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Prevention of Type 2 Diabetes in Persons with an Elevated Hemoglobin A1C

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Citation	Marksbury, Tiffanie. "Prevention of Type 2 Diabetes in Persons with an Elevated Hemoglobin A1C." 2017. Georgia State University. https://doi.org/10.57709/10405852
DOI	https://doi.org/10.57709/10405852
Download date	2026-03-09 08:48:32
Link to Item	https://hdl.handle.net/20.500.14694/11604

Prevention of Type 2 Diabetes in Persons with an Elevated Hemoglobin A1C

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Abstract

Diabetes is a chronic, complex illness with a risk for acute and long-term complications. The aim of this quality improvement project on prevention of type 2 diabetes was to increase self-management behaviors in patients at high risk of type 2 diabetes, decrease the financial burden of type 2 diabetes, and decrease the incidence of complications that can occur from type 2 diabetes. The primary outcome of this project was each participant reporting at least one lifestyle modification that would be helpful in preventing type 2 diabetes after attending two group education sessions. A pretest posttest design was used for this project. Three completed the initial questionnaires, and two attended the educational sessions and completed the posttest questionnaires. Of the total number of participants, one reported a decrease in hot/cold cereal, regular soda, sugar or honey in coffee/tea, other potatoes, tomato sauces, chocolate, doughnuts, and cookies, cake, pies, brownies. Two participants reported a decrease in fruit juice, fried potatoes, and pizza. One participant had an increase in physical activity while the other participant had no change in physical activity. The landmark Diabetes Prevention Program (DPP) Trial demonstrated that counseling on a healthy diet and moderate physical activity reduced the incidence of type 2 diabetes. The two participants in this project reported they made some helpful changes in diet after two education sessions. It is vital to the success of a prevention program to convey the significance of preventing a chronic disease such as type 2 diabetes

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Prevention of Type 2 Diabetes in Persons with an Elevated Hemoglobin A1C

Diabetes is a chronic, complex illness with a risk for acute and long-term complications. The American Diabetes Association defines prediabetes as a fasting plasma glucose of 100-125mg/dL or a hemoglobin A1C of 5.7-6.4% (American Diabetes Association, 2016). According to the Centers for Disease Control and Prevention (CDC), in 2014, there were 86 million people in the United States with prediabetes and 90% of those were unaware of this condition. The American Diabetes Association (ADA), states a hemoglobin A1C level between 5.7% and 6.4% is considered high risk for developing type 2 diabetes and these patients should be counseled on lifestyle changes to prevent or delay a diagnosis of type 2 diabetes (2016). The CDC supports this statement by declaring that 15-30% of people with prediabetes will develop type 2 diabetes within five years without lifestyle modification. Diabetes significantly affects quality of life as it increases a person's risk of blindness, amputation, renal failure, and cardiovascular disease (Fleming et al., 2001).

H.R.4124 - Diabetes Prevention Act of 2009 was introduced to the House of Representatives in November 2009. The purpose of this bill was "to establish a national diabetes prevention program targeted at persons at high risk for diabetes" (H.R. 4124, 2009). According to this amendment to the Public Health Service Act, the Secretary of Health and Human Services (HHS) can award grants to support community-based diabetes prevention programs, provide quality assurance of the programs, and allow the secretary to award grants for diabetes prevention research.

Background and Significance

According to the ADA (2014), in 2012 there were 86 million people over the age of 20 with prediabetes. Pre-diabetes encompasses risk factors such as African American or Asian race,

Hispanic ethnicity, family history of diabetes, body mass index (BMI) of 25 or greater, and a hemoglobin A1C level between 5.7% and 6.4% (ADA, 2016). Approximately 30 percent of people with a fasting glucose of 100 or higher develop diabetes (Fonseca, 2009). In a study by Nichols, Hillier, and Brown, diabetes developed over an average of 29 months (2007). The Diabetes Prevention Program (DPP) Research Group published data in 2002 demonstrating type 2 diabetes can be delayed or prevented. The incidence of diabetes was reduced in both the lifestyle intervention group and the metformin group (DPP Research Group, 2002). The greater reductions were present in the lifestyle intervention group which included counseling on weight loss and maintenance of weight loss, low-calorie and low-fat diet, and at least 150 minutes of exercise per week over an average of 2.8 years (Diabetes Prevention Program Research Group, 2002). There has been an eleven-fold increase in the prevalence of diabetes in the last five decades among adults in the U.S. (Leung, Pollack, Colditz, & Chang, 2015). Boyle, Thompson, Greg, Barker, & Williamson (2010), project that the prevalence of diabetes by 2050 will be approximately 25%. This translates to between one in five and one in three adults having diabetes by 2050.

Annually, healthcare costs are more than double for someone with diabetes versus someone without diabetes (Zhuo et al., 2014). In 2012, the ADA estimated the total cost of treating diagnosed diabetes was \$245 billion. The CDC (2014) reported the direct medical cost of diabetes in the United States is estimated at \$176 billion. Leung et al. believe “The prevalence of diabetes has imposed a substantial health and economic burden to patients and society” (2015, p. 460). Diabetes leads to an increase in health care expenditures across a lifetime and a decrease in life expectancy (Leung et al., 2015); however, preventing diabetes can also be expensive. As Zhuo et al. (2014) point out, preventing a chronic disease may extend a

person's life and therefore, result in more health care costs. However, the same study found diabetes prevention would lead to significant cost savings in the long-term (Zhuo et al., 2014). According to Meeto (2014), it is logical that preventing type 2 diabetes is the most efficient way to decrease the burden of diabetes. Modest changes in lifestyle, chiefly involving exercise and diet, are required to prevent diabetes and the benefits of these lifestyle changes can continue for several years after they are enacted (Meeto, 2014).

Based on the background provided and the evidence of the cost of type 2 diabetes in the United States, lifestyle modification to prevent type 2 diabetes should continue to be studied. The following PICO question has been developed for this project: Will a comprehensive educational program including in-person counseling on nutrition and exercise for people with a hemoglobin A1C level 5.7%-6.4% lead to a positive lifestyle change and reduce the progression to type 2 diabetes?

Synthesis of Evidence

The Diabetes Prevention Program (DPP) Research Group performed a randomized controlled trial with over three thousand participants assigned to either placebo, metformin, or lifestyle changes (Knowler et al., 2002). Participants had an elevated fasting glucose and elevated glucose after an oral glucose load but did not have a diagnosis of diabetes. The mean age of participants was 51 years, mean BMI 34 kg/m², 68% were women, and 45% were from a minority ethnic group. Plasma glucose was used for measurement to assess progression to diabetes. The 1997 American Diabetes Association diagnostic criteria for diabetes was utilized which included a fasting plasma glucose of 126 mg/dL or higher and a glucose of 200mg/dL or higher two hours after 75-gram oral glucose load (Knowler et al., 2002). An oral glucose-tolerance test was performed annually and fasting plasma glucose was checked twice yearly and

anytime a participant had symptoms indicative of diabetes. Average follow-up time was 2.8 years and the range was 1.8-4.6 years. This study showed the incidence of diabetes was reduced by both lifestyle changes and metformin, but lifestyle changes were more effective. The blinded treatment phase was actually discontinued one year earlier than planned due to evidence of efficacy of interventions. This is a landmark study in diabetes prevention (Kahn & Davidson, 2014).

The DPP Research Group has published several other articles since the landmark study. One article explains the methods for the groundbreaking study on diabetes prevention. (DPP Research Group, 1999). Another article by the DPP Research Group provides a detailed description of a lifestyle intervention administered to participants at high risk for diabetes. The study was performed in 27 centers with 1,079 participants in the lifestyle intervention arm. Again, this study demonstrated lifestyle intervention was more effective than metformin in preventing diabetes (DPP Research Group, 2002). The description of the lifestyle intervention used in the landmark study will help in designing a cost-effective, sustainable intervention to prevent diabetes in a smaller scale study.

Several years later, the DPP Research Group performed another randomized controlled trial with over three thousand adults to evaluate hemoglobin A1C as a predictor of diabetes (Knowler, 2015). Fasting plasma glucose, two-hour oral glucose tolerance test, and hemoglobin A1C were used as measurements in the study and hemoglobin A1C was found to be a valid predictor of diabetes (Knowler, 2014). This evidence supports the use of hemoglobin A1C as a measure of glucose control over the previous two to three months. Orchard et al. (2012) studied the long-term effects of the DPP interventions on cardiovascular risk factors and found lifestyle modification to have favorable effects on lipid and blood pressure control. Another positive

result from this study was the need for less medication for blood pressure and lipid control when lifestyle interventions were employed (Orchard et al, 2012). These are more encouraging results related to lifestyle modification and the prevention of type 2 diabetes and other long-term problems.

The ADA releases Standards of Medical Care in Diabetes annually. These guidelines provide the components of diabetes care, general goals of treatment, and tools to assess quality of care. They also include evidence-based recommendations on the prevention of type 2 diabetes. These guidelines are reviewed by the Professional Practice Committee and Executive Committee of the Board of Directors and published by the American Diabetes Association. The guidelines include strong recommendations to guide the prevention of type 2 diabetes. (ADA, 2016).

Sussman et al. (2015) completed a post hoc analysis of the initial study performed by the DPP Research Group to determine if some participants in the DPP were more or less likely to benefit from lifestyle modification or metformin. They found there was a variation in the likelihood of receiving benefit from treatments to prevent diabetes. Lifestyle modification was extremely effective in the quarter of participants that were at the highest risk of developing diabetes (risk reduced sixfold) but was also effective for those with the lowest risk. Metformin also showed benefit in the highest risk quarter but no benefit was seen in the lowest risk group (Sussman et al., 2015).

Hale et al. (2013) studied the relationship between metabolic syndrome and physical activity in prediabetes. The sample consisted of 301 overweight or obese people with prediabetes. Over half were female, approximately a quarter were non-white/ Hispanic, and 60% had metabolic syndrome. Participants reported total walking minutes per week and the International Physical Activity Questionnaire was used. The results indicate meeting the goal for

weekly physical activity reduced the odds of having metabolic syndrome. The goal for physical activity was 30 minutes of activity at least five days per week, which was derived from recommendations of the CDC. These results support physical activity for the prevention of type 2 diabetes as the pathophysiology of metabolic syndrome is similar to the pathophysiology of prediabetes. (Hale et al., 2013).

Kuo et al. (2013) performed a qualitative study to research the experiences of people with prediabetes who exercise. There were twenty participants from a medical center in Taiwan with impaired fasting glucose. A grounded theory of how people with prediabetes develop an exercise routine was formed. This theory can aid practitioners in assisting with development of an exercise regimen and supporting their psychological needs. According to the theory, change started with participants becoming aware of the importance of implementing exercise. After attaining this awareness, participants endeavored to assimilate exercise into their daily routine. All participants experienced struggle and were encouraged to continue exercise habits but when they were confronted with obstacles or were not being encouraged, exercise was reduced and some participants even stopped exercise completely. Exercise became essential to those participants who overcame obstacles.

An integrative literature review by Madden, Loeb, and Smith (2008) determined what diabetes prevention programs have been evaluated and which programs are most effective. The reviewers also examined the literature to determine the adherence to lifestyle changes after a person has been through a diabetes prevention program. Madden, Loeb, and Smith (2008) performed a search of electronic databases and found that prevention programs that utilize diet and exercise are most effective and maintaining lifestyle changes is difficult and recommend diabetes prevention programs should focus on long-term maintenance.

Peacock et al. (2008) examined preventing type 2 diabetes in women with a history of gestational diabetes mellitus (GDM). Their goal was to develop a diabetes prevention program for women who had GDM in the past and currently had a BMI > 25 kg/m². This was a randomized controlled trial with 31 women who had been diagnosed with GDM in the previous six to twenty-four months. Weight, waist and hip measurement, insulin sensitivity, level of physical activity, and self-efficacy of eating behaviors were all used as measurements. Results demonstrated improvement in physical activity and healthy eating behaviors but no significant change in body composition or glucose metabolism. They also found nutritional counseling and a pedometer program help support weight loss, physical activity, and eating behaviors in women who have had GDM (Peacock et al., 2008). Since women with a history of GDM are at risk of developing type 2 diabetes later in life (Peacock, 2008), interventions used to prevent progression to type 2 diabetes after GDM can also be used to prevent progression to type 2 diabetes in other high-risk groups.

The seminal DPP study laid the foundation for diabetes prevention and proved it is possible. Several studies have branched from the DPP trial and also show favorable outcomes in diabetes prevention and minimization of other risks such as cardiovascular disease when lifestyle modification is employed. Type 2 diabetes is a national concern due to cost and decreased quality of life and the prevalence is rapidly increasing. The government has recognized the need to decrease the incidence of type 2 diabetes by passing bills such as the Diabetes Prevention Act of 2009 (Diabetes Prevention Act of 2009). Healthy People 2020 also has a goal of decreasing new diagnoses of type 2 diabetes by 10% by the year 2020 (Healthy People 2020).

Conceptual Framework

Self Determination Theory (SDT) was selected as the conceptual framework for this

project. Initially developed by Edward Deci, currently a professor at the University of Rochester, and Richard Ryan, a clinical psychologist and professor in Sydney, Australia, the focus of SDT is the maintenance of new behaviors related to health after a person develops the motivation to initiate the behaviors (Sharma & Smith, 2011). Humans have an innate tendency toward physical and psychological health (Williams et al., 2009). Utilizing SDT can create an environment where people are empowered to make their own choices and be intrinsically motivated rather than motivated by external rewards.

As an individual level theory, SDT's focus is on factors that can be changed (Sharma, 2011, p. 5). Intrinsic or autonomous motivation is the foundation of SDT (Friederichs et al., 2015). Autonomous motivation leads to more commitment and continuation of healthy behaviors (Friederichs et al., 2015). SDT posits that people have three basic psychological needs and are more likely to change unhealthy behaviors or implement healthy behaviors when these needs are met (Williams et al., 2009).

The three psychological needs are autonomy, competence, and relatedness (Sharma, 2011). Autonomy is "the need to feel that one can choose one's behaviors" (Friederichs et al., 2015, p. 2). People feel autonomous when they feel they have the power to make their own choices (Williams et al., 2009). Conversely, people feel controlled when they feel pressured to act in a certain way (Williams et al., 2009). Deci notes anything that decreases a person's feeling of autonomy will decrease intrinsic motivation, cause a person to feel controlled, and probably lead to other negative consequences (1995).

Competence is "the need to feel competent and confident" (Friederichs et al., 2015, p. 2). People feel competent when they can achieve a desired outcome and if people feel confident they will reach goals and feel autonomous (Williams et al., 2009). Therefore, when people willingly

accept healthy behaviors, it is highly probable they will develop the necessary skills to manage their health (Williams et al., 2009). Relatedness is “the need to feel connected and understood by others” (Friederichs et al., 2015, p. 2). People will adopt behaviors more readily if the behaviors are suggested by someone they trust (Sharma, 2011).

Extrinsic motivation factors include money, prizes, acclaim, grades and opinions of others (Deci, 1995). Intrinsic motivation is driven by interests, curiosity, and personal values (Deci, 1995). If extrinsic rewards are given for intrinsically motivated behaviors, autonomy can be undermined (Deci, 1995; Cherry 2016). As external rewards progressively control behavior, people feel less in control of their behaviors and intrinsic motivation diminishes (Cherry, 2016).

SDT has been utilized in several health behaviors such as tobacco cessation, physical activity, weight loss, medication adherence, diabetes management, cholesterol lowering, and alcohol and drug abuse (Sharma, 2011). SDT was used to guide this DNP project. The student investigator recruited participants who were patients at Heritage Medical Associates, therefore, it was fair to assume these participants had an intrinsic desire for health and well-being. It was hypothesized that by increasing competence with an educational intervention, participants would demonstrate greater autonomy in managing their health and be more motivated to adopt behaviors that would improve their health. Efforts were made to build rapport between participants, promote relatedness, and encourage adoption of healthy habits.

Project Design

The aim of this quality improvement project on prevention of type 2 diabetes was to increase self-management behaviors in patients at high risk of type 2 diabetes, decrease the financial burden of type 2 diabetes, and decrease the incidence of complications that can occur

from type 2 diabetes. The primary outcome of this project was each participant reporting at least one lifestyle modification that would be helpful in preventing type 2 diabetes after attending two group education sessions.

Setting

The clinical setting for this project was a multi-specialty practice in Nashville, Tennessee with 10 specialties and fourteen locations (urban and suburban. There are 67 primary care providers for adults, including seven advanced practice professionals (Heritage Medical Associates, 2017). Patients at high risk of type 2 diabetes (specifically, a hemoglobin A1C between 5.7% and 6.4%) were recruited from all of the primary care providers. Recruitment flyers were emailed to primary care providers to facilitate recruitment (see Appendix A). On average, approximately 2,500 patients are seen per day at Heritage Medical Associates.

Subjects

Convenience sampling was used with a target sampling size of 20 participants. To be included in the project, potential participants had to be at least eighteen years old, English speaking, male or female, hemoglobin A1C of 5.7%-6.4%, and able to voluntarily consent to participate. Participants were excluded if they had a diagnosis of diabetes or current medication therapy for diabetes.

Recruitment

Primary care providers were given copies of the recruitment flyer. The recruitment flyer contained the contact information for the student investigator. Primary care providers were asked to identify patients meeting the inclusion criteria who presented for care at one of the locations and provide eligible patients with a recruitment flyer.

Ethics

The project was approved by the Chief Medical Officer (CMO) of the physician group and the Institutional Review Board (IRB) of Georgia State University (GSU). All participants signed an informed consent (see Appendix B). Records were kept private and were only accessible by the project investigator. Initials were used on records rather than names and information was stored on a password protected computer to which only the study investigator has access. Participants were deidentified in all project related records.

Instruments

The Dietary Screener Questionnaire (DSQ) was developed by Thompson et al. in 2004 and is beneficial in estimating intake of vegetables and fruit and percentage of calories from fiber and fat (see Appendix C). The DSQ is a 30-item questionnaire that uses an 11-point scale. It can be administered in paper/pencil format and takes approximately 10 minutes to complete. For this project, the DSQ was administered in paper and pencil format. The DSQ can be used to measure median or mean intakes of fruits, vegetables, fats, and fiber (Thompson et al., 2004). Reliability of this tool is unknown to date. A lack of evidence about use of this tool in the population of interest warrants a reliability analysis upon data completion.

The second survey participants completed was a simple two question survey about activity (see Appendix D). Johansson and Westerterp (2008) found that energy expenditure could be easily measured with these two questions. The first question was about physical activity at work and the second question pertained to physical activity during leisure time. Validated against a seven-day physical activity log, there was no statistical significance between the two-question survey and the seven-day log. Reliability of this tool could not be located. A lack of evidence about use of this tool in the population of interest warrants a reliability analysis upon data completion.

Intervention & Data Collection

A pretest posttest design was used for this project. Meeting space was reserved at the main location of Heritage Medical Associates. The first session was offered two times on January 18th and 21st, and the second session was offered February 15th and 18th. Each educational session lasted approximately one hour.

The first educational session included the following topics: insulin resistance/ type 2 diabetes pathophysiology, explanation of hemoglobin A1C, Diabetes Prevention Program (DPP) results, statistics of pre-diabetes including the percentage who progress to type 2 diabetes, brief overview of lifestyle modification, complications of diabetes, life expectancy changes, cost of medications and complications (including decreased productivity). The second education session was guided by the DPP curriculum as well but focused on lifestyle modification topics such as diet and exercise. Power points were used to guide conversation and handouts were given to each participant (see Appendix E). There was time for questions and discussion at the end of each session.

Participants were mailed the Dietary Screening Questionnaire and the Physical Activity Questionnaire before the first educational session. These questionnaires served as the pretest and participants were instructed to mail these questionnaires to the student investigator in a self-addressed, stamped envelope included with the questionnaires. The same questionnaires were mailed to participants again two weeks after they attended the second educational session and served as posttest. Upon completion of the questionnaires, participants again mailed them to the student investigator in a self-addressed stamped envelope. Upon receipt of the posttest, participants received a thank you letter from the student investigator (see Appendix F).

Results

Participants

Sixty-seven primary care providers were sent two recruitment emails with follow-up emails of support sent by the Chief Medical Officer. Three physicians referred patients for participation. Potential reasons for shortage of referrals include: unawareness of the impact of type 2 diabetes on lives and healthcare costs, lack of motivation to prevent type 2 diabetes, unfamiliarity with evidence proving type 2 diabetes can be prevented, and providers not realizing a patient is at high risk of developing diabetes (i.e. no hemoglobin A1C or fasting glucose).

Eleven potential participants were contacted and included eight women (aged 27-69, 7 white, 1 Asian) and three men (aged 30-73, 2 white, 1 Asian). Three completed the initial questionnaires, and two attended the educational sessions and completed the posttest questionnaires. The participant who completed the pretest but did not attend the educational sessions, also did not complete the posttest. One potential participant had young children at home and did not have the time to commit to the study. Another potential participant was training for a half marathon and did not feel she had the time to attend the educational sessions.

DSQ

The DSQ assessed intake of 25 food items that were grouped into grains, fruit, vegetables dairy, protein foods, mixed dishes, and discretionary foods. For the purposes of this study on diabetes prevention, the goal was for an increase in foods that have no carbohydrates or are very low in carbohydrates and high in fiber, such as fruit, salad, and vegetables. Items that have simple sugars or are high in carbohydrates, such as fruit juice, regular sodas, and sweets/desserts, are considered things to be decreased due to their effect on insulin resistance and blood sugar. Tomato sauces were also an item to be decrease since these sauces are typically added to high

carbohydrate foods such as pasta. Several items were considered neutral since many of them do have carbohydrates but also have protein and/or fiber. Despite being good sources of protein, cheese, red meat, and processed meats were labeled neutral. The recommendation would be to increase intake of lean meats such as fish, white meat turkey, chicken, and pork which is something the DSQ did not ask about.

Using Excel, intake of these foods was compared before and after educational sessions. Of the total number of participants, one reported a decrease hot/cold cereal, regular soda, sugar or honey in coffee/tea, other potatoes, tomato sauces, chocolate, doughnuts, and cookies, cake, pies, brownies. Two participants reported a decrease in fruit juice, fried potatoes, and pizza. Post-intervention, Participant 4 had an increase in two items that were desired to decrease- hot/cold cereal and ice cream/ frozen desserts. She had a decrease in vegetables which was an item desired to increase.

Participant 6 also had a decrease in vegetables on the post-education survey but did not have an increase in any item desired to decrease (see Table 1 for the desired outcome and actual outcome for each food item).

Table 1

Dietary Screening Questionnaire Desired and Actual Outcomes

Food Item	Desired Outcome	Actual Outcome Participant 4	Actual Outcome Participant 6
Hot/ Cold cereal	Decrease	Increase	Decrease
Milk	Less fat	Improved	No change
Regular Soda	Decrease	No change	Decrease
100% Fruit Juice	Decrease	Decrease	Decrease
Sugar or honey in coffee/ tea	Decrease	No change	Decrease
Sweetened Drinks	Decrease	No change	No change
Fruit	Increase	Increase	Decrease
Salad	Increase	Increase	No change
Fried Potatoes	Decrease	Decrease	Decrease
Other Potatoes	Decrease	No change	Decrease
Beans	Neutral	Decrease	Decrease
Brown Rice/ Other cooked whole grains	Neutral	Decrease	Decrease
Other vegetables	Increase	Decrease	Decrease
Salsa	Neutral	Decrease	No change
Pizza	Decrease	Decrease	Decrease
Tomato sauces	Decrease	No change	Decrease

Cheese	Neutral	Decrease	Increase
Red meat	Neutral	No change	Decrease
Processed meat	Neutral	Decrease	Decrease
Whole Grain Bread	Neutral	Decrease	Decrease
Chocolate	Decrease	Decrease	No change
Doughnuts	Decrease	Decrease	No change
Cookies, cake, pie, brownies	Decrease	Decrease	No change
Ice cream/ frozen deserts	Decrease	Increase	No change
Popcorn	Neutral	Increase	Increase

Key
Grains
Protein Foods
Fruit
Mixed dishes
Vegetables
Discretionary Foods
Dairy

The Physical Activity Questionnaire was scored using the scheme outlined in the article by Johansson and Westerterp. Physical activity for Participant 4 increased at work and stayed the same during leisure time for an overall increase in her score after the educational sessions. There was no change in the overall physical activity score for Participant 6. His physical activity at work increased after the educational sessions but his leisure time activity decreased and therefore, his score was neutral.

Discussion

The landmark Diabetes Prevention Program (DPP) Trial demonstrated that counseling on a healthy diet and moderate physical activity reduced the incidence of type 2 diabetes. The two participants in this project reported they made some helpful changes in diet after two education sessions. One of the participants did have an increase in physical activity. Even though the second participant had a decrease in leisure time activity, it was counter balanced with an increase in activity at work. As exhibited in the DPP trial, these lifestyle changes are more effective than medication to prevent diabetes.

Impact of Results on Practice

The Dietary Screening and Physical Activity questionnaires allowed participants to make an assessment of their intake of fruit, vegetables, fat, and fiber and their level of physical activity. After two educational sessions discussing these topics in depth and using the Diabetes Prevention Program curriculum to make a plan for healthy eating and regular exercise, participants will have an increased intake of fruits, veggies, and fiber, decreased intake of fat, and increase physical activity. Participants also have the opportunity to have a positive influence on friends and family as they share the knowledge gained from the educational sessions.

In the long term, the results of this project have the potential to provide a foundation for a diabetes prevention program at Heritage Medical Associates. Evidence from the DPP, CDC, and ADA support a diabetes prevention program and continuing follow up. This project aimed to appeal to people's intrinsic motivation to commit to healthy behaviors using the SDT as a framework. Follow-up will help ensure continuation of those behaviors. The intervention utilized in this project can evolve into a large-scale diabetes prevention program. This program is capable of meeting the three psychological needs of people SDT theorizes are necessary for someone to adopt and continue healthy behaviors- autonomy, competence, and relatedness.

Limitations

The major limitation of this project is poor participation. Time commitment for two educational sessions and the location of the sessions were challenges in having more participants.

Short-term follow-up is another limitation to this project. Long-term follow-up and tracking of hemoglobin A1C levels would assist in evaluating the effectiveness of the intervention. Time constraints due to an extended IRB process and program limitations do not allow for long-term follow up currently but this could be accomplished if the intervention were continued after this Doctorate program.

Dissemination Plan

Considering the small number of participants in this study and the limited data obtained, publication is not feasible at this time. The original dissemination plan was to present data from the project to shareholders of the organization where the project was carried out. More than half of the shareholders are the primary care providers I communicated with to recruit persons with an elevated hemoglobin A1C. The dissemination plan has been adapted to approach the chief medical officer about doing a brief presentation for the shareholders on the burden of prediabetes

and diabetes and the evidence showing diabetes can be prevented. Challenges associated with recruitment and participation will also be shared with the intent to improve logistical planning for future research at the organization.

Future Implications for Practice

The focus of this project was the prevention of type 2 diabetes. As learned from this project experience, it is vital to the success of a prevention program to convey the significance of preventing a chronic disease such as type 2 diabetes. It is important to communicate the evidence about the impact of type 2 diabetes on quality of life and healthcare costs and emphasize the evidence showing lifestyle modifications can prevent type 2 diabetes. Type 2 diabetes accounts for more than 90% of all cases of diabetes (Middelbeek & Abrahamson, 2014) and diabetes costs lives, livelihoods, families, and billions of dollars every year. The Diabetes Prevention Program Trial demonstrated a lifestyle intervention reduced the incidence of type 2 diabetes by 58% (Knowler et al., 2002). Healthcare providers need to be made aware of available resources for patients at high risk of developing type 2 diabetes.

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Appendix A

Recruitment Flyer

Is your hemoglobin A1C* 5.7% or higher?

*A hemoglobin A1C is a blood test that calculates an average
blood sugar over a 3-month period

**If you answered yes and are interested in
preventing Type 2 Diabetes, contact:**

Tiffanie Wright

615-564-2969

twright@heritagemedical.com

*Appendix B***Participant Consent Form**

Georgia State University
Department of Nursing
Informed Consent

Title: Prevention of Type Two Diabetes in Persons with an Elevated Hemoglobin A1C

Principal Investigator: Dr. Katherine Evans

Co-Investigator: Dr. Megan McCrory

Student Principal Investigator: Tiffanie Wright

I. Purpose:

You are invited to join a research study. The purpose of the study is to see if education can help prevent diabetes. You are invited to participate because you have prediabetes. Twenty people will be involved in this study. Participation will require about three hours of your time.

II. Procedures:

If you decide to be in the study, you will attend two classes. The classes will be held one month apart. The classes will be at the Heritage Medical Associates office building located at 222 22nd Avenue North, Nashville, TN 37209. One month after the second class, you will receive a survey in the mail to evaluate the classes.

III. Risks:

In this study, you will not have any more risks than you would in a normal day of life.

IV. Benefits:

Being in this study may benefit you. You may avoid diabetes. We hope to gain information about education to prevent diabetes for others who are at risk.

V. Voluntary Participation and Withdrawal:

You do not have to be in this study. If you decide to be in the study and change your mind, you can drop out at any time. Whatever you decide, you will not lose any benefits and your healthcare will not be affected.

VI. Confidentiality:

We will keep your records private. Only Dr. Katherine Evans and Tiffanie Wright, ANP-BC will have access to the information you provide. Information may also be shared with the GSU Institutional Review Board and the Office for Human Research Protection (OHRP). We will use your initials rather than your name on records. The information you provide will be stored on a computer. A password is required to access the computer. Your name will not be used when we present this study or publish its results.

VII. Contact Persons:

If you need to talk to someone about this study, please contact Dr. Katherine Evans at 404-413-1166 or Tiffanie Wright at 615-564-2969.

You can also call Susan Vogtner at 404-413-3513

VIII. Copy of Consent Form to Participant:

We will give you a copy of this consent form to keep.

If you are willing to participate, please sign below.

Participant

Date

Principal Investigator or Researcher Obtaining Consent

Date

Appendix C
Dietary Screener Questionnaire

DIETARY SCREENER QUESTIONNAIRE

These questions are about foods you ate or drank during the past month, that is, the past 30 days. When answering, please include meals and snacks at home, at work or school, in restaurants, and anyplace else.

Mark an to indicate your answer. To change your answer, completely fill the box for the incorrectly marked answer (✖). Then mark an X in the correct one. Your answers are important.

● How old are you (in years)?

			years
--	--	--	-------

● Are you male or female?

- Male
- Female

● During the past month, how often did you eat **hot or cold cereals**? *Mark one .*

- Never → **Go to question 4.**
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

● During the past month, what kind of cereal did you usually eat? – *Print cereal.*

● If there was another kind of cereal that you usually ate during the past month, what kind was it? – *Print cereal, if none leave blank.*

● During the past month, how often did you have any **milk** (either to drink or on cereal)? Include regular milks, chocolate or other flavored milks, lactose-free milk, buttermilk. Please do **not** include soy milk or small amounts of milk in coffee or tea. *Mark one .*

- Never → **Go to question 8.**
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

● During the past month, what kind of milk did you usually drink? *Mark one .*

- Whole or regular milk
- 2% fat or reduced-fat milk
- 1%, ½%, or low-fat milk
- Fat-free, skim or nonfat milk
- Soy milk
- Other kind of milk – *Print milk.*

● During the past month, how often did you drink **regular soda or pop** that contains sugar? Do **not** include diet soda. *Mark one .*

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day



9 During the past month, how often did you drink **100% pure fruit juices** such as orange, mango, apple, grape and pineapple juices? Do **not** include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to. Mark one .

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

During the past month, how often did you drink coffee or tea that had **sugar or honey** added to it? Include coffee and tea you sweetened yourself and presweetened tea and coffee drinks such as Arizona Iced Tea and Frappuccino. Do **not** include artificially sweetened coffee or diet tea.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

During the past month, how often did you drink **sweetened** fruit drinks, sports or energy drinks, such as Kool-Aid, lemonade, Hi-C, cranberry drink, Gatorade, Red Bull or Vitamin Water? Include fruit juices you made at home and added sugar to. Do **not** include diet drinks or artificially sweetened drinks.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

During the past month, how often did you eat **fruit**? Include fresh, frozen or canned fruit. Do **not** include juices.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat a green leafy or lettuce **salad**, with or without other vegetables?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day



14 During the past month, how often did you eat any kind of **fried potatoes**, including french fries, home fries, or hash brown potatoes?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat any **other kind of potatoes**, such as baked, boiled, mashed potatoes, sweet potatoes, or potato salad?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat refried beans, baked beans, beans in soup, pork and beans or any other type of cooked dried beans? Do not include green beans.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **brown rice** or other cooked whole grains, such as bulgur, cracked wheat, or millet? Do not include white rice.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, not including what you just told me about (green salads, potatoes, cooked dried beans), how often did you eat **other vegetables**?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you have Mexican-type **salsa** made with tomato?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day



20 During the past month, how often did you eat **pizza**? Include frozen pizza, fast food pizza, and homemade pizza.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you have **tomato sauces** such as with spaghetti or noodles or mixed into foods such as lasagna? Do not include tomato sauce on pizza.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat any kind of **cheese**? Include cheese as a snack, cheese on burgers, sandwiches, and cheese in foods such as lasagna, quesadillas, or casseroles. Do not include cheese on pizza.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **red meat**, such as beef, pork, ham, or sausage? Do not include chicken, turkey or seafood. Include red meat you had in sandwiches, lasagna, stew, and other mixtures. Red meats may also include veal, lamb, and any lunch meats made with these meats.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat any **processed meat**, such as bacon, lunch meats, or hot dogs? Include processed meats you had in sandwiches, soups, pizza, casseroles, and other mixtures.

Processed meats are those preserved by smoking, curing, or salting, or by the addition of preservatives. Examples are: ham, bacon, pastrami, salami, sausages, bratwursts, frankfurters, hot dogs, and spam.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day



25 During the past month, how often did you eat **whole grain bread** including toast, rolls and in sandwiches? Whole grain breads include whole wheat, rye, oatmeal and pumpernickel. Do **not** include white bread.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

26 During the past month, how often did you eat **chocolate** or any other types of candy? Do **not** include sugar-free candy.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **doughnuts**, sweet rolls, Danish, muffins, pan dulce, or pop-tarts? Do **not** include sugar-free items.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **cookies, cake, pie or brownies**? Do **not** include sugar-free kinds.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **ice cream or other frozen desserts**? Do **not** include sugar-free kinds.

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day

During the past month, how often did you eat **popcorn**?

- Never
- 1 time last month
- 2-3 times last month
- 1 time per week
- 2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2 or more times per day



*Appendix D***Physical Activity Assessment**

Describe your physical activity at work (even work at home, sick leave at home and studying, for instance in a university)

1. Very light, e.g., sitting at the computer most of the day or sitting at a desk
2. Light, e.g., light industrial work, sales or office work that comprises light activities
3. Moderate, e.g., cleaning, staffing at kitchen or delivering mail on foot or by bicycle
4. Heavy, e.g., heavy industrial work, construction work or farming

Describe your physical activity at leisure time. If the activities vary between summer and winter, try to give a mean estimate

1. Very light: almost no activity at all
 2. Light, e.g., walking, nonstrenuous cycling or gardening approximately once a week
 3. Moderate: regular activity at least once a week, e.g., walking, bicycling, or gardening or walking to work 10–30 min day⁻¹
 4. Active: regular activities more than once a week, e.g., intense walking or bicycling or sports
 5. Very active: strenuous activities several times a week
-

Appendix E



A Healthy Meal



Dairy—
1 cup skim milk

Fruit—
1 apple

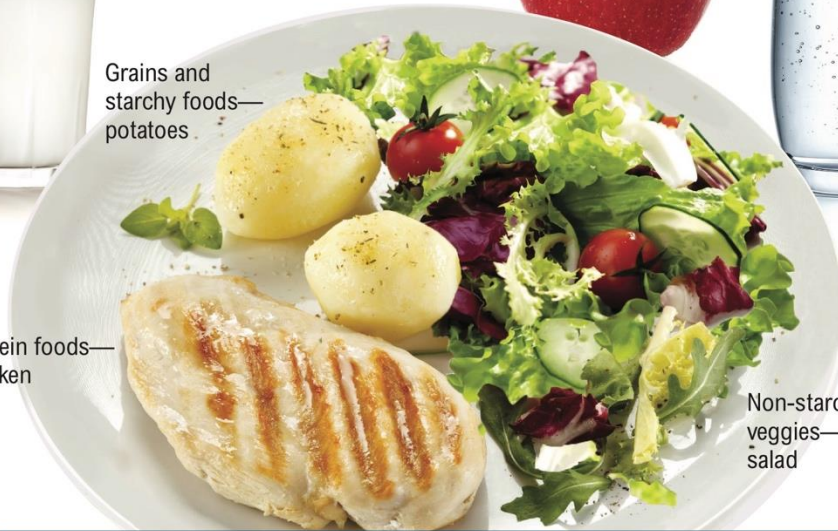


Drink—
water



Grains and
starchy foods—
potatoes

Protein foods—
chicken



Non-starchy
veggies—
salad

You'll want to make:

- Half of your plate non-starchy veggies (such as broccoli, lettuce, peppers)
- A quarter of your plate grains and starchy foods (such as potatoes, oatmeal)
- Another quarter of your plate protein foods (such as chicken, lean meat, fish)

You can also have:

- A small amount of dairy (1 cup skim milk)
- A small amount of fruit (one apple, half a banana, ½ cup berries)
- A drink that has low or no calories (water, sparkling water, coffee without sugar)

PREVENT2



Make Your Plate

Write the number of the correct food group on each line.
Then create a healthy meal by listing items that you like. You
can use "Foods to Choose" on pages 5-7 for ideas.

Food Groups

1. Non-starchy veggies
2. Grains and starchy foods
3. Protein foods
4. Dairy foods
5. Fruit
6. Drink



Participant Guide: Eat Well to Prevent T2

4



Foods to Choose

Non-starchy veggies:

- Asparagus
- Broccoli
- Cabbage
- Carrots
- Celery
- Cucumbers
- Leafy greens
- Mushrooms
- Onions
- Peppers
- Tomatoes
- Your favorites:



Grains and starchy foods:

- 100% corn tortillas
- 100% whole grain cereal
- 100% whole wheat bread
- Black beans
- Brown rice
- Corn
- Green peas
- Lentils
- Oatmeal
- Popcorn
- Potatoes
- Pumpkin
- Yams
- Your favorites:



Sources: CDC, ADA



Foods to Choose

Protein foods:

- Eggs (but limit yolks)
- Fish and seafood (catfish, cod, shrimp)
- Lean meat (lean ground beef, chicken and turkey without skin, pork loin)
- Nuts (limit because high in fat)
- Your favorites:



Dairy foods:

- Low-fat cheese
- Plain low-fat soy or almond milk
- Plain nonfat or low-fat yogurt
- Skim or low-fat milk
- Your favorites:



Sources: CDC, ADA



Foods to Choose

Fruit:

- Apples
- Apricots
- Blueberries
- Dates
- Grapefruit
- Grapes
- Oranges
- Strawberries
- Your favorites:



Drinks:

- Coffee without sugar
- Sparkling water
- Tea without sugar
- Water
- Your favorites:



Sources: CDC, ADA



Foods to Limit

Sweet foods:

- Candy
- Cookies
- Corn syrup
- Honey
- Ice cream
- Molasses
- Processed snack foods
- Sugar
- Other examples:



Fatty foods:

- Butter
- Creamy salad dressing
- Deep fried foods (French fries)
- Fatty meat (bacon, bologna, regular ground beef)
- Full-fat cheese
- Lard
- Shortening
- Whole milk
- Other examples:



Sources: CDC, ADA



How to Cope with Challenges

It can be challenging to shop, cook, and eat well. Here are some common challenges and ways to cope with them. Write your own ideas in the column that says “Other Ways to Cope.” Check off each idea you try.

Challenge	Ways to Cope	Other Ways to Cope
<p>Shopping this way costs too much.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Use coupons. <input type="checkbox"/> Buy in bulk. <input type="checkbox"/> Buy things on sale. <input type="checkbox"/> Grow your own veggies and fruit. <input type="checkbox"/> Buy frozen veggies and fruit. <input type="checkbox"/> Buy veggies and fruit in season. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>Shopping and cooking this way takes up too much time.</p>	<p>To free up time in general:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Be more organized. <input type="checkbox"/> Ask friends or family to help you get things done. <input type="checkbox"/> Take your kids with you to the grocery store and turn it into a fun field trip. <p>To find time to <u>shop</u> for healthy food:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Shop on the weekend. <input type="checkbox"/> Shop in bulk. <input type="checkbox"/> Use a list to make sure you get everything you need. <input type="checkbox"/> Buy healthy convenience items, like prewashed salad. <p>To find time to <u>cook</u> healthy food:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Look for recipes for fast, healthy meals. <input type="checkbox"/> Do some prep work before work in the morning. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____



How to Cope with Challenges

Challenge	Ways to Cope	Other Ways to Cope
<p>I don't like the way this food tastes.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Change your favorite dishes to make them healthier. <input type="checkbox"/> Choose cheeses that are strong-tasting and fairly low in fat, such as Parmesan and feta. <input type="checkbox"/> Choose good quality items. <input type="checkbox"/> Choose items with a variety of flavors, textures, scents, and colors. <input type="checkbox"/> Cook veggies like green beans and broccoli lightly, so they stay crisp and colorful. <input type="checkbox"/> Dress up food with herbs, spices, low-fat salad dressing, lemon juice, vinegar, hot sauce, plain nonfat yogurt, and salsa. <input type="checkbox"/> Grill or roast veggies and meat to bring out the flavor. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>It's unpleasant/boring/hard to shop, cook, and eat this way.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Shop, cook, and eat healthy with friends and family. <input type="checkbox"/> Learn new cooking methods and recipes from books, articles, and videos. Or take a healthy cooking class. <input type="checkbox"/> Try new ingredients. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____



PREVENT2
A PROVEN PROGRAM TO PREVENT OR DELAY TYPE 2 DIABETES

Ways to Get Active

There are so many great ways to get active. You're sure to find at least one that you enjoy. Here are just a few ideas.

1. After you read six pages of a book, get up and move a little.
2. Dance to your favorite music.
3. Pace the sidelines at your children's or grandchildren's sports events.
4. Play actively with your children or pets for 15 to 30 minutes a day.
5. Replace Sunday drives with Sunday walks.
6. Run or walk fast when you do errands.
7. Start a new active hobby, such as biking or hiking.
8. Take a walk after dinner with your family or by yourself.
9. Track your steps with a pedometer. Work up to 10,000 steps or more a day.
10. Walk around whenever you talk on the phone.
11. Walk briskly when you shop.
12. Walk up and down escalators instead of just riding them.
13. Walk your dog each day.
14. When you watch TV, stand up and move during the ads, or do chores.



How do you plan to get active?

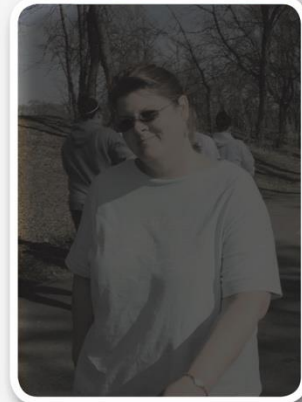
Source: American College of Sports Medicine (<https://www.acsm.org/docs/brochures/reducing-sedentary-behaviors-sitting-less-and-moving-more.pdf>) and Heart Foundation (<https://heartfoundation.org.au/images/uploads/publications/PA-Sitting-Less-Adults.pdf>)



Be Active, Be Safe

If you get hurt, you may need to take a break from being active. So follow these tips to work out safely.

1. Ask your healthcare provider if you are ready to be active. (See “Are You Ready to Get Active?” on page 5.)
2. Dress for the activity. Wear the right shoes and clothes. Use safety gear as needed.
3. Drink water before, during, and after your workout, even if you don’t feel thirsty.
4. Listen to your body. Slow down or stop if you feel very tired, sick, or faint, or your joints hurt.
5. Mix it up. Do a variety of activities. That way you won’t strain any one part of your body.
6. Start small. If you train too hard or too often, you may get hurt. Try to make slow, steady progress over time.
7. Warm up before you work out. Cool down after you work out. Take 5 to 10 minutes for each.
8. Watch out. Take care not to trip or bump into anything.
9. Work with the weather. Work out indoors if it’s too hot or too cold. If you get too hot, you may get a headache or a fast heartbeat. You may feel dizzy, sick to your stomach, or faint.
10. Use good form when strength training.



Source: National Institute of Aging/National Institutes of Health: Staying Safe During Exercise and Physical Activity (<https://go4life.nia.nih.gov/sites/default/files/StayingSafe.pdf>)
Harvard Health Publications (<http://www.health.harvard.edu/healthbeat/10-tips-for-exercising-safely>)



How to Cope With Challenges

It can be challenging to get active. Here are some common challenges and ways to cope with them. Write your own ideas in the column that says “Other Ways to Cope.” Check off each idea you try.

Challenge	Ways to Cope	Other Ways to Cope
It’s too hot, cold, or wet outside.	<input type="checkbox"/> Work out indoors. <input type="checkbox"/> Dress for the weather. <input type="checkbox"/> Swim in hot weather.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
I don’t have time.	<p>To fit fitness in <u>anytime</u>:</p> <input type="checkbox"/> Break your 150 minutes into smaller chunks. <input type="checkbox"/> Park your car farther away from the place you want to go. <input type="checkbox"/> Get off the bus or train one stop early. Walk the rest of the way. <input type="checkbox"/> Take stairs instead of elevator. <input type="checkbox"/> Use a fitness app. <p>To fit in fitness at <u>home</u>:</p> <input type="checkbox"/> Walk your dog briskly. <input type="checkbox"/> Sweep or mop your floor briskly. <input type="checkbox"/> Wash your car briskly. <input type="checkbox"/> Stretch, do sit-ups, or pedal a stationary bike while you watch TV. <input type="checkbox"/> Mow your lawn with a push mower. Or rake leaves. <input type="checkbox"/> Plant and care for a vegetable or flower garden.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____





How to Cope With Challenges

Challenge	Ways to Cope	Other Ways to Cope
<p>I don't have time.</p>	<p>To fit in fitness at work:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Take a brisk walk during your coffee or lunch break. Ask a friend to go with you. <input type="checkbox"/> Take part in an exercise program at work. <input type="checkbox"/> Join a nearby gym. Stop off before or after work, or during your lunch break. <input type="checkbox"/> Join the office softball team or walking group. <input type="checkbox"/> Use a copy machine on the other side of the building. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>I don't have child care.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Be active with your kids. <input type="checkbox"/> Swap child care with a friend. <input type="checkbox"/> Ask friends or family to help out. <input type="checkbox"/> Use gym child care. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>I don't have a car.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Work out in your own home or area. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>I feel embarrassed.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Work out in your own home. <input type="checkbox"/> Work out with a friend. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
<p>My area is not safe.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Work out in your own home. <input type="checkbox"/> Work out at a gym or community center. 	<ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____





How to Cope With Challenges

Challenge	Ways to Cope	Other Ways to Cope
It costs too much.	<input type="checkbox"/> Do free activities like walking. <input type="checkbox"/> Buy workout clothes and equipment on sale. <input type="checkbox"/> Look for free fitness classes at your library or community center.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
It's boring.	<input type="checkbox"/> Dance. <input type="checkbox"/> Play with your kids. <input type="checkbox"/> Work out with a friend. <input type="checkbox"/> Use a fitness app. <input type="checkbox"/> Listen to music, watch TV, or talk on the phone while you are active. <input type="checkbox"/> Keep trying new things until you find something you like.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
It's painful or tiring.	<input type="checkbox"/> Ask your healthcare provider what ways to get active are right for you. <input type="checkbox"/> Work out safely (see next handout). <input type="checkbox"/> Work out at the time of day when you have the most energy. <input type="checkbox"/> Walk slowly or swim. <input type="checkbox"/> Do yoga or Tai Chi.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
It messes up my hair.	<input type="checkbox"/> Work out in a cool place. <input type="checkbox"/> Try new hair products and styles.	<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

*Appendix F***Letter participants received with post-intervention survey**

Dear study participant

I want to take this opportunity to thank you for participating in this study about the prevention of type 2 diabetes. You were eligible to participate in this study because your hemoglobin A1C level indicated prediabetes. I hope that you found the educational sessions helpful and you gained some knowledge to help prevent diabetes in the future and avoid the cost and complications that come along with this chronic disease.

There is a survey included with this mailing which will be used to assess the effectiveness of the educational sessions you attended. Please answer all questions and give additional feedback in the space provided. The survey is anonymous. Please return the survey in the enclosed self-addressed, stamped envelope. Do not hesitate to contact me for questions or concerns. Again, thank you for your participation in the study.

Sincerely,

Tiffanie Wright Marksbury