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## Diabetic Child in the Elementary Classroom

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### Abstract

Efficiently managing the blood glucose levels of the diabetic child in the elementary classroom is essential in maintaining the overall health of the whole child. There are well documented academic, behavioral and health related consequences related to poor care of the diabetic child. The teacher needs to become aware of the nature of the disease and the elements of care in order to effectively manage the Blood Glucose Levels (BGL) of the child. Maintaining desired BGL (between 70- 140) is the 'lynch pin' of ensuring the long and short-term health of the diabetic child.

### Diabetic Child in the Elementary Classroom

Diabetes is a disease that affects 1 in every 400 children in the United States (www.diabetes123.com , 2007). Young children with diabetes require special care and monitoring that is rarely apparent in schools at this time. Teachers do not generally have an awareness of the disease or how to care for a child with the disease and young children may not have the ability to communicate their needs effectively. Efficient management of the blood glucose levels (BGL) is linked to every positive health outcome described in the literature (www.jdrf.org, 2007). This fact makes it imperative that teachers learn to manage the care of the diabetic student in their classroom and be aware of, and capable of addressing, the needs these young children require.

Diabetes is a disease that affects the functioning of the pancreas. With diabetes the pancreas creates little or no insulin which is a hormone the body needs to convert food into glucose. Without the insulin production the body is unable to absorb the glucose into the cells of the body. In people with type I diabetes, the body's immune system has attacked and destroyed the insulin producing beta cells causing high levels of blood glucose. High BGL over time, are linked to several health problems and could cause severe complications or even death. Insulin must be obtained through another source to lower the glucose levels and allow the cells to absorb the food energy. This insulin is delivered into the body via injections or by using the insulin pump (www.jdrf.org, 2007).

Individuals with diabetes are at a greater risk for several health complications. Some of these include periodontal disease, visual impairment, blindness, nerve damage resulting in infections of the foot, hypertension and heart disease, kidney disease, and neuropathy or nerve damage. The prevention of these complications is directly tied to tight control of blood glucose levels. In fact, tight blood glucose management is the lynch pin in prevention of all diabetic related conditions (www.jdrf.org, 2007). Since children spend much of their waking day in the care of school personnel it is essential that these

professionals understand the disease and are able to carry out the needed management regimen that will ensure good BGL's and good health outcomes later in life (www.jdrf.org, 2007)

#### *Diabetes and School Performance*

Investigations linking Type I diabetes and school performance have been researched extensively. Many studies indicate that there is a link between having the disease and school achievement. It has been found that children with type I diabetes demonstrate slightly lower attendance levels (Ryan, Longstreet, Morrow, 1985), lower test scores on visuospatial related measures, an increase of reported behavioral problems, and slightly lower intellectual functioning (McCarthy, Lindgren, Mengling, Tsalikan, Engvall, 2002). All of these studies clearly state that the effects are attributed to psychosocial variables or are only manifest in children having elevated BGL (as indicated by A1c levels of 8% or above) and who have a history of poorly managed BGL. This means that there are few negative academic or intellectual outcomes attributed to the disease itself and that most negative outcomes, if they exist, are attributed to poorly managed BGL (McCarthy, Lindgren, Mengling, Tsalikian, Engvall, 2002). These conclusions again emphasize the importance of managing the disease on a consistent basis.

#### *Diabetes and Social-Emotional Health and Well Being*

The social and emotional health of the young child is affected by this disease as well. Studies have shown that de-stigmatizing of chronic diseases like diabetes assist children in building and maintaining peer relationships that are seen as helpful and supportive in diabetes care (LaGreca, Bearman, Moore, 2002). It is suggested that the classroom teacher educate the children in the class as to the nature and treatment of the disease in an effort to make peers comfortable and more willing to support the child socially and emotionally (LaGreca, et al, 2002). This can be done by allowing students to learn about the disease through books, and presentations. This type of peer involvement can also assist the child in disclosing details about the disease to peers in positive ways thus developing trust and openness about the nature of the disease and its treatment (LaGreca, et al, 2002).

One parent describes what she did to not only introduce the student's peers to the care and treatment but also the parents of the children. This becomes important when parents bring in treats to eat for the class.

“ At the beginning of the year I come into the classroom and read some books to the class that teach them about diabetes and the care it requires. I encourage the children to ask questions. I also test Ally's blood sugar and let them hold the test strips and monitor. I also explain that diabetes is not contagious. This is often a concern. After my visit I send a letter home, through the teacher, to all of the parents in the class. Explaining the disease and to ask them if they could please call me before they bring in treats to class so we can adjust insulin dosage and so Ally can have a treat with her peers. We try to do everything we can to include Ally in all activities with her peers. These things seem to help the other kids and their parents sensitive to these needs.” Mother of child with diabetes, February, 2006.

#### *What Should Teachers Know?*

Much of what teachers should know about caring for children with diabetes is readily available through the Juvenile Diabetes Research Foundation (JDRF) or their local hospitals. Since much of the care involves assistance by school nurses and consulting information provided by the child's doctor, no teacher should ever feel left without resources. What they should know is that care is a collaborative effort that requires open communication between the school, the teacher, the family and the doctor responsible for primary diabetes care. This collaboration will create a care protocol or plan that will ensure that students receive the care they require.

Managing blood glucose levels is of utmost importance and will be the focus of this section.

1. *Build Relationships with Parents and Children:* Sending your child with diabetes to school can be very frightening. The classroom teacher should make special efforts to assure parents that they are going to take care of their children while at school. The building of reciprocal and trusting relationships with families has been widely accepted as 'best practice' in early childhood education for a number of reasons (Bredenkamp, 1997). It seems even more important when a health related issue is at stake. Allow parents to come into the class to 'check' on your care and their child. Educate the children and the parents of your other children about the disease and make them aware.
2. *Educate Yourself about Low and High Blood Sugar Dangers-* When blood sugar levels are not properly maintained students with diabetes are threatened with two possible emergencies: Hyperglycemia (high blood sugar), caused by the buildup of glucose in the bloodstream. Hypoglycemia (low blood sugar), caused by glucose levels dropping too low. Testing blood sugar levels is done using a monitor and test strips. See figure 1 for a description of how to test blood glucose using a monitor.

Both conditions are life threatening if left untreated. In children hypoglycemia tends to occur more rapidly and poses a greater threat to the child (www.jdrf.org, 2007) Hypoglycemia occurs for many reasons. Too much exercise, too much insulin, too little food. This can occur very quickly so it is imperative that you are able to identify the symptoms of hypoglycemia in your student. Refer to the chart below. If you identify any of the characteristics on this list check the child's blood sugar.

***Warning Signs of Low Blood Sugar (www.jdrf.org, 2007)***

- ***Headaches***
- ***Sweating***
- ***Pale, moist skin***
- ***Cold and Clammy***
- ***Extreme sudden hunger***
- ***Weakness/dizziness***
- ***Shakiness***
- ***Fatigue***
- ***Rapid pulse rate***
- ***Blurred or double vision***
- ***Shallow breathing***
- ***Confusion/ inattention***

- ***Loss of coordination***

***Symptoms requiring emergency medical intervention***

- ***Seizure***
- ***Loss of consciousness***

A primary school teacher in a suburban school in Cincinnati, Ohio relates this story of watching an ailing student with diabetes whose blood sugar has become dangerously low:

“During the morning routines I noticed that Ally was crying in the reading center. This was unusual because Ally is typically very happy and I have rarely seen her cry. As I walked toward her to ask her what was wrong she appeared pale and shaky. I asked her what was wrong and she was unable to tell me anything and continued to cry. I immediately went and got her test kit and tested her blood sugar. Her level was 42 mg/dl well below the ‘desired’ level of 70 mg/dl. I took a juice from the ‘care package’ Ally’s mother put together for us and Ally drank it down quickly. She continued to cry a bit but within a minute or two the crying subsided and color came back in her face. About 15 minutes later I tested her blood glucose level again. It now read 75 mg/dl. This was in the ‘safe’ range and Ally was fine. Back to her old self. She was laughing and again engaged in the class” February, 2006.

***Treating Mild Hypoglycemia***

The above story illustrates what is considered ‘best practice’ by diabetes specialists. The teacher identified the signs of low blood sugar, (hypoglycemia) and reacted quickly. A review of what to do in these situations is below.

Check blood sugar. If the student is below 70mg/dl, give them a source of sugar quickly. Common choices are:

- 2-4 glucose tablets
- 6 oz. of soda
- 4-6 oz of fruit juice. (the small Juicy Juice boxes work well)

Avoid cookies, cake chocolate as these have high fat content and absorb relatively slowly. (www.jdrf.org, 2007). Check blood glucose again in 10 minutes. If it has risen above 70 mg/dl then monitor if not administer another 15 gram serving of suggested carbohydrate.

***Treating Severe Hypoglycemia***

If the child is delirious or unconscious do not give food to eat because of risk of choking. Glucagon is a prescription drug taken by injection that causes the liver to release stored glucose into the system. This should be administered immediately. A glucagons hypodermic kit should accompany every diabetic child to school and the classroom teacher, as well as the school nurse, should be trained on how to give the shot when needed.

***Hyperglycemia (high blood glucose levels)***

The emergency condition related to hyperglycemia is ketoacidosis. This condition develops slowly as a result of extended high blood glucose levels but require treatment immediately.

*Warning Signs of Hyperglycemia (www.jdrf.org, 2007).*

- \* *Extreme thirst*
- *Frequent urination*
- *Drowsiness*
- *Sugar in urine*
- *Dry, hot skin*
- *Lack of appetite*
- *High levels of ketones in urine*
- *Fruity smelling breath*
- *Heavy labored breathing*
- *Stupor, unconsciousness*

*Treatment of Hyperglycemia*

- *call doctor/nurse*
- *administer fluids ( without sugar)*

High levels of blood sugar are typically less immediately dangerous than low blood sugars. This is because the child typically does not lose consciousness.

*3. Supplies to Have in the Classroom- Explanations*

- *Lancet Device-* typically a lancet device is provided with the blood glucose monitor. It is used to get a tiny blood droplet from the skin of the student. It is a tiny needle that pricks the finger or forearm of the student. The blood droplet is then absorbed by the test strip.
- *Test Strips-* Tiny strips that are inserted into the blood glucose monitor. The sample of blood is absorbed into the tip of the strip which then renders a number representing the amount of glucose in the system .
- *Blood Glucose Monitor-* This is the tiny hand held electronic unit that calculates the blood glucose levels in the tiny blood sample from the student. The monitor renders a number representing the ratio of glucose to blood in the blood stream.
- *4 oz Juicy Juice boxes (equaling 15 grams carbohydrate) –* These 4 oz. juice boxes are equivalent to one serving (15 grams carbohydrate). These are handy to use when the student is manifesting low blood sugars. Servings are to be given in 15 gram portions until the blood sugars rise above 70 mg/dl.
- *Alcohol swabs-* used to sterilize the area of skin where the blood sample is taken. To be used before and after testing.
- *Hazardous waste container-* Commonly known as a ‘sharps’ container. It is a red container that you use to dispose of test strips and lancets after testing.

Christine, the mother of a six year old child with diabetes creates a ‘care package for each teacher at school and the bus drivers. Each package contains several boxes of juice, a fact sheet listing the symptoms of Hypoglycemia/ Hyperglycemia and treatment options, and emergency phone numbers.

“This way all of Ally’s teachers and care givers are educated as to how to treat lows and highs. It also makes them aware of her condition and the necessity of keeping an eye on her at all times”.

#### *4. Knowledge of 504 Plans*

Section 504 of the rehabilitation Act of 1973 states that a student may not be denied the benefits of a program on the basis of their disability or medical condition (Richards & Lindsey, 2005). This statute provides a way for parents and schools to write a binding legal document formalizing the plan of care for a child requiring treatment for diabetes. This document will serve as the formal plan of care and its writing is a guaranteed right of the parent and child in public schools. Its existence requires schools to provide a free and appropriate education that is not altered significantly because of the care provided. In other words a plan must be created that does not adversely affect the child’s access to all of the benefits of education. It ensures full participation in extracurricular activities as well as necessary modifications for testing situations and certain academic requirements.

For most children with diabetes this simply means that their care takes place with as little disruption to their day as possible. For example, when checking blood glucose levels effort should be made to limit the time spent out of class. Limiting time out of the classroom, access to snacks and water, nurse accessibility, restroom availability and curriculum modifications as required, should occur without penalty to the student (Richards & Lindsey, 2005). Examples of written 504 plans are available at the JDRF web site, search for 504 plans.

#### *Conclusion*

Children with diabetes require specialized care in the classroom. This requires teachers to aware of the dangers of low and high blood glucose levels. These conditions are linked to many long term ailments in people with diabetes. All negative academic outcomes are also linked to poor blood glucose management. These facts make it imperative that teachers be aware of how best to care for students with diabetes. As part of the development of a strong plan for care, a 504 plan is often required. Knowledge of the purpose and the function of this document are essential for teachers to be familiar with when developing a care plan for a child with diabetes.

Figure 1 - How to test blood glucose levels using a blood glucose monitor