

Contents lists available at [ScienceDirect](#)

Canadian Journal of Diabetes

journal homepage:
www.canadianjournalofdiabetes.com

Original Research

Glycemic Control, Self-Efficacy and Fear of Hypoglycemia Among Iranian Children with Type 1 Diabetes


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ARTICLE INFO

Article history:

Received 13 August 2014

Received in revised form

14 December 2014

Accepted 15 December 2014

Keywords:

education

fear

hypoglycemia

self-efficacy

type 1 diabetes

ABSTRACT

Objective: This study was designed to test the reliability of a Persian version of 2 questionnaires to assess the level of fear of hypoglycemia (FoH) and self-efficacy in diabetes management and their association with glycated hemoglobin (A1C) and parents' demographic characteristics in a sample of children with type 1 diabetes.

Design: We assessed 61 children with type 1 diabetes (35 boys and girls, 6.0 to 12.7 years of age) using the Hypoglycemia Fear Survey-Child version (HFS-C) and Self-Efficacy for Diabetes Scale-Child version (SED-C). Their glycemic control was evaluated by A1C levels.

Results: The internal consistency of the Persian version of HFS-C and SED-C were very good. Our results showed that children older than 10 years of age report lower levels of FoH, which are related to higher levels of self-efficacy ($r = -.30, p = 0.025$ and $r = -.30, p = 0.02$, respectively). Of the children, 42.3% of girls and 31.4% of boys reported that low blood sugar is a big problem for them. These findings suggest that FoH is a significant concern for this target group. Only 19.7% of children had controlled diabetes based on A1C levels. There was no significant association between higher A1C levels and other variables, including HFS-C, SED-C and parents' demographic characteristics.

Conclusions: The Persian version of HFS-C and SED-C are reliable and valid measures of the fear of hypoglycemia and of self-efficacy in children with type 1 diabetes, and these questionnaires could be used in our country for identifying those children who may need diabetes education and other supports. The association between greater self-efficacy and lower fear of hypoglycemia suggests that addressing self-efficacy in diabetes education courses may be effective in helping to overcome FoH.

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R É S U M É

Objectif : L'étude dont il est question était conçue pour tester la fiabilité des versions en langue perse de 2 questionnaires qui évaluent le degré d'inquiétude liée à l'hypoglycémie (IH) et le sentiment d'efficacité personnelle concernant la prise en charge du diabète ainsi que leur association à l'hémoglobine glyquée (A1c) et les caractéristiques démographiques des parents d'un échantillon d'enfants souffrant de diabète de type 1.

Méthodes : Nous avons évalué 61 enfants souffrant de diabète de type 1 (35 garçons et 26 filles, de 6,0 à 12,7 ans) à l'aide du HFS-C (Hypoglycemia Fear Survey-Child version) et du SED-C (Self-Efficacy for Diabetes Scale-Child version). Leur régulation glycémique était évaluée par les concentrations de l'A1c.

Résultats : La cohérence interne de la version en langue perse du HFS-C et du SED-C s'est avérée très bonne. Nos résultats ont montré que les enfants de plus de 10 ans rapportent des degrés d'IH plus faibles, qui sont reliés à des degrés du sentiment d'efficacité personnelle plus élevés ($r = -0,30, p = 0,025$ et $r = -0,30, p = 0,02$, respectivement). Parmi les enfants, 42,3 % des filles et 31,4 % des garçons ont rapporté qu'une faible glycémie représente pour eux un grave problème. Ces résultats suggèrent que l'IH est une préoccupation importante pour ce groupe cible. Seuls 19,7 % des enfants avaient maîtrisé leur diabète en fonction des concentrations de l'A1c. Il n'y a eu aucune association importante entre les concentrations de l'A1c et les autres variables, soit le HFS-C, le SED-C et les caractéristiques démographiques des parents.

Conclusions : Les versions en langue perse du HFS-C et du SED-C constituent des mesures fiables et valides de la peur de l'hypoglycémie et du sentiment d'efficacité personnelle des enfants souffrant du

Mots clés :

enseignement

peur/inquiétude

hypoglycémie

sentiment d'efficacité personnelle

diabète de type 1

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diabète de type 1. Ces questionnaires pourraient être utilisés dans notre pays pour déterminer les enfants qui auraient besoin d'enseignement sur le diabète et d'autres types de soutien. L'association entre un plus grand sentiment d'efficacité personnelle et une plus faible inquiétude liée à l'hypoglycémie suggère qu'aborder le sentiment d'efficacité personnelle au cours des séances d'enseignement sur le diabète peut contribuer de manière efficace à surmonter l'IH.

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Introduction

Type 1 diabetes is usually diagnosed in childhood and adolescence, and the incidence rates are increasing worldwide, including in many parts of Asia (1). It is predicted that in European children younger than 15 years of age, the incidence will rise by 70% between 2005 and 2020 (2). Of the estimated 430 000 prevalent cases of childhood type 1 diabetes worldwide, more than one-quarter live in Southeast Asia (1).

The Diabetes Control and Complications Trial (3) and its long-term follow-up study, the Epidemiology of Diabetes Interventions and Complications (EDIC) study (4), have shown that a period of poor control can cause lasting damaging effects, even if control later improves, so it is important to aim for good control from the time of diagnosis (5).

Surveys of glycemic control in the United Kingdom, Europe and Australia have demonstrated consistently that many children and adolescents do not achieve targets for glycemic control (6–8). In children in Asia, however, there is relatively limited information available on glycemic control and management and the prevalence of diabetes complications, although high rates of microvascular and macrovascular disease have been reported in adolescents and adults (9,10). Diabcare Asia 1998 reported an overview of diabetes management and complications in patients from 230 centres in Asia but, of the 24 317 participants, only 152 (0.7%) were younger than 18 years of age. The mean glycated hemoglobin (A1C) level was higher in this younger subgroup ($10.7\% \pm 3.0\%$) than in the whole cohort ($8.6\% \pm 2.2\%$) (9).

Managing diabetes in children presents many challenges, especially children's inability to recognize and verbalize symptoms of high or low blood glucose and their unpredictable eating behaviours and physical activity levels, all of which make diabetes management more challenging in this age group.

Some factors that we hypothesized would affect children's glycemic control in a family framework include 1) children's fear of hypoglycemia and 2) beliefs about their abilities to manage their illness (self-efficacy) (11).

Hypoglycemia is one of the most important barriers to good glycemic control for children as well as for adults with diabetes (12). Because hypoglycemia causes unpleasant symptoms that may frighten not only the child with diabetes but also the parents, they may prefer to maintain elevated blood glucose levels to prevent hypoglycemia, which could limit attainment of glycemic targets. There is evidence that fear of hypoglycemia (FoH) may have significant negative impacts on diabetes management, metabolic control and subsequent health outcomes (13,14). Although studies have indicated that an insulin regimen involving better technology and insulin analogues may reduce the risk for hypoglycemic episodes, hypoglycemia remains a problem (15,16) and should be evaluated in children with type 1 diabetes.

An important question is whether FoH can be assessed reliably in children, and whether they can give reliable self-reports of their own FoH. There is evidence that the English-language version of a FoH survey can be completed reliably by children as young as 6 years of age (17). The evidence concerning assessment of health-related quality of life in children also indicates that children as young as

5 or 6 years of age can give reliable and valid self-reports (18–20). There is strong evidence that intrapersonal factors contribute to youths' adherence to type 1 diabetes regimens (21). Self-efficacy, or one's perceived ability to follow a diabetes treatment program, is one of the significant intrapersonal characteristics to consider in the understanding of the contributors to self-care in youth with type 1 diabetes and is an important indicator of health-behaviour changes in youth (21). Enhanced diabetes self-efficacy has been linked to improved glycemic control in older adolescents and youth (21,22). Despite the importance of self-efficacy in diabetes management, relatively little attention has been paid to its predictors and correlates, and these relationships have not been examined in pre-adolescents. Also, children's efficacy in managing their diabetes maybe associated with better management. Research concerning self-efficacy in the diabetes literature is limited (11,23,24). This study also investigated the relationship between fear of hypoglycemia and self-efficacy in youth.

Because examining child-reported psychosocial outcomes may offer important information for interventions that achieve optimal diabetes management in children with type 1 diabetes and, to the best of our knowledge, there has been no previous research or questionnaires in this field in our country, this study was designed to test the reliability of a Persian version of the Hypoglycemia Fear Survey-Behavior subscale (HFS-C) and Self-Efficacy for Diabetes Scale-Child version (SED-C).

The SED-C was used to assess whether these questionnaires can be useful tools for quick assessment of developing targeted educational interventions or not. Also, this study examined HFS-C and SED-C levels and their association with A1C and parents' demographic characteristics in a sample of children with type 1 diabetes.

Methods

Participants and procedures

Families were identified by a review of the Gabric Diabetes Education Association (<http://www.gabric.ir/about/en>) database from 2005 to 2012 and then contacted by a member of the research team. Parents were eligible to participate if they had a child 6 to 12 years of age who had been diagnosed with type 1 diabetes for at least 6 months. Families were excluded if the child had been diagnosed with another disease known to affect growth or other autoimmune diseases (e.g. thyroid, celiac). A total of 75 families were approached for the study, and 61 agreed to participate and were eligible (81.33% recruitment rate). Parents and children came to the office of the Gabric Diabetes Education Association, where parents provided written informed consent, then completed a diabetes history questionnaire, including an item to assess frequency of severe hypoglycemia episodes in the last 3 months. Severe hypoglycemia was defined as hypoglycemia with unconsciousness or with consciousness but needing parents' help for treatment due to mental confusion and disorientation. Children completed a battery of questionnaires, including HFS-C (both behaviour [HFS-B] and worry [HFS-W] subscales) and the SED-C to assess confidence in managing their diabetes. Children's gly-

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