

Living on the Edge of Diabetes: How to Integrate the Diabetes Prevention Program into a Community Setting

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It is estimated that 26% of U.S. adults above the age of 20 have impaired fasting glucose.¹ This condition, which is a precursor to diabetes, is diagnosed by a fasting plasma glucose level of 100–125 mg/dl.² The cardiometabolic risk factors for diabetes include dyslipidemia, hypertension, smoking, being overweight (BMI ≥ 25 kg/m²), hypertriglyceridemia, and inactivity.³ Other risk factors are a large waist circumference (women ≥ 35 inches; men ≥ 40 inches), a history of gestational diabetes, and a family history of diabetes. The percentage of Americans who are overweight or obese is 66.3%.⁴ The increasing number of pre-diabetes diagnoses and rates of overweight and obesity are staggering, causing many health professionals to feel overwhelmed.

The Diabetes Prevention Program (DPP) was a landmark study that demonstrated a reduction or delay in the diagnoses of type 2 diabetes in high-risk individuals, which was achieved through lifestyle intervention with a weight loss of 7% of initial body weight combined with an exercise program of at least 150 minutes per week.⁵ Participants in this study were assisted by a lifestyle coach who provided motivation and support. The purpose of this article is to describe a program created to integrate materials from the DPP into a year-long education course for self-paying individuals. The intent of the course was to delay or prevent type 2 diabetes in a high-risk population in a rural and economically challenged community while keeping the course cost-effective.

Background

Since 2005, we have successfully organized a diabetes prevention program in Kalispell, Mont. Kalispell is located in Flathead County in northwest Montana. Flathead County is classified as a rural county with ~ 14.6 people per square mile and a total population of 74,471.⁶ We have one regional medical center and serve approximately five surrounding counties with outreach programs. Our area of service encompasses a large portion of the state, which is the fourth largest in the nation, yet we are one of the least populated. One of the challenges for people who live in Montana is the remote area. Many patients drive more than 100 miles to access a diabetes center, and their access to overall health care is limited. Preventive services are scarce, and our rates of uninsured are high.

Montana is estimated to have a diabetes prevalence of 6.4%.⁷ In 1985, Montana had an obesity rate of < 10%; by 2007, this had increased to > 20%.⁸ Much of this is the result of changes in industry. In the past, Montana industry included agriculture (ranching and farming), logging, forestry jobs, and construction. Many of these jobs have been replaced with tourism jobs. Our physically active jobs have turned into desk jobs or no jobs. The influx of chain restaurants has also had an impact on obesity rates. A 1-mile stretch of road was all agricultural or industrial 10 years ago; now, the agriculture and industries have been replaced by fast-food or chain restaurants. Food is visible and readily available.

Our organization is fortunate to have a medical fitness facility called the Summit next to the hospital.

Cardiac Rehabilitation and Healthy Hearts programs are coordinated there. It offers an Olympic-sized pool, a therapy pool, physical therapy and occupational therapy rehabilitation programs, an indoor track, a full-sized gymnasium, and a multitude of weights and exercise machines. Classes are offered daily for both exercise beginners and experienced athletes. Because the Summit is associated with the hospital, it is staffed by exercise physiologists, certified personal trainers, registered nurses, and therapists. The focus of evidence-based practice is an underlying theme. To develop our DPP-type program, we formed a collaboration between the medical fitness facility's exercise physiologist and myself.

Program Design

As we began planning our DPP, titled "Living on the Edge of Diabetes," we also discussed the lifestyle-coaching concept, and both the exercise physiologist and I were on board with the idea of "coaching" our patients rather than acting as an authoritarian health care worker who was going to "tell them what to do." Becoming a lifestyle coach was inspirational and gave us a new way to present ourselves to our clients.

Given the high rates of uninsured and unemployed, the goal was to keep the cost of the class reasonable but still make a slight profit to prove the validity of this class concept to our organization. We devised a fee of \$100 per person and a break-even point of seven class participants. We also determined that a shorter class duration than the original 16 weeks of the DPP core curriculum would

prove to be beneficial. Our main denominator in this decision was cost-effectiveness and participant retention.

Next, we developed the curriculum. All of the DPP coaching and participant information (“Lifestyle Balance”) materials are available for downloading at www.bsc.gwu.edu/dpp/manuals.htmlvdoc. We developed our curriculum from these materials. The DPP curriculum consists of 16 core sessions that focus on weight reduction through counting fat grams and exercising at least 150 minutes per week. Behavior-change topics are also integrated in the core. The After Core session materials contain a plethora of information for the maintenance stage, including topics on emotional eating, food cues, handling holidays and vacations, problem solving, addressing barriers to physical activity, and many others. The emphasis has been to help participants keep the changes already accomplished.

We devised a curriculum that was team taught for 2 hours per week for 4 weeks, with a follow-up meeting for 1 hour per month for 1 year. The exercise physiologist taught for 1 half-hour per session in the 4-week course. The monthly classes lasted 1 hour, during which the exercise physiologist taught for 15 minutes. In addition to class instruction on physical fitness, participants were given a Summit fitness center membership for the first month of the class, an individual fitness orientation, and a pedometer to assist in their physical activity goal of at least 150 minutes per week. After the first month, they were given the option to continue with their membership and have the fitness club registration fee waived.

Program Curriculum

Based on our research and programming decisions, we developed the following outline for the four sessions of the program:

- **Session 1.** Topics included the definition of pre-diabetes, health risks associated with pre-diabetes, and issues related to diabetes prevention. Food and activity records were introduced. Participants were required to keep the log for the entire month and into the fol-

low-up sessions. Both the exercise physiologist and I reviewed logs weekly and provided comments to help clients improve their health.

- **Session 2.** Topics included how to prevent cardiovascular disease in pre-diabetes and identify the risks involved. Participants learned how to count fat grams using food records. Medications used to treat pre-diabetes and the risks and benefits associated with the different regimens were briefly discussed.
- **Session 3.** Topics included healthy eating behaviors, including calorie counting to reach weight loss goals. All participants were provided with a glucose meter and instructed in the techniques of self-monitoring of blood glucose (SMBG).
- **Session 4.** Topics included carbohydrate counting and how different macronutrients affect blood glucose levels. The importance of fiber in weight loss and diabetes prevention was discussed. This session was added based on feedback from our first group of participants. Although it is not included in the Lifestyle Balance curriculum, we found that many participants were curious about carbohydrates and insistent on the need to know how they affect blood glucose levels.

Program Evaluation

In 2007, we compiled the data from our program and completed an abstract for a poster session at that year’s American Diabetes Association Annual Meeting and Scientific Sessions in Chicago. The data that were most pertinent to our program were weight, BMI, blood pressure, body fat percentage, and waist and hip measurements. Overall, the less abdominal adipose tissue a person at risk for diabetes has, the lower their chance of acquiring diabetes.⁹ Changes in weight, BMI, body fat percentage, and waist AND hip measurements reflect the reduced risk and are something recognizable that patients can see regarding their overall cardio-metabolic risk. Blood pressure is also improved with a decrease in abdominal fat and is a marker of a reduced risk of cardiovascular disease.⁹

We collected anthropometric measurements weekly and monthly, including weight, BMI, and blood pressure. Body fat percentage and waist and hip measurements were collected at baseline and at 1 year. Of the initial 33 patients measured in the first year, 100% were in the program at 1 month, and 50% remained after 2 months. The average weight loss per participant at 2 months was 8.4 lb, and systolic and diastolic blood pressure decreased an average of 22.5 and 6.6 mmHg, respectively.

Thirty-seven percent of the participants remained in the program at 1 year, at which time average weight loss per participant was 19.83 lb. This correlates to an average decrease of 3.96 kg/m² in BMI 1 year from the enrollment date. Waist and hip measurement decreased an average of 2.79 and 3.42 inches, respectively, and body fat percentage decreased an average of 3.08% by 1 year from date of enrollment. Systolic and diastolic blood pressure decreased an average of 27.5 and 13 mmHg, respectively, at 1 year. Participants whose blood pressure was in the recommended range (\leq 130/80 mmHg) at the initial class kept it in the recommended range at 1 year.

None of the participants who completed the year-long course were subsequently diagnosed with type 2 diabetes. The program was effective for all participants who remained in the program at least 2 months, with the biggest improvements seen at 1 year. The program was able to break even in terms of costs based on the class fee and the number of participants.

One of our greatest challenges in implementing this program was retention. Our data show a 63% drop-out rate at 1 year. In retrospect, we should have contacted patients once they missed two classes in a row to determine their reasons for leaving the program or to encourage them to return. Satisfaction surveys for those who did complete the program were positive.

Ongoing Class Structure, Funding, and Practice Pearls

These classes began in 2005 with two per year. Subsequently, because

of demand, they were increased to three per year, and the price increased to \$200 in 2006. If patients paid the first day, they received a 10% discount. Patients had the option of turning the bill in to their insurance provider, but we did not work with insurance companies directly because of poor reimbursement rates at the time.

We have continued to be successful with these classes. In autumn 2008, we applied for and were awarded a \$25,000 diabetes prevention grant from the Montana State Department of Public Health and Human Services, from funds the state legislature had set aside for this purpose from tobacco settlement funds.

As a result of charting a course for diabetes prevention in Kalispell, our physicians and community at large have a heightened awareness of pre-diabetes. We have a constant referral source for diabetes prevention and a database of ~ 250 patients with pre-diabetes. We developed class flyers that were placed in referring providers' mailboxes, offices, and strategic areas throughout the hospital and sent to the local newspaper office. We also conducted a mass e-mail campaign, which helped to develop this database. Our program was placed on the diabetes education referral form, which made it easy for primary care providers to refer participants.

Embarking on the course of diabetes prevention has been a learning experience, and many "practice pearls" have been identified. These include:

- Have a "catchy" title. "Living on the Edge of Diabetes" has caught the attention of many potential participants. We have had a huge response, not only from pre-diabetes patients, but also from type 2 diabetic patients wanting to take a course with this title.
- Gain support from physicians by educating them on diabetes prevention through continuing medical education presentations, office visits, newsletters, and the experiences of successful patients.
- Supplement the DPP's Lifestyle Balance materials with information about the condition of

pre-diabetes, risk factors for type 2 diabetes, and reasons for prevention, which are critical and should be interwoven into the sessions. Always keep your audience in mind, and tailor your classes to your patients as much as possible, which individualizes the class education experience.

- Meet individually with participants initially to assess their readiness to change. This is crucial to their success and the success of a prevention program.
- Incorporate a contract, such as the one used in the DPP, that explains your role as a lifestyle coach and their role as participants and can increase participant "buy in."
- Add medications and SMBG to the DPP curriculum. Participants need to be aware of the medications that can help prevent diabetes when used in addition to, not in place of, lifestyle interventions. An interesting and unexpected discovery was the benefit of SMBG in pre-diabetes patients.
- Recognize that lifestyle intervention and diabetes prevention are lifelong challenges.

In our experience, pre-diabetes patients appear to be in denial more than those with type 2 diabetes; they are not totally convinced that they have pre-diabetes and still have the hope they may not get diabetes. When they use a glucose meter and compare results of tests after a large meal and after a reasonably sized meal, they can see the difference in glucose levels, and this reaffirms the importance of their meal plan and exercise goals. We recommend that participants perform SMBG daily, weekly, or sporadically after large meals to track how their lifestyle changes affect their blood glucose levels. It is a very powerful tool for change. Because most insurance plans do not pay for test strips for patients with pre-diabetes, forming an alliance with representatives of blood glucose meter companies can help in obtaining test strips for participants during the course.

In today's health care environment, patients must advocate for

their own needs. The tools previously mentioned can provide them a basis for discussion with their primary care provider about the best way to manage diabetes prevention.

We had excellent results in preventing diabetes in the short term, but our biggest challenge was and is retention of class participants for the full year. Incentives such as grocery store coupons, gas coupons, or gift cards will be tested in our "After Core" session in an attempt to improve retention. We are also taking off our educator's caps and putting on our cheerleader's and coach's caps in all classes. Focusing on the positive and using constructive criticism in all participant interactions is important. This is a long haul for participants, and they rely on their Lifestyle Coaches to help them stay motivated.

An additional challenge will be to continue with this monumental task once the grant funds have been spent. In the future, we are planning to meet with the Human Resources Department benefits liaison at our hospital to demonstrate the results of our program and the demand from our own employees to be part of the class. The cost and program outcomes of these classes will be used to make a case to our organization to cover DPP classes as an insurance benefit. We will then take this information to other insurance providers in the community to work on changing their wellness packages to include pre-diabetes education. Medicare's recent ruling to pay for pre-diabetes education will be a catalyst.

Conclusion

In the current economic climate, it is more important than ever before to ensure that the programs we offer are fiscally responsible and effective. Six preventive services have been identified as cost-effective, including smoking cessation, providing aspirin to high-risk individuals, controlling pre-diabetes, encouraging weight loss in obese people, decreasing blood pressure in people with diabetes, and lowering LDL cholesterol levels in people with coronary artery disease.³ A program such as "Living on the Edge of Diabetes" targets three out of the six preventive services. The

key is to have ongoing education and support and to learn what motivates patients with pre-diabetes. This could be one of the greatest challenges we will face in the upcoming years, and our ability to evolve as clinicians into disease-prevention coaches will be a key to success in this endeavor.

The time is now to prevent diabetes in your community. The following statement, from a grateful participant in our program, demonstrates the potential impact of developing a local diabetes prevention program in your community.

“I am just so thankful for the opportunity to participate in these classes. Diabetes runs in my family, and I don’t want to acquire it. I signed up to join the Summit a few years ago but never used it because I didn’t think I fit in with the perfect Spandex bodies and pretty blondes who came here. I have no fears in using the Summit now as part of this class, and I use it almost every day. I

feel like I belong here. I have a place just my own. I have a disease I am trying to prevent!”

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