019) found in a sample of 796 patients a prevalence of prediabetes of 11% and only 0.7% for diagnosis of DM2 in Colombian population [15], a different result from those obtained in our study.

Based on the results obtained, we were able to conclude that the prevalence of prediabetes and DM2 is higher in our population, this could be explained for the large follow-up (2 years) after the test was performed, in contrast to other studies where the diagnosis was made at the same time that the questionnaire was carried out. Another consideration is that the follow-up of these patients could not be carried out in the optimal way; the SARS-Cov-2 pandemic caused a lower evaluation of patients. An area of opportunity in patients with

increased T2D risk is to improve preventive measures or screening measures frequently than in the population without risk or decreased risk.

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