

A Team Approach

A Group Approach to Nutritional Problem Solving Using Self-Monitoring of Blood Glucose With Diabetic Adolescents

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The most difficult part of diabetes management for many individuals, including adolescents, is the diet.^{1,2} With the advent of self-monitoring of blood glucose (SMBG), a greater degree of dietary flexibility is possible.^{3,4} The Michigan Diabetes Research and Training Center (MDRTC) developed a nutrition intervention module to communicate diabetes nutrition and SMBG concepts to groups of adolescents and their parents. SMBG can enable adolescents to take a more active and informed role in their diabetes nutritional management.⁵

Program Description

The team consisted of a pediatric clinical nurse specialist, a dietitian, a psychologist, and pediatric endocrinologist. Adolescents and parents met in separate, concurrent groups. The nurse coordinated the adolescent sessions that were based on a problem-solving, hands-on curriculum. The psychologist facilitated the parent group sessions that focused on the family and the developmental repercussions of diabetes management. The

dietitian met with both groups to implement the nutrition module "Meals, Snacks, and Blood Glucose Monitoring." The module was designed to encourage adolescents to use SMBG to evaluate meal planning, to facilitate information exchange, and to identify diabetes nutrition concerns of adolescents and their parents. The physician conducted physical examinations and discussed diabetes care with adolescents on an individual basis following the group sessions.

Adolescent Group

Thirty adolescents, aged 11–15 years (mean = 12.7 years), with an average disease duration of 4.9 years, participated in the program. Small groups of five to seven adolescents with insulin-dependent diabetes mellitus (IDDM) met together for a single 90-minute session. This educational intervention was integrated into routine pediatric diabetes clinic visits.

Teens were grouped by sex to enhance peer interaction and open communication of concerns and problems. The adolescents were instructed to come to the clinic fasting. Each adolescent obtained a fasting blood sugar level, using either the Glucoscan Plus (LifeScan Inc, Mountain View, Calif) or Accu-Chek bG (Boehringer Mannheim Corp, Indianapolis) blood glucose monitor, and then administered the prescribed morning dose of insulin. The nurse observed the SMBG and the

insulin administration and reviewed techniques with each individual. Twenty-nine subjects were on a split, mixed dose of insulin; one used multiple daily doses of regular insulin.

Adolescents selected their own breakfast at the hospital cafeteria and then ate together in a group with the nurse. No guidance was given about food selection. After breakfast, the group returned to the clinic to meet with the dietitian.

In an introductory group exercise, the group converted each person's breakfast into exchanges. Each adolescent stated what he/she had eaten for breakfast, and the group identified the food exchange groups and number of exchanges consumed. This peer interaction provided an opportunity for teens to demonstrate nutrition exchange knowledge, as well as to facilitate a group review of the exchange system. Blood glucose was measured 1/2 hour, 1 hour, and 1 1/2 hours after eating. Thus, each participant had several opportunities to practice SMBG in a supervised setting. A two-hour measurement after the group had dispersed was also recommended. Each teen plotted his/her blood glucose response on a graph. This exercise helped the teens correlate their blood sugar response to the breakfast they had consumed. The hands-on SMBG and graphing led into a discussion about how to use SMBG to measure the effects of food, what factors affect the glycemic response of

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foods, how to develop a glycemic chart, what ingredients are in a food, and how to experiment with different foods in the diet.

Questions such as "What if I want to have a milkshake with my friends at McDonalds?" or "What do I do on the nights I have swim team?" led to discussions on fast foods, how best to include sugar-containing foods in the diet, how to determine the appropriate time for exercise, and what foods to eat as exercise snacks. Throughout the session SMBG was emphasized as a gauge for nutritional planning.

Each adolescent received a notebook containing information, articles, and references on the glycemic response of foods, treatment of hypoglycemia, exercise snacks, and exchange values for fast foods and convenience foods.

Parent Discussion Groups

Parent discussion groups focused on nutritional and developmental concerns. The dietitian and psychologist addressed specific parental questions about diet, food-related behaviors, and communication in the family.

Parent discussion topics were similar to those raised by the adolescents. Parents were particularly interested in glycemic index information and in the pros and cons of alternative sweeteners. A very positive factor of the group experience was the opportunity for parents to voice worries and find out that similar issues were shared by others. Parents were concerned about not knowing what their adolescent was eating and about secretive eating of sweets, skipped meals, and snacks. Adolescents have the responsibility for much of their own dietary management, but parents continue to be concerned about the food selection made by their adolescents.

Evaluation and Assessment

Five-item pre- and posttests, designed to assess present knowledge and gains from session topics, were given to the adolescent groups. Pre- and posttest items were in true/false format and assessed knowledge of nutritional concepts. Parents completed only the pretest. This was used as a springboard for group discussion.

Items from the pretest and posttest are listed in Table 1. The percentage of adolescents who responded correctly to

Table 1. Five-Item Pre- and Posttests: Percentage of Correct Responses

Pretest Item	Percent Correct	Posttest Item	Percent Correct
1. Foods such as pop and Lifesavers cause a more rapid rise in blood sugar than ice cream and vanilla wafers. (<i>True</i>)	92%	1. Sweet foods containing protein and/or fat (such as ice cream) are absorbed more slowly than soda pop and Lifesavers and cause a slower, smoother rise in blood sugar. (<i>True</i>)	96%
2. Snack foods like Doritos, french fries, and ice cream should <i>not</i> be included in a diabetic diet. (<i>False</i>)	92%	2. Snack foods like pizza, Nachos, and a Big Mac <i>may</i> be included in a diabetic diet. (<i>True</i>)	100%
3. Your blood sugar reaches its peak within 1/2 hour after eating a meal. (<i>False</i>)	35%	3. Your blood sugar reaches its peak within 1-2 hours after eating. (<i>True</i>)	96%
4. Foods within the same exchange group may affect the blood sugar differently. (<i>True</i>)	84%	4. One slice of bread and 1/2 cup spaghetti may affect the blood sugar differently even though they are both one bread exchange. (<i>True</i>)	100%
5. Skim milk and fruit juices are good foods to eat if you are having a hypoglycemic reaction. (<i>True</i>)	77%	5. List two foods that would be best to use to treat a hypoglycemic reaction:	96%

each item at pre- or posttesting is also provided in Table 1. On the pretest, adolescents most frequently missed the item "Your blood sugar reaches its peak within 1/2 hour after eating." Only 35% of the participants answered this item correctly (ie, false). However, on the postsession probe, 96% of the adolescents answered this item correctly. This represents improvement in knowledge and demonstrates that an active problem-solving approach can be an effective tool in teaching adolescents. Other items showed similar, but less dramatic, improvement. In summary, despite the brief and exploratory nature

of this evaluation, it is clear that adolescents improved, at least for the short term, their understanding of core nutritional concepts.

At the conclusion of the sessions, parents and adolescents were asked to complete a brief information survey that focused on the most difficult aspects of the youngsters' diets and areas in which more information was desired. Parents and teenagers were asked, "What is the most difficult aspect of the diet for you?" Adolescents' responses fell into four categories: (1) the timing of meals and snacks, or temporal regularity; (2) the social

Table 2. Topics About Which More Information Is Wanted by Parents and Adolescents

Topics	Percentage of Parents Responding (N=22)	Percentage of Adolescents Responding (N=30)
Hypoglycemic reactions	33%	0%
Snack foods	61	76
Weekend schedule changes	55	47
Early or delayed meals	50	12
Traveling/eating out	67	29
Fiber	50	12
Glycemic index	28	29
Exchanges	33	29
Exercise snacks	50	47

stigma of eating differently from family members or peers; (3) the restriction of concentrated sugars; and (4) a global difficulty in following the diet plan, without mention of a specific problem area. Similarly, parental responses grouped into three categories: (1) the timing of meals, including planning meals; (2) adolescents skipping snacks; and (3) trying to enforce restrictions. Clearly the issue of regularity of meals and snacks was a central concern to both adolescents and their parents and reflects the irregular day-to-day schedules that are typical for most teenagers.

Both adolescents and parents were asked to indicate nutritional areas in which they would like more information. Responses are summarized in Table 2. Both parents and adolescents perceived that they needed more infor-

mation about snack foods and exercise snacks. Both groups wanted to learn more about adjusting to weekend schedule changes, while parents were especially interested in more information about traveling and eating away from home.

Conclusions

Adolescents and their parents need to be updated on current dietary information and meal-planning strategies to complement a varied life-style. SMBG is a key tool to evaluate dietary adjustment and to make possible the flexibility so necessary to healthy adolescent development. Our program indicated that diabetes nutrition education can be effectively implemented in a clinical setting using a team approach with small groups of adolescents and their parents.

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