An Ambulatory Approach to Self-Care of Diabetes

Fred W. Whitehouse
Iris J. Whitehouse
Mary Sue Cox
Dorothy M. Kahkonen

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Managing the insulin-requiring diabetic patient in an ambulatory setting includes metabolic regulation of the diabetes and education in its self-care. Means of achieving these goals include structured group or one-on-one individualized sessions. Third party policies relating to ambulatory care are challenged and their need for fiscal support emphasized. During the coming decade, diabetic patients should 1) have access to ambulatory care programs for metabolic regulation and education in self-care, 2) expect third party support of these programs, and 3) heighten their own priorities on diabetes care to ensure quality management of their diabetes. (Henry Ford Hosp Med J 1991;39:35-40)

Previous reports have indicated advantages to ambulatory (outpatient) regulation of diabetes and concomitant education in self-care (1-3). Responding to restrictions in funding of hospital care by diagnosis-related groups (DRGs), to the rising cost of daily hospital care, and to a patient preference to remain out of the hospital, we started in 1979 an ambulatory program designed to establish metabolic regulation and self-care education for the diabetic patient. Subsequently, inpatient hospital care for diabetes regulation has proved necessary only when the insulin-requiring patient is acutely ill with decompensated diabetes or lacks substantial support in the home.

Teaching self-care can be achieved in small groups with a structured program following a planned curriculum or by one-on-one sessions between the patient and an educator during which a pertinent single issue is addressed. Single issues can include insulin administration technique, the mixing of two insulins in the same syringe, preventive foot care, coping with hypoglycemia, or instruction in self-monitoring of blood glucose. Appropriate follow-up evaluation can be accomplished by return visit in the office or by a home health care nurse. At some group sessions single issues are discussed (i.e., coping with diabetes, avoiding risk factors).

Experience with a structured outpatient program in a pilot study encouraged us to continue the small group approach (1). Wilson and colleagues (3) reported successful initiation of insulin in an ambulatory setting using single visits and close follow-up. Satterfield and Davidson (4) emphasized a team approach to education in self-care and treatment and noted a decline in the prevalence of ketoacidosis and lower limb amputation. Assal et al (5) summarized the European experience with patient education as a basis for diabetes care, emphasizing structured diabetes education and follow-up.

We reviewed experience with our structured outpatient program (Ambulatory Diabetes Regulation and Education Program [ADREP]) from July 1983 to June 1986 with follow-up through December 1988. We also analyzed our experience from September 1986 through December 1988 with single-issue instruction in diabetes self-care in which patients met one-on-one with a nurse educator or dietitian. Both programs are now available to our patients new to insulin and to those using insulin whose treatment requires adjustment or intensification.

Ambulatory Diabetes Regulation and Education Program

ADREP is an outgrowth of our pilot outpatient diabetes regulation and education program. Its purposes include avoidance of hospitalization, initial regulation of the newly diagnosed insulin-requiring diabetic patient, education of the patient in self-care of the diabetes, and readjustment of insulin in patients who take insulin. Table 1 lists those diabetic patients who we believe are most suitable for this structured program. Other patients who respond better to a single-issue educational experience are not enrolled in ADREP (Table 2).

On the first day the patient completes a pre-test given by the nurse educator and a needs assessment which is reviewed by the nurse educator and the dietitian. This is followed by a three-day, seven hours/day, instruction period using a curriculum which addresses pertinent issues related to diabetes self-care. The program includes the initiation of insulin for the diabetic patient new to insulin or the adjustment of an insulin program for an insulin-taking person. Staff personnel for ADREP include a nurse educator, dietitians, and diabetologists. After completion of the program, participants return to their referring physician or nurse.

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*Division of Endocrinology and Metabolism, Henry Ford Hospital.
Address correspondence to Dr. Whitehouse, Division of Endocrinology and Metabolism, Henry Ford Hospital, 2799 W Grand Blvd, Detroit, MI 48202.
clinician. Subsequently, a two-hour follow-up session is held two to six weeks later. Details of the ADREP curriculum are outlined in the Appendix.

The Michigan Department of Public Health has developed standards for diabetes patient education programs to assure a high-quality educational program as well as to persuade third party payers to fund patient participation in a certified program (6). ADREP was certified by the Michigan Department of Public Health in 1985 and recertified in 1988. Though this certification is sufficient for fiscal support by some third party payers in Michigan, ADREP also has been certified by the American Diabetes Association upon fulfilling their standards (7). As required by both sets of standards, curricular status, budgetary items, and assessment of educational quality of the instructors are reviewed annually by an advisory committee to ADREP.

A total of 267 patients enrolled in ADREP from July 1, 1983, through June 30, 1986. We reviewed their need for hospital care subsequent to completion of the four-day session. Reasons for hospitalization were analyzed and judged related to a breach in successful diabetes self-care or to factors unrelated to diabetes self-care. Those admissions related to hypoglycemia, ketosis and acidosis, severe hyperglycemia, need for “regulation of diabetes,” and acute foot problems (i.e., diabetic ulcer, cellulitis) were deemed causally related to diabetes self-care. All other admissions were judged unrelated to diabetes self-care. Follow-up information was adequate if the patient, a knowledgeable family member, or a primary care physician supplied pertinent interim history. Admissions by these patients to Henry Ford Hospital were reviewed through December 31, 1988. Of 267 patients reviewed, 174 (66%) had adequate follow-up. Of these 174 patients, 100 did not require hospital care. The remaining 74 patients had 107 hospital admissions. Of these 107 admissions, 92 (86%) were unrelated to diabetes self-care while 15 (14%) related to self-care. Patients who completed ADREP in 1988 and 1989 are now being studied for frequency of emergency room visits, urgent office visits, and quality of metabolic control of the diabetes.

**Single-Issue Instruction**

While there are advantages to group classes in diabetes self-care, many patients cannot attend a four-day session. Some patients cannot afford the out-of-pocket expense for the group program, others cannot arrange time off from work or home, and still others are instructed more appropriately in individual sessions with a nurse educator or a dietitian. Our nurses use patient assessment sheets for self-monitoring of blood glucose and for adjustment of insulin dosage. At times the patient will start insulin therapy after individual instruction and learn first how to give insulin and implement a modified diet. Instruction

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### Table 1

**Preferred Candidates for ADREP**

<table>
<thead>
<tr>
<th>A. Literate in English</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Committed to self-care</td>
</tr>
<tr>
<td>C. Committed to insulin treatment</td>
</tr>
<tr>
<td>D. Understanding and accepting of the time requirements of the program (four consecutive days)</td>
</tr>
<tr>
<td>E. A committed family member</td>
</tr>
<tr>
<td>F. Have good home resources</td>
</tr>
</tbody>
</table>

### Table 2

**Patients Better Helped by “Single Issue” Individual Teaching**

<table>
<thead>
<tr>
<th>A. Functionally illiterate in English</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Emotionally impaired</td>
</tr>
<tr>
<td>C. Uncommitted to self-care of diabetes including insulin treatment</td>
</tr>
<tr>
<td>D. Cannot commit four consecutive days</td>
</tr>
<tr>
<td>E. Children</td>
</tr>
<tr>
<td>F. Physically impaired (blind, deaf, demented, neuromuscular deficit)</td>
</tr>
</tbody>
</table>

### Table 3

**Nutritionist III**

<table>
<thead>
<tr>
<th>Components</th>
<th>Actual</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>96%</td>
<td>15%</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>91%</td>
<td>55%</td>
</tr>
<tr>
<td>Fat</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>4%</td>
<td>0%</td>
</tr>
</tbody>
</table>

+ Excerpted from 57 individual nutrients.
in self-monitoring of blood glucose, in care and prevention of hypoglycemia, and in preventive foot care may follow. Data are not available about patient preference for the single-issue program versus ADREP. Fees for a series of individual sessions may match charges for ADREP.

From September 1986 to June 1989, 156 patients attending our clinic started insulin therapy through one-on-one contact with a nurse educator. In general, these patients took a morning injection of insulin under the supervision of the nurse and subsequently visited from two to six times over the ensuing weeks for insulin dosage adjustment and technique assessment. Some patients were assisted in their home by home health care nurses when it became apparent that daily assistance and reinforcement required by the patient would be prolonged. The combination of office instruction and home health care support has interdicted hospitalization in this group of patients. Data on subsequent need for hospital and/or emergency care in these patients are now under study.

Access for a diabetic patient to a dietitian has been possible at our institution for over 50 years. For patients who require individual instruction, our dietitians use either a meal plan that follows the pattern recommended by the American Diabetes Association or one modified for those whose needs are idiosyncratic. We have identified a cadre of patients who do better with a simplified diet plan rather than the more complex exchange system. There are some patients who prefer to follow a fixed meal plan which permits less choice but retains accuracy.

Our dietitians often use a computerized analysis of a prospectively recorded diet diary (Nutritionist III, N-Squared Computing, Silverton, OR) (Table 3). Following specific instruction by the dietitian in the proper collection of data, patients will record as accurately as possible a three-day food intake. These data, as recorded by the patient, are analyzed by the dietitian who obtains a computerized summary of each day’s diet and a three-day mean. Detailed information on macronutrients, calories, and several micronutrients is available. It is possible for the dietitian to learn the percentage and types of carbohydrate ingested, the percentage of fat ingested and its nature, and how much protein was eaten. We favor this approach in some patients who require an individualized meal plan and in other patients to assess the accuracy of daily intake and the degree of daily variation from a prescribed meal plan. When a patient analyzes a personal diet along with the dietitian, Nutritionist III serves as a valuable educational tool.

**Third Party Issues**

People with diabetes face increased medical care costs related to the frequency of visits to health care professionals, to risk factor monitoring, and to the purchase of supplies for insulin use.
and for the self-monitoring of blood glucose. Annual out-of-pocket expenses may exceed $1,000; third party reimbursement for some of these expenses enhances the likelihood of quality self-care of the diabetes.

Obstacles to third party assistance include health insurance plans that delay the coverage of a patient with diabetes or fail to cover for preexisting medical problems. At present, patients admitted to the hospital pay little out-of-pocket expenses, though the cost to the health care system is considerable. (In 1990 the daily charge for a semiprivate room at Henry Ford Hospital was $454.)

Patients who are managed outside the hospital often will have out-of-pocket expenses when third party payers fail to cover those charges which would have been covered had the patient been in the hospital. Charges to patients who participate in structured ambulatory diabetes regulation and education programs which are certified under the standards of the Michigan Department of Public Health are covered by some third party carriers including Medicare, Medicaid, some health maintenance organizations, and several commercial insurance companies. Yet the largest commercial health insurance payer in Michigan (Blue Cross and Blue Shield of Michigan) has never reimbursed patients who attend a certified ambulatory diabetes regulation and education program. Of the last 222 patients who completed ADREP, 87 were covered by a health maintenance organization (Health Alliance Plan), 54 by Medicare, 14 by Medicaid, 34 by Blue Cross/Blue Shield, and 33 by other companies. Blue Cross/Blue Shield insured 15% of patients who completed ADREP even though it covered 27% of patients who made office visits to our clinic during 1988. These data suggest that the number of patients covered by Blue Cross/Blue Shield who are referred to ADREP is lower than those patients who visit us regularly. We lack data on how many patients are referred to ADREP but do not attend because of the out-of-pocket expense.

Discussion

Current practice favors as much medical care as possible in an ambulatory setting. This trend is based largely on higher costs for inpatient care and patient preference for an ambulatory setting. Many health care professionals are attempting to achieve quality diabetes care in an ambulatory atmosphere. For those pa-
Patients admitted to the hospital for the acute care of decompensated diabetes, short-term help with insulin administration, diet, and self-monitoring of blood glucose can achieve metabolic recompensation. The patient can be assessed for long-term self-care shortly after discharge. This assessment may result in: 1) enrollment in a structured diabetes regulation and education program (like ADREP), 2) enrollment for individual instruction in one-on-one sessions, and 3) use of home health care personnel for one-on-one sessions in the patient’s home.

Third party support of outpatient regulation and education in diabetes self-care has not kept pace with the change in medical practice. Too often the patient, being spared hospital care and sent home early (driven in part by DRGs), is required to pay out-of-pocket expenses for further regulation and education in diabetes self-care that formerly would have been accomplished during the hospital stay. Indeed, the current short hospital stay prevents any self-care instruction except for initial contacts that teach survival techniques. At times the patient may fail to follow up as scheduled because of further charges expected. As mentioned, with certified diabetes patient education programs available, some, but not all, insurance companies will underwrite charges to an individual patient for attendance at a certified program. Yet when one-on-one sessions are required, patient charges are often not covered.

It seems reasonable that the diabetic patient who remains out of the hospital because of access to an ambulatory regulation and education program should not be required to pay personally for these services. Rather, all third party payers ought to be willing to underwrite the charges to patients who participate in approved (certified) ambulatory activities in diabetes self-care when the more expensive hospital admission is avoided. This situation has not been the case for the last 10 to 15 years in Michigan.

We are now in a period between full fiscal support for necessary inpatient care of the diabetic patient and adequate fiscal support for the patient who requires regulation of diabetes and education in self-care but who remains out of the hospital. Third party payers through DRGs place restrictions on the number of inpatient days covered for management of diabetes. Some admissions for management of diabetes are challenged by professional review organizations. Short inpatient stays interfere with teaching of quality self-care. Patients are discharged as soon as they are deemed “clinically stable.” When they visit an ambulatory setting, the third party payers often fail to underwrite further metabolic regulation and education in self-care. The patient is squeezed between two policies: keep the inpatient stay to a minimum and challenge many stays but do not underwrite the use of ambulatory programs even when they are certified.

The recommendations of the Diabetes Control and Complications Trial (DCCT) will be available in the mid 1990s (8). If a statement emerges from this study relating quality diabetes control to the prevention or amelioration of small blood vessel complications, the diabetic person will require quality education in self-care in order to sustain acceptable metabolic control.

Achievement of quality control in an outpatient setting will require full third party support for ambulatory diabetes regulation and education. This support should be available even now as we mimic the goals of the DCCT in many of our patients. Third party payers, health care professionals, and patients with diabetes and their families will need to collaborate on implementing the best way to ensure quality management of diabetes. Understanding that self-care education is an integral part of diabetes management might persuade third party payers to realize that education as such is not being covered; rather, education in self-care is covered because it is a means to achieve quality diabetes control. The diabetic patient will need to heighten the personal priority to diabetes care. Health care professionals, educators, and planners should offer sufficient self-care programs so that any diabetic person will have access to such a program.
When third party payers underwrite the necessary diabetes self-care in an ambulatory setting, they should expect lessened hospital costs from diabetic patients. The diabetic patient and his/her family should implement quality self-care, especially as the medical community develops a consensus on the nature of that self-care. Responsibility for self-care by the patient can be enhanced when means are devised to permit implementation of self-care with a minimal degree of disruption of the patient’s lifestyle. It is possible that, in larger communities, central areas for learning diabetes self-care might serve the entire medical community. In areas of lower population density, one-on-one individualized instruction could be the pattern with referral to a medical center for selected patients. Standards of medical care for patients with diabetes have been published and can be used as guidelines (9). For those patients with limited resources, understanding, or motivation, frequent contacts with health care personnel and specially designed programs may assist the patient to minimize medical problems secondary to the disease.

Appendix
ADREP Curriculum Outline

I. Definitions and basic pathophysiology of diabetes
   A. Blood glucose range
      1. Normal
      2. Diabetic
   B. Insulin and its function
   C. Symptoms of insulin lack
   D. Effects of stress and obesity on diabetes
   E. Types of diabetes

II. Risk factors for long-term complications for the person with diabetes and reduction of their risk factors
   A. Specific to diabetes
      1. Retinopathy
         a) Annual eye examination by ophthalmologist
         b) Informal referral to ophthalmologist
            1) To patient in writing
            2) To physician in referral letter
      2. Nephropathy
      3. Neuropathy
      4. The “diabetic foot”
         a) Referral for podiatric care in writing
         b) To physician in referral letter
   B. General to all persons
      1. Coronary artery disease
      2. Hypertension
      3. Peripheral vascular disease
      4. Cerebrovascular disease and stroke
      5. Hypercholesterolemia
      6. Hypertriglyceridemia
   C. Related to pregnancy and prepregnancy
      1. Control of blood glucose (avoidance of hyperglycemia)
      2. Hypertension
      3. Toxemia
      4. Congenital malformations
      5. Macrosomia
      6. Neonatal complications
         a) Hypoglycemia
         b) Hypocalcemia

III. Nutrition
   A. Types of diets used for diabetes
      B. Caloric content, carbohydrates, and protein
      C. Fat content, amount of fat used, and type of fat preferred
      D. Types of food to be eaten
      E. The diet and daily living
      F. The diet and exercise
      G. Individual food selection

IV. Alcohol beverages and relationship to hypoglycemia

V. Insulin
   A. Types, origins, and strengths
   B. Amounts used
   C. How to administer
   D. Actions of insulins
   E. Daily care of insulin

VI. Review and/or explanation of medications currently taking
   A. Oral agents for control of diabetes
   B. Other drugs
   C. Over-the-counter drugs

VII. Home monitoring for diabetes
   A. Self blood glucose monitoring
   B. Urine glucose monitoring
   C. Ketone measurement

VIII. Interrelationship between diet, exercise, and medications

IX. Hemoglobin A1c
   A. Normal level
   B. Acceptable level (Henry Ford Hospital) for diabetes control

X. Hypoglycemia/hyperglycemia
   A. Identify it and its causes
   B. Prevention
   C. Treatment

XI. Exercise

XII. How to stay well; complicating illness

XIII. Foot care and general hygiene

XIV. Self-care
   A. Responsibility for own care
   B. Sources of community help
   C. Coping skills in diabetes

References