Journal of Diabetes Science and Technology
Volume 1, Issue 1, January 2007

ORIGINAL ARTICLES

Analysis of the Role of Electronic Blood Glucose Trending Software in Improving Health Outcomes in a Primary Care Setting

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Abstract

With the increasing prevalence of diabetes reaching 7% of the total U.S. population,[1] the need for additional tools and resources to help physicians treating diabetes in a primary care setting is needed and often times lacking. In this issue of *Journal of Diabetes Science and Technology* (DST), Janssen *et al.*[4] evaluate the role of Ascensia® WinGLUCOFACTS® Professional Blood Glucose Management Software in improving blood glucose control, diabetes related behaviors, and patient knowledge and attitudes in a primary care setting versus the traditional handwritten blood glucose (BG) logs. Results from their analysis include a clinically significant reduction in A1C from baseline in comparison to the 9 and 12 month checks (-0.64 at 9 months, and -0.41 at 12 months).

J Diabetes Sci Technol 2007;1(1):54-55

With the increasing prevalence of diabetes reaching 7% of the total U.S. population,[1] the need for additional tools and resources to help physicians treating diabetes in a primary care setting is needed and often times lacking. Today, we have access to national standards for treatment, vast technology resources and increased pharmaceutical selections to help in successful diabetes management. Even with all these improvements, we are still not achieving victory.

In our current healthcare system, the care of patients with diabetes falls into the primary care setting. It is in this setting that approximately 90% of diabetes care is delivered by primary care physicians (PCPs).[1] The primary care setting is not equipped to provide the care necessary to afford positive health outcomes for its patients with diabetes. The Centers for Disease Control and Prevention (CDC) lists the average time of patient visits in a primary care setting in 2002 as 16.1 minutes during which only 14.3% included diet or nutrition education counseling, 10% exercise counseling and 3.6% weight-reduction counseling.[3] This time allotment does not allow for the basis of education needed for successful management of diabetes, especially if patients are not able to accurately or legibly track and turn in their own blood glucose (BG) results to their providers. A well-known national quality tool used to access performance in diabetes management, the National Committee of Quality Assurance (NCQA) Health Employer Data and Information Set (HEDIS) 2004 State of Health Care Quality

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Abbreviations: (A1C) Hemoglobin A1c, (BG) blood glucose, (CDC) Centers for Disease Control and Prevention, (DSME) Diabetes Self-Management Education, (DST) Journal of Diabetes Science and Technology, (HEDIS) Health Employer Data and Information Set, (NCQA) National Committee on Quality Assurance, (PCPs) primary care physicians

Keywords: blood, glucose, outcomes, software, WinGLUCOFACTS

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cites that 15% of diabetes patients covered by commercial insurance plans did not receive one hemoglobin A1c (A1C) test within 12 months and that 32% of those who did have an A1C test were found to have values >9.5% representing a poor level of control. May 2005, American Association of Clinical Endocrinologists revealed the results of a survey indicating that 61% of 157,000 adults with diabetes did not know what an A1C test was and that a high percentage were not achieving desired A1C goals. A January 2004 National Institute of Diabetes and Digestive and Kidney Diseases revealed in a press release a study revealing that <12% of people with diabetes were meeting the recommended goals for blood glucose, blood pressure and cholesterol control.[2]

In this issue of *Journal of Diabetes Science and Technology* (DST), Janssen *et al.*[1] evaluate the role of Ascensia® WinGLUCOFACTS® Professional Blood Glucose Management Software in improving blood glucose control, diabetes related behaviors, and patient knowledge and attitudes in a primary care setting versus the traditional handwritten blood glucose (BG) logs. WinGLUCOFACTS features include: an electronic logbook for storing and organizing downloaded BG data; data displays in textual and graphic forms; analysis of BG and testing frequency time averages; and a Data Wizard™ tool that identifies and interprets BG trends. Two primary care physicians managed 90 Test Group and 66 Control Group subjects over a 12 month period of time. Results from their analysis include a clinically significant change in A1C drop for both the Control Group (-0.48%) and Test Group (-0.58%) subjects at the 3 month visit, whereas the drop in Control Group subjects was attributed to the Hawthorne effect, given the increased diligence of all the subjects in managing their diabetes care. The Control Group's A1C levels increased at each succeeding visit to an indistinguishable level from baseline at the 9 and 12 month checks whereas the Test Group's A1C remained significantly lower (90% confidence level) than baseline (-0.64% at 9 months, and -0.41% at 12 months). Besides the realization in improved A1C health outcomes, both physicians and test subjects reported favorably in the follow-up survey, listing satisfaction with thesoftware's ability to provide better accessibility to patient information, ease of ability in interpreting BG logs, increased clarity of information in regards to BG trends, and increased legibility with complete and organized information.

Lastly, but certainly not least important, the conclusions in the cost benefits of using WinGLUCOFACTS and realizing an estimated $75.04 to $111.54 per subject, per year can be realistically attributed to cost savings over the 12 months in which the study was conducted. However, within the Test Group, A1C levels increased towards baseline levels noted by a percent change of 36% between the 9 to 12 month mean A1C levels. It is unknown whether the A1C reduction observed at 12 months can be sustained for 5 years. Therefore the calculated longterm savings projections that were based on an assumption that the A1C reduction can be sustained for five years may or may not be valid. It is also possible that the WinGLUCOFACTS system may have only delayed the A1C's return to baseline measures by a period of 6 months over that of the Test Group subjects. The mean A1C was lowest in Test subjects at the 9 month interval and then proceeded to increase at the same slope and rate as that which was seen in the Control Group subjects beginning at the 3 month interval. At 12 months, however, the Test Group still maintained a significant improvement in their mean A1C levels (compared to baseline) but the Control Group's mean A1C was statistically indistinguishable from baseline. To better estimate the long-term cost benefits of utilizing this system, an additional 6 to 12 months of data should be analyzed.

There are many factors to be considered in managing diabetes. This task is a complex issue, which requires use of the latest technologies, problem solving skills, and innovative medication management. Diabetes Self-Management Education (DSME) is the groundwork of care for providers who want to achieve a positive effect on the health of people with diabetes. Several studies have found that DSME alone is associated with improved diabetes knowledge, self-care behavior, clinical outcomes such as lower A1C and improved quality of life. Simply addressing DSME in the primary care setting is a step in the right direction and technology that eases the burden on the health provider in interpreting the information is a useful and crucial tool. With SMBG it is important to have proper interpretation of the data and patients should be taught how to use the data to adjust food intake, exercise, or pharmacological therapies to achieve specific glycemic goals.[1] Having technology such as WinGLUCOFACTS in the primary setting is one component in a variety of strategies needed to improve the health outcomes of patients with diabetes.

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