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Diabetic Prevention the Hard Way: Modified Diet and Increased Exercise

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UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
Betty and Bob Beyster Institute for Nursing Research,
Advanced Practice, and Simulation

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

Torrie St.Julien, BSN, RN, FNP/AGNP/DNP student

A portfolio presented to the

FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE
UNIVERSITY OF SAN DIEGO

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DOCTOR OF NURSING PRACTICE

May 11, 2015

Kathy James, DNSc, APRN, FAAN, Faculty Chairperson, Seminar Faculty

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Diabetic Prevention the Hard Way: Modified Diet and Increased Exercise

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Diabetic Prevention the Hard Way: Modified Diet and Increased Exercise

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Torrie St.Julien performed all the analyses, wrote the initial draft of the manuscript, collected chart data, but both authors revised the manuscript for final submission. In accordance with IRB requirements, all subjects are to be referred to as participants. The submitted manuscript has been read and approved by all listed authors, and the work is original and not under consideration by any other journal. This manuscript material has not been published in any form previously, but has been presented at the Western Institute of Nursing (WIN) Conference in Albuquerque, New Mexico on April 24, 2015.

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Diabetic Prevention the Hard Way: Modified Diet and Increased Exercise

Abstract:

Background and Purpose: In the United States, 79 million people are pre-diabetic: most have no symptoms. If left untreated, 37% will develop diabetes within 4 years. Fourteen percent of United States health care expenditures are related to diabetic complications. This Evidenced Based Project (EBP) involved a behavioral lifestyle change with the purpose of 7% weight loss and a minimum of 150 minutes of physical activity a week. It was also designed to reduce risk factors and glycated hemoglobin A1c (HgA1c) levels.

Methods: The interventional approach was modeled after the Diabetes Prevention Program (DPP) and Group Lifestyle Balance Program. Participants were identified based on high risk factors and HgA1c levels. Bi-monthly meetings were conducted over 12 weeks. Participant education and monitoring of weight loss and activity level were provided.

Conclusion: Changing a person's behavior is complex and multi-factorial. Although participants had a significant increase in healthy behavior modifications, knowledge, awareness, and activity, they were unsuccessful in reducing HgA1c levels in this particular study.

Implications for practice: Reducing high risk and pre-diabetic populations may lower health costs, provide a healthier patient population, and decreased cardiovascular incidents related to diabetes. Findings could be used in conjunction with decreasing the rates of metabolic syndrome.

Background and Purpose:

The purpose of this Evidenced Based Project (EBP) is focused on the prevention and progression of diabetes mellitus in prediabetic and high risk populations. It is designed to reduce risk factors or glycated hemoglobin A1C (HgA1C) levels in prediabetics to less than 5.7%. Evidenced based research has shown that diet alone does not provide a long term solution for most individuals, as weight regain is common (Sénéchal, Slaght, Bharti, & Bouchard, 2014). Weight loss has been known to decrease insulin resistance and risk for diabetes as well as other metabolic abnormalities. The goals of diabetic prevention include delaying the onset of diabetes, preserving beta cell function, and preventing latent stages of microvascular and cardiovascular complications. This project involved a behavioral lifestyle change intervention with the purpose of 7% weight loss, a minimum of 150 minutes of physical activity a week, and nutritional monitoring or modification.

More than 29 million people in the United States have diabetes: in addition to an estimated 8.1 million that are undiagnosed (National Diabetes Statistics Report, 2014). According to the American Diabetes Association (2014) around 79 million are pre-diabetic and usually have no symptoms, yet they are at risk for eventually developing type 2 diabetes, heart disease, and having a stroke. Prediabetes is a condition in which individuals have a blood glucose level that is elevated above normal, but not high enough to be classified as diabetes. The diagnostic criteria for prediabetes is an elevated fasting plasma glucose level (100 mg/dL-125 mg/dL), or a glycated hemoglobin (HbA1c) value between 5.7-6.4% (American Diabetes Association, 2014). This condition increases the risk of developing Type 2 diabetes. Considering an estimated 34% of the population is prediabetic and most of which are overweight and obese, it is now recognized as a

reversible condition based on lifestyle risk factors: including but not limited to physical inactivity and sedentary lifestyle. If left untreated, 37% develop diabetes within 4 years (Tuso, 2014). Evidenced based research has shown that diet alone does not provide a long term solution for most individuals, as weight regain is common (Sénéchal & Bouchard, 2014). Individuals with high risk factors such as increased BMI or metabolic syndrome can reduce their chances of developing diabetes if proper preventions are taken. This project involves behavioral lifestyle interventions with the purpose of 7% weight loss through a minimum of 150 minutes of physical activity a week, along with nutritional monitoring and or modification. Weight loss has been known to decrease insulin resistance and risk for diabetes as well as other metabolic abnormalities. The goal of diabetic prevention is to delay the onset of diabetes, preserving beta cell function, and preventing latent microvascular and cardiovascular complications.

Findings from the Diabetic Prevention Program (DPP) research group revealed that millions of high-risk individuals can delay or avoid developing type 2 diabetes through weight loss using a low fat, low carbohydrate diet and regular physical activity (2002). Coupling weight loss and physical activity lowers the risk of diabetes since it improves the body's ability to utilize insulin and process glucose. The participants in the lifestyle change group received individual counseling and motivational support to help them achieve a successful nutritional diet, adequate exercise, and behavior modification. The DPP resulted in reducing participant's risk of developing diabetes by 58 percent across the board for different ethnic groups as well as gender. In participants 60 years and older, lifestyle change reduced their risk by 71 percent (DPP, 2002). Another meta-analysis involving behavioral interventions, with over five thousand participants, over a

ten year span, yielded similar outcomes of significantly lower incidences with the groups that used a combination of exercise and diet, as opposed to simply exercise alone. (Norris, Zhang, Avenell, Gregg, Christopher, & Lau, 2009). Interventions involving physical activity has shown to be more effective than drug treatments like Metformin and diet alone (Huseyin & Loannidis, 2013). High risk groups, like those with impaired glucose or metabolic syndrome also have decreased incidence of developing Type 2 Diabetes when interventions are aimed at increasing exercise combined with diet modification.

As of 2012, 7.3 out of every 100 adults in California had been diagnosed with diabetes and 1 in 5 are prediabetic. According to "California Diabetes Statistics" (2012) this would have ranked California the eleventh worst state in the nation with the highest ratio of people with diabetes in the general population. Currently 1 in 12 Californians are diabetic. Diabetes accounts for almost 14 percent of United States health care expenditures, half of which are related to complications associated with underlying microvascular and macrovascular changes contributing to problems such as myocardial infarction (MI), stroke, end-stage renal disease, retinopathy, and foot ulcers. Quality of life and economic factors are directly related to a high prevalence of diabetes and adversely impacts employment, absenteeism, and work productivity. Direct and indirect medical cost average about 245 billion dollars in 2012 (National Diabetes Statistics Report, 2014). The question becomes how can we derail the deadly and dangerous growing trend in this state and the nation? How can best possible outcomes for these high risk patients be achieved? When prevention is obtained through early, efficient intervention implementation and management of disease processes more efficient goals

are acquired. Research has shown that you can greatly reduce your risk for being pre-diabetic and getting type 2 diabetes by eating a healthy diet, getting plenty of physical activity, and losing excess weight (NIH, 2014).

After conversing with multiple healthcare professionals at the primary facility, it was undeniable that a majority of the practitioners had the same major complaint: too many diabetic patients and not enough time during visits for adequate teaching to focus on prevention. The intended improvement would reduce the overall prevalence of pre-diabetics in the Primary care practice setting. The participant population would have regular education along with closely monitored weight, activity, and nutrition. The expectation is that the outcomes of the project may lead to lower health costs, a healthier patient population, and decreased cardiovascular incidents related to diabetes.

In high risk and pre-diabetic populations' ages 18-75 years old, will bimonthly reinforcement of Evidenced based practice involving behavior modification with respect to modified nutrition and increased exercise, decrease risk factors or HgA1c levels, in comparison with the current standard of care: were education is given at 3 month intervals or more. This Evidenced based project took place in a Primary care setting. An average of ten percent of the population in this facility were diabetic. The staff consists of Nurse Practitioners, Medical Doctors, and nurse corpsmen. The patients within the setting have similar insurance plans that cover regular guideline screenings and maintenance. The participants are of military affiliation through active duty, veteran, spousal, or dependent relationship. IRB approval was given on the project.

Methods:

When planning the intervention the approach was modeled after the Diabetes Prevention Program (DPP), which is heavily supported by research and evidenced based practice. This EBP project was implemented in a primary care setting where an average of ten percent of the population were diabetic. Patients were identified based on high risk factors and pre-diabetic HgA1C levels between 5.7-6.4%, over the past 6 months. Bi-monthly group meetings were held over a 12-week period, in addition to weekly follow up phone calls. This implementation was to educate and monitor participant's progress with regards to weight loss, activity levels, and behavioral modification. The data collected included HgA1C level, weight, height, activity level, nutrition habits, waist circumference, and BMI.

The intervention is modeled after The Group Lifestyle Balance (GLB) Program, and was a comprehensive lifestyle behavior change program adapted from the successful lifestyle intervention used in the National Institutes of Health funded Diabetes Prevention Program (DPP, 1999). The original individually administered DPP Lifestyle Balance intervention (copyright 1996; 2011) was developed and written at the University of Pittsburgh by the DPP Lifestyle Resource Core on behalf of the DPP Research Group. Members from the original DPP lifestyle team collaborated to adapt and update the individual intervention to a group-based program with the core content including a broad behavioral focus on making healthy food choices and meal planning to combine both calorie and fat self-awareness. Monitoring was done from the first day of intervention to the last day of the program. Each group meeting provided patient education that focused

on specific topics relating to nutrition and exercise (See Table I). There was also time allotted for questions and anecdotes related to the participants experience with the program at each meeting. As in the DPP, the goals of the "Group Lifestyle Balance Program" (2014) intervention were to achieve and maintain a 7% weight loss, and to safely and progressively increase to 150 minutes per week of moderately intense physical activity similar to a brisk walk. Each participant was able to choose the type of exercise that they preferred as long as it increased their heart rate for at least 20 minutes at a time. They also kept a detailed record of everything they ate each day, the corresponding calories, and the length and type of exercise performed (See Figure I).

A large part of planning the intervention was making sure participants has self-accountability. After each group meeting, the daily food tracker was reviewed to see if participants were reducing carbohydrates, eating low calorie foods, and doing the required amount of exercise. At the beginning of each meeting the material was given back with any appropriate feedback. One on one discussions were conducted when needed. At the beginning of the program, the idea was bring awareness to the types of foods participants were eating and learning to read food labels to understand what to look for or avoid when making healthy choices.

Two different types of tools were used to measure the effectiveness of the intervention: the Diabetic Knowledge Questionnaire (DKQ-24) and the Diabetes Risk Test. Both tests were given on the initial and final group meetings and the scores were compared. The DKQ-24 is a qualitative measurement of the patient's knowledge of diabetes signs and symptoms, nutritional and exercise awareness. The Diabetes Risk Test (DRT), created by the American Diabetic Association, is a quantitative form that gives

each participant a score indicative of their risk of developing diabetes based on personal and familial traits (See Figure II). The other means of evaluation included bi-monthly data collection of participant's weight, waist circumference, amount of exercise, and pre and post HgA1C levels.

Results:

The results of the project varied. Only three out of twelve participants completed the program from the beginning to end: participants A, B, and C. Participant A lost a total of 24 lbs in 3 months, decreased risk factor score from 8 to 6, BMI from 32.5 to 29 and waist circumference from 47 to 38.5 inches, but pre and post HgA1c remained unchanged at 5.6 (See Figure III-VI). Participant B lost a total of 11 lbs in 3 months, risk factor score remained the same at a 6, decrease BMI from 37.2 to 25.6 and waist circumference from 41 to 39 inches, pre and post HgA1c increased from 5.3 to 5.8. Participant C lost a total of 0.2 lbs in 3 months, risk factor score decreased from 8 to 7, BMI remained the same at 24.6, waist circumference decreased from 37 to 36.5 inches, and pre and post HgA1c remained unchanged at 6.1. The average change of risk factors scores was a two point decrease. The average increase in diabetic knowledge, via the DKQ-24 went from 60% up to 92%. All patients self-reported an increase in quality of life and more energy. Two of the three patient anthropometric measures were impacted positively: weight, BMI, waist circumference.

Conclusion:

In summary, the process of changing a person's behavior is complex and multifactorial. Although participants had a significant increase in healthy behavior

modifications, knowledge, awareness, and activity, they were unsuccessful in reducing HgA1c levels in this particular study. Small sample size and shorter time frame played a large factor in the outcome of this study. EBP shows enhanced and longer lasting results when this type of program is conducted for a year or more.

Reducing prediabetic risk factors may not always correlate with reduction of HgA1c, and progression rates may differ which impact planning and implementation of interventions (Morris, Khunti, Achan, Srinivasan, Gray, Davies, & Webb, 2013). Patient B lost weight but his HgA1c remained unchanged. This could be due to the fact that normal turnover for a red blood cell is an average of about three months. This is an average. It is possible that patient B's red blood cell turnover time was longer than three months. The longer the life of the cell, the more glucose will be attached. As a result, blood glucose levels would be elevated when the labs are drawn less at three months. Patient C was partially non-compliant throughout the process due to acute illness and an injury, which decreased the amount of weekly exercise performed. Patient A maintained a healthier lifestyle, but was unwilling to give up alcohol two to three times a week. Alcohol has very high sugar content. This could have led to the HgA1c remaining unchanged, although over twenty pounds were lost.

Implications for Practice:

When considering future research or EBP, the results from this program could be used in conjunction or comparison with decreasing the rates of metabolic syndrome among adults, due to the desired impact it had on waist circumference. Metabolic syndrome is often in high correlation with diabetes (Orchard, Temprosa, Goldberg,

Haffner, Ratner, Marcovina, & Fowler, 2005). Reducing the overall prevalence of pre-diabetics in Primary care practice, could lead to lower health costs, a healthier patient population, and decreased cardiovascular incidents related to diabetes.

The expected outcomes of the project were to modify behavior physically and nutritionally, and decrease body fat and HgA1c levels. Only one third of the group met all of these criteria except reducing the Hga1c level. Another third of the group had issues with nutritional compliance and was unable to meet specific physical requirements of the exercise portion. The remaining third of the group has inconsistent results, whereas there the goal weight loss was achieved, but the HgA1c level rose. Although all patients self-reported an increased quality of life, increased energy, the HgA1c levels did not reflect patient's progress.

The project had some limitations, barriers, and benefits. The sample for this observational project was very small and the dropout rate was considerable. Providers implementing this study should not begin over the holiday season (November – December) due to the high dropout rate associated with unwillingness to change behavior during times of high temptation and stress. All of the participants were male, which limits generalizability of the results particularly for women. The electronic medical record system did not have an official code for prediabetics. Diabetic patients information was easily and readily available, but not prediabetics. Each patient's records, in the Primary care, had to be pulled up individually to find participants fitting the requirements: risk factors and HgA1c. The cost of the program was very low. Participants each received a five dollar, 3 ring-binder with the downloadable version of the Group Lifestyle Balance Program: Diabetes Prevention. Each binder had about 200 sheets of copy paper that

totaled nearly \$42 total or \$3.50 per person, with 12 initial participants. The facility allowed the copies to be made on their black and white printer so no out of pocket expenses was needed for ink. Each participant received a laminated low car nutritional placemat that was \$7.50 per person. Each participant also received a \$20 cook book approved by the American Diabetic association. Therefore the cost was approximately \$36 per person.

Prediabetes is the precursor to Diabetes Mellitus Type 2. Studies have shown a known correlation between cardiovascular risk factors such as obesity, hypertension, high LDL cholesterol levels, and hypertriglyceridemia. Abdominal obesity, smoking, physical activity, and diet habits showed the strongest association with prediabetes (Diaz-Redondo, 2015). Modifiable risk factors can be identified by the health care provider and interventions implemented by the provider and the participants. When considering early detection of individuals with high risk of development of diabetes, interventions should be geared toward addressing modifiable risk factors. Multi-component interventions involving lifestyle changes to include dietary and physical exercise have shown moderately effective in outcomes in at risk and prediabetic populations (Aguiar, Morgan, Collins, Plotnikoff, & Callister, 2014). Further studies should include more research relating to metabolic syndrome and prediabetes. The results from this program might be used in conjunction or comparison with decreasing the rates of metabolic syndrome among the diabetic population, considering the favorable outcome in decreased waist circumference.

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Figures and Tables

Table I: Group Lifestyle Balance Curriculum

Bi-Monthly Schedule	Group Lifestyle Balance Curriculum
Core Sessions	
Group Meeting 1	<u>1: Welcome to the Program</u> <u>2: Be a Fat and Calorie Detective- food labels</u> <u>3: Healthy Eating and Tip the Calorie Balance</u> <u>4: Jump Start Your Activity Plan</u>
Group Meeting 2	<u>5: Take Charge of Your Surroundings</u> <u>6: Slippery Slope of Lifestyle Change</u> <u>7: Problem Solving</u> <u>8: Four Keys to Healthy Eating Out</u>
Group Meeting 3	<u>9: Strengthen Your Exercise Plan</u> <u>10: Ways to Stay Motivated</u> <u>11: Make Social Cues Work for You</u> <u>12: Balance Your thoughts: Mindful Eating</u>
Core-Transition Sessions	
Group Meeting 4	<u>13: More volume, More Calories</u> <u>14: Heart Health</u>
Group Meeting 5	<u>16: Stress and Time Management</u> <u>17: Balance Your Thoughts</u>
Group Meeting 6	<u>18: Stretching: The truth about Flexibility</u> <u>19: Standing Up for Your Health</u> <u>20: Prepare for Long-Term Management</u>
Group Meeting 7	<u>21: Looking Back and Looking Forward</u>

Figure I: My Daily Food Tracker

Week: _____ Date: _____

Time	Food: Description	Amount	Fat Grams	Calories	Hunger Rating Scale	Comments
----- -	Daily Totals	----- -----				

Physical Activity Description

Activity	Minutes	Or Steps
Daily Activity Total		

Figure II: Diabetes Risk Test

Diabetes Risk Test
Age: <40(0 pt), 40-49 (1 pt), 50-59 (2pts), 60or greater (3pts)
Man (1pt) or female (0pt)
Woman ever diagnosed with gestational diabetes: yes(1pt), no (0 pt)
Diagnosed with high blood pressure: yes(1pt), no(0pt)
Are you physically active? yes(0pt), no(1pt)
What is your weight status: height/weight (1, 2, or 3 points)
Total score: between 0-10
If your score is 5 or higher: you are at increased risk for having type 2 diabetes

Figure III: Body Mass Index (BMI)

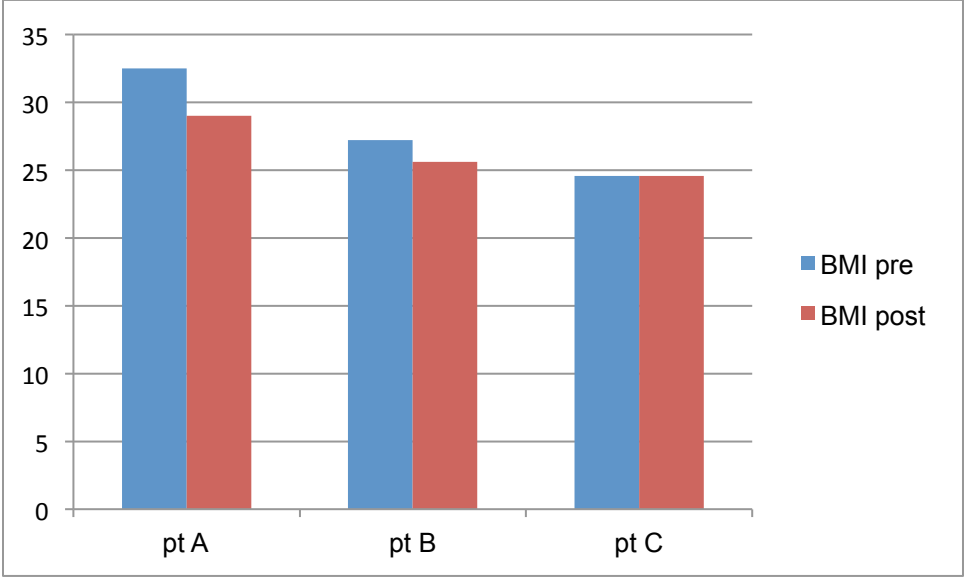


Figure IV: Weight loss

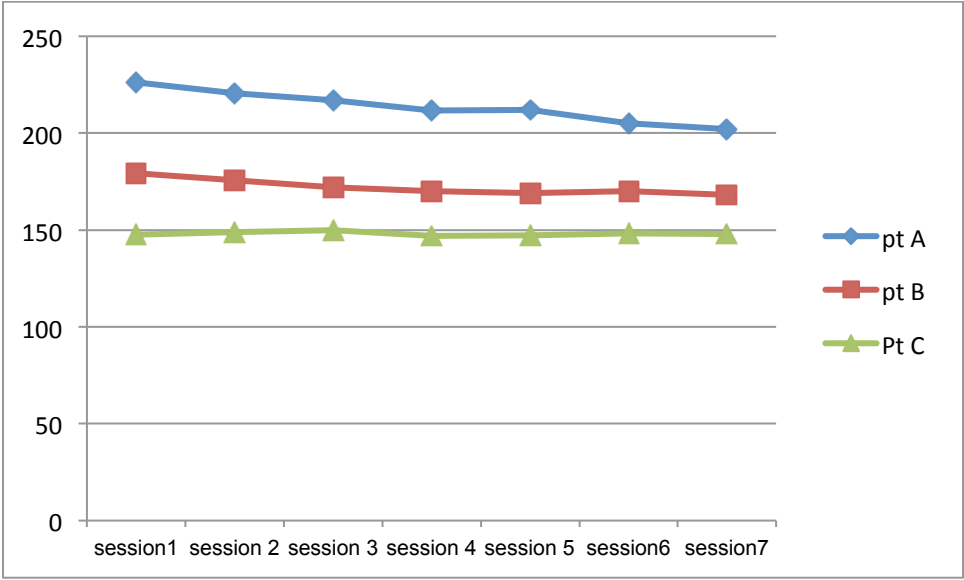


Figure V: Waist Circumference

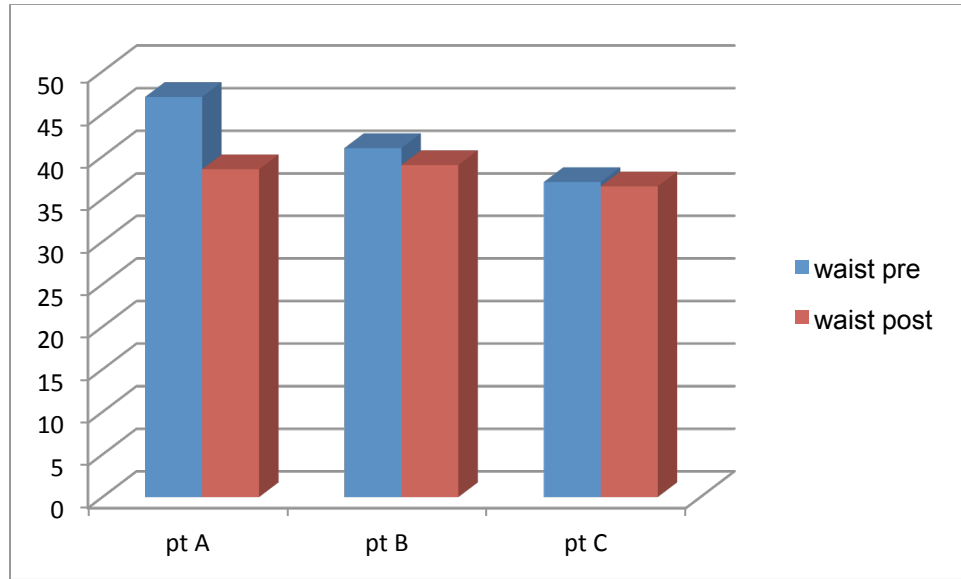
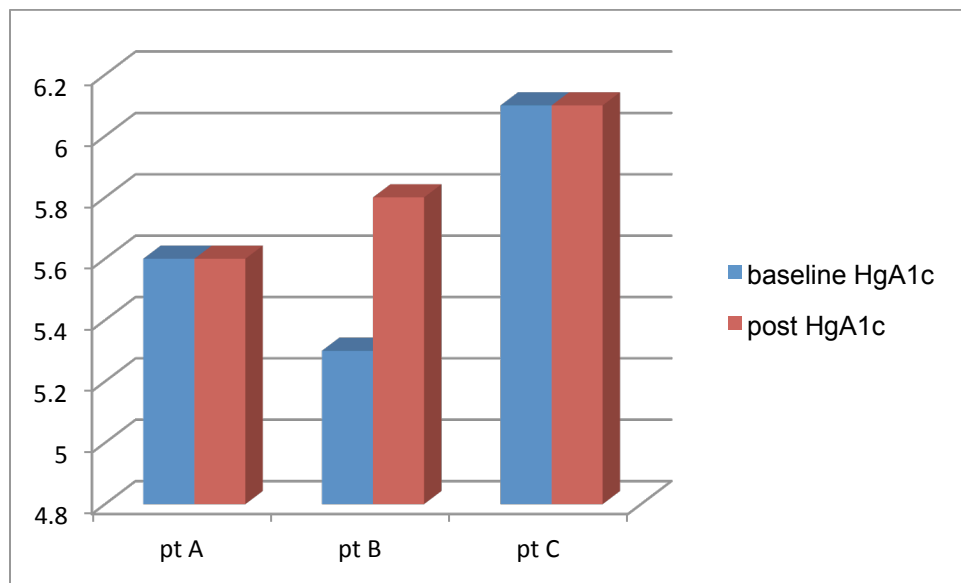
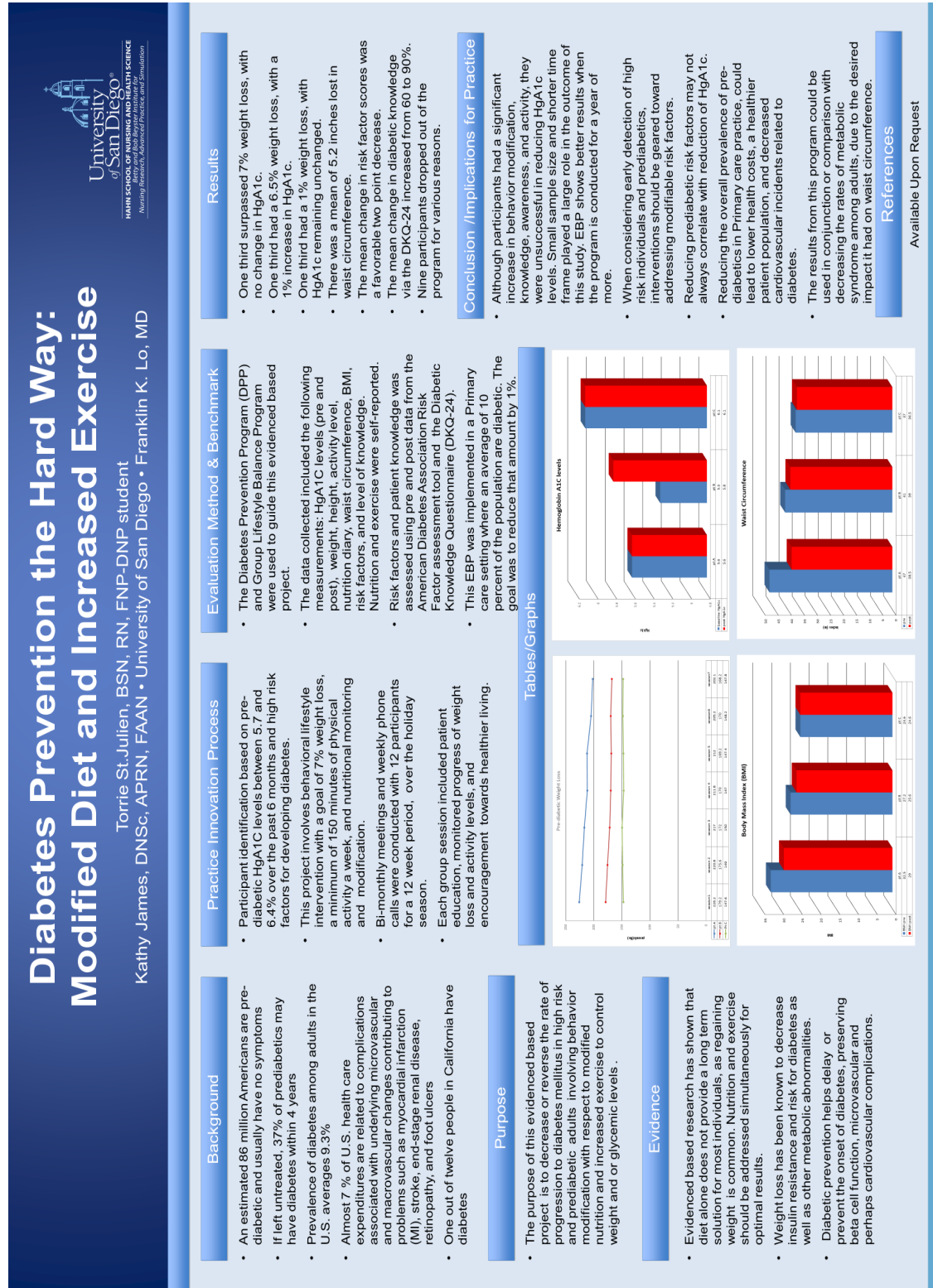


Figure VI: Hemoglobin A1c



e. Copy of Poster:



Results

- One third surpassed 7% weight loss, with no change in HgA1c.
- One third had a 6.5% weight loss, with a 1% increase in HgA1c.
- One third had a 1% weight loss, with HgA1c remaining unchanged.
- There was a mean of 5.2 inches lost in waist circumference.
- The mean change in risk factor scores was a favorable two point decrease.
- The mean change in diabetic knowledge via the DKQ-24 increased from 60 to 90%.
- Nine participants dropped out of the program for various reasons.

Conclusion /Implications for Practice

- Although participants had a significant increase in behavior modification, knowledge, awareness, and activity, they were unsuccessful in reducing HgA1c levels. Small sample size and shorter time frame played a large role in the outcome of this study. EBP shows better results when the program is conducted for a year or more.
- When considering early detection of high risk individuals and prediabetics, interventions should be geared toward addressing modifiable risk factors.
- Reducing prediabetic risk factors may not always correlate with reduction of HgA1c.
- Reducing the overall prevalence of pre-diabetics in Primary care practice, could lead to lower health costs, a healthier patient population, and decreased cardiovascular incidents related to diabetes.
- The results from this program could be used in conjunction or comparison with decreasing the rates of metabolic syndrome among adults, due to the desired impact it had on waist circumference.


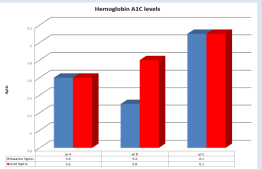
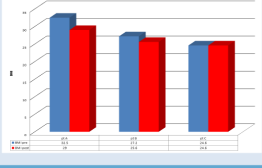
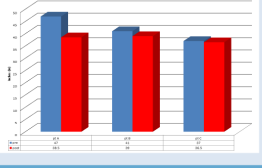
References

Available Upon Request

f. Power Point Slides for Stakeholder Presentation:

Diabetes Prevention the Hard Way: Modified Diet and Increased Exercise

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Kathy James, DNSC, APRN, FAAN • University of San Diego • Franklin K. Lo, MD

Background	Practice Innovation Process	Evaluation Method & Benchmark	Results
<ul style="list-style-type: none"> An estimated 86 million Americans are pre-diabetic and usually have no symptoms If left untreated, 37% of prediabetics may have diabetes within 4 years Prevalence of diabetes among adults in the U.S. averages 9.3% Almost 7 % of U.S. health care expenditures are related to complications associated with underlying microvascular and macrovascular changes contributing to problems such as myocardial infarction (MI), stroke, end-stage renal disease, retinopathy, and foot ulcers One out of twelve people in California have diabetes 	<ul style="list-style-type: none"> Participant identification based on pre-diabetic HgA1C levels between 5.7 and 6.4% over the past 6 months and high risk factors for developing diabetes. This project involves behavioral lifestyle intervention with a goal of 7% weight loss, a minimum of 150 minutes of physical activity a week, and nutritional monitoring and modification. Bi-monthly meetings and weekly phone calls were conducted with 12 participants for a 12 week period, over the holiday season. Each group session included patient education, monitored progress of weight loss and activity levels, and encouragement towards healthier living. 	<ul style="list-style-type: none"> The Diabetes Prevention Program (DPP) and Group Lifestyle Balance Program were used to guide this evidenced based project. The data collected included the following measurements: HgA1C levels (pre and post), weight, height, activity level, nutrition diary, waist circumference, BMI, risk factors, and level of knowledge. Nutrition and exercise were self-reported. Risk factors and patient knowledge was assessed using pre and post data from the American Diabetes Association Risk Factor assessment tool and the Diabetic Knowledge Questionnaire (DKQ-24). This EBP was implemented in a Primary care setting where an average of 10 percent of the population are diabetic. The goal was to reduce that amount by 1%. 	<ul style="list-style-type: none"> One third surpassed 7% weight loss, with no change in HgA1c. One third had a 6.5% weight loss, with a 1% increase in HgA1c. One third had a 1% weight loss, with HgA1c remaining unchanged. There was a mean of 5.2 inches lost in waist circumference. The mean change in risk factor scores was a favorable two point decrease. The mean change in diabetic knowledge via the DKQ-24 increased from 60 to 90%. Nine participants dropped out of the program for various reasons.
<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;">Purpose</p> <ul style="list-style-type: none"> The purpose of this evidenced based project is to decrease or reverse the rate of progression to diabetes mellitus in high risk and prediabetic adults involving behavior modification with respect to modified nutrition and increased exercise to control weight and or glycemic levels. 	<p style="background-color: #0056b3; color: white; padding: 2px; margin: 0;">Tables/Graphs</p> <div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>		
<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;">Evidence</p> <ul style="list-style-type: none"> Evidenced based research has shown that diet alone does not provide a long term solution for most individuals, as regaining weight is common. Nutrition and exercise should be addressed simultaneously for optimal results. Weight loss has been known to decrease insulin resistance and risk for diabetes as well as other metabolic abnormalities. Diabetic prevention helps delay or prevent the onset of diabetes, preserving beta cell function, microvascular and perhaps cardiovascular complications. 	<p style="background-color: #0056b3; color: white; padding: 2px; margin: 0;">Conclusion /Implications for Practice</p> <ul style="list-style-type: none"> Although participants had a significant increase in behavior modification, knowledge, awareness, and activity, they were unsuccessful in reducing HgA1c levels. Small sample size and shorter time frame played a large role in the outcome of this study. EBP shows better results when the program is conducted for a year of more. When considering early detection of high risk individuals and prediabetics, interventions should be geared toward addressing modifiable risk factors. Reducing prediabetic risk factors may not always correlate with reduction of HgA1c. Reducing the overall prevalence of prediabetics in Primary care practice, could lead to lower health costs, a healthier patient population, and decreased cardiovascular incidents related to diabetes. The results from this program could be used in conjunction or comparison with decreasing the rates of metabolic syndrome among adults, due to the desired impact it had on waist circumference. 		
<p style="background-color: #0056b3; color: white; padding: 2px; margin: 0;">References</p> <p style="font-size: small; margin: 0;">Available Upon Request</p>			

Background

- An estimated 86 million Americans are pre-diabetic and usually have no symptoms
- If left untreated, 37% of prediabetics may have diabetes within 4 years
- Prevalence of diabetes among adults in the U.S. averages 9.3%
- Almost 7 % of U.S. health care expenditures are related to complications associated with underlying microvascular and macrovascular changes contributing to problems such as myocardial infarction (MI), stroke, end-stage renal disease, retinopathy, and foot ulcers
- One out of twelve people in California have diabetes

Evidence

- Evidenced based research has shown that diet alone does not provide a long term solution for most individuals, as weight regain is common. Nutrition and exercise should be addressed simultaneously for optimal results.
- Weight loss has been known to decrease insulin resistance and risk for diabetes as well as other metabolic abnormalities.
- Diabetic prevention helps delay or prevent the onset of diabetes, preserving beta cell function, microvascular and perhaps cardiovascular complications.

Purpose

- The purpose of this evidenced based project is to decrease or reverse the rate of progression to diabetes mellitus in high risk and prediabetic adults involving behavior modification with respect to modified nutrition and increased exercise to control weight and or glycemic levels .

Practice Innovation Process

- Participant identification based on pre-diabetic HgA1C levels between 5.7 and 6.4% over the past 6 months and high risk factors for developing diabetes.
- This project involves behavioral lifestyle intervention with a goal of 7% weight loss, a minimum of 150 minutes of physical activity a week, and nutritional monitoring and modification.
- Bi-monthly meetings and weekly phone calls were conducted over a 12 week period .
- Each group session included patient education, monitored progress of weight loss and activity levels, and encouragement towards healthier living.

Cost Analysis

- The cost of the program was very low.
- Participants each received a \$5, 3 ring-binder with the downloadable version of the Group Lifestyle Balance Program: Diabetes Prevention.
- Each binder had about 200 sheets of copy paper that totaled nearly \$42 total or \$3.50 per person, with 12 initial participants.
- The facility allowed the copies to be made on their black and white printer so no out of pocket expenses was needed for ink.
- Each participant received a laminated low car nutritional placemat that was \$7.50 per person.
- Each participant also received a \$20 cook book approved by the American Diabetic Association.
- Therefore the total cost was \$36 per person.

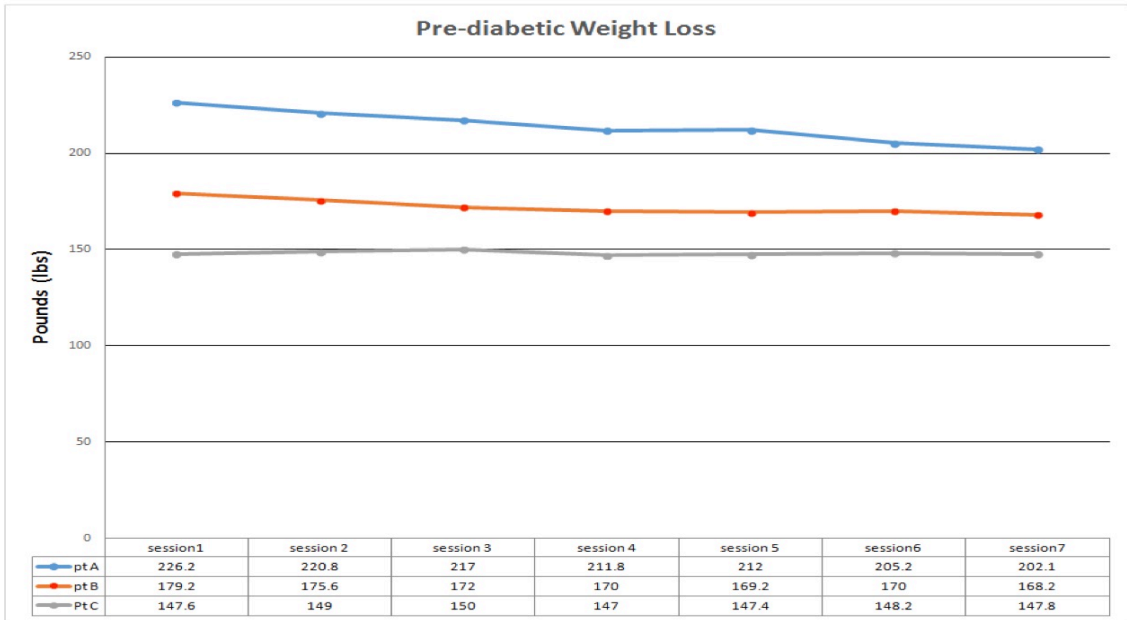
Results

- One third surpassed 7% weight loss, with no change in HgA1c.
- One third had a 6.5% weight loss, with a 1% increase in HgA1c.
- One third had a 1% weight loss, with HgA1c remaining unchanged.
- There was a mean of 5.2 inches lost in waist circumference.
- The mean change in risk factor scores was a favorable two point decrease.
- The mean change in diabetic knowledge via the DKQ-24 increased from 60 to 90%.

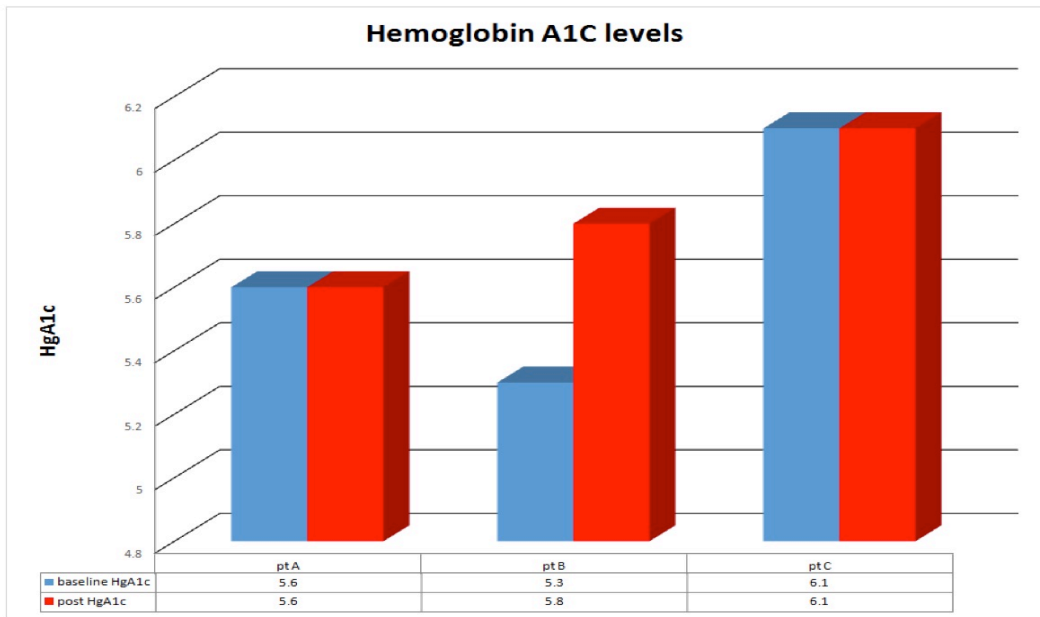
Evaluation Methods & Benchmark

- The Diabetes Prevention Program (DPP) and Group Lifestyle Balance Program were used to guide the program.
- The data collected included the following measurements: HgA1C levels (pre and post), weight, height, activity level, nutrition diary, waist circumference, and BMI. Nutrition and exercise were self-reported.
- Risk factors and patient knowledge was assessed using pre and post data from the American Diabetes Association Risk Factor assessment tool and the Diabetic Knowledge Questionnaire (DKQ-24).
- This evidenced based project was implemented in a Primary care setting where an average of 10 percent of the population are diabetic. The benchmark is to reduce that population by at least 1%.

Tables & Graphs

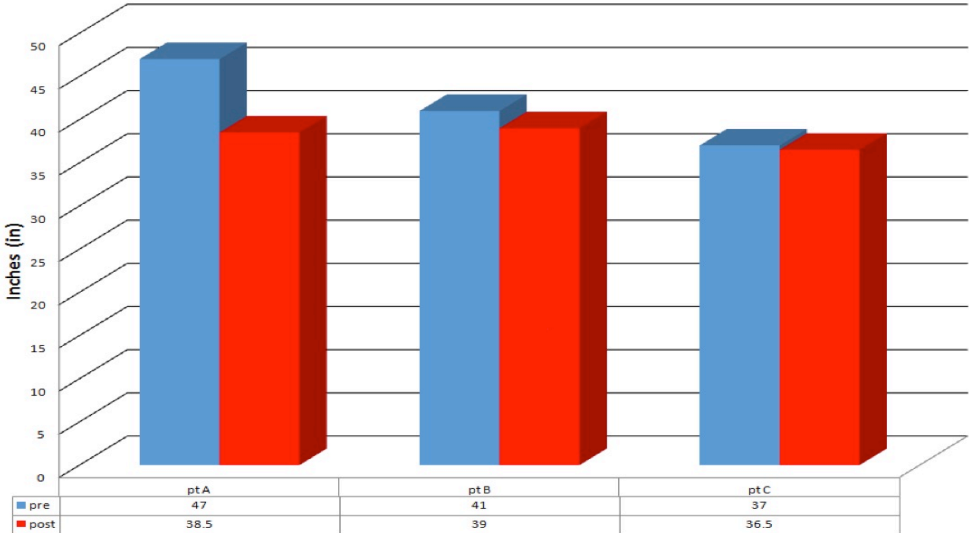


Tables & Graphs



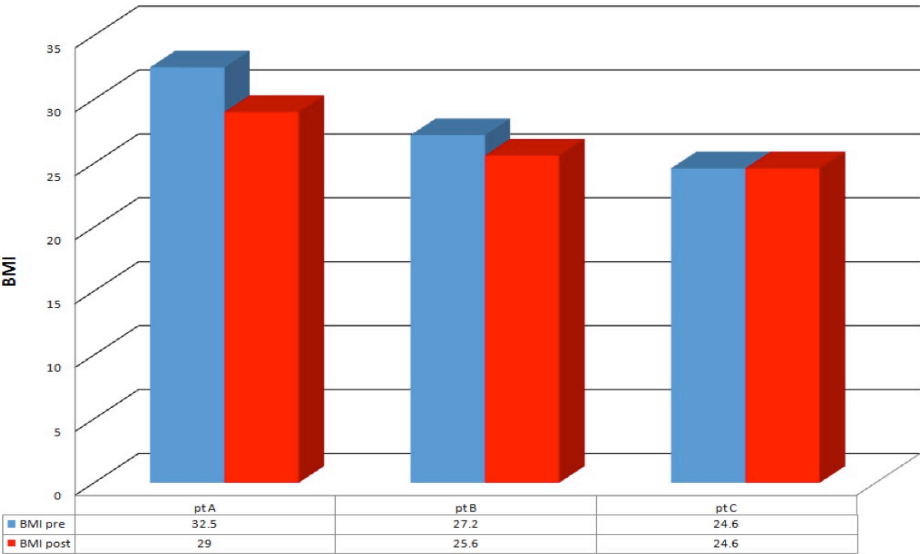
Tables & Graphs

Waist Circumference



Tables & Graphs

Body Mass Index (BMI)



Conclusions & Implications

- Although participants had a significant increase in behavior modification, knowledge, awareness, and activity, they were unsuccessful in reducing HgA1c levels. Small sample size and smaller time frame was a large factor in the outcome of this study. EBP shows better results when program is conducted for a year of more.
- When considering early detection of high risk individuals and prediabetics, interventions should be geared toward addressing modifiable risk factors.
- Reducing prediabetic risk factors may not always correlate with reduction of HgA1c.

Conclusions & Implications

- Reducing the overall prevalence of pre-diabetics in Primary care practice, could lead to lower health costs, a healthier patient population, and decreased cardiovascular incidents related to diabetes.
- The results from this program could be used in conjunction or comparison with decreasing the rates of metabolic syndrome among adults, due to the desired impact it had on waist circumference.