

ORIGINAL ARTICLE

Impact of diabetes education on type 1 diabetes mellitus control in children[☆]



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KEYWORDS

Type 1 diabetes mellitus;
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Abstract

Introduction: Diabetes education is an essential tool to achieve treatment objectives in type 1 diabetes mellitus (T1DM). The aim of this study was to determine if understanding of diabetes by caregivers/patients or sociodemographic factors affect blood glucose control in children and adolescents with T1DM.

Patients and methods: The level of knowledge of 105 caregivers of children and adolescents with T1DM was assessed using a survey adapted to the type of treatment used (multiple dose insulin [MDI] or continuous subcutaneous insulin infusion [CSII]). Mean HbA1c levels in the previous year was considered as metabolic control marker.

Results: Mean HbA1c levels were similar in both treatment groups, with slightly higher values in children over 12 years of age. Patients on CSII had a longer time since disease onset and had poorer results, maybe because the items were more difficult due to the higher level of knowledge required for this treatment modality ($p=0.005$). Caregivers with lower educational levels achieved poorer scores in the survey, but mean HbA1c levels of their children were lower, probably because of their greater involvement in disease care.

Conclusions: The level of knowledge of caregivers and/or patients with T1DM was high, and this was associated to good metabolic control. Studies to assess the impact of caregiver knowledge on metabolic control of children are needed.

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PALABRAS CLAVE

Diabetes mellitus tipo 1;
Educación diabetológica;
Insulina;
Administración subcutánea;
Bomba de insulina

Impacto de la educación diabetológica en el control de la diabetes mellitus tipo 1 en la edad pediátrica

Resumen

Introducción: En la diabetes mellitus tipo 1 (DM1) la educación diabetológica es fundamental para lograr los objetivos de tratamiento. El objetivo de este estudio es determinar si el nivel de conocimientos diabetológicos de cuidadores/pacientes o los factores sociodemográficos afectan al control glucémico de niños y adolescentes con DM1.

Pacientes y métodos: Se analiza el nivel de conocimientos de 105 cuidadores de niños y adolescentes con DM1 o de los pacientes adolescentes mediante una encuesta adaptada a la modalidad de tratamiento (múltiples dosis de insulina [MDI] o bomba de infusión subcutánea continua de insulina [ISCI]). Se considera la HbA1c media en el último año como marcador del control metabólico.

Resultados: La media de HbA1c fue similar en ambos grupos de tratamiento ($6,6 \pm 0,5$ para MDI y $6,5 \pm 0,5\%$ para ISCI, $p=0,63$), siendo discretamente más alta en niños mayores de 12 años. Los pacientes con bomba tenían un mayor tiempo de evolución de la diabetes y obtuvieron peores resultados porque además la exigencia teórica de la encuesta fue superior por la mayor complejidad de manejo ($p=0,005$). Los cuidadores con nivel de estudios más bajos obtuvieron peores puntuaciones, si bien las cifras de HbA1c de sus hijos fueron más bajas, en probable relación con una mayor dedicación al cuidado de la enfermedad.

Conclusiones: El nivel de conocimientos analizados fue alto, y esto se asoció con un buen control metabólico. Son necesarios estudios que evalúen la influencia de los conocimientos de los cuidadores en pacientes con diferentes grados de control metabólico.

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Introduction

Type 1 diabetes mellitus (T1DM) is the most common form of diabetes in children. The *Diabetes Control and Complications Trial* (DCCT) showed that poor blood glucose control increases the risk of chronic microvascular complications, including renal and retinal complications.¹ When T1DM starts in children or young adults, the course of disease is long, and metabolic control is essential to prevent the occurrence of such complications.^{2,3}

Advances in treatment of T1DM have decreased the risk of complications and delayed their occurrence, with the resultant overall increase in quality of life of patients. Nutritional education, with systematic assessment of carbohydrates and use of the insulin-to-carbohydrate ratio, has allowed for optimizing insulin dosage.⁴ The basal-bolus scheme with multiple dose insulin (MDI) injections or continuous subcutaneous insulin infusion (CSII) and multiple capillary blood glucose measurements allow for better metabolic control. For this, adequate and continued diabetes education of patients and families is required.^{5,6} And although the effect of glycemic variability on the occurrence of chronic complications is unknown, the current goals of treatment of T1DM are to maintain adequate pre- and post-prandial blood glucose levels, avoiding both hyperglycemia and hypoglycemia, both harmful for the central nervous system and cardiovascular risk.⁷⁻⁹

Diabetes education is the main therapeutic tool to achieve implication of the family in care of children with T1DM, and the best metabolic control is achieved when participation and intervention of patients and families are

adequate. *Family empowerment* refers to caregivers who have received more comprehensive training in management of diabetes in order to make them able to make decisions in multiple situations.¹⁰ This results in improved blood glucose control, and treatment optimization is greater the more intensified the modality used.¹¹

There are studies assessing quality of life of patients in relation to the degree of metabolic control. The conclusion of such studies is that the better the metabolic control, the greater the quality of life perceived.^{12,13} The essential role of diabetes education nurses for achieving better metabolic control is also known.^{14,15} It is however difficult to find references describing the impact of patients and family education on glucose control.¹⁶

The purpose of this study was to assess whether the level of diabetes knowledge of caregivers/patients or sociodemographic factors affect blood glucose control in children and adolescents with T1DM. Secondary objectives were to ascertain whether better metabolic control contributes to decrease the occurrence of acute events (ketoacidosis and severe hypoglycemia) and whether differences exist in metabolic control related to the treatment modality used (MDI or CSII).

Patients and methods

An observational, cross-sectional, non-interventional study was conducted on the knowledge and skills of families about management for diabetes. All caregivers of patients with T1DM up to 18 years of age who attended the pediatric

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