
Hemoglobin A1C Value for Evaluating a Community Diabetes Education Series

H Jeffreys

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Abstract

Type 2 diabetes mellitus is a major health concern of increasing incidence. Complications associated with poor management of the disease include increased morbidity, mortality, and financial burden. Group diabetes education programs in community settings have been shown to reduce disease complications and cost. Using collaborative efforts of community leaders, a community diabetes education program was implemented with great success. Participant post intervention hemoglobin A1C levels revealed an overall two point drop, a drop associated with significant reductions in mortality, myocardial infarction, microvascular complications, and health care cost. This project serves as an inexpensive, convenient, and effective model for improving outcomes for diabetic populations in community settings.

INTRODUCTION

Type 2 diabetes mellitus is a major health concern affecting 20.8 million Americans annually. This number is predicted to increase 43% by the year 2020 ¹. While 5.9% of the U.S. population has been diagnosed with diabetes, another 2.4% or 4.9 million people with diabetes remain undiagnosed ². As the incidence of diabetes increases, so does the associated health care cost. In the United States, one of every five health care dollars is spent on diabetes health care, totaling \$132 billion annually ³. To address the increasing incidence of diabetes and its associated health and economic implications, healthcare providers are directing their attention toward improving diabetes management.

Diabetes is a complex, chronic disease requiring ongoing health care to reduce the risk of both acute and long term complications. Recent transformations in care encourage patients to take a more active approach in managing their health care needs. Traditionally, diabetes care primarily focused on medication, diet, and exercise. In 2001, the Center for Disease Control published a report ⁴ recommending broad scale health-care system interventions and diabetes self management education in community settings. In 2007, the American Diabetes Association (ADA) standards of medical care position statement ⁵ supported diabetes self management education (DSME) naming it an essential element in diabetes management. The significant impact of diabetes alerts health providers to recognize the

need and prepare for interventions that address the health care needs of the diabetic population reducing both health disparities and cost. Professional community members and leaders in a small community collaborated to implement an affordable, effective diabetes education program.

BACKGROUND

One nurse practitioner and four family practice physicians form a unique health care team in a family practice setting providing quality health care for local individuals, families, and community members. The team provides care during acute and chronic illness and injury, focusing on disease prevention and health promotion for patients six months of age and older. Like other communities throughout the nation, this community has experienced an alarming increased in the incidence of diabetes and diabetes related complications ⁶. Recognizing the need for additional interventions to address these growing concerns, the clinic's healthcare team collaborated with local community leaders to implement a community education series.

PROGRAM INTERVENTION

The local county extension agent along with the family nurse practitioner developed a local coalition of support consisting of a city commissioner, pharmacist, county treasurer, and county tax assessor. The coalition assisted the extension agent and nurse practitioner with marketing, registration, data collection, and promotion of the diabetes education

program. The Do Well Be Well with Diabetes program was designed to educate patients, families, and community members on effective strategies of managing health care needs for people with Type 2 diabetes ⁷. In 2002, the Texas Cooperative Extension health and nutrition faculty developed and initially piloted the program throughout 12 Texas counties. To date, over 4,000 people in 147 Texas counties have participated in the program. The curriculum is consistent with the ADA Standards of Care, and program materials include session overheads, videos, a marketing package, and an evaluation program. The program covers ten self-care and nutrition topics delivered over five sessions. The first hour of each session focuses on the disease process and related complications of type 2 diabetes, while the second hour of each session focuses more on individual nutrition and lifestyle management. The health care team members, along with the recruited aid of a registered dietician, pharmacist, podiatrist, sport psychologist, and local nursing students volunteered time and effort each week to provide education to class participants. Prepared course materials included PowerPoint slides with instructor notes, as well as suggested interactive games and engaging activities. An open question and answer period following each lesson allowed the participants to interact with individual professionals in the respected areas of diabetes expertise. All instructors remained available each evening for individual questions during breaks and after class. The classes are offered at no cost and the relaxed and open environment provided an ideal setting for information sharing between providers and participants.

The clinic initially implemented the program in 2004 and continues to offer the sessions on a regular basis. At the beginning and end of each class series, participants are asked to complete an evaluation form that examines diabetes knowledge and management strategies, in addition to other pertinent information including age, race, and health history. A primary goal of the Do Well Be Well program is to improve blood glucose management in diabetic patients. Therefore, in the most recent education series, with participant permission and prior Institutional Review Board (IRB) approval, the team of providers collected and analyzed an objective measurement of significant importance for diabetic patients, the hemoglobin A1C (Hgb A1C) level.

Glucose control is fundamental to the management of diabetes and is best judged by the combination of the patients self monitored blood glucose results (SMBG) and Hgb A1C ⁸. The Hgb A1C is the average measurement of

the individuals' blood glucose level over a preceding 2-3 month period. A general A1C goal for most diabetics patients is less than 7%, but goals should be individualized and as close to the non-diabetes value (4% to 6%) as possible in the absence of hypoglycemic events ⁵. Currently, only 37% of diabetics have A1C's less than 7% ⁴, again illustrating the need for effective education and improved diabetes management.

THEORETICAL FRAMEWORK

Several theories support and guide the implementation of the community diabetes education series. The first theory involves the use of diabetes self management education (DSME). Self management, which is critical to glucose management, refers to the patient's ability to address the symptoms, treatment, physical and social consequences, and lifestyle changes resulting from chronic illness ⁹. Patients who actively participate in self care and clinical decision making are more likely to adhere to the recommended plan of care. DSME is the process of teaching persons ⁴ to manage their disease. The recommended timing for DSME is initially at diagnosis and as needed thereafter.

A meta-analysis ¹⁰ examined self-management education for adults with type 2 diabetes and found improvements in immediate Hgb A1C values. Additionally, Berikia, Meye, Kazlauskaite, Savoy, Kozik, and Fogelfeld ¹¹ found DSME to be associated with improved diabetes knowledge, improved self-care behavior, and improved clinical outcomes, particularly improvements in glycemic control as evidenced by lowering Hgb A1C values.

The American Association of Diabetes Educators recognize seven self care behaviors ¹² as critical to diabetes self management. These behaviors include monitoring, taking medications, being active, healthy eating, problem solving, healthy coping, and reducing risk factors. The Do Well Be Well curriculum promotes self management and focuses class sessions and learning activities around these behaviors of self care.

A second supporting theory includes that of adult learning ¹³. Malcolm Knowles, a pioneer in the field of adult learning, identified active engagement of the participant in the educational content as a key characteristic. In order to gain such engagement, the participant must be respected, and his/her goals be of both practical and immediate relevance to the participant's life experiences. The Do Well Be Well curriculum incorporates practical and relevant learning activities with each lesson and offers ample time for an

interactive question and answer period with experienced instructors.

The last theoretical consideration implemented is that of group learning. A randomized study by Rickheim, Weaver, Flader, and Kendall¹⁴ compared the effectiveness of individual versus group education for diabetes patients. The study found that group learning resulted in greater improvements in glycemic control and provided a more efficient and cost effective approach than individual diabetes education. Norris and associates¹⁰ revealed that the benefit of improved glycemic control following DSME declines over time; however, increased contact and follow up increases the positive glycemic effects. Do Well Be Well not only facilitates group interaction, but the program also provides reunion opportunities, a diabetes cooking school series for graduates of the educational series, and an ongoing newsletter for all participants.

METHODS

A local university granted this author IRB approval to perform an electronic chart review of all consenting class participants evaluating both pre and post education Hgb A1C levels. The class included 19 participants, of which 13 met the evaluation inclusion criteria of 18 years or older, a diagnosis of type 2 diabetes, and lab data available within the designated time frame. The participants also had to complete all five classes in the series. Participants' Hgb A1C levels were recorded within a two month period prior to the first class date, and at least two months after completion of the last class. The inclusion participants included seven Caucasian males and six Caucasian females with a mean age of 64.71 years. Eleven participants (85%) reported being diagnosed with diabetes between 2 - 4 years and two participants (15%) reported having diabetes for one year or less. Nine participants (64%) reported no prior diabetes education classes. Seven family members without diabetes participated in the education series in support of a family member with diabetes, but did not contribute to the data collection.

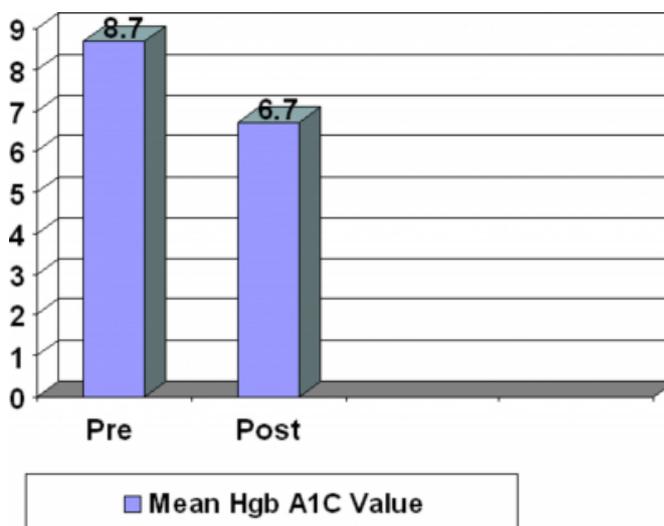
RESULTS

The participants' pre and post educational intervention Hgb A1C values were entered into an SPSS program and a paired sample t test was performed (n=13). The results (Figure 1) revealed post education Hgb A1C values were significantly lower (M = 6.73, SD = 0.73) than the pre education Hgb A1C values (M = 8.72, SD = 2.91), $t(12) = 2.63$, $p < .05$. Results are encouraging and provide evidence for similar

continued educational efforts in the community.

Figure 1

Figure 1: Community Diabetes Education Intervention



SIGNIFICANCE

Research has demonstrated a 1% decrease in Hgb A1C results in a 21% reduction in diabetes associated mortality, a 14% reduction in myocardial infarction, and a 37% reduction in microvascular complications.¹⁵ Given that this small sample of participants experienced an overall 2% drop, the expectation is that this group will also experience benefits equal to or greater than the demonstrated research benefits. Increased glycemic control and greater Hgb A1C reduction has also been shown to significantly reduce macrovascular complications, improving overall life span and diabetes health outcomes¹⁶.

The mean value of the post educational intervention Hgb A1C level was 6.73%, a value consistent with the general recommendation of less than 7%⁵. An inverse relationship has been established between the improvements in diabetic health and the associated health care cost. For the participants of this small class alone, the potential lifetime health care cost savings resulting from improved management of diabetes is estimated to be \$686,933, well over half a million dollars.¹⁷

CONCLUSION

Health providers must acknowledge and anticipate the health needs specific to the individuals, families, and communities for which they provide care. Community health providers and leaders interested in improving community health and lowering community health care cost can collaborate in the implementation of similar educational programs in their

respected communities. A nurse practitioner providing care in a community setting is in a unique position to not only recognize the community health care needs firsthand, but also become an advocate for those needs by developing and leading interdisciplinary teams. Highly diverse, professional team members contribute individual expertise while collaborating to achieve recognized national and community health goals. The end result is an overall improvement in the health and sustainability of affected individuals, families, and communities.

Implementation of the Do Well Be Well with Diabetes program in this community proved to be an inexpensive, convenient, and effective way to positively influence both the health and economic outcomes for an adult diabetic population. Implementing this pilot project in a larger and more diverse population would contribute additional beneficial information with regards to diabetes education. Additional research and data collection in similar educational programs is necessary to provide evidence-based guidelines for diabetes education prior to widespread implementation and dissemination in community settings.

CORRESPONDENCE TO

Holly L. Jeffreys, MSN, RN, FNP-BC 911 23rd Street Canyon, Texas 79015 Phone: (806) 640-4215 Fax: (806) 655-0522 Email: hjeffreys@wtamu.edu

References

1. Centers for Disease Control and Prevention. National diabetes fact sheet. 2008 March. Available from: URL: <http://www.diabetes.org/usdocuments/NationalDiabetesFactSheetRev.dpf>.
2. Koopman RJ, Mainous AG, Jeffcoat AS. Moving from undiagnosed to diagnosed diabetes: The patient's perspective. *Family Medicine* 2004; 36 (10): 727-32.
3. Narayan KMV, Boyle JP, Geiss LS, Saaddine JB, Thompson TJ. Impact of recent increase in incidence on future diabetes burden: U.S., 2005-2050. *Diabetes Care* 2006; 29: 2114-2116.
4. Centers for Disease Control and Prevention. Strategies for reducing morbidity and mortality from diabetes through health-care system interventions and diabetes self-management education in communities: A report on recommendations of the task force on community preventive services. 2008 April; Available from: URL: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5016a1.htm>.
5. American Diabetes Association. Standards of medical care in diabetes - 2007. 2008 March; Available from: URL: http://care.diabetesjournal.org/cgi/reprint/30/suppl_1/S4.
6. Texas Diabetes Council. Texas diabetes fact sheet, 2007. 2008 April; Available from: URL: <http://www.dshs.state.tx.us/diabetes/PDF/algorithms/minplfow.pdf>.
7. McCorkle D, Rice C, Klose S, Waller M, Hanselka D. Do well be well with diabetes program improves lives and saves health care cost. Texas Cooperative Extension: The Texas A & M University System 2007. 2008 March; Available from: URL: <http://agecoext.tamu.edu/fileadmin/econimpact/MKT3557A.pdf>.
8. United States Department of Health and Human Service. Steps to a healthier US. Diabetes: A national plan for action. 2008 May. Available from: URL: <http://aspe.hhs.gov/health/NDAP/NDAP04.pdf>.
9. Powers M, Carstensen K, Colon K, Rickheim P, Bergenstal R. Diabetes basics: Education, innovation, revolution. *Diabetes Spectrum* 2005; 19: 90 - 98.
10. Norris S, Lau J, Smith SJ, Schmid CH, Engelgau MM. Self management education for adults with type 2 diabetes. *Diabetes Care* 2002; 25 (7): 1159-1171.
11. Berikai P, Meyer PM, Kazlaukaite R, Savoy B, Kozik K, Fogelfeld L. Gain in patients' knowledge of diabetes management targets is associated with better glycemic control. *Diabetes Care* 2007; 30 (6): 1587-1589.
12. Martin C, Dally A, WeWhorter LS, ShwideSlavin C, Kushion W. The scope of practice, standards of practice, and standards of professional performance for diabetes educators. *Diabetes Education* 2005; 31: 487-512.
13. Adragony. Malcolm Knowles' adult learning theory. 2008 March; Available from: URL: <http://tippsychology.org/knowles.html>.
14. Rickheim PL, Weaver TW, Flader JL, Kendall DM. Assessment of group versus individual diabetes education. *Diabetes Care* 2002; 25 (2): 269-274.
15. Stratton IM, Adler AI, Neil H, Matthews DR, Manley SE, et al. Association of glycemia with macrovascular and microvascular complications of type 2 diabetes. *British Medical Journal* 2002; 332: 405-412.
16. Trento M, Passera P, Borgo E, Tomalino M, Bajardi M, et al. A 5-year randomized controlled study of learning, problem solving ability, and quality of life modifications in people with type 2 diabetes managed by group care. *Diabetes Care* 2006; 27: 670-675.
17. Texas Cooperative Extension Agency Report. Randall County, Texas. Forthcoming 2008.

Author Information

Holly L. Jeffreys, MSN, RN, FNP-BC

Family Nurse Practitioner, Family Medicine Center of Canyon, Graduate Faculty at West Texas A&M University