

4-2019

Losing Weight and Improving A1c Level by Adding a 30-Minute Walk to Individuals' Daily Activities

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DOI: <https://doi.org/10.31979/etd.6pnx-6rqa>

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LOSING WEIGHT AND IMPROVING A1c LEVEL
BY ADDING A 30-MINUTE WALK TO
INDIVIDUALS' DAILY ACTIVITIES

ABSTRACT

Overweight/obesity is a global health concern, as is the growing prevalence of type 2 diabetes mellitus. Health complications related to these two problems negatively affect individuals' quality of life and the healthcare system. In the literature on controlling these two health issues and preventing their related health complications, few studies examine use of a simple and affordable method. This research investigated the possibility of improving BMI (body mass index) and lowering blood sugar level, as measured by A1c, by adding a 30-minute daily walk to individuals' activities. Thirty patients classified as overweight or obese (BMI of 25-35) with type 2 diabetes ($A1c > 6.5$) from a family practice outpatient office in Clovis, California, participated in a walking intervention. They walked 30 minutes a day at least 4 times per week for a period of 3 months. Paired *t*-test analysis showed that participants' A1c level and BMI were significantly improved after the 3-month intervention. Additionally, mean A1c level decreased significantly more among participants who walked 5 days per week compared to participants who walked 4 days per week.

Lobat Danehvar-Jahromi
April 2019

LOSING WEIGHT AND IMPROVING A1c LEVEL
BY ADDING A 30-MINUTE WALK TO
INDIVIDUALS' DAILY ACTIVITIES

by

Lobat Danehvar-Jahromi

A project

submitted in partial

fulfillment of the requirements for the degree of

Doctor of Nursing Practice

California State University, Northern Consortium

Doctor of Nursing Practice

April 2019

APPROVED

For the California State University, Northern Consortium
Doctor of Nursing Practice:

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ACKNOWLEDGMENTS

I am very blessed to be surrounded by supportive friends, family, colleagues, and mentors. I would like to express my special thanks to Dr. Nisha Nair, Dr. Sylvia Miller, Dr. Sharmel Kasten, and Dr. Kevin Nguyen, who gave me the great opportunity to do this study, which enabled me to do a lot of research and improve my knowledge. I hope this study will be used to shine a light for those who are vulnerable in their careers.

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CHAPTER 1: INTRODUCTION

Obesity is a growing health issue affecting the lives of many people and often leading to further health complications (Shepherd, 2009). These complications include hypertension, cardiac disease, diabetes mellitus (DM), shortness of breath, and sleep apnea. Obesity usually results from a combination of factors including an unhealthy diet, inactivity, family lifestyle, medical problems, and socioeconomic issues (Ogunbode, Fatiregun & Ogunbode, 2009).

Observing patients who suffer from illnesses related to their weight should motivate clinicians to help them enhance the quality of their lives by fighting obesity. Many individuals, especially from minority communities, lack education or support to combat obesity from their healthcare providers. Focusing on the problem of obesity can help overweight patients regain not only their health and strength, but also their self-esteem and emotional wellbeing.

Diabetes mellitus, also known as type 2 DM or DMII, is one of the major obesity-related health issues, is indicated by one's hemoglobin A1c level (HbA1c). HbA1c is a measure of the average blood sugar in an individual's blood in the past 3 months. Exercising is effective way to lose weight and improve type 2 DM; however, little is known about the relationship between weight loss and improved A1c. This study examined the impact of adding a 30-minute walk at least four times per week to an individual's weekly routine schedule on reducing weight and improving A1c level.

Problem Statement

The HbA1c test is a standard tool for monitoring DM (Radin, 2014). Because HbA1c level is the main measure used in diagnosing and treating DM, improving it (reducing the level) is essential in managing and eliminating the

disease. One of the most effective ways to improve A1c levels is weight loss, which can be obtained by healthy eating and exercising (Wilding, 2014). Although participating in physical activities and fitness programs may motivate people to lose weight, many individuals have limitations that prevent them from going to a gym on a daily basis. Many people have to work at least 8 hours most days and have other responsibilities such as taking care of their family members, attending school, and managing personal life issues. They may not have the time or finances to go to a gym regularly. Some individuals may dislike participating in group activities for weight loss, and some may suffer from musculoskeletal pain that prevents them from participating in vigorous activities to lose weight. The problem this study addressed was the need to identify an affordable, non-vigorous activity that would enable individuals to both lose weight and improve their Hb A1c levels.

Purpose of the Study

One possible activity for this purpose is a 30-minute walk four times per week. A 30-minute walk is affordable, nonstrenuous, and requires little time. This study was conducted to determine whether overweight and obese individuals engaging in this activity could achieve weight loss and reduced Hb A1c levels. More specifically, the purpose of this study was to determine if adding 30 minutes of walking four times per week to the daily routine of individuals diagnosed with type2 DM with a body mass index (BMI) between 25 and 35 decreased their BMI and if decreasing BMI improved their A1c level.

Background

Type 2 DM is caused by impaired insulin secretions and a resistance to the hormone insulin, leading to high blood sugar in the human body (Taylor, Fletcher,

Mathis & Cade, 2014). This chronic health issue is one of the major problems related to overweight and obesity. Fischetti (2015) showed that insulin resistance is an acquired condition due mainly to an unhealthy and sedentary lifestyle. Each year about 11% of individuals diagnosed with pre-diabetes who do not change their sedentary lifestyle develop type 2 DM within 3 years (Li, Geiss, Burrows, Rolka, & Albright, 2013). According to the Centers for Disease Control and Prevention (CDC, 2018b), more than 30 million individuals in the United States have diabetes, and 90-95% of them have been diagnosed with type 2 DM.

The A1c level rises when the amount of glucose in the blood increases. Therefore, a high A1c level indicates poor control of diabetes. When diabetes is effectively controlled and managed, the A1c level is lower than 7%. Wilding (2014) showed that there is a direct relationship between weight loss and decreased A1c level. It is very important for individuals who suffer from both obesity and diabetes to be aware of this direct relationship and take measures to improve their health outcome.

Significance

Obesity and type 2 DM are two chronic health issues, and if they remain untreated, they can cause many further health complications. Diabetic health-related problems include skin wounds and infections, kidney disease, neuropathy, vascular disease, loss of limbs, and eye issues that in severe cases leads to blindness (American Diabetes Association, n.d.). Obesity can lead to heart problems, high blood pressure, high cholesterol, stroke, skin issues, sleep apnea, and shortness of breath (Ogunbode et al., 2009). Appropriate treatment along with a healthy lifestyle can prevent these health-related complications. This study examined one treatment suggestion: adding a 30-minute walk to individuals'

weekly schedule to assist them in reducing weight, thereby improving their A1c level.

Obesity and DMII can raise healthcare costs by increasing emergency room visits and hospitalizations. According to the American Diabetes Association (n.d.), the cost of taking care of diabetes in the United States was \$327 billion in 2017 compared to \$245 billion in 2012. The indirect costs included absence from work, disability, and decreased work productivity. Therefore, improving A1C levels and treating DMII will not only lead to better healthcare outcomes, but will also lower healthcare costs.

Theoretical Framework

Improving knowledge and skills in professional practice is the key to becoming an effective practitioner. Knowledge of nursing theories and evidenced-based practices helps advanced-practice healthcare practitioners enhance their skills. Applying appropriate theories to practice and focusing on patients as the primary elements of care lead to the best patient outcomes. Many nursing theories focus on patient care; one is the Neuman systems model. This theory focuses on wellness of the individual based on identifying and eliminating disease-inducing stressors. The Neuman model considers the patient's body as a whole system. It describes good health as a condition in which all parts of the body work in a stable relationship in order to achieve the greatest possible health. The model identifies three types of stressors: intrapersonal stressors are those within the patient, interpersonal stressors exist between individuals, and extra-personal stressors are outside of the patient. These stressors have different effects in patient care, some positive and some negative. In the Neuman model, the goal of nursing is to help

patients maintain a stable and balanced system (Beckman, Fawcett, & Neuman, 2010).

The Neuman theory can be used to recognize and define the risk of untreated diabetes resulting in additional health problems. An example of an intrapersonal stressor relevant to this study is a patient's lack of knowledge regarding the relationship between losing weight by changing one's lifestyle and improving A1c. An interpersonal stressor might be a lack of effective communication between a patient and a healthcare provider due to cultural differences. Poor communication could negatively affect the patient's understanding of the need for weight loss and lowering A1c level. An extra-personal stressor would be cost of treatment and lack of insurance. A healthcare provider applying the Neuman model would seek to decrease the patient's negative intra-, inter-, and extra-personal stressors. Using this model of nursing enables providers to not only enhance their knowledge, but also improve their skills for recognizing their patients' needs; it encourages providers to alleviate their patients' stressors throughout the treatment process in order to help the patients realize how to improve their A1c levels.

Applying the Neuman model to patient care, providers assess their patients to identify the patients' stressors. After accurate evaluation, the providers help the patients decrease their stressors or cope with them during the treatment process, enhancing the patients' wellness and improving their outcomes. For example, patients with obesity and type 2 DM are often stressed about the chance of developing health-related complications of these two chronic diseases. A provider can educate these patients regarding the positive effects of daily walks on reducing or eliminating this risk and explain the benefits of office visits in monitoring and managing their BMI and A1c levels. This education and communication should

encourage the patients to follow up with office visits and assist them in managing their weight to improve their A1c level before it leads to further health issues. The healthcare provider's essential role of applying the nursing theory to patient care based on evidenced-based practice is vital in the healthcare system to providing optimal patient care at minimal healthcare cost.

Research Questions

For this study, research questions were formulated utilizing a PICO format. This format for framing research questions considers four aspects of the research: population, intervention, comparison, and outcome. The population of the study consisted of individuals aged 40 to 50 years, both male and female, from a family practice outpatient office in Clovis, California. The patients had been diagnosed with type 2 DM and had BMIs between 25 and 35. Most were educated and had health insurance coverage. The intervention was a 30-minute daily walk at least four times a week. The desired outcome was weight loss and improvement in A1c levels. The duration of the study was 3 months. The research addressed two questions: Does adding 30 minutes of walking four times per week to the weekly routine of overweight and obese individuals with type 2 DM result in weight loss for the individuals? Does losing weight improve the individuals' A1c levels?

Summary

Changing from unhealthy to healthy lifestyles can prevent the development or progression of health-related problems and improve individuals' quality of life. Many health complications related to obesity and DM-2 are preventable if the conditions are treated or controlled in a timely manner. Although exercising in a gym and adopting a healthy diet can help people lose weight and control their diabetes, many individuals cannot participate in vigorous physical activities or

remain on a strict diet for a long time. In this study, the researcher added 30 minutes of daily walking to participants' weekly routine. The purpose of the research was to determine whether this simple and affordable intervention would enable participants to lose weight and improve their A1c levels.

CHAPTER 2: LITERATURE REVIEW

According to the CDC (2018a), 39.8% of U.S. adults suffered from obesity in 2015-2016. Obesity-related health conditions include heart disease, stroke, and type 2 DM. Obesity is higher among adults aged 40-59 years (40.2%) and adults age 60 and over (37.0%) than among younger adults age 20-39 (32.3%). The estimated annual medical cost of obesity in the United States was \$147 billion in 2008. The medical costs for people who have obesity were \$1,429 higher than for people of normal weight.

One of the major complications of overweight and obesity is type 2 DM. The CDC (2018b) reported that more than 30 million individuals in the United States suffer from diabetes, and 90-95% of them are diagnosed with type 2 DM. The American Diabetes Association (n.d.) estimated the total cost of diabetes in 2017 to be \$327 million. These two chronic problems are responsible for poor health and lowered quality of life for many people and a large economic burden for the country.

Research Studies

Many researchers have reported that a healthy diet and regular exercises can help individuals lose weight and control the health issues associated with overweight. Taylor et al. (2014) conducted a randomized clinical trial at the University of Central Arkansas, Conway, from September 2011 to August 2012 to compare the effectiveness of moderate versus high-intensity physical activity training among 21 individuals with DMII. The goal was to determine which level of activity would improve physical fitness and physical function in the participants with type 2 DM. Participants were divided into a moderate-intensity training group (MOD group) and a high intensity training group (HIGH group). Data were compared at the beginning of the study and after 3 months. Glucose levels were

measured before training, 1 hour after training began, and at the end of the physical training.

Both groups displayed improvement in physical fitness and physical function:

The between-group effect sizes were not statistically significant (exercise capacity estimated marginal mean [EMM] difference 2.1, 95% confidence interval [95% CI] = -0.2, 4.5; muscle strength EMM difference = 20.8, 95% CI = -23.3, 65.0; and physical function EMM difference = 0.1, 95% CI = -0.6, 0.9). (Taylor et al., 2014, p. 6)

Both groups also displayed reductions in blood glucose measurements:

Mean percent changes in glucose levels measured immediately before exercise and immediately after exercise, immediately after exercise and 1 hour after exercise, and immediately before exercise and 1 hour after exercise for the MOD group were 11.4%, 5.0%, and 15.8%, respectively; those for the HIGH group were 21.5%, 7.9%, and 15.3%, respectively. (Taylor et al., 2014, p. 6)

Although the study was limited by its small sample size, Taylor et al. (2014) concluded that both moderate- and high-intensity exercise training had positive impacts on weight loss and glucose levels.

Najafipour and his colleagues (2017) conducted a quasi-experimental study with a pretest/posttest design evaluating the effect of regular exercise training on HbA1c, BMI, and oxygen consumption (VO_2 max) among patients with type 2 DM. The researchers evaluated 65 patients with type 2 DM, aged 33-69, over an 8-year period. They divided the patients into an experimental group ($n = 35$) and a control group ($n = 30$). Patients in the experimental group participated in a training program that included 90 minutes of aerobic exercise three times a week.

Participants' A1c level, BMI, and VO₂ max were measured before and after the intervention. The data on 15 patients from the experimental group and 15 patients from the control group were evaluated at the end of the study using multivariate analysis of covariance.

The researchers found that the long-term exercise program had a significant effect on A1C, BMI, and VO₂ max ($p < 0.05$). Compared with patients in the control group, patients in the experimental group had significantly decreased A1c levels and significantly improved BMI and VO₂ max levels. The researchers concluded that long-term exercise training was effective in improving A1c and BMI among patients with type 2 DM. They recommended further research identify more specific outcomes of long-term exercise (Najafipour et al., 2017).

A non-randomized controlled study conducted by Mendes, Sousa, Reis, & Themudo-Barata (2017) evaluated individuals in a 9-month supervised exercise program (EXE) versus those in a control group (CON). Fasting sugar level, A1c level, cholesterol, blood pressure, BMI, waist circumference, and 10-year risk of coronary artery disease were evaluated as initial results before and after the intervention. Habitual physical activity and dietary pattern were evaluated as secondary results. Of the 124 participants (63.25 ± 7.20 years of age), 39 engaged in a 9-month supervised exercise program consisting of three 70-minute sessions per week of combined aerobic, resistance, agility or balance, and flexibility exercise. A control group ($n = 85$) maintained their usual care. A1c, cholesterol panel, blood pressure, anthropometric profile, and 10-year risk of coronary artery disease were evaluated before and after the 9-month intervention. A significant time group interaction effect ($p < 0.001$) was observed in A1C level, lipid panel, blood pressure, BMI, waist circumference, and 10-year risk of coronary artery disease.

Mendes, Nogueira, Reis, de Meiners, & Dullius (2017) evaluated the benefits of a 12-month diabetes teaching program that included an emphasis on physical exercise. They assessed participants' A1c, cholesterol panel, and anthropometry at the beginning, middle, and end of the quasi-experimental study. The program offered 2 hours of teaching and physical activity interventions twice per week. Before and after each session participants' capillary blood glucose (BG) was measured. Pearson's χ^2 , paired t -tests, ANOVA-RM, and MANOVA tests were used for the statistical analysis, with significance levels set at $p < 0.05$. Of the 103 subjects, 73% were women years and 23% of were on insulin therapy. Mean age of participants was 64.1 ± 10.8 .

Results showed a significant ($p < 0.001$) decrease in mean BG, from 157.5 ± 61.5 mg/dL to 128.5 ± 47.5 mg/dL after the intervention sessions, and increased prevalence of normoglycemic BG (from 44.0% to 68.6%) (Mendes, Nogueira, et al., 2017). The researchers concluded that the diabetes teaching program with a major focus on supervised physical activity improved A1c and lipid panel in participants with type 2 DM:

Chronic effects of participation in the program could be perceived through significant reduction ($p < 0.05$) from beginning to end of the study of mean BG (from 144.8 ± 5.0 mg/dL to 135.3 ± 3.1 mg/dL), HbA1c (from $7.3 \pm 1.3\%$ to $7.1 \pm 1.0\%$) and triglycerides (from 177.9 ± 121.3 mg/dL to 150.5 ± 130.9 mg/dL). (Mendes, Nogueira, et al., 2017, p. 850)

De lae and his colleagues (2016) evaluated the effects of participating in moderate strength training (ST) and aerobic training (AT) on 11 patients with type 2 DM. The five male and six female patients completed two 10-week exercise programs. Anthropometric measures (BMI; waist, abdomen, and hip circumferences; waist/hip ratio) and biochemical measures (A1c and cholesterol

panel) were taken at baseline, 10 weeks, and 20 weeks. For intra and inter analyses, a mixed ANOVA model was used. Changes were measured using the minimum detectable change, based on a 90% confidence interval.

De Lade et al. (2016) found no significant changes in any anthropometric variable for either group. They reported statistically significant differences in mean A1c levels in both groups between initial session (AT: 8.6 ± 2.5 ; ST: 9.2 ± 1.9) and 10 weeks (AT: 7.2 ± 1.7 ; ST: 7.9 ± 1.2) ($p = 0.03$) and initial session (AT: 8.6 ± 2.5 ; ST: 9.2 ± 1.9) and 20 weeks (AT: 7.5 ± 1.7 ; ST: 7.4 ± 0.9) ($p = 0.01$). Regarding the minimal detectable changes, “40% of the ST and 33% of AT attained these changes for A1c” (p. 4). The researchers concluded that aerobic and strength physical activities can help patients with DMII achieve metabolic control even if they have no major changes in anthropometry. This training resulted in reductions in A1c and estimated average blood sugar levels, which are important factors in managing diabetes; the study thus demonstrated the importance of an exercise routine or some physical activity for people with type 2 DM.

In a systematic review and meta-analysis of literature, Schwingshackl, Missbach, Dias, König, & Hoffmann (2014) examined randomized controlled trials comparing the effects of aerobic exercise training (AET), resistance training (RT), and combined training (CT) on A1c level and cholesterol level in participants with DMII. They searched the MEDLINE, EMBASE and Cochrane Library databases using as inclusion criteria adults with DMII and supervised physical training of at least 8 weeks duration. Their study examined a total of 915 individuals in 14 trials. They found that “AET was more effective than RT in improving HbA1c levels (mean difference [MD] -0.20% [-2.2 mmol/mol]; 95% CI $-0.32, -0.08$; $p = 0.0007$, 10 trials/515 participants) and fasting glucose (MD -0.9 mmol/l; 95% CI $-1.71, -0.09$; $p = 0.03$, 8 trials/245 participants)” (p. 1788). They

observed that CT was more effective than AET in decreasing A1c levels (MD - 0.17% [-1.87 mmol/mol]; 95% CI -0.31, -0.03; $p = 0.02$, 9 trials/493 participants). Of the three exercise modalities, CT resulted in the greatest decrease in HbA1c, fasting sugar, and triglyceride levels. The researchers therefore concluded that CT might be the most effective form of physical training for improving HbA1c and cholesterol panel.

Qiu et al. (2014) conducted a meta-analysis of randomized controlled trials to assess the correlation between walking and A1c control and other cardiovascular risk factors related to DMII. Three databases were searched for trials in English. Data were gathered using a random-effects model. Subgroup evaluation was based on supervised status. Meta-regression evaluation of data was conducted to determine correlations of characteristics of individuals and of walking with A1c. The researchers examined 18 research articles involving 20 trials and 866 participants.

Qiu et al. (2014) found that walking significantly decreased A1c level by 0.50% (95% CI: 20.78% to 20.21%). Supervised walking was associated with reduction in A1c level (WMD 20.58%, 95% CI: 20.93% to 20.23%), but non-supervised walking was not associated with A1c improvement. However, further subgroup evaluation showed non-supervised walking using motivational strategies was associated with decreased A1c. Association of covariates on A1c level were not clear. The results of the study for other risk factors showed that walking significantly decreased BMI level and diastolic blood pressure, but non-significantly decreased systolic blood pressure, high-density and low-density cholesterol levels. These results suggest that supervision and use of motivational techniques should be incorporated into plans for implementing walking programs to improve A1c, BMI, and blood pressure to ensure optimal results.

Summary of the Literature Review

There is a direct relationship between obesity, DM-2, and individuals' lifestyles. The rates of obesity and diabetes are high among individuals who have sedentary lifestyles. It is essential for individuals who suffer from obesity and type 2 DM to realize that unhealthy lifestyles cause weight gain and increase HbA1c levels. Therefore, expanding people's knowledge about healthy lifestyle choices should contribute to improved health outcomes. Although many studies demonstrate the value of vigorous physical activities for weight loss and improving A1c levels, little research has examined the effectiveness of a simple daily walk for weight loss. There are likewise few studies showing a correlation between weight loss and improvement in A1c level. This project addressed this gap in the literature by exploring the impact on BMI and A1c levels of adding a 30-minute walk to one's schedule four times a week.

CHAPTER 3: METHODOLOGY

This project addressed the following research questions: Does adding 30 minutes of walking four times per week to the weekly routine of overweight and obese individuals with type 2 DM result in weight loss for the individuals? Does losing weight improve the individuals' A1c levels? The project consisted of delivery of education to patients on the benefits of walking followed by 3 months of walking by the patients. The education provided patients the opportunity to enhance their knowledge; the walking gave them the opportunity to treat their overweight/obesity and prevent further health issues related to excess weight. The ultimate goal was that after completion of the project, patients would continue the exercise regimen as part of their daily routines.

Setting

This project was conducted in the primary care outpatient family practice office of Dr. Sharmel Kasten family practice in Clovis, California. Clovis is located in California's Central Valley

Sample Population

The population in this project consisted of 30 patients who suffered from overweight and obesity (with BMI between 25 and 35) and were diagnosed with type 2 diabetes. Exclusion criteria were pregnant women, individuals with BMI above 35, and individuals with severe neuropathy who were suffering from pain and having difficulty walking. Participants were between 40 and 50 years of age, male and female, and English speaking. Educationally, they had at least a high school diploma. All had some form of health insurance coverage and personal transportation.

Recruitment of Participants

Participants were recruited through a face-to-face request from the researcher. The researcher created an invitation flyer (Appendix A) and handed copies to potential participants who met inclusion criteria. These patients were individuals who suffered from overweight/obesity (BMI of 25-35) and were also diagnosed with type 2 DM.

Ethical Considerations

Confidentiality was ensured by keeping all information regarding the medical offices, staff members, and patient records private. No information was shared with anyone except the researcher. All materials collected were private; they did not contain names, social security numbers, or any other identifiable markers. All information collected was secured in a locked filing drawer in a medical provider's office to maintain confidentiality. Only the researcher had access to the information. All documents were destroyed by shredding after project completion.

Potential Benefits

The subjects may benefit from this project by learning how to lose weight by walking 30 minutes each day. They may benefit by achieving a decrease in their A1c level. This project may benefit science, society, and humanity by demonstrating a way to prevent or reduce the health-related issues associated with overweight/obesity and type 2 DM. In so doing, it may contribute to lowering hospitalizations and healthcare costs.

Instruments

Part of the intervention was an educational brochure (Appendix B). This tool was given to patients to teach them about the benefits of a 30-minutes daily

walk in decreasing weight and thereby reducing some of the health issues related to obesity, including DM-2. The researcher used the Adult Obesity Provider Toolkit as a basis for developing the brochure. The California Medical Association and California Association of Health Plans (2013), with the assistance of healthcare professionals, created this toolkit to address obesity and its health-related issues. In this project, the researcher used information from this toolkit to create an educational brochure for participants. The goal of the brochure was to improve participants' knowledge about the positive effects of daily walking in treating their overweight/obesity and decreasing their A1c level.

Data Collection

A brief introduction about the study and the goal of the study was summarized on an information handout (Appendix C) and given to the patients in the outpatient family practice office. If patients decided to participate in the study, then they were given the educational brochure (Appendix B) and an informed consent form (Appendix D). The brochure explained the benefits of a 30-minute daily walk on decreasing weight and therefore also improving A1c level. The consent form contained information about the study, including its purpose, participants' freedom to withdraw at any time, and assurances of confidentiality. After participants signed the informed consent form, they were asked to complete a demographic questionnaire (Appendix E). Then their A1c and BMI levels were measured. Each participant's A1c and BMI levels were checked at the beginning of the project, before they began 30 minutes of daily walking, and at the end of the project, after 3 months of daily walking.

A checklist was given to each participant so participants could record their compliance with the weekly walking. Participants were instructed to bring the

checklist to the office every month. Another option for the participants was to email their weekly walk records to the researcher.

The data were collected and stored safely in a health provider's office in a private desk with a safety lock. The researcher was the only person who had access to participants' information. Permission to conduct this study at a family practice outpatient office (Appendix F) was given by the family practice physician who was the owner of the office. Because the office was a small clinic, it had no institutional review board (IRB) committee. The IRB of the Department of Nursing of California State University, Fresno, approved the project (Appendix G). The researcher started collecting data after receiving IRB approval in October 2018.

Data Analysis

This project was a quasi-experimental study. A quasi-experimental design allows a researcher to evaluate the effect of independent variables on dependent variables (Creswell, 2013). In this study the dependent variables were patients' BMI and A1c levels. The independent variable was a 30-minute daily walk. The one-tailed *t*-test was used to determine whether patients' BMI and A1c levels improved after addition of a 30-minute walk, at least four times per week, to their weekly routine. The one-tailed *t*-test was also used to identify any significant differences in A1c and BMI levels between individuals who walked 4 days per week and those who walked 5 days per week.

Summary

This project explored the impact of a 30-minute daily walk on weight reduction and improvement in A1c level on individuals with overweight/obesity and DMII. Participants were given an educational brochure at the beginning of the

project to enhance their knowledge about the positive effects of 30 minutes of daily walking on decreasing their weight and thus also lowering their A1c level. Participants added a 30-minute walk, at least 4 days a week, to their weekly routine for a period of 3 months. The data were analyzed by paired *t*-testing. In addition to examining the impact of the intervention on weight and A1c reduction, the study also investigated differences in outcomes between individuals who walked 4 days per week and those who walked 5 days per week.

CHAPTER 4: RESULTS

Thirty patients from a primary care outpatient clinic were approached to participate in the project. All 30 patients agreed to participate. Although the recruitment response rate was 100%, the small sample size may limit the usefulness of the results of this project. The data collection took place from October 2018 until January 2019.

Demographics of Participants

The demographic characteristics of the participants are shown in Table 1. The sample consisted of 18 females (60%) and 12 males (40%). They ranged in age from 40 to 50 years. The mean age for females was 45.9 years and for males the mean age was 45.1 years. By ethnicity, 53.4% were White, 30% Hispanic, 10% Asian, and 3.3% each African American and American Indian. All had at least a high school diploma, and 66.7% had postsecondary degrees. All spoke English, had health insurance coverage, had access to internet at home, and had personal transportation.

Effects of Intervention on BMI and A1c

The intervention consisted of a 30-minute daily walk at least 4 times per week for a period of 3 months period. All participants completed the intervention as planned. Among 30 participants, 16 (53%) reported that they walked 5 days per week (Monday-Friday), and 14 (47%) reported that they walked 4 days per week (Monday-Thursday) during the study period. Of the 16 participants who walked 5 days per week, 14 were female (88%) and 2 were male (12%). Of the 14 participants who walked 4 days per week, 10 were male (71%) and 4 were female (29%).

Table 1

Demographic Characteristics of Participants (N = 30)

Characteristic	%
Gender	
Female	60
Male	40
Age 40-50 years	100
Ethnicity	
White	53.4
Hispanic	30
African American	3.3
American Indian	3.3
Asian	10
Educational attainment	
High school diploma	33.3
Associate degree	20
Bachelor degree	30
Master degree	10
Doctoral degree	6.7
Language	
English	100
Bilingual	30
Health insurance	100
Transportation	100

A dependent-samples *t*-test was conducted to test for differences in participants' BMI levels before and after the walking intervention. The mean for participants' BMI before walking was 28.57 ($SD = 2.99$). The mean for participants' BMI after walking was 26.07 ($SD = 2.72$). Using a one-tailed *t*-test, BMI was shown to be significantly decreased after the 3-month walking intervention compared to pre intervention ($t = 19.27, p < 0.01$; see Table 2).

Table 2

T-test Results Comparing Mean Pre/Post A1c and BMI Levels

Variable	<i>df</i>	<i>t</i>	<i>p</i>
A1c	29	17.07	< 0.01
BMI	29	19.27	< 0.01

Note. Postintervention *p*-value for A1c was < 0.01, for BMI was < 0.01.

A dependent-sample *t*-test was conducted to test for differences in participants' A1c levels before and after the walking intervention. The mean for participants' A1c before walking was 9.01 ($SD = 1.48$) and after walking 6.60 ($SD = 0.88$). Results of a one-tailed *t*-test showed that A1c was significantly decreased after 3 months of walking compared to pre intervention ($t = 17.07, p < 0.01$; see Table 2).

Comparison of Effects of 4-days/Week vs 5-days/Week Walking Intervention

An independent-samples *t*-test was conducted to test for differences in BMI levels of those who reported walking 4 days per week and those who reported walking 5 days per week. Results showed the mean difference for those walking 5 days per week ($M = 2.61, SD = 0.67$) did not differ significantly from that of those

walking 4 days per week ($M = 2.17$, $SD = 0.34$); $t(28) = 1.41$, $p > 0.05$ (See Table 3).

Table 3

T-test Results Comparing Pre/post Differences in A1c and BMI Levels Between Participants Walking 4 and 5 Days per Week

Variable	<i>df</i>	<i>t</i>	<i>p</i>
A1c	28	5.90	< 0.01
BMI	28	1.41	> 0.05

Note. Post intervention p -value for A1c was < 0.01, for BMI was > 0.05.

An independent-samples t -test was performed to test for differences in A1c levels of those who reported walking 4 days per week and those who reported walking 5 days per week. Results showed the mean difference in A1c level for those walking 5 days per week ($M = 2.93$, $SD = 0.12$) was higher, resulting in a significantly lower mean A1c level than for those walking 4 days per week ($M = 1.8$, $SD = 0.04$); $t(28) = -5.90$, $p < 0.01$ (see table 2).

Conclusion

The response rate for this study was 100%, and the completion rate was also 100%; all 30 participants completed the 3-month intervention. The fact that participants had relatively high educational levels, insurance coverage, and access to personal transportation and internet had a significant positive effect on study completion. These participants were able to drive to the lab and to the outpatient office using their own cars without limitations. They were able to email their weekly walking schedules to the researcher anytime from their homes. Participants' educational level was helpful in enabling participants to understand

the benefits of daily walk in enhancing their health. This understanding may have influenced their motivation to participate and persist in the study.

This data revealed that participants' A1c and BMI numbers decreased after 3 months of walking for 30 minutes at least 4 days per week. The female participants were more interested in walking more days per week than the male participants. The data showed that mean A1c level decreased significantly more among participants who walked 5 days per week compared to participants who walked 4 days per week. No significant difference in BMI level changes was observed between the 2 groups. No difference in number of days walked per week was reported by age of participants.

CHAPTER 5: DISCUSSION

This study was designed and conducted to determine if adding a 30-minute daily walk 4 days a week to the weekly schedule of people who are overweight or obese and have type 2 DM will improve their BMI and A1c levels. Some individuals think they need to follow strict diets and do vigorous exercises at a gym to improve their BMI and A1c levels. These individuals often become frustrated with their strict diet or with spending money and time to go to the gym to work out. It is very important for these people to understand that they are able to improve their BMI and A1c levels, and thus control their diabetes and prevent further health-related complications, by adding a simple and affordable 30-minute daily walk to their schedule.

Strengths of the Study

This study had a 100% completion rate. After the researcher discussed the benefits of daily walks and the possibility of decreasing weight and reducing A1c levels, all patients solicited for the study were highly motivated to participate. The group of patients who participated in this study were all educated; they had at least a high school diploma and most had postsecondary degrees. They all spoke English and had access to personal transportation, making office visits convenient. The participants were given the choice to email or text their data instead of dropping the reports documenting their walking to the office. All had access to the internet at home; therefore, they had no problem sending their data or contacting the researcher when needed. The participants had health insurance coverage, facilitating office follow-up visits for measuring A1c levels. The affordability and ease of the daily walking helped participants maintain the regimen for the entire 3 months of the study. The fact that all participants completed the entire 3-month

intervention enabled the researcher to arrive at good results. The results of the study show significant improvements in A1c and BMI levels among participants after 3 months of walking at least 4 days per week.

Consistency with the Literature

The results of this project are consistent with those of other studies. In a quasi-experimental study, Najafipour et al. (2017) showed a significant reduction in BMI and A1c levels after 90 minutes of aerobic exercises three times per week. Mendes, Nogueira, et al. (2017) found that individuals' A1c significantly improved after 2 hours of training and exercising twice per week for 12 months. De laide et al. (2016) demonstrated that, even without major changes in anthropometry, 20 weeks of aerobic and strength physical activities can lower A1c levels for patients with type 2 DM. Qiu et al. (2014) achieved significant decreases in A1c and BMI levels through supervised walking.

Although these studies indicated positive results in decreasing BMI and A1c levels through physical exercise, they did not evaluate the effects of brief daily walks on BMI and A1c levels. Neither did these studies show a direct relationship between decreased BMI and decreased A1c. In the present study, the researcher determined that adding a brief, simple, and affordable daily walk to patients' routine decreased participants' A1c levels as well as their BMI levels. The research suggested that the convenience of the simple, affordable practice enabled participants to maintain the activity and thus receive its positive benefits.

Limitations and Recommendations

The small sample size as well as the short duration of the study may affect the generalizability of the results. The results of this project may have been different if the research was of longer duration, had a larger sample, and had equal

or close to equal representation from both genders. For future studies, the researcher recommends not only increasing the number of participants and lengthening the time, but also conducting research in multiple locations with individuals of different socioeconomic statuses.

Several factors may have affected the results of the study, such as participants' diet, comorbidities, and medications. Because of the short study duration, the researcher was not able to account for these factors. In the future, project researchers can separate participants who are on diabetes medications or other medicines that may affect the result of the project, participants who consume different diets, and participants with specific comorbidities and risk factors to obtain more comprehensive results.

Implications for Practice

Healthcare professionals and providers treat many patients with diabetes who are overweight or obese. These two health conditions, if not controlled, may lead to other health-related problems such as cardiac issues, neuropathy, and loss of extremities or body organs. These conditions and the health-related complications reduce patients' quality of life and increase healthcare costs. Thus, diabetes and overweight negatively affect both individuals and the healthcare system. Healthcare providers need to understand the importance of treating or controlling DM2 along with overweight or obesity.

The findings of this study can be used as a reference and a starting point for other researchers and healthcare professionals who wish to design interventions that will improve their patients' knowledge and outcomes. It is important that healthcare professionals teach their patients that they are in control of improving their health outcomes, and that they can make healthy lifestyle choices. It is

essential for patients to know how changing from unhealthy lifestyles can prevent further health issues and improve the quality of their lives. In order to achieve the best result, it is also important for future researchers to listen to their patients and focus on their concerns when designing interventions.

The intervention used in this project can be used with other patients in outpatient practice settings. The educational brochure provides information that shows patients how to improve their BMI and A1c levels and thus prevent further complications related to DM-2 and obesity. The practice of adding a simple daily walk to patients' weekly schedule can be implemented. Healthcare professionals should educate their patients about the importance of consistency with their daily walk to improving and maintaining their health.

Conclusion

The results of this study show that both BMI and A1c levels can be decreased by adding 30-minute walks to one's daily routine. The researcher hopes that the goal and the findings of this project encourage healthcare professionals and researchers to engage in more research on this topic and to pursue related studies. Many health issues related to DM-2 and overweight are preventable if these two health conditions are treated or controlled. Therefore, it is essential for healthcare professionals, providers, and researchers to educate patients and encourage them to begin and maintain a daily walking plan.

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APPENDICES

APPENDIX A: RECRUITMENT FLIER

LOSE YOUR WEIGHT & IMPROVE YOUR

DIABETES

BY A SIMLPE DAILY WALK

JOIN US AND KILL TWO BIRDS WITH ONE STONE



APPENDIX B: EDUCATIONAL BROCHURE

Educational Brochure

Benefits of Daily Walking

Assisting with weight management
Reducing Body Mass Index (BMI)
Improving Cardiovascular System
Reducing cholesterol level
Improving blood pressure
Improving Diabetes Mellitus
Decreasing Hgb A1C level
Increasing energy level
Improving mental health
Decreasing Depression and Anxiety Level
Assisting with sleeping well at night time
Decreasing Morbidity and Mortality

Tips for Daily Walking

Wear comfortable walking shoes and appropriate clothing
Warm up activities before starting to walk (eg, 5-10 minutes stretching)
Drink enough water before and after walk to prevent dehydration
Put sunscreen on while needed to protect your skin

APPENDIX C: INFORMATION HANDOUT

Information Handout

Obesity is a growing health problem which can cause further health complications such as high blood pressure, heart disease, diabetes mellitus, shortness of breath, and sleep apnea. Obesity may results from unhealthy diet and sedentary lifestyle. Type 2 diabetes mellitus is one of the major health problems related to overweight and obesity. Hemoglobin A1c shows the past three months of sugar level in your body. The Body Mass Index (BMI), shows a percentage of your body fat, based on your weight and high. Hemoglobin A1c is an accurate blood test to monitor your diabetes. It can be check every three months. Because of its important role that shows us if your diabetes is under control or not, it is important to focus on improving its level. One of the best ways to improve A1c level is losing weight by adding daily walk to your schedule. Measuring your BMI is a good way to show if you lost any weight. This research study is about improving people's A1c level, by losing weight, among individuals with the Body Mass Index (BMI) between 25-35, who are diagnosed with type 2 DM, by adding 30 minutes daily walk, minimum four times per week, to their weekly schedule. The purpose of this study is to collect A1c and BMI levels among individuals who have a BMI between 25-35, and are diagnosed with type 2 DM. This study seeks to determine if adding 30 minutes of walking, at least four times per week, to individuals' daily routine activities, decreases their BMI levels. It also determines if decreasing BMI levels, improves their A1c level.

APPENDIX D: INFORMED CONSENT

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Losing Weight and Improving A1c Level by Adding 30 Minutes Walk to Type 2
Diabetes Patients' Daily Activities

Study Title: Losing Weight and Improving A1c Level by Adding 30 Minutes
Walk to Type 2 Diabetes Patients' Daily Activities

Investigator: Lobat Daneshvar-Jahromi Phone:559-593-9864

California State University Northern Consortium Doctor of Nursing Practice

Doctor of Nursing Practice (DNP) Project- Research study

In this research study, a researcher is a Family Nurse Practitioner (FNP), at Dr.
Sharmel Kasten's office, and a Doctor of Nursing Practice(DNP) student at
California State University Northern Consortium

What is a research study?

A research study is a way for researchers to find out about a specific problem in more details. Research studies include individuals who choose to participate. You may decide if you want to participate in this study. If you have any questions, you can ask the researcher.

What is this research study about?

This research study is about improving people's A1c level, by losing weight, among individuals with the Body Mass Index (BMI) between 25-35, who are diagnosed with type 2 DM, by adding 30 minutes daily walk, minimum four times per week, to their weekly schedule.

Hemoglobin A1c shows the past three months of sugar level in your body. The Body Mass Index(BMI), shows a percentage of your body fat, based on your weight and high. Hemoglobin A1c is an accurate blood test to monitor your

diabetes. It can be check every three months. Because of its important role that shows us if your diabetes is under control or not, it is important to focus on improving its level. One of the best ways to improve A1c level is losing weight by adding daily walk to your schedule. Measuring your BMI is a good way to show if you lost any weight.

You are being asked to participate in this study because your BMI level is between 25-35 and you are diagnosed with type 2 DM. Therefore, you may benefit to improve your A1c level by losing weight by adding 30 minutes daily walk, minimum of four times per week, to your weekly schedule.

Why is this study being done?

The purpose of this study is to collect A1c and BMI levels among individuals who have a BMI between 25-35, and are diagnosed with type 2 DM. This study seeks to determine if adding 30 minutes of walking, at least four times per week, to individuals' daily routine activities, decreases their BMI levels. It also determines if decreasing BMI level, improves their A1c level.

How many people will participate in this study?

There will be 30 people participating in this study.

What will happen if I participate in this research study?

If you agree to participate, the following procedures will occur:

A researcher will explain a research study to you in detail and will answer all of your questions

Your BMI level will be check in the beginning of the study, before start walking

Your A1c level will be check in the beginning of the study, before start walking

A researcher will give you an educational brochure and will teach you about benefits of daily walk and tips for daily walk

A researcher will give you three monthly schedule and will ask you to pick and circle at least four days per week and to put a checkmark by any days you walk. You will start your 30 minutes daily walk, minimum of four times per week and you will complete your monthly walking log.

At the end of each month I will call, email, or text you (whichever you prefer) to remind you to either bring your log to the office or email it to a researcher, so we can keep track of your daily walk.

At the end of three months, your BMI and A1c level will be checked again to see the results.

Study location

Dr. Sharmel Kasten outpatient family practice office

How long will I be in the study?

You will be in this study for three months.

Can I stop being in the study?

Yes, at any time you can tell a researcher that you no longer wish to be in this study. We will tell you about new information or changes in the study that may affect your health or willingness to continue in the study.

What side effects or risks can I expect from being in the study?

There will not be any harm or any physical risks to you during this study. You may stress from not completely understanding the process of the project. A researcher will explain the project in detail. You may ask any questions from the researcher any time before and during a project for more clarification.

Treatment and Compensation for Injury

There will not be any injury during this study.

Are there benefits to taking part in the study?

The education process will increase your knowledge regarding benefits of daily walk in losing weight and improving your A1c level. Adding 30 minutes daily walk to your daily schedule will help to lose weight, therefore decrease your BMI and A1c level.

What other choices do I have if I do not take part in this study?

You do not have to take part in this study. You can decline the offer to participate in this study

Will information about me be kept private?

Yes, your information will be kept in private. There will be no sharing of information to anyone except the researcher of this project. All information collected are private and will not include names, social security numbers or any other identifiable markers. Any information collected will be secured in a locked filing drawer in a provider's office. Only the researcher of this project will have access to the information. All documents will be destroyed by shredding, six months after the project completed.

What are the costs of taking part in this study?

There is no cost to you to participate in this study.

What are my rights if I participate in this study?

Participating in this study is totally depends on you. You may choose either to participate or not in this study. If you decide to participate in this study, you may leave the study at any time. There will be no penalty to you, no matter if you choose to participate or not.

Who can answer my questions about the study?

A researcher of this study will answer to all your questions or concerns. You may call or email:

Lobat Daneshvar- Jahromi

Phone# 559-593-9864

E-mail: lobatstar@yahoo.com

CONSENT

You will be given a copy of this consent form, and all of your questions about the study will be answer.

PARTICIPATION IN THIS RESEARCH STUDY IS VOLUNTARY.

You have the right to decline to participate or to withdraw at any point in this study without penalty or loss of benefits to which you are otherwise entitled.

If you wish to participate in this study, you should sign below

Participant name:

Signature:

Date:

APPENDIX E: DEMOGRAPHIC QUESTIONNAIRE

Demographic Questionnaire***Age***

What is your age?

Ethnicity

Ethnic origin: Please specify your ethnicity.

- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Other

Education

What is the highest degree or level of school you have completed?

- No schooling completed
- Some high school, no diploma
- High school graduate, diploma or the equivalent (for example: GED)
- Some college credit, no degree
- Associate degree
- Bachelor's degree
- Master's degree
- Professional degree
- Doctorate degree

What is your professional status?

- Employed
- Self-employed
- A homemaker
- A student
- Retired

APPENDIX F: PERMISSION TO CONDUCT STUDY

Site approval from Dr. Sharmel Kasten. DO. at Sharmel Kasten , Family Medicine Physician, 2131 Herndon Ave, Ste 103 Clovis, Ca 93611, listed directly below.

Lobat Daneshvar-Jahromi

Family Nurse Practitioner- MSN

Doctor of Nursing Practice student

California State University Northern Consortium

July 15/2018

Doctor Sharmel Kasten. DO

SHARMEL KASTEN, DO. FAMILY MEDICINE PHYSICIAN, 2131

HERNDON AVE, STE#103, CLOVIS, CA 93611

Dear Dr. Sharmel Kasten

I am a Doctor of Nursing Practice student at CSU Northern California Consortium. I am in the process of conducting my doctorate project to fulfill the requirements for my graduation in Spring 2019.

Patients from your family practice outpatient office (Participants) will be invited to participate in my research DNP project. My project title is “ Losing Weight and Improving A1c Level by Adding 30 Minutes Walk to Type 2 Diabetes Patients’ Daily Activities”. This study will focus on adding a 30 minute walk to an individuals' weekly routine schedule to help them losing weight, thus improving their A1c level.

The purpose of this letter is to obtain your signed consent for me to conduct my research study

at your office on adult patients. The population of interest in this project is 30 patients who suffer from overweight or obesity (with the BMI between 25 to 35) and are diagnosed with type 2 diabetes. This population is individuals between age 40 to 50, from both genders, male and female, from your family practice primary

care outpatient office in Clovis, California. All of these participants have health insurance coverage which pays for their A1c level, to be checked in the beginning of the project and after three months of 30 minutes daily walk.

The participants fully understand this DNP project including its purpose, procedure, potential risks, and benefits and are aware of the following conditions below. The study is focusing on whether weight loss by 30 minutes daily walk decreases A1c level in diabetes patients. Participants may benefit from this project by learning about losing weight and decreasing their A1c by increasing their daily activities. There will be no potential risks or harm to the patients. A brief introduction about the study and the goal of the study will be summarized on a handout which will be given to patients. If patients decide to participate in the study, then they will be given an educational brochure and an informed consent to sign to participate in the project. After signing an informed consent by patients, their A1c and BMI levels will be measured. All information gathered will be anonymous; will not involve patients' identifying information (names, address, or identification number). All information gathered will be kept in a locked cabinet at my residence. I will utilize the data gathered for my project, at the research conference sponsored by California State University Northern California Consortium, and possibly a publication if selected. All data will be shredded and destroyed after completion of my project and or schooling. The involvement of this project is voluntary. Participants have the right to withdraw from the project any time without prejudice or penalty. In addition, the participants will not be provided with any compensation.

The research investigator Lobat Daneshvar-Jahromi can be contacted any time for questions or concerns via phone (559) 593-9864 or email lobatstar@yahoo.com.

Sincerely, Lobat Daneshvar-Jahromi

By your signature below, I have your consent to proceed with my data gathering. Thank you in advance for your assistance in this matter. I greatly appreciate the opportunity.

SHARMEL KASTEN, DO.

I Understand the research process of Lobat Daneshvar-Jahromi, DNP student at California State University Northern Consortium, and I approve the project will be done in this office, **SHARMEL KASTEN, DO.** FAMILY MEDICINE PHYSICIAN, 2131 HERNDON AVE, STE#103, CLOVIS, CA 93611, in Fall-Winter of 2018 (October- December 2018).

Name:

Signature:

Sincerely, Lobat Daneshvar-Jahromi

By your signature below, I have your consent to proceed with my data gathering. Thank you in advance for your assistance in this matter. I great appreciate the opportunity.

SHARMEL KASTEN, DO

I understand the research process of Lobat Daneshavar-Jahromi, DNP student at California State University Northern Consortium, and I approve the project will be done in this office, **SHARMEL KASTEN, DO**. Family Medicine Physician, 2131 Herndon Ave, Ste #103 Clovis, CA 93611, in Fall-Winter of 2018 (October-December 2018)

Name:

Sharmel Kasten, D.O.

Signature:



8/9/18

APPENDIX G: IRB APPROVAL LETTER



College of Health and Human Services

California State University, Fresno
School of Nursing
IRB Approval

Date: October 5, 2018

RE: DNP 1814 Losing Weight and Improving A1c Level by Adding 30 Minute Walk to Type-2 Diabetes Patients' Daily Activities

Dear Lobat Daneshvar-Jahromi,

As the Chair of the School of Nursing Research Committee, serving as the Institutional Review Board for the School of Nursing, I have reviewed and approved your review request for the above-referenced project for a period of 12 months. I have determined your study to meet the criteria for Minimal Risk IRB review.

Under the Policy and Procedures for Research with Human Subjects at California State University, Fresno, your proposal meets minimal risk criteria according to section 3.3.7: Research in which the risks of harm anticipated are not greater, probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

The Research Committee may periodically wish to assess the adequacy of research process. If, in the course of the study, you consider making any changes in the protocol or consent form, you must forward this information to the Research Committee prior to implementation unless the change is necessary to eliminate an apparent immediate hazard to the research participant(s).

This study expires: October 5, 2019

The Research Committee is authorized to periodically assess the adequacy of the consent and research process. All problems having to do with subject safety must be reported to the Research Committee. Please maintain proper data control and confidentiality.

If you have any questions, please contact me through the CSU, Fresno School of Nursing Research Committee at nishanair@csufresno.edu.

Sincerely,

Nisha Nair, DNP, RNC, CNS, CNE, IBCLC
School of Nursing, Research Committee, Chair

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P 559.278.2041 F 559.278.6360 www.FresnoState.edu/nursing

THE CALIFORNIA STATE UNIVERSITY

DISCOVERY. DIVERSITY. DISTINCTION.

APPENDIX H: INSTRUMENT



ADULT OBESITY PROVIDER TOOLKIT

What clinicians should consider in the prevention, assessment and treatment of adult overweight patients.



2008

APPENDIX I: COPY OF HUMAN SUBJECT ASSURANCE CERTIFICATE

