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# ORIGINAL ARTICLE

# Glycemic control in patients with type 2 diabetes mellitus in Spain $^{\Leftrightarrow}$



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## **KEYWORDS**

Type 2 diabetes; Glycemic control; Duration of diabetes; Atherogenic dyslipidemia; Oral antidiabetic agents; Insulin therapy; Primary care

#### **Abstract**

*Objective*: To evaluate the degree of glycemic control in patients with type 2 diabetes in Spain and identify factors associated with glycemic control.

Patients and methods: This was a cross-sectional, multicenter, epidemiological study that used consecutive sampling and was conducted in primary care practices in Spain. A total of 5591 patients with type 2 diabetes mellitus lasting more than 1 year and who were treated with hypoglycemic agents for more than 3 months were included in the study. At a single visit, HbA1c levels were measured (A1cNow+ system) and demographic and clinical variables related to diabetes and its treatment were recorded. During the visit, CV risk factors (CVRF), the presence of target-organ damage (TOD), the presence of hypoglycemia and body weight changes within the previous year were recorded.

Results: We analyzed data from 5382 patients (mean age 66.7 [10.8] years, mean duration of the diabetes 8.8 [6.3] years). TOD was present in 43.6% of the patients and 59.1% were taking 2 or more drugs. The patients' mean HbA1c was 7.1 (1.1)%, and 48.6% had HbA1c levels <7.0%. The patients with HbA1c levels  $\geq$ 7.0% had longer-standing diabetes, a higher prevalence of TOD and CVRF, used more complex therapies, experienced more hypoglycemic episodes in the

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previous year and had more weight gain. In the multivariate analysis, the absence of insulin treatment, the absence of abdominal obesity and atherogenic dyslipidemia, a duration of the diabetes <10 years and an age >70 years were associated with improved glycemic control. *Conclusions*: Patients with poorly controlled type 2 diabetes mellitus are highly prevalent in Spain. Factors associated with poorer glycemic control include the complexity of both the disease and the hypoglycemic therapy, a history of hypoglycemia and weight gain. © 2014 Elsevier España, S.L.U. All rights reserved.

#### PALABRAS CLAVE

Diabetes tipo 2; Control glucémico; Duración de la diabetes; Dislipemia aterogénica; Antidiabéticos orales; Insulinoterapia; Atención primaria

#### Control glucémico en pacientes con diabetes mellitus tipo 2 en España

#### Resumen

*Objetivo*: Evaluar el grado de control glucémico en los pacientes con diabetes tipo 2 (DM2) en España, e identificar los factores asociados con el nivel de control glucémico.

Pacientes y métodos: Estudio epidemiológico transversal, multicéntrico realizado en consultas de atención primaria en España. Se incluyeron 5.591 pacientes con DM2 (>1 año evolución) y con tratamiento farmacológico (>3 meses). En una única visita, se determinó la HbA1c (sistema A1cNow+) y se registraron las variables relacionadas con la diabetes y su tratamiento, los factores de riesgo cardiovascular (FRCV), la presencia de lesiones de órgano diana (LOD), y la presencia de hipoglucemia y modificación del peso en el año previo.

Resultados: Se analizaron los datos de 5.382 pacientes (edad media 66,7 años; 8,8 años de evolución); el 43,6% presentaban alguna LOD y el 59,1% recibían  $\geq$ 2 fármacos. La HbA1c media fue de 7,1 (1,1)% y el 48,6% tenían HbA1c <7,0%. Los pacientes con HbA1c  $\geq$ 7,0% presentaban mayor duración de la diabetes, mayor prevalencia de LOD y FRCV, usaban terapias más complejas y en el año previo presentaron más hipoglucemias y mayor aumento de peso. En el análisis multivariante, la ausencia de tratamiento con insulina, la ausencia de obesidad abdominal y dislipemia aterogénica, el tiempo de evolución de DM2 <10 años y la edad >70 años se asociaron con mejor control glucémico.

Conclusiones: la proporción de DM2 con deficiente control en España es elevada. Los factores que reflejan la complejidad de la enfermedad y del tratamiento hipoglucemiante, así como el antecedente de hipoglucemia y aumento de peso, se asocian con peor control glucémico. © 2014 Elsevier España, S.L.U. Todos los derechos reservados.

# **Background**

Diabetes mellitus is a chronic disease with a prevalence of 13.8% in our community. The microvascular and macrovascular complications of diabetes, as well as its high cardiovascular mortality, make diabetes a disease with considerable health and social repercussions. The disease requires continuous care and represents a significant consumption of healthcare resources.2 Treatment according to clinical practice guidelines has demonstrated a reduction in morbidity and mortality and improvements in the quality of life.3-5 However, most studies (regardless of country) show considerable difficulty in achieving the therapeutic objectives, especially in terms of glycemic control. In Spain, the most recent studies performed in primary care show that >40% of patients have HbA1c levels >7.0%.6-8 In a previous study performed on a population with type 2 diabetes (DM2) who were treated in primary and specialized care in which 97.8% of the patients were treated with drugs, we observed that only 40.4% of the patients had HbA1c levels <7.0%. Furthermore, this proportion decreased with the progression of the disease, as well as the complexity of the process and of the treatment.8 One of the major limitations of most of these studies is the lack of information on the methods used to determine HbA1c levels and the scarce information on factors that could contribute to glycemic control, especially weight fluctuations, the presence of hypoglycemia and the insulin regimen used.

The present study is therefore designed to assess the degree of glycemic control in individuals with DM2 using the measurement of HbA1c levels with the A1cNow+ system and identify factors (related to diabetes and hyperglycemia therapy) associated with the degree of glycemic control, including the insulin regimen, changes in body weight and the presence of hypoglycemia the previous year.

## Participants and methods

## Study design

This was an epidemiological, cross-sectional and multicenter study, with sequential sampling performed in primary care consultations throughout Spain under standard clinical practice conditions between 2011 and 2012. A total of 1797 researchers participated in the study in a nonrandom distribution among the 13 autonomous communities of Spain. These researchers recruited the first 3 patients with DM2

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