

# Time Needed for Diabetes Self-Care: Nationwide Survey of Certified Diabetes Educators

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## ABSTRACT

**Purpose.** To approximate the time required for self-care of individuals with diabetes, as estimated by certified diabetes educators (CDEs).

**Methods.** A survey was sent to the CDE member list of the American Association of Diabetes Educators (AADE). The survey asked the CDEs to estimate the time in minutes/day needed for 1) each component of diabetes self-care and 2) all components of diabetes management as recommended by the American Diabetes Association and AADE. Estimates were for two sample patients: 1) an adult with type 2 diabetes (for at least 1 year) on oral medications who performs self-monitoring of blood glucose (SMBG) twice daily and 2) a school-age child with established type 1 diabetes (for at least 1 year) who takes four insulin injections per day and has SMBG four times daily.

**Results.** A total of 674 CDEs completed and returned the survey. The mean times needed for an adult with type 2 diabetes for routine, daily diabetes self-management and for all recommended components of self-care were estimated to be 66 and 234 minutes, respectively. The mean times needed for a child with type 1 diabetes for routine, daily diabetes self-management and for all recommended components of self-care were estimated to be 78 and 305 minutes, respectively.

**Conclusion.** The total estimated time needed daily for recommended diabetes self-care was ~4 hours for adults and >5 hours for children—far more than is reasonably feasible for most people with diabetes. This information should be considered when helping patients with diabetes achieve self-care goals.

Diabetes is a chronic disease that requires lifelong metabolic control (of glucose, lipids, and blood pressure) to reduce the risk for major microvascular and macrovascular complications. Once diagnosed, individuals with diabetes and their families have to make major changes to their daily routines in addition to learning effective diabetes self-management skills to help control diabetes. These changes can be facilitated through diabetes self-management education. However, <7% of people with diabetes attend diabetes self-management education programs

within the first year of diagnosis (1). Further, diabetes self-care habits and skills are needed for a lifetime and may change based on stage of life, duration of disease, and presence of complications (2). In 2015, the American Diabetes Association (ADA) and the American Association of Diabetes Educators (AADE) developed a joint position statement on the standards for diabetes self-management education and support (3) to help individuals effectively manage diabetes.

AADE highlights seven essential patient self-care behaviors that have

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been shown to benefit individuals with diabetes: healthy eating, regular physical activity, self-monitoring of blood glucose (SMBG), compliance with medications, good problem-solving skills, healthy coping skills, and other risk-reduction behaviors (e.g., foot care and oral care) (3). Although routine diabetes self-care for adults is largely managed by the individual, it has been estimated that up to 95% of daily self-care for young children with diabetes requires the assistance of a parent or responsible adult, depending on the age and maturity of the child (4). The amount of time required for patients (and/or parents) to perform all of these tasks every day is a significant burden that can interfere with normal daily activities. In addition, time is also required to obtain diabetes medications and durable medical supplies (i.e., getting prescriptions and contacting insurance companies and suppliers), go to medical appointments, and complete diabetes education programs. Even routine tasks that are universal for all individuals (e.g., grocery shopping, cooking, exercising, and managing stress) change significantly once a person is diagnosed with diabetes, resulting in additional time for planning and execution of these tasks (5).

Although patients, families, and health care providers are aware of this time burden, only one previous study reported a quantitative estimation of the time required for daily self-management (6). This survey included eight certified diabetes educators (CDEs) in a focus group who estimated the time it takes for an adult with type 2 diabetes to complete a daily routine (6). The CDEs estimated that an additional 122 minutes/day (~2 hours) was required for routine self-management tasks (6). Additional activities such as monitoring blood pressure; managing stress; attending support groups; scheduling appointments; communicating with educators, physicians, and insurers; filling prescriptions; and obtaining supplies added another 21 minutes/

day for a total of 143 minutes/day (~2.5 hours). They also estimated it would take even more time for patients with newly diagnosed diabetes or for patients with major microvascular or macrovascular complications (6).

For patients with type 1 diabetes, premeal carbohydrate counting and insulin bolus calculations are required for every meal and snack. These challenging steps require skill and additional training and time. Further, exercise and sports often require additional adjustment of insulin and/or pre- and post-exercise snacks based on the intensity or duration of activity and also require additional time for each activity. No previous studies have reported the estimated time requirements for self-care for patients with type 1 diabetes.

The goals of the current national survey of CDEs were twofold: 1) to determine their time estimates for the self-care of two hypothetical patients: an adult with type 2 diabetes on oral medications only and a child with type 1 diabetes on multiple doses of insulin; and 2) to determine whether there were differences in the time requirement estimations of CDEs who were registered nurses or registered dietitians or from different geographic regions of the country.

### Methods

A list of all CDEs was obtained from AADE. A survey was mailed to 7,784 CDEs on the AADE mailing list. Paper surveys were sent by postal mail to the entire list. Questions pertained to the demographics of the AADE members, the type of health care training they had, the duration of their role as a diabetes educator, the region of the country in which they lived, whether they were in a rural or urban environment, and whether they had diabetes.

Participants were provided with an introductory letter and two surveys based on case scenarios. The first scenario was an adult with established type 2 diabetes who was taking oral

medications and performing SMBG two times/day. We asked participants about daily activities (diabetes survival skills) that included performing SMBG, taking medications, carrying out foot care and oral care, obtaining supplies, and attending medical appointments. We asked participants to include estimated times for food shopping, meal planning, and meal preparation (other general components of diabetes self-care). Finally, we asked about time needed for other recommended components of self-care such as exercise, stress management, and support groups.

The second survey described a child with established type 1 diabetes on basal-bolus insulin therapy (four shots/day) and a minimum SMBG of four times/day. In this scenario, we asked participants to estimate the time for SMBG, insulin administration, recordkeeping, oral and foot care, problem-solving, obtaining supplies, appointments, and support groups. In addition, we asked about the child's time for exercise and stress management, and also parental time for shopping, meal planning, and preparing meals; visiting the child's school; and managing the child's extracurricular activities.

The surveys were based on the seven AADE self-care behaviors. The questions were modified from the focus group study completed by Russell et al. (6). The survey was then beta tested for clarity with a local group of diabetes educators. To ensure content validity, CDEs were involved in modifying the survey before widespread dissemination.

Blank spaces were left for participants to fill in responses about the times needed to complete each self-care task. For ease of comparison, the activities that were not done daily were summed up per week and then divided by 7 to get a daily time estimate. If a person left an item blank (e.g., some participants said they do not work with kids), we did not include the answer in the database. If participants provided a range for

the activity, the mean was calculated, and the total was rounded up to the nearest whole minute.

Surveys were completed and returned to the team by U.S. mail. Data were then entered into an Excel spreadsheet (2013; Microsoft, Redmond, WA) and analyzed for descriptive frequencies (mean and SD for time in minutes). The general linear model was used when comparing three or more groups, and Duncan's multiple range test was performed to separate means. Independent *t* tests were performed when comparing two groups. Statistical significance was established at the 5% level. SPSS version 16 was used (SPSS, Chicago, IL). This study was approved by the Ohio University institutional review board.

### Results

Of 7,784 surveys mailed to CDEs nationwide, 674 were returned (8.7% response rate), and results are depicted in Tables 1 and 2.

#### Summary of Survey Results for an Adult with Type 2 Diabetes

The estimated time needed for diabetes self-care per day for an adult with type 2 diabetes is depicted in Table 1. Time for routine daily self-management (SMBG, recordkeeping, taking medications, foot care, oral care, problem-solving, and obtaining supplies) was estimated to be 66 minutes, whereas the total time for all recommended components of daily self-care, including exercise, was estimated to be 234 minutes (~4 hours).

A breakdown of the estimated times for individual tasks involved in diabetes self-care included 20 minutes to perform SMBG and record results twice a day. Preventive measures such as foot and oral care added 14 minutes, whereas another 98 minutes were required for routine meal planning, shopping for food, and preparing food. Finally, 32 minutes was required for exercise each day.

#### Summary of Survey Results for a Child with Type 1 Diabetes

The total estimated time for self-

**TABLE 1. CDE Estimation of Time Needed for Self-Care Activities for an Adult With Established Type 2 Diabetes on Oral Medications and Performing SMBG Twice Daily**

ADA-Recommended Task	Time Needed $\pm$ SD (minutes)
SMBG	11 $\pm$ 26
Recordkeeping (e.g., fasting serum glucose and blood pressure)	9 $\pm$ 13
Taking medications	8 $\pm$ 8
Foot care	6 $\pm$ 6
Oral care	8 $\pm$ 6
Problem-solving	13 $\pm$ 15
Obtaining supplies	11 $\pm$ 16
Meal planning	21 $\pm$ 18
Shopping for food	23 $\pm$ 24
Preparing meals	54 $\pm$ 32
Exercise	32 $\pm$ 17
Stress management	16 $\pm$ 19
Support/support groups	13 $\pm$ 19
Scheduling medical appointments	9 $\pm$ 13

**TABLE 2. CDE Estimation of Time Needed for Self-Care Activities for a Child (and Family) With Established Type 1 Diabetes on Basal-Bolus Insulin Therapy (Four Shots/Day) and Performing SMBG Four Times Daily**

ADA-Recommended Task	Time Needed $\pm$ SD (minutes)
SMBG	17 $\pm$ 12
Recordkeeping (e.g., fasting serum glucose and blood pressure)	16 $\pm$ 18
Insulin drawing and administering	16 $\pm$ 12
Foot care	4 $\pm$ 4
Oral care	7 $\pm$ 5
Problem-solving	18 $\pm$ 21
Meal planning for home	20 $\pm$ 21
Shopping for food	21 $\pm$ 19
Preparing meals	60 $\pm$ 265
Exercise/extracurricular activities	53 $\pm$ 31
Meal planning for school	13 $\pm$ 11
Medications for school	11 $\pm$ 11
Parental visits to school for problems (hypoglycemia/hyperglycemia)	15 $\pm$ 21
Support/support groups	14 $\pm$ 21
Obtaining supplies	11 $\pm$ 16
Scheduling medical appointments	9 $\pm$ 15

management of diabetes in a child with type 1 diabetes was 305 minutes/day (~5 hours) and is depicted in Table 2. Routine daily diabetes

self-care (SMBG, recordkeeping, calculating and administering insulin doses [three to four times/day], foot care, oral care, and problem-solving)

was estimated to be 78 minutes/day (1 hour, 18 minutes). Estimated time required for school participation (school meal and medication planning and emergent visits to school for illnesses [hyperglycemia or hypoglycemia]) was estimated to be 39 minutes/day. Preparing for participation in extracurricular activities and sports was estimated to take an additional 53 minutes/day. Finally, the estimated time spent obtaining durable medical supplies and scheduling appointments was estimated to be 20 minutes. Thus, as anticipated, there was a significantly greater amount of estimated time required for self-care for children with type 1 diabetes than for adults with type 2 diabetes.

### Characteristics of Survey Respondents

The majority of the respondent CDEs were nurses (58%), whereas all of the rest were dietitians (41%) except one (a pharmacist). The mean duration of practice for respondent CDEs was 8 years. Twenty percent of the respondents had been a CDE for <2 years, whereas 10% had >19 years of experience. Most of the responses came from the Midwestern region of the country; the greatest numbers of respondents came from Virginia, Texas, Ohio, Kentucky, and Georgia.

There were no significant differences in responses between rural and urban CDEs ( $P = 0.301$  for child and  $P = 0.341$  for adult). Only 17% of the CDEs reported that they had diabetes, and there were no significant differences in responses between those with diabetes and those without diabetes. However, there was a numerical difference in the estimated time needed for parental visits (22 vs. 14 minutes) and problem-solving (23 vs. 18 minutes). Nurse CDEs had a statistically significantly higher estimated time (8 minutes) for diabetes foot care for an adult than non-nurse CDEs (6 minutes) ( $P = 0.045$ ). For a child, there is no statistical difference between nurse CDEs (6 minutes) and non-nurse CDEs (4 minutes)

for diabetes foot care time estimates ( $P = 0.052$ ).

### Discussion

In this survey of 674 practicing CDEs, the estimated time needed for recommended diabetes self-management tasks was 234 minutes/day (~4 hours) for stable adults with type 2 diabetes and 305 minutes/day (~5 hours) for children with type 1 diabetes. Children with type 1 diabetes required an estimated 39 minutes to ensure appropriate diabetes management at school and 53 minutes for safe participation in sports and extracurricular activities; hence, a total of 92 minutes/day (1.5 hours) was needed by family members of children with type 1 diabetes for tasks not needed for adults with type 2 diabetes.

This national survey of CDEs' estimated time for self-care for type 2 diabetes is similar to that reported in a previous study by Russell et al. (6) using a focus group to survey eight CDEs, who estimated that individuals with stable type 2 diabetes spent an average of 122 minutes/day (~2 hours) on self-care (6). However, there has never been a report of the estimated time required for self-care of a child with type 1 diabetes.

Further, Safford et al. (7) completed a cross-sectional study of nearly 1,500 Midwestern adults with diabetes. These patients spent a mean of 58 minutes/day on self-care. However, many skipped key self-care activities such as foot care (38%) and exercise (38%), and 54% reported no time on food shopping or preparation. In a more recent study, it was found that, in adult Americans ~25 years of age, only 6.6% reported health-related daily self-care. Among these individuals, the mean time of self-care was 90 minutes, and one in five individuals reported >2 hours/day (8). These results highlight the difference between best practice and real-world experience. Although some patients (20%) may spend long periods of every day following

best practices of self-care (8), most will skip components of care because they may not perceive the importance of some of the tasks. Other tasks may be completed subconsciously, and because the tasks meet needs for other conditions or general self-care, they may not be perceived as separate tasks themselves.

There are a number of important implications to take from this study. First, the CDEs' perceptions of the time required for diabetes self-management is substantial. There is an even greater time demand for children with type 1 diabetes and their families. Acknowledging the significant time needed for diabetes self-management is important for providers and patients because actually carrying out such tasks may require more steps and more time than anticipated, especially when doing so requires interfacing with other people at home, work, or school. One way to address this, as educators often do, is to tackle only one self-care behavior at a time. This approach allows smaller changes to become integrated and normalized into a person's schedule before he or she takes on a new task. Once the task is fully integrated into the daily routine, such as brushing teeth, it may no longer seem to require special time or schedule adjustments.

Second, the responses in this study were from educators, not patients or their family members who actually have to do the work. As far as the authors are aware, there are no studies of patients' estimates of the actual time they spend on diabetes self-care. This information would be interesting to learn. In the study of patients with diabetes, Safford et al. (7) found that adults with type 2 diabetes spend about 1 hour/day on self-care. This difference between what educators recommend and patients actually spend should be explored.

Finally, families, health care providers, CDEs, durable medical product developers, and insurance providers need to recognize that these time

constraints contribute significantly to the burden of diabetes self-care. These groups should develop a consensus that more needs to be done to reduce the time and increase the efficacy of diabetes self-care through use of diabetes education and perhaps even new technology focused on this issue. Timely diabetes education is needed at diagnosis and annually thereafter, when transitions in care occur, and when new complicating factors influence self-management (2). We know that diabetes education can have a lasting benefit for self-care behavior (9). If we can increase each patient's efficiency through education to reduce the time burden of diabetes self-care, we can help people with diabetes improve both their glucose control and their quality of life.

There are a number of limitations to this study. There were only two standard patients described, limiting the ability to include baseline knowledge and skills. These data do not adequately represent the spectrum of diabetes experience. Another limitation was the small response rate. Although this study may not represent all CDEs, it is the largest study to explore this question to date. Another limitation was the inability of the respondents to individualize recommendations more specifically for the case patients. The survey described a patient with established diabetes, but the educators may have been thinking they were estimating time needed for a person who is newly diagnosed. The authors assumed that the CDEs were estimating time for the ideal performance of a task, but in real life, people can take "shortcuts" to curb

activities, which may shorten the time spent. Further, many of these self-care behaviors may not be performed daily, making daily time estimates more difficult. Finally, some of these behaviors may not be considered unique to diabetes; thus, the time needed per day for diabetes may be overestimated.

### Conclusion

This study found that there is substantial time needed to complete the recommended daily diabetes self-care activities. Although many of these activities not only help diabetes, but also improve overall health, the time needed is potentially far beyond what is possible for most people to allot. Further, if people do not receive timely diabetes education, they may not know what activities will improve glucose management and reduce complications risk. This study should inform educators and providers of the challenge of diabetes self-management and help them gain an appreciation of the need for support in achieving these self-care behaviors.

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### Duality of Interest

No potential conflicts of interest relevant to this article were reported.

### Author Contributions

J.H.S. developed the research question, collected and analyzed data, and was the primary person responsible for writing the manuscript. G.D.B. contributed to pre- and post-study statistical analysis and contributed to the writing of the manuscript. A.W. and G.K. both worked on the research question, collected data, and contributed to the

manuscript development. F.L.S. helped to develop the research question and assisted in data analysis and manuscript development. J.H.S. is the guarantor of this work and had full access to all of the data and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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