

Module IV-1

Diabetes in children and adolescents

Overview

Annually, at least 60 000 children and adolescents are diagnosed with type 1 diabetes worldwide, and its incidence continues to increase by 3-5% per year. Despite recent progress in our understanding of the genetics and immunology of the disease, its cause is unknown. Although type 2 diabetes has been considered rare in the paediatric population, an increased incidence has been reported throughout the world, associated with the increase of childhood obesity and physical inactivity.

As they grow, children and adolescents with type 1 diabetes have major physical, emotional, psychological, social and intellectual differences and needs compared with adults with type 1 diabetes. These needs must be recognized and addressed by the general public and health professionals. These differences arise from the stages of growth and development through which young people pass. Although their total dependence on insulin and their need for good and appropriate nutrition are the same as in adults with type 1 diabetes, affected infants, toddlers, school children and adolescents, with their developing independence, must each be considered differently.

Optimal management of diabetes in children and adolescents includes a balanced intake of food supplying adequate energy, protein and all nutrients to maintain growth and development; two to four injections of insulin per day and/or other medications; urine testing for glucose and ketones; monitoring of blood glucose levels; and regular physical activity.

Regular monitoring by the paediatric multidisciplinary team is essential.

Individualized assessment and monitoring of the child's maturity level, developmental stage, family and social supports, eating habits, and school and sports schedules are critical. The assessment should be sensitive to cultural, socio-economic and environmental determinants in order to develop a realistic and comprehensive individualized management plan.

Experience in the management of type 2 diabetes in children and adolescents is in its infancy. The management of obesity and cardiovascular risk factors are the main aims of the individualized care plan. A family-based approach, concentrating on positive parental role-modelling and a behavioural approach to lifestyle changes is essential.

All children and adolescents with type 1 diabetes and those with type 2 diabetes have the right to a competent, experienced multidisciplinary team to medically manage and provide diabetes education. The multidisciplinary team needs to be responsive to the changing medical and psychosocial needs of young people and their families. All children and adolescents should have the right to consistent, uninterrupted supplies of food and medication – including insulin.

Children and adolescents cannot advocate on their own behalf. It is therefore the responsibility of society to provide all necessary support to children and adolescents with diabetes and their family and/or carers. This should include social, public, governmental and industrial resources, and medical supplies.

Goals

- To recognize and have a broad understanding of the issues surrounding the care of children and adolescents with type 1 diabetes and those with type 2 diabetes, and their parent(s), family, carers and others
- To understand the clinical management of both types of diabetes and demonstrate the importance of care in relation to long-term diabetes outcomes.

Objectives

After completing this module the participant will be able to:

Clinical management

- Recognize that care should be provided by an experienced, consistent, committed paediatric multidisciplinary team
- Recognize that children and adolescents have special and different needs, and that these will change over time
- Describe the key management components of diabetes care in children; refer to specific care topics, such as insulin treatment and adjustment, nutritional management, blood glucose monitoring, self-care, family dynamics, psychosocial well-being and support
- Recognize young people's constantly changing insulin requirements during growth and development
- Recognize the practical skills, and the importance of shared roles between young people and parent(s), associated with insulin therapy:
 - o demonstrate optimal injection techniques, including the need for short fine needles if available
 - o describe the need for rotating insulin injection sites in children and adolescents
 - o describe the reasons for inspecting injection sites
 - o describe blood glucose monitoring techniques and regimens
 - o discuss the reasons for promoting self-care

- Discuss how to interpret urine and blood glucose readings and adjust insulin accordingly
- Discuss the need for regular monitoring of growth in weight and height, and the importance for children of following correct percentiles on a chart
- Discuss with parents and carers the recognition, treatment and prevention of hypoglycaemia in children and adolescents, with appropriate guidance on carbohydrate management
- Discuss the need for others involved in caring for children and adolescents (teachers, coaches, other family members) to be able to recognize and treat mild, moderate and severe hypoglycaemia
- Provide education on adjusting insulin and carbohydrates to enable safe participation in physical activities generally and specific sporting events
- Discuss the importance of transitional clinics, and strategies to improve attendance of young adults at clinic
- Describe the specific age-related diabetes education that is necessary during the transitional period, including contraception, safe sex, alcohol, drugs

Impact of age, growth, development and maturity on diabetes care

- Describe the needs of children at each stage of growth and development, and the ways in which diabetes impacts daily living at each stage
- Understand how children accomplish diabetes tasks at different ages based on their emotional maturity and parental and carer support – not on chronological age
- Recognize abnormalities of growth and development
- Explore strategies to promote positive growth and development

Nutrition

- Establish meal patterns and develop a staged approach to positive dietary changes
- Understand the need to organize food patterns around the child's food preferences and his or her relationship with insulin treatment
- Discuss the need to individualize food intake and insulin therapy in relation to the child's age and lifestyle
- Consider the existing food pattern and choose an appropriate insulin profile

- Discuss the key role that food plays in the dynamics of the family
- Describe how food can be used as a weapon and cause family disharmony
- Describe the reasons why nutrition goals are based on an individual's diabetes management goals
- Recognize that dietary goals should be self-selected and negotiated between the child, family and health professionals
- Appreciate age-related problems – including, for example, toddler food refusal, peer pressure, omission of insulin by teenagers, religious and cultural influences, insulin abuse and hypoglycaemia, fast foods, such as burgers, food fads (these differ between countries)
- Describe the importance of the amount and types of carbohydrates and their effects on blood glucose levels
- Describe guidelines on the distribution of food to prevent hypoglycaemia and hyperglycaemia
- Recognize changes in weight patterns and assess total energy intake and physical activity
- Describe the importance of healthy eating and an increase or reduction in energy intake to stabilize weight gain or maintain growth percentile lines
- Design a suitable age-appropriate weight-reducing programme for a growing child (including lifestyle changes and provision of adequate nutrients)*

Psychosocial influences

- Recognize the emotional trauma present when the diagnosis of diabetes is made, begin education when the family is ready, and pace education according to the family's wishes (refer to **Module I-4, Psychosocial and behavioural approaches**)
- Discuss the need to encourage consistent and continuing support from the extended family/carers, peers and paediatric multidisciplinary team
- Discuss behavioural themes, and strategies to promote acceptance and agreement for sharing responsibilities for a management plan – especially when the child exhibits difficulties or distress
- Discuss psychosocial themes, health beliefs and quality of life, and strategies to promote sound family functioning
- Discuss the need to facilitate the total integration in all activities of children and adolescents at nursery, school and college; they should not be excluded from any sports or activities because of diabetes

- Discuss strategies for coping with insulin refusal or omission
- Know the strategies for minimizing trauma in blood testing and coping with refusal
- Recognize the fear that children, adolescents and their parents have of hypoglycaemia, and the impact this has on tightening blood glucose control
- Understand the detrimental behavioural and health effects of both hypo- and hyperglycaemia
- Know that different environmental circumstances (for instance due to school activities, camps, day trips, sleepovers, or sports days) can increase the likelihood of hypoglycaemia
- Promote special diabetes-related holiday activities, such as camps and other group activities for different ages ranges
- Promote the need for all children to be involved in all sports at all levels
- Recognize and help to alleviate the social stigma (and bullying) associated with chronic conditions such as diabetes in many parts of society

Adolescents/young adults

- Recognize the substantial changes in insulin and nutritional management which need to be made during the pubertal phase
- Discuss risk-taking behaviours in adolescents, including (where culturally appropriate):
 - contraception
 - alcohol and its effects on blood glucose
 - smoking, diabetes and vascular disease
 - eating disorders and insulin misuse
 - drugs
- Discuss driving-related safety issues
- Discuss strategies to educate school and college personnel, faith/ community leaders, sports leaders, etc.
- Assist parents and adolescents to develop their own peer- and group-support networks
- Appreciate the problems encountered by teenagers (these differ between countries)
- Appreciate the importance of the specific behavioural, psychological and social characteristics in children and adolescents that may influence their level of adherence to a management regimen

- Identify behaviour which might require additional psychological help
- Recognize the increased incidence and prevalence of mental health issues, such as depression and eating disorders, and know when to make an urgent referral to mental health services

Complications

- Recognize that being underweight may have important nutritional and/or emotional causes
- Recognize that overweight and obesity is usually a serious family problem (not only the problem of the child) and increases insensitivity to insulin
- Discuss in a comprehensive but positive way the risks of developing long-term vascular complications, strategies for preventing these or reducing their progression, and the need for annual assessment

Rarer forms of diabetes

- Discuss the occurrence and significance of neonatal diabetes
- Identify the increasing incidence in many countries of children with type 2 diabetes
- Identify ethnic minority groups that have a high prevalence of children with type 2 diabetes
- Understand the various genetic types of MODY and their management

Teaching strategies

Short lectures, workshops, problem-solving through case presentations, role play, presentation by parent/adolescent, attendance at group events, including holidays and camp

Suggested time

4 hours devoted to theory, divided into short modules

Who should teach this module

Educator (nurse/dietitian) and/or paediatrician, behavioural scientist with expertise in diabetes

Evaluation of learning

Multiple-choice questionnaire

Present a case history that illustrates a problem and discuss possible solutions from the clinical, therapeutic and psychosocial points of view

References

American Diabetes Association. Nutrition recommendations and interventions for diabetes 2006: A statement of the American Diabetes Association. *Diabetes Care* 2006; 29: 2140-57.

Anderson BJ, Auslander WF, Jung KC, et al. Assessing family sharing of diabetes responsibilities. *J Pediatr Psychol* 1990; 15: 477-92.

Australian Paediatric Endocrine Group. The Australian Clinical Practice Guidelines on the Management of Type 1 Diabetes in Children and Adolescents. APEG. Westmead, 2005. (www.chw.edu.au/prof/services/endocrinology/apeg)

Canadian Diabetes Association Clinical Practice Guideline Expert Committee. Nutrition Therapy, Type 1 Diabetes in Children and Adolescents. In *Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*. CDA. Toronto, 2003. (<http://www.diabetes.ca/cpg2003/chapters.aspx>)

Daneman D, Frank M, Perlman K. *When a Child has Diabetes*. Key Porter Books Ltd. Toronto, 1999.

Hanas R. *Type 1 diabetes in children, adolescents and young adults* 3rd edition. Class Publishing. London, 2007.

International Diabetes Federation Consultative Section on Childhood and Adolescent Diabetes. *Diabetes Information*. IDF. Brussels, 2001.

International Society for Pediatric and Adolescent Diabetes. Consensus Guidelines 2000. Medforum. Zeist, 2000.

Mellor L, Rifkin H, McGill M, Silink M; ISPAD Task Force. International Diabetes Federation's philosophy on childhood and adolescent diabetes. In *ISPAD Consensus Guidelines 2000*. (www.diabetesguidelines.com/health/dwk/pro/guidelines/ISPAD/20.asp)

National Institute for Health and Clinical Excellence. Type 1 diabetes: diagnosis and treatment of type 1 diabetes in children, young people and adults. NICE. London, 2004. (www.nice.org.uk/CG015NICEguideline)

Silverstein J, Klingensmith G, Copeland K, et al; American Diabetes Association. Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care* 2005; 28: 186-212. (<http://care.diabetesjournals.org/cgi/reprint/28/1/186>)

Siminerio LM, Betschart J. *Raising a child with diabetes: A guide for parents*. American Diabetes Association. Alexandria, 1995.

Further reading

Series of articles in *Pediatric Diabetes*. December 2006 – August 2008.