

Medical Management Needs of Children with Diabetes at School

by Rodney A. Lorenz, MD

Management of diabetes in children has changed dramatically in the past decade as a result of research that demonstrated profound health benefits from tighter control of blood glucose levels. Blood glucose management is now more aggressive and treatment strategies are more extensive, even though more flexible. This means that many health professionals' knowledge of diabetes treatment in children needs to be updated. This article briefly summarizes the topic. More details are found in the new resource *Helping the Student with Diabetes Succeed: A Guide for School Personnel*, published recently by the National Diabetes Education Program.

The basic elements of type 1 diabetes management are blood glucose testing, insulin administration, nutrition management to match carbohydrate intake with insulin, and adjusting therapy for glucose excursions or in anticipation of special circumstances. All aspects of the regimen are individualized. There is no single recipe that fits all children. Blood glucose targets, types of insulin used, frequency of blood glucose testing and insulin injections, and details of nutrition management, may all vary among individuals. The family and diabetes care team determine the regimen that best suits each child's individual characteristics and circumstances.

Blood Glucose Monitoring

Most children with diabetes test blood glucose routinely before meals and at bedtime (4 times a day). They also are taught to test when any symptoms occur that could be related to high or low blood glucose. Children should test immediately when they suspect hypoglycemia. Ideally, this test is

performed wherever symptoms occur, i.e., without walking to another location. Children should have access to their testing equipment at all times.

Insulin Therapy

Modern insulin therapy combines slow- and fast-acting insulins, or involves use of an insulin pump to mimic physiologic insulin production. Many children take fast-acting insulin before each meal, and sometimes before large snacks. To match the "meal dose" of insulin with carbohydrate, it is necessary to count carbohydrate intake. Children may use a meal plan with a consistent carbohydrate intake at each meal, matched with a consistent insulin dose, or alternatively may vary their intake and calculate the proper insulin dose by using an insulin/carbohydrate ratio.

Blood Glucose Lows and Highs

Even ideal management does not normalize blood glucose in type 1 diabetes. Most children with well-controlled diabetes will experience episodes of mild hypoglycemia weekly. Recognition of hypoglycemic symptoms, confirmation by blood glucose testing when possible, and prompt administration of 10 to 15 grams of glucose are essential self-management skills. Injection of glucagon is indicated for the rare episode in which consciousness or ability to eat is impaired.

Routine management also includes responding to hyperglycemia. Most children's insulin regimen will include a "sliding scale" or algorithm to increase insulin doses when the blood glucose is high. Glucose levels above 300 mg/dl should also prompt a urine test for ketones. If ketones are moderate or large, or nausea, vomiting, or other systemic

symptoms occur, special "sick day management" procedures should be invoked. High blood glucose causes increased urine output and need for greater fluid intake.

Many circumstances that are a normal part of a child's day will affect blood glucose levels. Exercise and changes in the usual meal content or schedule are common examples. Families can anticipate events likely to influence blood glucose and make adjustments in advance to maintain blood glucose as close to the target range as possible. A common example is to increase carbohydrate intake in anticipation of the hypoglycemic effect of extra exercise. Skillful adjustments of the usual regimen are an important part of effective management.

The Diabetes Medical Management Plan

As is true for children with other chronic diseases, students with diabetes are more likely to succeed in school when school nurses, parents, students, principals, teachers, other school personnel and the student's personal health care team work together to ensure effective diabetes management. The school health team needs to work together to implement the student's Diabetes Medical Management Plan developed by the student's personal health care team and family. This plan describes the student's diabetes care regimen and generally will include the following information:

- Emergency contact information for the student's parents/guardians
- Assessment of the student's willingness and ability to perform self-management tasks at school
- List of diabetes equipment and supplies
- Specific medical orders regarding blood glucose monitoring, insulin, glucagon

and other medications, meal and snack plan, and exercise requirements

- Typical signs, symptoms, and prescribed treatment for hypoglycemia and hyperglycemia

Information from the student's Diabetes Medical Management Plan is used by the school nurse to develop the student's nursing care plan and may be incorporated into the 504, IEP, or other education plan.

Roles and Responsibilities of the School Nurse

The National Diabetes Education Program's new guide on diabetes management provides school nurses with a set of roles and responsibilities for helping to ensure the safety and well-being of children with diabetes. The school nurse's responsibilities are summarized in Table 1.

Conclusion

Management of type 1 diabetes is a complex task that is integral to each school day and demands constant attention and perseverance. Nevertheless, with the help of well-trained professionals, such as school nurses, and working with the student and his or her family, most school personnel can help the student with diabetes succeed. 🌱

REFERENCE

National Diabetes Education Program (2003). *Helping the Student with Diabetes Succeed: A Guide for School Personnel*. Bethesda, MD: National Institutes of Health, NIH Publication No.03-5217.

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Table 1.

HELPING THE STUDENT WITH DIABETES SUCCEED

Actions for the School Nurse*

- Obtain and review the student's current Diabetes Medical Management Plan
- Facilitate the initial school health team meeting for developing the student's 504, IEP, or other education plan
- Conduct a nursing assessment of the student and develop a nursing care plan
- Coordinate development of Emergency Action Plans for school personnel to respond to signs and symptoms of hypoglycemia and hyperglycemia
- Obtain materials and medical supplies necessary for diabetes care tasks from parents
- Perform routine and emergency diabetes care tasks, as needed
- Practice universal precautions and infection control procedures
- Train, assess competence, and monitor trained non-medical personnel who are assigned to help the student with diabetes in case of emergencies or with routine care
- Participate in diabetes management training to attain and/or maintain knowledge about current standards of care
- Maintain accurate documentation of contacts
- Collaborate with other members of the school health team
- Communicate to parents/guardians any concerns about the student's diabetes management or health
- Promote and encourage independence and self-care consistent with the student's ability and maturity
- Respect the student's confidentiality and right to privacy
- Assist the classroom teacher with developing a plan for substitute teachers
- Be knowledgeable about federal, state, and local laws and regulations that pertain to managing diabetes at school

*Adapted from National Diabetes Education Program, *Helping the Student with Diabetes Succeed: A Guide for School Personnel*, 2003.