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Los Angeles

Educational Coaching with Teaching for Adult Hispanics with Type 2 Diabetes Mellitus

A dissertation submitted in partial satisfaction of the
requirements for the degree
Doctor of Nursing Practice

by

Carina Lizette Guerra

2022

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ABSTRACT OF THE DISSERTATION

Educational Coaching with Teaching for Adult Hispanics with Type 2 Diabetes Mellitus

by

Carina Lizette Guerra

Doctor of Nursing Practice

University of California, Los Angeles, 2022

Professor Dorothy Wiley, Chair

Background: Preventing premature morbidity and mortality for adults with Type 2 Diabetes Mellitus (T2DM) increases the quality and quantity of life lived in healthier communities. Low-income Hispanic adults with T2DM living in South Los Angeles are at high risk for complications (of T2DM) due to language barriers, low health literacy, and limited access to the highest quality healthcare.

Objective: A quality-improvement project was developed that incorporated evidence-based education and personal week-to-week coaching to improve diet and exercise for 34 adults with Type 2 Diabetes Mellitus (T2DM).

Methods: Sixteen of 34 adults completed the first and last study visit and 12 coaching follow-up calls from the Advance Practice Registered Nurse in a Federally Qualified Healthcare Center (FQHC). Participant characteristics were limited to: adults aged 18 or over, have a BMI at or above 25 kg/m², are monolingual Spanish speakers, with fewer than 12 years of formal education or award of a General Education Development (GED) certificate, diagnosed with T2DM, and prescribed oral hypoglycemic agents by one of five in-clinic providers. The Diabetes Knowledge Questionnaire (DKQ-24) evaluated diabetes and self-care knowledge, and the difference between the baseline and final visit was estimated for 16 participants, as were Glycated Hemoglobin (HbA1c) levels and body mass index (BMI). Bivariate associations were evaluated using a Student's *t-Test* for continuous variables and a chi-square test for categorical variables (e.g., years of education: <8, 8-11, 12, 12 or more years).

Results: Results indicate that completers show a 1.8 lb. reduction in weight after the 12 weeks of intervention, on average ($p=0.0074$). In addition, there was a modest reduction in BMI, -0.3125 (SD: 0.43) kg/m² ($p=0.0102$). Corresponding to this, the HbA1c followed the same trend and showed a modest reduction over the intervention period (-0.375%, SD: 0.43, $p=0.0035$). In addition, participants showed DKQ-24 scores that were statistically significantly greater than 0 at baseline. Diabetic knowledge improved between baseline and the last study visit (Δ correct=4.94 questions correct, $p<0.001$).

Conclusions: A community-based education program plus weekly coaching using evidence-based criteria holds promise to improve self-care and health outcomes for low-income Hispanic adults with low educational attainment and T2DM.

Keywords: Community-based education, coaching, Hispanics, diabetes, low-literacy

The dissertation of Carina Guerra is approved.

Sarah Choi

Emma Cuenca

Catherine Carpenter

Dorothy Wiley, Committee Chair

University of California, Los Angeles

2022

This capstone scholarly work is dedicated to my mother, father and two older brothers who have provided all the support I needed to get through all of life's hardships. Having been a young student with both developmental and learning delays as a child as well as having been diagnosed with Obsessive Compulsive Disorder (OCD) as a teenager in college, I was highly doubtful of my capabilities. My family has been the source of my inspiration, especially my parents who came to an unknown country in an attempt to escape war and poverty in a 3rd world country. To my mom and dad who have sacrificed so much in their lives so that their children may have better lives than they did in El Salvador. Words cannot express how forever grateful I am for everything you have done for me, Sam, and Edgar and for being accepting of who we are. To my oldest brother Sam, I am forever grateful for all your unconditional support in whatever it is that I wish to do with my life, no matter how crazy it sounds. To my other older brother Edgar, you are definitely my best friend. Thank you for always being there in my toughest moments, during my failures; you were able to help me get back up. My family is truly everything to me and I have achieved all of my accomplishments through your unconditional love and support. I love each one of you dearly. Gracias! Los quiero mucho!

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VITA

Carina Guerra, BSN, CMSRN, MSN, APRN, FNP - C



Education

2020-2022	University of California, Los Angeles (UCLA)	Los Angeles, CA
Doctor of Nursing Practice pending		
2018-2019	Chamberlain University	Los Angeles, CA
Master of Science of Nursing – Family Nurse Practitioner		
2016-2018	Chamberlain University	Los Angeles, CA
Bachelor of Science in Nursing		
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Bachelor of Science Degree in Human Development		
2012-2013	Los Angeles City College ADN	Los Angeles, CA
Associates Degree in Nursing		



Professional Experience

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Family Nurse Practitioner		
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08/2021-09/2021	University of California, Los Angeles	Los Angeles, CA
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09/2017-07/2020	Cedars Sinai Medical Center	Los Angeles, CA
Medical-Surgical/Neurosurgery Spinal Unit – Registered Nurse		
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Medical-Surgical/Telemetry-Registered Nurse		
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09/2014-12/2014	Medical Support Services Registry, Inc.	Los Angeles, CA
Medical-Surgical/Telemetry-Registered Nurse		
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06/2014-08/2014	Barlow Respiratory Hospital	Los Angeles, CA
Medical-Surgical/Telemetry-Registered Nurse		
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Certifications & Licensures

2014 - present	Registered Nurse license no: 95028372
2017 - present	Member, Sigma Theta Tau Honor Society of Nursing
2017 - present	BLS Certification
2018 – present	Member, American Academy of Nurse Practitioners
2019 – present	Family Nurse Practitioner license no: 9501454
2019 – present	Certified Med-Surge Registered Nurse
2019 – present	Member, California Association of Nurse Practitioners
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2020 – present	Drug Enforcement Administration no: MG5930082



Volunteer Work

Los Angeles Food Drive	Assist local communities in charitable work each year
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Languages

Able to speak and write fluently in both English and Spanish

CHAPTER ONE: INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a chronic yet preventable disease state requiring a lifestyle change. For example, T2DM prevalence among primarily U.S. adults is 1 in 10; however, pre-diabetes affects 1 in 3 adults nationwide (Centers for Disease Control and Prevention (CDC), 2021a; CDC, 2021b). In addition, evidence-based self-care principles may prevent poor health outcomes, including premature death for adults affected by pre-diabetes and T2DM (CDC, 2021a). Specifically, the most commonly used measure for overall patterns of blood glucose levels is HbA1c, which measures blood glucose excursions over three months (American Diabetes Association (ADA), 2021). Thus, experts suggest that pre-diabetes is diagnosed when two consecutive HbA1c measurements within three months are between 5.7% and 6.4%; in addition, T2DM is diagnosed with HbA1c measurements are 6.5% or higher (ADA, 2021).

T2DM is positively associated with overweight and obesity. Obesity causes insulin resistance, which stimulates the higher secretion of insulin, a key feature of T2DM (Chobot et al., 2018). Substantial data show a 7- to 12-fold higher risk for T2DM associated with obesity among adult men and women, respectively (Wilding, 2014, as cited in Chobot et al., 2018). Also, fasting and post-administration of glucose (75 gm oral glucose) serum measurements for insulin and glucose show progressive patterns of insulin resistance and abnormal glucose metabolism. Higher fasting insulin levels (hyperinsulinemia) are seen among adults with impaired fasting glucose ($\mu=9.8$ mU/L) and in a fraction of adults with standard glucose tolerance tests ($\mu=12.8$ mU/L) compared to insulin-sensitive adults with regular glucose tolerance tests ($\mu=3.6$ mU/L) (Wang et al., 2019). However, mean circulating insulin levels among adults with impaired fasting glucose ($\mu=59.9$ mU/L), impaired glucose tolerance ($\mu=47.9$ mU/L), and adults recently

diagnosed with diabetes ($\mu=120.4$ mU/L) show progressively higher insulin two hours following a bolus of oral glucose (Wang et al., 2019) Similarly, mean serum glucose levels increase monotonically across these states (Wang et al., 2019).

Among U.S. residents, approximately 9.4% or 30.3 million Americans are diagnosed with diabetes, and as many as 50% shows HbA1c greater than 7.0% (Freeman et al., 2018). The American Diabetes Association recommends HbA1c levels at or below 7% as a target for the standard of care treatment (Freeman et al., 2018). People with low socioeconomic status and educational attainment are at higher risk for diabetes, hypertension, hyperlipidemia, and other metabolic diseases (Freeman et al., 2018; Bellou et al., 2018). Low educational attainment, low income, limited work opportunities, low income, and poor access to nutrient-dense food are social determinants that negatively impact health (Hill et al., 2013). Hispanic adults show disproportionately higher rates of T2DM, and risk factors include low socioeconomic status, limited education, and language disparities (Fortmann et al., 2019). These influence diet and exercise patterns that increase the risk for obesity and T2DM. A loss of 5% to 10% of body weight improves random and fasting blood glucose measurements in prediabetic-affected adults. Some estimates suggest the risk for incident T2DM may be lowered by 58% (CDC, 2021b).

Research shows that health literacy is a significant predictor of health; it is greater than income or education (Fan et al., 2021). Although education alone has shown a limited impact on self-care, structured telephone coaching improves self-management and quality of life among adults with low health literacy (DeWalt et al., 2006; Possin et al., 2019). Thus, to enhance self-care management for Hispanic, monolingual Spanish speakers with T2DM, this study compared each patient's pre-intervention BMI, HbA1c, diabetes knowledge, using DKQ-24, to similar

measurements taken after participation in a structured, 12-week, evidence-based, nurse-led educational program plus telephone-based structured diabetes education coaching program.

CHAPTER TWO: THEORETICAL FRAMEWORK

Dorothea Orem's grand nursing theory of self-care deficit may be used to identify an individual's needs for obtaining the adequate learning tools necessary for promoting self-care management and preventing T2DM complications (Borji, 2017). A DNP-educated nurse must have the theoretical knowledge and tools necessary to improve diabetes education for underserved patients (Borji, 2017). Orem's Self-Care Deficit theory provides a framework for the practitioner to find the strengths and weaknesses of oneself and others to assist in building a solid foundation to educate patients (Borji, 2017). The goal is to ensure success in achieving healthcare goals for each individual patient through healthcare promotion, maintenance, and disease prevention.

Four significant factors of Orem's theory that promote diabetes education include self-care, self-care agency, self-care management, and nursing agency (Bahagia et al., 2018). These four factors focus on how a patient can carry out personal self-management. In this case, self-management of glycemic control. The theory's constructs pinpoint how the constructs will support the clinical problem and intervention of the current project. Self-care activities are the focus of Orem's definition of knowledge about and activity that will prevent T2DM complications and promote healthy living in people with T2DM (self-care agency); it is not about giving a pathophysiology class but a class on how to self-manage T2DM (El-Aal & El Nagar, 2018). El-Aal and El Nagar (2018) agree with the ADA that patients with T2DM who receive education and guidance on T2DM self-management improve glycemic goals. Self-care

activities include a healthier diet, exercise, blood glucose monitoring, medication management, problem-solving skills, coping skills, and risk-reduction behaviors.

The capacity of the DNP-educated nurse (nurse agency) to design patient care systems that promote risk reduction and maximize disease prevention improves the healthcare system and the patients it serves (nursing agency) (El-Aal & El Nagar, 2018). T2DM-affected adults may show low literacy (reading or writing), poor self-administration skills for prescribed medications, mood disorders that affect motivation and hopefulness (e.g., depression), or unhealthy options sourcing foods and beverages that affect their ability to manage their prediabetes or T2DM effectively (Fan et al., 2021).

Substantial data suggest individual coaching improves self-care over traditional forms of education alone (Dewalt et al., 2006; Possin et al., 2019). In addition, some data suggest that individual coaching is especially effective in low-literacy adult populations (Dewalt et al., 2006). Thus, a nurse-led weekly coaching intervention based on Orem's Self-Care Deficit Theory and focused on individual periodic coaching may significantly improve T2DM self-management among T2DM-affected adults. Telephone coaching based on the American Diabetes Association standards of medical care (2020; 2022) was administered over 12 weekly follow-up telehealth appointments concentrating on reinforcing self-care activities for affected adults. Coaching strategies employ teach-back, blood-glucose logging, and brainstorming weekly to improve independence among low-health literacy adults (DeWalt et al., 2006). We anticipate that focusing on self-care and self-management through weekly coaching sessions may reduce rates of emergency room visits and hospitalizations for T2DM-affected patients, similar to the results from randomized clinical trials for heart failure and dementia care providers where reliance on self-management is essential (DeWalt et al., 2006, Possin et al., 2019).

CHAPTER THREE: REVIEW OF LITERATURE

Scientific literature was identified using EBSCOhost, Cochrane Library, PubMed databases, and the Google Scholar search engine. Inclusion criteria included T2DM-affected adults prescribed oral hypoglycemic medications, Hispanic Spanish speakers, BMI, and HbA1c. Search terms included combinations of key terms: diabetes, diabetes education program, diabetes coaching, telephonic interview, health literacy, BMI, Hispanics, low health literacy, weight loss, obesity, overweight, and education. For example, the phrase "Hispanic adults with T2DM and low health literacy" yielded 48,700 results using Google Scholar. Boolean operators such as *or* and used alone or in combination with keywords narrowed the search to 331 peer-reviewed articles with full-text content. A careful analysis of each article suggested that five articles were most relevant to diabetes teaching and motivational telephonic coaching. An additional two articles were identified through recommendations from experts.

One cross-sectional study where 40 Hispanic participants received T1DM education and coaching to improve HbA1c (T2DM) knowledge, self-efficacy, BMI, and low-density lipoprotein (LDL) levels showed a positive trend in diabetes knowledge, self-care management, and self-efficacy for skills routinely employed in self-management of T2DM, as well (Ruiz-Gonzalez et al., 2016). Discussions centering T2DM in comparison to pre-diabetes and T1DM may improve learning as comparative physiological states, to improve understanding of definitions, causes, and treatments for people with T2DM. Evaluating the long-term effects of self-management coaching on HbA1c levels, technical diabetes knowledge, self-efficacy, and BMI and LDL cholesterol control, a repeated measures analysis suggested improvement in biomedical and psychological variables, with positive lifestyle changes that continued one year after the diabetes education program was implemented.

The intervention included printed material before participating in education and questionnaires evaluating the knowledge at the end of the study. Questionnaires included the Escala de Conocimientos Sobre la Diabetes (ECODI) translated to Scale of Diabetes Knowledge and the Self-Care Activities (SDSCA) assessment that reports (patient) diabetes knowledge and frequency of diabetes self-care tasks (Ruiz-Gonzalez et al., 2016). Diabetes education was done by a diabetes educator and consisted of three sessions, six hours each. These sessions covered areas including defining T2DM, diet, physical activity, insulin, hypoglycemia, and self-care management at home. Two of the six hours pertained to the education portion; the other 4 hours included follow-up on the patient's clinical history and return demonstration of what was learned. These demonstrations included insulin administration, carbohydrate counting, and self-monitoring blood glucose.

Overall, participation in the diabetes education program was associated with decreased HbA1c levels at six months and following one-year enrollment. For example, the average HgbA1c among participants was 8.99 mmol/L (SD: 1.28) at onset and dropped to 8.07 mmol/L (SD:1.26) on average at the following one-year enrollment ($p < 0.001$) (Ruiz-Gonzalez et al., 2016). At one year, data for targeted self-care changes included BMI (20–25 kg/m²), total cholesterol (<200 mg/dL), and LDL cholesterol (<100 mg/dL) (Ruiz-Gonzalez et al., 2016). Analyses suggest the intervention produced a measurable change in perceived barriers relative to diet, exercise, insulin management, and foot care among T1DM-affected adults (p -values<0.05) (Ruiz-Gonzalez et al., 2016). In addition, self-efficacy and self-care-management skills showed improvement that was not statistically significant at one year ($p = 0.06$) (Ruiz-Gonzalez et al., 2016).

Relative to diabetes knowledge, both theoretical and technical knowledge improved. Results showed a significant change in theoretical knowledge ($p < 0.01$); mean values increased from 18.10 (SD=1.24) to 22.56 (SD=1.04), with an effect size ($\eta^2 = 0.89$) (Ruiz -Gonzalez et al. 2016). In addition, theoretical knowledge was shown to be statistically significant in that there is indeed a correlation between coaching, education, and knowledge ($p < 0.01$); technical knowledge also showed a statistical significance ($p < 0.01$) (Ruiz et al., 2016).

This article shows how an expert in the field of T2DM, a diabetes educator, can serve as a diabetes teaching coach for the participants within the study throughout each planned session. There are themes between prediabetes with the use of the diabetes prevention program and T2DM education, including self-care and self-management (diet, exercise, and healthcare participation (National Institute of Diabetes and Digestive Kidney Diseases (NIDDK), 2021). Therefore, the same principles would apply to the intended project; a single expert in the field of T2DM would serve as a coach in providing weekly coaching calls.

Various interventions have been tested to improve self-care and knowledge for people with T2DM. For example, Castillo et al. (2010) conducted a diabetes education program provided by community health workers (CHWs) within the community. They evaluated its effectiveness in improving glycemic control and self-management skills for Hispanic/Latino adults with T2DM. A mixed study consisting of 47 Hispanic adults with T2DM was done over a three-month period which focused on coaching and empowerment of participants by trained clinical health workers (CHWs) (Castillo et al., 2010). The aim was to improve overall glycemic control and self-care management skills via educational classes and coaching of patients over ten weeks. These classes included ten two-hour weekly group sessions, including diabetes knowledge, self-care behaviors, symptoms of depression, HbA1c, weight, and BMI. Diabetes

knowledge was measured using the Diabetes Knowledge Questionnaire (DKQ-24), consisting of twenty-four true/false questions on diabetes, its diagnosis, complications, and treatment. Self-care was measured using the Summary of Diabetes Self-Care Activities (SDSCA) (Castillo et al., 2010). This questionnaire evaluates diabetes self-care management and its regimen components; it consists of eleven questions regarding healthy eating, exercise, blood glucose testing, foot care, and smoking. (Toobert et al., 2000). In addition to this, depression was measured using the PHQ-9. Self-efficacy was measured using the Diabetes Empowerment Scale-Short-form (DES-SF) about eight questions via the Likert scale model on how participants viewed feelings of self-efficacy. Height, weight, HbA1c, home blood glucose, and blood pressure were obtained pre-and-post study (Castillo et al., 2010).

Results indicated a positive response to diabetes education for the population in the study. Mean HbA1c dropped from 8.39 to 7.79 ($p < .001$). There was attrition of 32.86% (23 out of 70) in the entire sample of $N = 70$; there was no difference in HbA1c values ($p = .738$) between those that completed the program and those that did not complete the program (57.3 vs. 51.3) (Castillo et al., 2010). Results of the qualitative aspect of this study showed that past experiences with T2DM encouraged participants to be motivated for self-care management (Castillo et al., 2010). Although future implications call for research with a larger sample size and the possibility of making this a randomized controlled study, results provided an optimistic point of view on the role of diabetes education for Hispanic patients of low literacy and low-socioeconomic status, focus and population of this project.

Some evidence-based interventions have improved self-care for low-literacy populations affected by complex diseases caused by progressively worsening T2DM. For example, DeWalt et al. (2006) conducted a study that evaluated structured, tailored telephone coaching as the

primary intervention (education plus coaching). The control group received standard-of-care education from the primary care provider (PCP) and a heart failure education pamphlet at the seventh-grade level (DeWalt et al., 2006). The education plus coaching group received an initial one-hour educational session led by a clinical pharmacist and the educational booklet designed for low-health literacy (DeWalt et al., 2006). Teach-back and brainstorming strategies were used with the education plus coaching group. This intervention focused on critical daily activities for heart failure self-care, much like the daily behaviors needed for T2DM self-care. Although the medications to treat these two diagnoses often differ, repetitive daily activities remain essential to self-care management.

Interestingly, DeWalt and colleagues (2006) report as many as eight telephone coaching calls in the first eight weeks, lasting 5 to 15 minutes, to motivate and reinforce self-care education. These approaches are embraced in *this* T2DM lifestyle modification protocol. At 12 months, DeWalt and colleagues (2006) report a nearly three-fold lower rate of hospitalization or death among low-health literacy adults treated with education and coaching compared to the control group (Incidence Rate Ratio (IRR)=0.39, 95%CI: 0.16, 0.91). At one year, knowledge was 12 percentage points higher for the education plus coaching group than measured among controls (95% CI: 6%, 18%; $p<0.001$) (DeWalt et al., 2006). An intervention patterned to match the *education plus coaching* approach informs this T2DM-lifestyle quality improvement project. A weekly food diary and daily blood glucose monitoring mirror the reporting systems used effectively by DeWalt and colleagues (2006) (Appendix A and B).

In addition, telephonic coaching for education, support, and coordination of care has been tested by Possin et al. (2019). Briefly, telephone-based dementia care was tested in a collaborative approach between advanced practice nurses, social workers, and pharmacists with

families in rural and urban centers, often isolated due to the condition (dementia). The Care Ecosystem, a telephone-and internet-based coaching system for patients with dementia, successfully met the needs of people with dementia (PWDs), their caregivers, and third-party payers (Possin et al., 2019). A care team navigator and dementia specialists implemented coaching for 512 participants in comparison to 268 participants that received usual and standard care. In addition, immediate needs, medication reconciliation, safety screening, referrals, caregiver education, and (PWD) behavior management and advance care planning were offered to Care Ecosystem participants (Possin et al., 2019). Outcome surveys at 6 and 12 months showed the Care Ecosystem enhanced PWD quality of life ($\beta=0.53$, 95% CI, 0.25 – 1.30; $p = 0.04$), decreased the number of emergency room visits ($\beta=-0.14$, 95% CI: -2.15 to -0.13; $p = 0.03$), and decreased report of caregiver burden ($\beta=-1.90$, 95% CI: -3.89 to -0.08; $p = 0.0046$) (Possin et al., 2019). Together with evidence from Dewalt et al. (2006), this evidence supports the positive health benefits of telephonic coaching to improve health outcomes for adults with diverse and complex illnesses such as T2DM.

Azami et al. (2018) developed a randomized controlled trial to identify the effectiveness of a nurse-led T2DM self-management education on HbA1c as the primary outcome and blood pressure, body weight, and self-management behaviors as secondary outcomes. All participants had an HbA1c of 9% or higher. The control group received the standard T2DM care, which consisted of 20-30 minutes of individualized education at three-monthly intervals; medication management, examination, and a pamphlet with T2DM information were provided during these meetings. A total of 142 adults diagnosed with T2DM were randomized into either the control (72 adults) or intervention group (72 adults). The interventional group would receive standard T2DM care and a 12-week nurse-led T2DM self-management, education, and motivational

interviewing. In addition, this group obtained an information booklet that provided information regarding T2DM self-management; they were shown four 10-minute videos on T2DM self-management, participated in four weekly educational sessions in person, and received weekly telephone calls from the nurse. The four weekly sessions were 120 minutes long and consisted of peer support, setting goals, and how problem-solve. After the group discussions were completed, the follow-up calls were initiated, lasting between 15-20 minutes each. These calls provided motivational interviewing, which aided participants in continuing their agenda of maintaining healthier lifestyle changes. Reflective listening, providing empathy in the discussion, and reinforcing positive lifestyle changes encouraged the interventional group to maintain effective lifestyle changes to improve their T2DM. Results showed that 21.1% of the participants in the intervention group obtained an HbA1c of less than 7% compared to no change in the control group at 24 weeks ($p < 0.001$) (Azami et al., 2018).

Brunk et al. (2017) developed a qualitative research design to provide an educational intervention for adult Hispanics with T2DM and low literacy. Similar to the DNP proposal, the intervention of a diabetes course enables participants to feel empowered in self-care and self-management of diabetes through lifestyle changes. The educational process was tailored toward the Hispanic culture. It consisted of four weekly, two-hour evening diabetes education classes, provided in Spanish, discussing information such as glucose self-monitoring with a discussion on diet and exercise. The goals of this study were to increase participant desire to engage in lifestyle changes via positive feedback and to impact readiness to change self-management skills. This was measured through participant feedback that is assembled around four topics: information and knowledge of T2DM, motivation and barriers to lifestyle change, experience with self-management, and personal accountability for T2DM disease maintenance (Brunk et al., 2017).

Although this study provided no quantifiable data, the research provides sufficient evidence of a strong relationship between diabetes education and lifestyle change through participants' feedback on T2DM. As Orem's model demonstrates, patients had the motivation and self-efficacy to provide self-care management when encouraged and supported to do so. In using Orem's model for this article, patients had a deficit in disease management. However, once education was provided on T2DM, this deficit was removed, and self-care management was achieved.

Vaughan et al. (2017) proposed a randomized controlled research design to assess the probability of incorporating community health workers (CHWs) as part of team-leading diabetes group visits for a Hispanic population. Although CHWs will not participate in the proposed project, they represent what the nurse-led coaching will accomplish for the project. This study also focused on a diabetes education intervention for the experimental group, aiming to identify if this intervention produces expected reductions in HbA1c, blood pressure, weight, and lipid panel within six months. A total of 50 adult Hispanic participants of low socioeconomic status participated in this study, comprising two groups of 25 participants. The control group continued regular PCP follow-up visits. The intervention group participated in three-hour monthly educational sessions on diabetes medical management, overcoming social barriers to care, overcoming psychological barriers, and positive lifestyle changes for improved self-management. Weekly follow-up motivational coaching calls were provided to the intervention group only to aid with questions or concerns. Results showed a reduction in HbA1c (8.7 to 8.0), blood pressure (Systolic 134.8 to 131.9 mmHg and diastolic 81 to 78.4 mmHg) low-density lipoprotein (LDL) (111.7 to 108.7 mg/dL), and BMI (33 to 32.2 kg/m²) for the interventional group with coaching (Vaughan et al., 2017). Albeit the targets were not reported, investigators

reported that 57.1% of intervention participants *obtained* targeted HbA1c levels, compared to 25% of the control group ($p < .05$) (Vaughan et al., 2017). Some limitations of this study are that findings are based on a small sample size and that statistics reported by the investigators are contradictory. For example, while researchers reported more than half of T2DM-affected adults attained a targeted HbA1c, the goal is unreported, mean HbA1c (standard deviations) are not statistically significantly different, and ranges are essentially the same at 0 and 6 months of follow-up (Vaughan et al., 2017). The value of this report, like the protocol for the comparison population in *this* study, is that reminder calls connecting patients and providers improve overall access to prevention for T2DM-affected Hispanic adults.

Synthesis of Literature Review

Education with telephonic coaching fosters positive lifestyle changes among patients with low literacy focused on self-care management of diabetes (DeWalt et al., 2006; Possin et al., 2019). Self-care management and lifestyle change through education and coaching exemplified evidence reported in the literature review. This project focuses on Hispanic T2DM-affected adults with low literacy. Informative education with standardized follow-up phone coaching sessions is aimed at increasing engagement and self-management skills (Brunk et al., 2017).

Questionnaires assessing test diabetes knowledge, including long-term complications of disease progression, as well as hypoglycemic medications and standard of care dietary recommendations, are assessed using the *Diabetes Knowledge Questionnaire* (DKQ-24) (Garcia et al., 2001).

Several investigations evaluated the effects of coaching in low-literacy populations (Vaughan et al., 2017; Castillo et al., 2010; DeWalt et al., 2006). Each emphasized the significant positive impact that education accompanied by meaningful behavior-focused

coaching in low-literacy populations. In addition, Azami et al. (2018) emphasized the importance of reflective listening. Together, these data suggest that empathic care and education may strengthen positive lifestyle change in Hispanic adults with T2DM who have low literacy.

Implications of these findings support the importance of diabetes education programs delivered by healthcare providers or community health workers as an essential component to diabetes knowledge, reduction in HbA1c levels, and BMI. A DNP-educated leader holds the capabilities to provide positive and necessary healthcare decisions with the interprofessional team. Although this may be one of several quality improvement projects needed to develop quality outcomes in this population, an investment in focused and meaningful diabetic education that benefits affected Hispanic adults in underserved communities is long overdue.

CHAPTER FOUR: METHODS

Project Design

The project design for the proposed DNP project is a pretest-posttest quality improvement project. This project aims to reduce HbA1c levels and BMI and improve diabetes self-care knowledge among Spanish-speaking adults diagnosed with T2DM and treated with oral hypoglycemic agents. In addition, the project seeks to strengthen dietary lifestyle choices that enhance self-care management and prevent T2DM complications.

The DNP candidate is employed at and provides primary care as a nurse practitioner at a large Federally Qualified Healthcare Center (FQHC) in South Los Angeles. The protocol will be evaluated by UCLA School of Nursing faculty members and the South Campus Institutional Review Board (IRB) at UCLA. Quality improvement projects are not considered human research. Standard of care treatment will be provided for all patient participants, and each patient

in the study will receive periodic phone follow-ups to ensure that a linkage to care is maintained. No investigational drugs or devices are employed.

Sample

Thirty-four participants were recruited for the quality-improvement intervention using a standard protocol. However, more than half were lost to follow-up. The final sample size was 16 participants at visit 13, the last in-person visit where each was weighed and tested for point-of-care HbA1c. This was due to reasons such as participants' lack of answering their phones, participants leaving the state, or other personal reasons by the participants.

Eligibility

Participants were limited to adults 18 years and older, with a BMI at or above 25 kg/m², who self-identify as Hispanic ethnicity, speak Spanish *only*, with fewer than 12 years of formal education, or were awarded a General Education Development (GED) certificate, are diagnosed with T2DM, and take oral hypoglycemic medications only. Each was diagnosed with T2DM by a physician, nurse practitioner, or physician's assistant and prescribed oral hypoglycemic agents alone by 1 of 5 providers at the index clinic. In addition, as an FQHC, most patients report low annual household income, but individual family income is not registered in the medical record. Thus, this adult patient population is mainly poor, with limited education, and overweight or obese Spanish speakers who are self-described as Hispanic and are affected by T2DM.

Instrument(s)

A log of weekly phone calls and intervention notes was used to measure independent variables in the participants' education (Appendix D). The dependent variables, BMI and HbA1c, will be abstracted from the EMR, and T2DM knowledge was evaluated from the 24-item Diabetes Knowledge Questionnaire (DKQ24). The DKQ24 is translated into Spanish (Garcia et

al., 2001). Other covariates of interest available in the EMR include age, formal education completed (years), number of household residents and household income as a definite measure, medications prescribed, and a point-of-care HbA1c before enrollment (less than three months). Other covariates include the number of short (15-minute) and extended encounter visits completed during the follow-up period. In the event of specialty questions, on-site experts are available to talk with participants, including a board-certified MD Endocrinologist or Registered Dietician. In addition, referrals can be made for further assessment, including mental health professionals available within the clinic.

Study Procedures

Recruitment

Nineteen individual clinics and school-based health center locations comprise the St. John's Community Health Clinics (St. John's Community Health Clinic, n.d.). The Magnolia Place Health Center is located in South Los Angeles and serves a large population (St. John's Community Health Clinic, n.d.). The most recent agency-wide Impact Report shows that 450,891 primary care patient visits were provided to 91,756 individual patients in the fiscal year 2021 (St. John's Community Health Clinic, n.d.). St. John's reports that 84% (76800/91756) of the patient population obtain healthcare through Medi-Cal insurance coverage (59%) or are uninsured (25%) (St. John's Community Health Clinic, n.d.). In 2021, across all St. John's Community Health clinics, 53,840 treatment visits were completed for diabetes patients (St. John's Community Health Clinic, n.d.). The Magnolia Clinic is home to one Primary Care provider team that manages adult and pediatric primary healthcare for this agency location.

The recruitment protocol engaged all five primary healthcare providers (PCP) at this large Federally Qualified Healthcare Center: one physician and four certified nurse practitioners.

The lead APRN invited each healthcare provider to select six eligible patients from their patient list that would be invited to participate in the project. The project medical assistants contacted these direct referrals from providers to the intervention study team by telephone. Each referred patient was invited to participate in the diabetes education program that included individual telehealth coaching over 12 weeks. All identified patients verbally agreed to participate in the educational intervention and were scheduled for Visit 1. In addition, PCPs reported (to the APRN) that they also spoke with other adult patients with T2DM about the project. Consequently, an additional four participants contacted the quality-improvement team to volunteer their participation and were scheduled. The total Visit 1 sample was comprised of these 34 participants.

Pre-visit Phone Contact

This FHQC requires formal prescheduling for healthcare-related telephone contacts with patients (telehealth). FHQC medical assistants telephoned each quality-improvement study patient to schedule the first study visit, verifying their identity through self-reported first and last names and birth dates. Additionally, patients described the prescribed oral hypoglycemic medications currently used. Each data point was verified against the EMR, and age, first and last names, telephone, and STUDYID numbers were entered into an IDKEY file and stored in the medical practice under lock and key.

Electronic Medical Record Abstraction

Sociodemographic characteristics were collected from the EMR or self-reported when their first intervention visit was scheduled. Hispanic ethnicity, monolingual Spanish language skills, and years of formal education without a report of a General Education Degree (GED) were abstracted from the *information section* of the EMR. In addition, the most recent height and

weight, BMI, and specific oral hypoglycemic agents prescribed, as well as the absence of prescribed insulin, were abstracted from the *clinical section* of the EMR.

Visit 1: Type 2 Diabetes Mellitus Education Pre-Intervention Class

An evidence-based, four-hour group instruction program was designed and executed for 34 patient participants by the quality improvement project team: the lead APRN, three medical assistants employed by the agency, and Dr. Inese Verzemnieks. The lead APRN (C. Guerra) and Dr. Verzemnieks collaborated to design an intervention to teach basic knowledge and skills deemed by experts as necessary to T2DM self-management (ADA Standards of Care, 2020; ADA Standards of Care 2022). A narrated PowerPoint presentation was created for adults with low health literacy. The presentation was translated into Spanish by a fluent bilingual Spanish/English speaker and validated by the agency's Registered Dietician, also a fluent Spanish speaker. A copy of the PowerPoint presentation was prepared as a handout and distributed to all participants. Food consumption and blood sugar logs were printed and distributed to all participants before the meeting began.

The meeting was conducted in a large classroom, with a maximum seating of nearly 100 persons. The classroom is airconditioned. Long tables and chairs designed for adults were provided to maximize comfort. Pencils were provided to all participants. The duration of the instruction was 3 of the 4 allotted hours.

Body weight, height, and HbA1c measurements were completed before the educational presentation, safeguarding patient privacy as measurements were conducted and recorded. The APRN could speak privately or in small groups to participants before and after the presentation.

Body Weight, Height, and HbA1c Measurements

We measured HbA1c (%), height (inches), and weight (lbs.) during the 60 minutes before the class meeting (see: Visit 1: T2DM Education Preintervention Class). We rechecked HbA1c and body weight three months after initiating the intervention, using the same instruments employed at visit one to estimate a reduction in HbA1c or BMI.

A fluent, Spanish-speaking medical assistant measured height and weight during the first and last study visits. Weight was measured with an electronically calibrated scale, the *Health O Meter 752KL Electronic Physician Scale*. The manufacturer calibrates the scale at the factory, and scales require no periodic recalibration for healthcare use (Canadian Standards Association, 2008). Height was measured in inches using a single mechanical-beam scale height rod. The medical assistant recorded each measurement in the EMR on the date and time measured.

Trained medical assistants collected blood for HgA1c at the first and last in-person visits, Visit 1 and Visit 13, using a standard protocol. Medical assistants clean the participant's index finger with an alcohol swab and lance the skin manually to obtain a sample collected into a capillary glass tube. The blood specimen is inserted into a cassette is locked into the point of care HbA1c measurement tool: *Siemens DCA Vantage* (Siemens Medical Solutions Diagnostics Point of Care (POD) Products, 2007). The *Siemens DCA Vantage* estimates the percentage of glycosylated hemoglobin in the blood specimen using a standardized protocol executed over approximately six minutes (Siemens Medical Solutions Diagnostics Point of Care (POD) Products, 2007). Calibration was performed at the time of purchase (for the clinic). Routinely scheduled recalibrations are scheduled every three months. Nonetheless, the last date the *Siemens DCA Vantage* was calibrated is still being determined. The operator's manual reports and the laboratory personnel confirm that a *System Settings Wizard* assisted in configuring the device

settings, including time and date, with proper formatting, and test sequence number settings (Siemens Medical Solutions Diagnostics Point of Care (POD) Products, 2007).

Administration of the DKQ-24

The DKQ-24 questionnaire was administered initially during the day of the presentation but before the project-orientation class started. The APRN and two medical assistants issued it as a paper and pencil questionnaire. Participants completed the questionnaire in 30 or fewer minutes without questions. It was again administered at the end of the study at week 13. The questions were re-arranged differently compared to the pretest, yet the questions remained the same. This questionnaire was used as the pretest and posttest, but the questions were ordered differently compared to the pretest.

A few questionnaires are valid and reliable for assessing self-reported diabetes knowledge. In addition, some questionnaires are specifically developed or translated for non-English speaking adults. For example, Castillo et al. (2010) employed the Diabetes Knowledge Questionnaire (DKQ-24) to assess understanding of the diagnosis and treatment and the complications that may ensue when (diabetes) is uncontrolled. Items are formatted as true/false responses to short phrases (Appendix C). Using pretest and posttest questionnaires with randomly ordered questions allows one to evaluate knowledge gained at the second assessment visit. Validity and reliability were assessed for DKQ-24 in a sample of adult Mexican Americans with T2DM (Garcia et al., 2001). Cronbach's alpha showed strong reliability, i.e., 0.78 (Garcia et al., 2001). Validation was identified by comparing the DKQ-24 scores between the experimental and control groups at baseline and three months utilizing a two-by-two repeated-measures analysis of variance; this was significant, $p < 0.001$ (Garcia et al., 2001).

Weekly Coaching Topics and Procedures

Topics discussed during the weekly coaching sessions aimed to improve diabetes self-care management for adults with T2DM. This program aimed to improve individual health outcomes and reduce the risk of T2DM complications (Appendix D). An evidence-based standard list of educational topics to promote self-care was divided into 12 weekly coaching sessions (ADA Standards of Care, 2020; 2022). The script guided the discussion. Teaching was provided in Spanish by the lead APRN who is fluent in Spanish and who instructs adults with T2DM treated at this clinic. Consistently, the FHQC providers evaluate this patient population as having low health literacy, albeit unmeasured at this time. Thus, the coaching style was adapted to a low-health-literacy monolingual Spanish-speaking population by the lead APRN in real-time with each coaching session.

All telephone calls to the patient were conducted by FHQC employees, prescheduled, and placed (to them) at a convenient pre-agreed-upon time and date. Thus, in advance of the coaching call, a medical assistant would have called and scheduled a telehealth visit with each participant (each week). All telephone calls were made using a HIPAA-approved (phone) *app* that substitutes the FHQC's telephone number for a personal one. For coaching, the APRN would call three times, at 10-minute intervals, if a call went unanswered. If the patient answered and reported that the call had become inconvenient, a coaching call was rescheduled. Unanswered coaching calls were marked as *a no-show*.

Assessment of Patient Understanding for Weekly Coaching Topics.

The APRN adapted coaching topics outlined at a higher level of education than this population evidenced. Consequently, during each coaching session, the APRN employed the outline as a guide for content explained in (Spanish) language consist with early elementary school

education. Verbal feedback elicited from patients demonstrated their understanding. For concepts poorly perceived, the APRN reinforced teachings to improve understanding. Teaching using *everyday* examples helped convey essential concepts. For instance, during the *diabetic nutrition* week, patients discussed high-carbohydrate foods, such as starches, which included culturally-relevant foods such as sweetbreads, rice, and tortillas, that they plan to constrain to adhere to carbohydrate recommendations. Notes regarding each weekly teaching session were recorded in the patient's EMR for the provider's review.

Patients were told that any concerns about their T2DM safety would be reported to providers immediately. However, the APRN detected no untoward outcomes or reports by patients.

Visit 13: Post-Intervention Measurements

A final in-person visit was scheduled to complete data collection for 18 patient participants who had participated in 12 telehealth coaching (weekly) visits. A total of 16 attended the final post-intervention measurement visit (Visit 13). The final visit was scheduled by project medical assistants. No structured educational intervention was scheduled, although the lead APRN was available throughout the visit to answer questions and discuss self-management concepts with participants. The order of questions in the DKQ-24 was randomized before being re-administered to the group by the APRN (see: *Administration of the DKQ-24*). Body weight, and HbA1c were collected by medical assistants using the same standardized procedures employed at Visit 1.

Setting

The proposed intervention was conducted in a classroom in one of agency's 19 Federally Qualified Healthcare Center (FQHC) clinics where preventive healthcare services for patients of

all ages are offered (St. John's Community Health Clinic, n.d.). The clinic classroom seats up to 100 people and has tables and chairs, a projection system, a public address system (microphone and speakers), and a large projection screen.

Participants were reminded of weekly coaching calls, which lasted about 15-30 minutes each. Medical assistants (MAs) called each participant to notify them of their telehealth appointment. All medical assistants and APRNs are fluent Spanish speakers. Telehealth times were scheduled, and the schedule was conveyed to the lead APRN. Calls were placed on either Saturdays or Sundays but were done during the middle of the week per the patient's preference and availability. A medical assistant scheduled the first telephone follow-up visit during the day of the PowerPoint presentation, where all participants were present; the medical assistant also prepared the following weekly calls at the end of each weekly call. A message was sent to the medical assistant via the EMR to schedule the participant at the date and time requested by the participant.

Telephone follow-up was conducted using a cell phone and the Doximity phone app that masks the caller ID with the clinic telephone number and is HIPAA compliant. Topics discussed on each call are based on issues addressed in educational meeting held at the pre-intervention visit. In addition, each coaching session followed the ADA Standards of Care for medical providers (2020; 2022). All medical assistants and the APRN are fluent Spanish speakers.

Intervention

By design, each patient served as their control. At the outset, a single, four-hour class providing standard-of-care diabetes self-care instruction was delivered to 34 participants by the APRN lead. Baseline HbA1c (%), body weight (lbs.), and height (inches) were measured by Spanish-speaking certified medical assistants. Measurement procedures are described in

the *Study Procedures* section. Instruction included a PowerPoint presentation created in collaboration with Dr. Inese Verzemnieks at the University of California, Los Angeles (UCLA) School of Nursing (Appendix E & Appendix F). Although the presentation includes information about Type 1 Diabetes and prediabetes, it is solely for comparative purposes to support the definition of T2DM. The ADA website is also provided in Spanish; information from this website is noted in the ADA Standards of Care (2020; 2022) and contributed to the weekly coaching and PowerPoint presentation. The PowerPoint presentation was reviewed by Dr. Verzemnieks and is consistent with the needs of a low-literacy audience.

The project timeline started on March 17, 2022, lasting 13 weeks (3 months); the community-based education course with PowerPoint presentation was provided during the first week on a single day. Before the educational intervention, the APRN introduced the Spanish-language version of the DKQ- 24. prior to the initiation of the PowerPoint. The presentation focuses on critical topics important to self-care management, including the pathophysiology of T2DM, diet and physical activity, complications of diabetes, and self-care management (Appendix E & Appendix F).

Weekly coaching telehealth calls are described extensively elsewhere and were placed in the FHQC using a standardized protocol (see: *Weekly Coaching Topics and Procedures*) . The weekly for diabetes coaching script was based on the ADA Diabetes Standards of Care (2020;2022) and included as an appendix (Appendix D). The script was translated into Spanish by the APRN and validated by a bilingual Spanish-English nutritionist employed by the FHQC. Motivational interviewing techniques, supportive care, and answers to patient-specific questions about diabetes, medications, signs and symptoms of worsening diabetes and possible outcomes,

and recommended foods arose during coaching sessions. Each question was answered using evidence-based responses routinely employed at the clinic.

Data Collection

Health data, including anecdotal notes reflecting the content and patient responses to coaching topics, were recorded in the electronic medical record by the APRN. After visit 13, all deidentified data were abstracted onto an EXCEL® spreadsheet and preserved as raw data. In addition, a data dictionary was created that defined each variable. Separate spreadsheets were stored in a single EXCEL® workbook, and iterations over the analysis were individually labeled and dated in a single subdirectory on a laptop computer.

Statistical Analysis

The target population of adults with T2DM numbers 20 and 25 patients daily for each of five FHQC providers. We anticipated 30 participants would enroll in the study. Thirty-four patients enrolled. However, by visit 12, 18 participants remained in the intervention group, two of whom were lost to follow-up at visit 13. For this quality-improvement study, the participants served as their control.

Descriptive, graphical, and tabular analyses explored associations in the data, including relationships between T2DM knowledge at week one and the post-intervention visit 13 weeks later. Arithmetic means and their corresponding standard deviation (average) and medians for BMI, HgA1c, age, gender, minutes of exercise, and years of education were estimated from the data. For weekly reports for exercise, we estimated the means and standard deviation for each visit and plotted the week-to-week pattern using EXCEL® (Microsoft Corporation, n.d.). To characterize the change in knowledge, the post-test DKQ-24 score was subtracted from the pre-test score, and we evaluated the change in knowledge as paired Student's t-test. We analyze the

pre-and post-intervention HgA1c and BMI for each participant. As an exploratory aim of this quality improvement program, we compare the pre-and post-intervention outcomes for BMI and HgA1c by age, gender, race, education (years completed), number of household residents, total household income, and medications prescribed as recorded in the EMR. We converted education and age to categories above and below the mean. We evaluated bivariate associations between diabetes knowledge at the baseline and follow-up visits using Student's t-test for continuous variables (e.g., age) and Chi-square tests for categorical variables (e.g., years of education:<8, 8-11, 12, 12 or more years). The difference between pre-intervention and post-intervention diabetes knowledge was summarized as a different measure and evaluated using a paired Student t-test. Analyses were completed using EXCEL® and SAS Statistical software, Version 9 (Microsoft Corporation, n.d.; SAS Institute Inc., 2019a; 2019b).

CHAPTER FIVE: RESULTS

Sample Characteristics

The baseline characteristics of the sample are summarized in Table 1. The participants at baseline numbered 34, 11 of whom were male (32%), and 23 were female (68%; $p=0.0396$). The average age of all participants was 51.8 (SD: 11.6) years. All participants self-identified as Hispanic, over the age of 18, with a diagnosis of T2DM, were taking oral hypoglycemics only without the aid of insulin, and were overweight or obese, following the study design. Participants were, on average, 62.9 (SD: 2.5) inches tall. The mean years of formal education reported by participants were 3.65 (SD:2.82) (Table 1). The baseline average BMI and HbA1C were 34.4 (SD: 5.8) kg/m^2 and 8.3% (SD:0.7), respectively (Table 1).

Of the 34 participants, 18 (53%) completed the entire intervention (*completers*). However, 2 of 18 had not completed the second DKQ-24 survey (missing data at time 2, 11%),

and 16 (47%) did not complete the intervention program (*non-completers*). Non-completion is attributable to loss to follow-up, travel, family emergencies, or repeatedly unreachable by telephone. For those who did not answer the phone, medical assistants and the DNP student attempted to call at different times and on different days unsuccessfully.

Table 1: Sociodemographic Characteristics for Baseline for a Sample of 34 Participants, 16 of Whom Completed 12 Weeks of a Structured Diet and Exercise Coaching Lifestyle Modification Program

Characteristic	Number	%	<i>p</i>
Sex			
Male	11	32	0.0396
Female	23	68	
Program Participation			
Baseline	34	100	
Completers (Visit 12)	18	53	
Non-Completers	16	47	
	Mean	Standard Deviation	
Age	51.8	11.6	
Education (Years of Formal Education)	3.65	2.82	
Exercise (Minutes/Week)	90.8	47.2	
Baseline (Minutes/Week)	88.7	72.5	
Weight (lbs.)			
Baseline (n=34)	193.2	33.8	
Height (inches)			
Baseline (n=34)	62.9	2.5	
Body Mass Index (kg/m ²)			

Baseline (n=34)	34.4	5.8	
HbA1C (%)			
Baseline (n=34)	8.3	0.7	

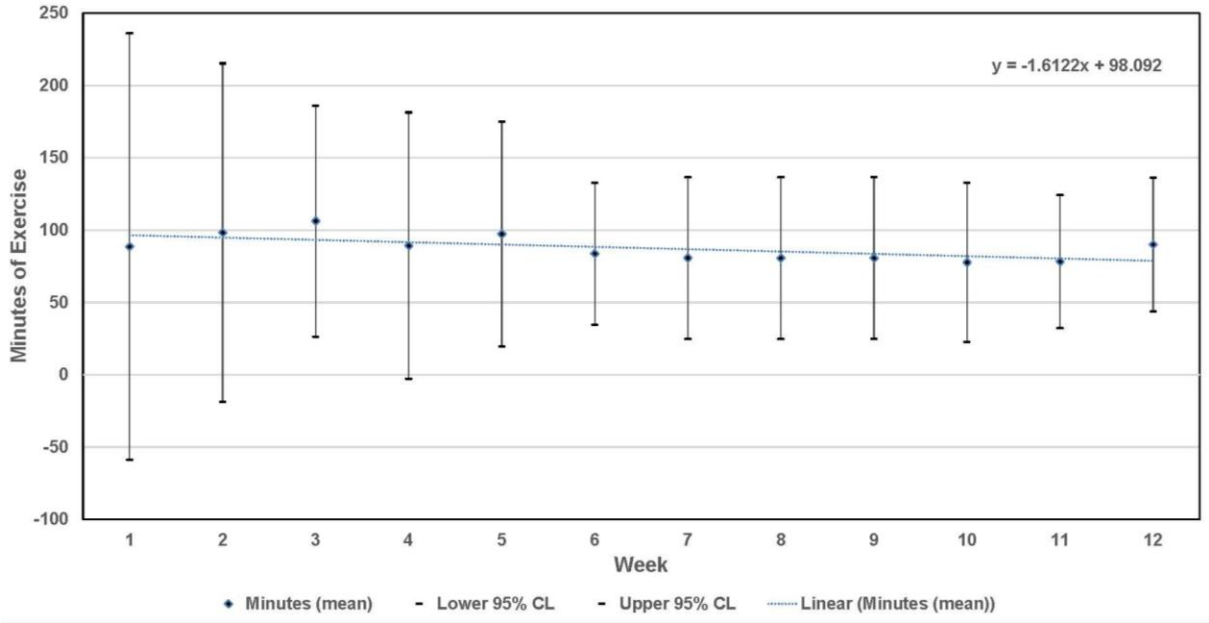
Measurable changes in important T2DM self-management parameters include weight, BMI, and exercise. Among *completers*, exercise reported at the first study visit was 88.7 (SD:72.5) minutes/week, on average, and among *completers*, the reported exercise at week 12 was 88.3 (SD:21.7) minutes/week. Notably, the difference between baseline and visit 12 was 5.8 (SD: 69.0) minutes/week, with a median of 30.0 minutes per week (Table 2). This slight change is visualized in Figure 1, where the slope of week-to-week exercise reported is -1.61 minutes/week over the period ($p>0.05$) (SAS Institute Inc., 2019b). The average weight at baseline was somewhat less than that observed at visit 12 (Table 2). Albeit modest, *completers* lost, on average, 1.8 (SD: 2.3) pounds over the 12 weeks ($p=0.0074$) (Table 2). This resulted in a similarly modest reduction of BMI, -0.3125 (SD: 0.43) kg/m² ($p=0.0102$) (Table 2) (SAS Institute Inc., 2019b). The mean HbA1C measurements were high, on average, among all participants ($\mu=8.3$, SD: 0.7) and the 16 *completers* ($\mu=8.1$, SD: 0.6) were similar at the baseline visit ($p>0.05$) (SAS Institute Inc., 2019a). Among those with complete data for the intervention, HgA1c was modestly reduced over the study period (-0.375%, SD: 0.43, $p=0.0035$) (Table 2) (SAS Institute Inc., 2019b).

Table 2: Comparison of characteristics and differences for a sample of 34 T2DM who began, 16 of whom completed, a 12-week diet and exercise lifestyle modification intervention at a community clinic

Characteristic	Measure		
	Mean	Standard Deviation	<i>p</i>
Exercise (Minutes/Week)	90.8	47.2	

Baseline (Minutes/Week)	88.7	72.5	
Visit 12 (<i>completers</i> , n=18)	88.3	21.7	
Difference between Baseline and Visit 12 (<i>completers</i>) (NOTE: Median =30.0)	5.8	69.0	>0.05
Weight (lbs)			
Baseline (n=34)	193.2	33.8	
Visit 12 (<i>completers</i>)	198.6	40.0	
Difference between baseline and visit 12 (<i>completers</i> , n=18)	-1.8	2.3	0.0074
Body Mass Index (kg/m ²)			
Baseline (n=34)	34.4	5.8	
Visit 12 (n=16, <i>completers</i>)	35.1	6.5	0.0102
Difference between Baseline and Visit 12 (<i>completers</i>)	-0.3125	0.43	
HbA1C (%)			
Baseline (n=34)	8.3	0.7	
Visit 12 (n=16, <i>completers</i>)	8.1	0.6	
<i>Among completers</i>			
Difference between Baseline and Visit 12 (<i>completers</i>)	-0.375 ^b	0.43	0.0035

Figure 1: Comparison of average number of minutes of weekly exercise over 12 weekly visits among 16 adults participating in a diet and exercise lifestyle modification coaching program to improve diabetes outcome



(Microsoft, n.d.)

Diabetic Knowledge

Overall, univariate statistics suggested that participants showed knowledge about diabetes at the pre-test and post-test (Table 3). The post-test was completed at the FQHC on week 13. Specifically, participants showed DKQ-24 scores that were statistically significantly greater than 0 at baseline and visit 13, using Student’s t-test ($H_0: \mu=0$, $p\text{-values}<0.001$) (Table 3). More important, knowledge improved, on average, across the intervention period. The mean and median DKQ-24 difference scores were closely approximated and positive, and a test of the hypothesis that there was *no change* in knowledge ($H_0: \mu=0$) suggests there was a statistically significant improvement ($p<0.001$) (Table 3).

We evaluated whether the change is associated with education, sex, age, and exercise and the difference in DKQ-24 scores measured at baseline and visit 13 using Student’s t-test. While participants with greater than the average education showed higher pre-intervention DKQ-24 scores (16.8 vs. 15.5, $p=0.03$), the change in DKQ-24 scores was not statistically significantly different for education level of *program completers* ($p>0.05$). Sex, age, and change in reported exercise (minutes/week) were not associated with change in diabetes knowledge (the DKQ-24 scores) among *completers* ($p\text{-values}>0.05$).

Table 3: Comparison of diabetic knowledge (DKQ-24) among participants in a 12-week diet and exercise lifestyle modification intervention at a community clinic

Characteristic	Measure			
	Mean	Standard Deviation	Median	<i>p</i>
Diabetic Knowledge Questionnaire, (DKQ-24)				
Baseline	16.24	1.88	16	
Visit 13	20.5	1.15	20	
Difference between baseline and Visit 13 scores	4.94	2.17	5	<0.0001

Discussion

Low health literacy decreases the efficacy of information gathering and negatively affects personal health and treatment in ways that lead to disease complications. Specifically, a systematic review showed mortality risk for people with measurable low-health literacy using 1 of 4 validated tools was 1.25-fold higher than otherwise similar adults with moderate to high health-literacy skills (Fan et al., 2021). This DNP project shows potential for improved diabetes knowledge for poorly educated, economically struggling Hispanic adults with T2DM. Unlike Fan et al. (2021), we employed years of education as proxy for functional health literacy. Some data suggest a standardized tool to identify low health literacy would improve the clinic's ability to employ evidence-based methods that improve health for low health literacy populations (Fan et al., 2021). In this target clinic, providers perceive that the majority of patients have low health literacy. Estimating the prevalence of low health literacy may support staff training on communication skills and new outreach strategies that engage patients effectively.

Coaching has been shown effective in several disease-affected populations. For example, DeWalt et al. (2006) suggests that coaching for lifestyle modification for diet and exercise works especially well for adults with low health-literacy and heart failure. Further, weekly health coaching for people living with dementia and their caregivers decreased emergency room visits, and increased quality of life and mood, while decreasing caregiver burden in comparison to otherwise similar people that were given usual and customary care (Possin et al., 2019). Our findings are similar to these published studies. Specifically, we showed that weekly health coaching improved diabetes knowledge population and fostered weight loss in a short three-month period. Both are hallmarks of potential health improvement in this poorly educated group of Hispanic adults. Thus, weekly coaching intervention may be highly beneficial in this

population. Education with telephonic coaching promotes positive lifestyle changes among patients struggling with significant disease and among people with low literacy (DeWalt et al., 2006; Possin et al., 2019).

Measuring knowledge may be important to understanding improved self-care management. Many investigators have employed relatively short knowledge tests to evaluate outcomes of diabetes education programs. For example, Ruiz et al. (2016) employed *Escala de Conocimientos Sobre la Diabetes (ECODI)*, a validated 25-item Spanish-language questionnaire, to assess T2DM disease, treatment, complication prevention knowledge among Hispanic adults. After six months, knowledge improved an average of 4.46 points (of 25) over the baseline visit (Ruiz -Gonzalez et al., 2016). Castillo et al. (2010), utilized the DKQ-24 as part of an eight-week educational intervention providing 17 hours of instruction in English or Spanish found a 4.22 point improvement from the pretest to the post-test ($p < 0.001$). Our observation of an average 4.94 point (of 24) improvement in knowledge is in keeping with the positive findings reported by these other investigators.

The use of an evidence-based education program with weekly telehealth coaching may motivate patients with T2DM to more actively participate in their healthcare. Support, involvement, and education of clinic staff will enhance project sustainability and include a higher patient population to employ T2DM education and weekly coaching.

CHAPTER SIX: DISCUSSION

Implications for Practice and Research

Weekly coaching has been demonstrated benefits for other diseases, such as hypertension, cardiovascular disease, including stroke, heart failure, and for people living with dementia and their caregivers. The high frequency of cardiovascular disease among people with

T2DM makes these findings of similar interventions applied to people with cardiovascular disease relevant (Einarson et al., 2018). For example, study of adults with systolic hypertension, 33% of whom were living with diabetes, employed a scripted telephone coaching intervention and found a strong positive association between the number of coaching *visits* and systolic blood pressure reduction after 24 weeks (Margolius et al., 2012). Specifically, when divided into tertiles, subjects showed greater mean reductions in systolic blood pressure as coaching visits increased: 17.2 mmHg (1 to 5 visits), 21.6 mmHg (6 to 12), and 25.9 mmHg (>12) (p=0.008) (Margolius et al., 2012). A different multi-month heart failure educational coaching intervention employing written materials and weekly telephonic coaching showed higher knowledge overall, and reduced risk for hospitalization or mortality at one year among adults with (measurable) low health literacy (DeWalt et al., 2006). Possin et al. (2019) report telephonic coaching for education, support, and care coordination resulted in overall improvement in rates of emergency department visits (lower) as well as higher quality of life scores for people living with dementia and their caregivers.

Diabetes education programs with weekly coaching for low-literacy Hispanic adult patients in primary care clinics may improve overall clinical management. An education program that is led by a nurse and offers weekly coaching for low-literacy Hispanic adults with T2DM may eliminate barriers to diabetes self-management. Nonetheless, to sustain these gains, we must further improve the intervention and focus on the fiscal feasibility of the model. First steps include codifying, testing, and incrementally modifying the weekly coaching script so that a staff member may be trained to provide coaching under the supervision of a nurse. A program that trains health promoters, *promotores de salud*, may improve the fiscal sustainability of this project in comparison to an APRN-administered coaching program. Within the target FQHC,

diabetes classes and telephone coaching were previously implemented by a Registered Dietician. Alternatively, healthcare providers who are already assigned a day each week for telehealth appointments could be trained to implement coaching in these weekly (telehealth) visits. Training providers to employ coaching offers two beneficial bridge effects: enhanced provider skills to provide individual coaching *and* a training period that bridges between provider administration and *promotores* training. Collectively, these combined approaches may make the program sustainable and improve health outcome simultaneously.

Employing the Plan-Do-Study-Act (PDSA) quality improvement process to enhance the health of this clinic population is important to the public's health (Clarkson, 2021). For example, sequentially designed, evaluated, and modestly redesigned coaching interventions for Hispanic adults with T2DM and low health-literacy will focus the care team on workable solutions for *this* population. The benefit of a successful coaching intervention could significantly improve the health, longevity, and well-being of Hispanic people with T2DM in South Los Angeles.

Limitations

A major limitation of this study is the small sample size (34 participants) *and* our high loss to follow-up. Some losses may have been related to nonadherence to diabetes self-care recommendations. Some may have refused the telehealth visits scheduled by the medical assistants over the 12-week follow-up period. Future PDSA cycles might best include electronic templates that nudge providers to record information relevant to quality improvement. For example, Chen and colleagues (2022) suggest gentle *EMR persuasion* that provides education that is easily implemented through standing orders and easy access to evidence-based guidelines may improve adherence. Additionally, *EMR nudges* that request rationale for non-adherence to recommended care, including patient refusal, may improve care *and* documentation (Chen et al.,

2022). For example, we found that some participants deferred one or more coaching calls. Currently, EMR entries of refusal or multiple unanswered calls are recorded in a narrative format that is difficult to analyze for quality-improvement purposes. Some care-related barriers may have complicated our interpretation of these findings. While most patients at this clinic have a payment source (e.g., health insurance, including Emergency MediCal), some care may be interrupted when insurance programs change, or a patient is dropped from coverage.

CONCLUSION

From the outset, we identified an intervention that was trialed in relevant populations to support behavior change. We evaluated weekly coaching using telehealth calls to improve diabetes education and self-care using diet and exercise lifestyle modification for a sample of Hispanics with T2DM and low health literacy. In addition, our goal was to decrease periodic measurements of HbA1c (%) and BMI (kg/m²). Overall, patient knowledge on T2DM was increased and HbA1c (%) and BMI (kg/m²) measurements were decreased by the end of the study, indicating further evidence that education with weekly coaching supports healthier lifestyle changes. Future studies indicate developing quality improvement programs that promote healthy lifestyle for Hispanic adults with low-income who may lack support for healthy lifestyle choices. DNP-prepared APRNs can be leaders in educating affected patients *on the ground* and collaborating with other healthcare providers in clinics serving low-income Hispanic patients with T2DM.

APPENDICES

Appendix A: Weekly Meal Planning for Diabetics



Meal Planner

Week of: _____

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast							
Lunch							
Dinner							

(ADA, 2021)

Appendix B: Blood Glucose Log

Blood Glucose Log

Week of _____



before meal



after meal



Insulin/meds



bedtime



DAY	BREAKFAST			LUNCH			DINNER			SNACK/ OTHER	BED	
Mon												
TIME												
Notes:												
Tues												
TIME												
Notes:												
Wed												
TIME												
Notes:												
Thurs												
TIME												
Notes:												
Fri												
TIME												
Notes:												
Sat												
TIME												
Notes:												
Sun												
TIME												
Notes:												



Visit diabetes.org or call 800-DIABETES (800-342-2383) for more resources from the American Diabetes Association.

(ADA, 2021)

Appendix C: Diabetes Knowledge Questionnaire – DKQ-24

Spanish-language diabetes knowledge instrument

APPENDIX—Diabetes Knowledge Questionnaire

Preguntas

Si (Yes) No No se (Don't know)

Item # Questions Yes No I don't k

- 1. El comer mucho azúcar y otras comidas dulces es una causa de la diabetes.**
1. Eating too much sugar and other sweet foods is a cause of diabetes.
- 2. La causa común de la diabetes es la falta de insulina efectiva en el cuerpo.**
2. The usual cause of diabetes is lack of effective insulin in the body.
- 3. La diabetes es causada porque los riñones no pueden mantener el azúcar fuera de la orina.**
3. Diabetes is caused by failure of the kidneys to keep sugar out of the urine.
- 4. Los riñones producen la insulina.**
4. Kidneys produce insulin.
- 5. En la diabetes que no se está tratando, la cantidad de azúcar en la sangre usualmente sube.**
5. In untreated diabetes, the amount of sugar in the blood usually increases.
- 6. Si yo soy diabético, mis hijos tendrán más riesgo de ser diabéticos.**
6. If I am diabetic, my children have a higher chance of being diabetic.
- 7. Se puede curar la diabetes.**
7. Diabetes can be cured.
- 8. Un nivel de azúcar de 210 en prueba de sangre hecha en ayunas es muy alto.**
8. A fasting blood sugar level of 210 is too high.
- 9. La mejor manera de checar mi diabetes es haciendo pruebas de orina.**
9. The best way to check my diabetes is by testing my urine.
- 10. El ejercicio regular aumentará la necesidad de insulina u otro medicamento para la diabetes.**
10. Regular exercise will increase the need for insulin or other diabetic medication.
- 11. Hay dos tipos principales de diabetes: Tipo 1 (dependiente de insulina) y Tipo 2 (no-dependiente de insulina).**
11. There are two main types of diabetes: Type 1 (insulin-dependent) and Type 2 (non-insulin-dependent).
- 12. Una reacción de insulina es causada por mucha comida.**
12. An insulin reaction is caused by too much food.
- 13. La medicina es más importante que la dieta y el ejercicio para controlar mi diabetes.**
13. Medication is more important than diet and exercise to control my diabetes.
- 14. La diabetes frecuentemente causa mala circulación.**
14. Diabetes often causes poor circulation.
- 15. Cortaduras y rasguños cicatrizan más despacio en diabéticos.**
15. Cuts and abrasions on diabetics heal more slowly.
- 16. Los diabéticos deberían poner cuidado extra al cortarse las uñas de los dedos de los pies.**
16. Diabetics should take extra care when cutting their toenails.
- 17. Una persona con diabetes debería limpiar una cortadura primero yodo y alcohol.**
17. A person with diabetes should cleanse a cut with iodine and alcohol.
- 18. La manera en que preparo mi comida es igual de importante que las comidas que como.**
18. The way I prepare my food is as important as the foods I eat.
- 19. La diabetes puede dañar mis riñones.**
19. Diabetes can damage my kidneys.
- 20. La diabetes puede causar que no sienta en mis manos, dedos y pies.**
20. Diabetes can cause loss of feeling in my hands, fingers, and feet.
- 21. El temblar y sudar son señales de azúcar alta en la sangre.**
21. Shaking and sweating are signs of high blood sugar.
- 22. El orinar seguido y la sed son señales de azúcar baja en la sangre.**
22. Frequent urination and thirst are signs of low blood sugar.
- 23. Los calcetines y las medias elásticas apretadas no son malos para los diabéticos.**
23. Tight elastic hose or socks are not bad for diabetics.
- 24. Una dieta diabética consiste principalmente de comidas especiales.**
24. A diabetic diet consists mostly of special foods.

(Garcia et al., 2001)

Appendix D: Weekly Script for Education plus coaching

This script will be read by the APRN (myself) each week during a preferred patient afternoon/evening. This may occur either during a weekday or a weekend day of which the patient prefers to be called each week. The topics will be focused on the American Diabetes Association (ADA) Standards of Care (2020; 2022).

Week 1: Discussion on Type 2 Diabetes

Today, we are going to focus more on what was learned in the slides during class.

- Was there anything new you learned? Tell me about it?
- Did anything surprise you? Tell me more about what did.
- Are you concerned about anything? Are you checking in?

Let's talk more about what T2DM is:

> It is irreversible unlike prediabetes

> Among patients with Type 2 diabetes, most have had the need to require medication, and while it is always possible that they may control their T2DM with their ideal weight, based on their height, and recommended exercise and diet (including alcohol intake), many people still need some medication management to keep their blood sugar in control.

- Blood sugar monitoring twice a day, once before breakfast, and once at night before bed, and medication adherence helps manage, not cure the disease
- The close association between T2DM and long-term risk for cardiovascular disease, including a heart attack or stroke, can be **managed** by improving exercise and adhering to dietary recommendations

- There is a good payoff to making changes. This leads to a longer and healthier lifespan

Week 2: Further Discussion on Type II Diabetes

Today we are going to talk about your T2DM symptoms, current lifestyle, and motivation to change. In your handout there are symptoms that are caused by high blood sugar. Let's talk about any symptoms you had when you were first diagnosed with diabetes.

Probe: Tell me more about the amount of water you drank each day? Tell me about any day you felt thirstier this week? Tell me about your diet this week? Tell me more about your hunger and there were times when you felt hungrier than normal? What were you doing? Tell me about your diabetes medication.... When did you take it ("Oh, I forgot and went off to work."), okay, tell me about your blood sugar reading that morning ("Oh I forgot..."), tell me about your blood sugar that day.

Tell me about your exercise schedule. How often do you exercise? What do you do for exercise? How long do you exercise for? Do you feel ready to make a change to your diabetes control? Do you have a good support group?

Advice prompts: (add in what you will do if they give you information that requires action)

Necessitate ED visit: symptoms of very high blood sugar: nausea, vomiting, blurred vision, palpitations

Necessitate contact with Primary Care (24-48h)

Routine follow-up

Note to file to review during next visit

Week 3: Discussion of glycemic target ranges, hypoglycemia, and hyperglycemia

(Introduce these things “for the next week, please pay attention to how you feel... (shaky, tremors, hungry, headaches” – look at your blood sugars and see if there is any link between how you feel and what your blood sugar measurement is...”) Today, we are going to discuss target blood glucose ranges as well as what is low blood sugar and high blood sure. We will discuss what to do if any of these were to occur,

We will also discuss things we can change to avoid complications and discuss further on what symptoms you might have depending on what blood sugar you have.

Let’s take a look at the goal thermometer on slide 6 which shows what ranges are normal, a cause of concern, and dangerous.

Let’s talk about what to do if you have blood sugars in each of those ranges

- Fasting blood sugar less than 70
- Fasting blood sugar greater than 200 and symptomatic
- Fasting blood sugar when glucometer is unable to read blood sugar

Week 4: T2DM complications – Microvascular Complications, Diabetic Retinopathy,

Neuropathy, Foot Care (ADA Standards of Care, 2020;2022)

Microvascular Complications: slowing progression of chronic kidney disease through:

- BP maintenance - take your BP meds, check your BP daily and maintain a BP log
- Taking ACE/ARB BP medications
- Checking urine protein at least once a year – follow up with your PCP to make sure your urine is checked at least once a year for protein in the urine. We want to slow progression of chronic kidney disease that is caused by long-term diabetes and high blood pressure. This is why blood sugar and blood pressure control are important.

Diabetic Retinopathy:

- Regular yearly eye exam
- BP control and cholesterol control

Neuropathy

- Regular foot care – wearing closed-toed shoes, checking feet for any wounds
- If numbness/tingling – blood sugar control
- Neuropathic pain – prescription medications – for example: Gabapentin, Lyrica, Duloxetine

Week 5: Medications taken for T2DM

Number one medication for T2DM: Metformin to protect your kidneys

- ACE/ARB for further kidney protection
- Cholesterol-reducing medications

Weeks 6 and 7: Physical Activity Recommendations

→ bracketing idea → start exercising early...every week on the things that are hard → coaching (2 minutes at the beginning to talk honestly about exercise → negotiate to “win” → end the coaching session with “recap” – what did we agree to.

- 150 min or more of moderate to vigorous-intensity aerobic activity per week
- Daily exercise diary or measurement device (e.g., even inexpensive smart phones can download a pedometer to measure step. Discuss their use of this over the past week? Did they set a goal? Did they meet that goal?)

Probe:

- What do you do for exercise? How much exercise do you do a day or each week?
- Do you tire easily? Do you get shortness of breath, chest pain, or palpitations?

- Do you use a smartphone or pedometer to count your steps when walking/running?
- Do you exercise alone or with someone for support?

Week 8: How to Read a Food Label.

- Recommended 500-750 kcal /day energy deficit
- Daily food diary
- Blood sugar log twice a day – once in the morning before breakfast and once before bedtime
- Allowing some days when they might have a few more calories such as a weekend day if blood sugar is well-controlled

Probes:

- Possibly, review their dietary log, explore about difficulties they face (e.g., working and taking breaks to eat, carrying, or having access or money for healthy food and snacks, fresh vegetables...
 - i. Discuss the recommendations

Week 9: Diet plans (MyPlate, Diabetes Plate Model, CDC recommendations) Let's discuss your weekly diet log

- Discussion of recommendations per ADA and CDC
- Discussion of different diet methods – MyPlate, Diabetes Plate, CDC recommendations of amount of foods
- Discussion of sugar content in drinks (soda, juices, energy drinks)

Probes:

- Do you find it difficult to obtain healthy foods? How often do you cook at home?
How often do you buy fast food? Tell me more about what you eat and how much you eat. Is your family also eating the same as you?
- Have you thought about ... binge *dieting* or binge *eating* – *what does that mean to you* (difference – negotiation -- > what are the things that you value)

Weeks 10: Assessment of comorbidities and how they can affect T2DM

Tell me what other health care issues have you been previously or recently diagnosed with?

- Are you taking medications for your other health issues? If so, what are they?
- Are you being followed by any specialists?

Blood pressure management and chronic kidney disease (CKD) prevention

- Have you even been diagnosed with high blood pressure?
- Are you taking any blood pressure medications or water pills? If so, what are they and how often do you take them
- BP log recommended

Week 11: Discussion of Psychosocial issues and Smoking

Today, we will follow up in your depression/anxiety screening and any referrals that have been made or discuss the effects of any medications that have been started and how are they helping you?

(Review/follow-up for emotional well-being)

- PHQ-9
- GAD-7
 - Providing empathic listening

- Provide stress reduction techniques – yoga, medication, take a walk, listen to music, spending time with family/friends
- Probe patient: suicide risk assessment
- Smoking cessation
- Referral if indicated

Week 12: Discussion of diabetes technology and closing; questions the patient may have

- How to use a glucometer
- How to use a blood glucose log or for self-management at home
- Exercise log through smartphone such as a pedometer

Type 2 diabetes: What is it?

*...And what I can do to
avoid diabetes complications*

CARINA GUERRA, MSN, APRN FNP-C

DNP student



March 17, 2022

Prediabetes vs Diabetes: What's the Difference?



A blood test, called "**Hemoglobin A1C**" ["**A1C**"] tells us how stable your blood sugar was over the last 3 months.

Prediabetes

A1C between 5.7% - 6.4%

Your **A1C** is higher than normal

- But not high enough to be called diabetes – yet!
- This can **lead to** diabetes - BUT

If you make lifestyle changes NOW, you can AVOID getting diabetes

Diabetes

A1C above 6.5%

- Your **A1C** is too high
- Your pancreas makes a hormone called **insulin**, which helps keep your blood sugar levels normal
 - Your body either **makes less insulin**, so it can't keep normal blood sugar levels, or **your body can't use insulin right**
- **You need to keep your A1C low, so it does not damage your body**



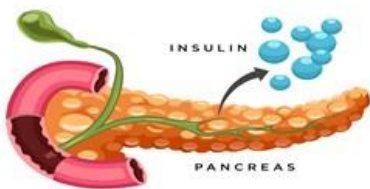
Signs of Diabetes



Type 1 vs. Type 2 Diabetes?

Type 1 Diabetes

Pancreas makes very little or no insulin.



You need insulin injections to live



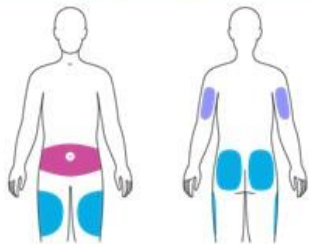
Type 2 Diabetes

Pancreas still makes some insulin, but your body might not be able to use it.

You may only need pills - **or** - sometimes insulin injections.



! If you inject insulin: Rotate sites! (Prevents scar tissue)



Is It Prediabetes or Diabetes ?

Shows how even your blood sugar was over the past 3 months



Lab Tests tell us:

Normal **Prediabetes** **Diabetes**

Test	Normal	Prediabetes	Diabetes
A1C	< 5.7%	5.7% - 6.4%	≥ 6.5%
Fasting Blood Glucose	70-100 mg/dL	100-125 mg/dL	> 126 mg/dL
Glucose Tolerance Test	< 140 mg/dL	140-199 mg/dL	> 200 mg/dL

Nothing by mouth overnight – get one blood test in morning

Nothing by mouth overnight – go to lab and drink glucose; blood is tested over 2 hours

Things we CAN change and things we CAN'T change

Things we CAN'T change ...
still put us at risk

- ✓ **Age:** 45 years old or older
- ✓ Certain **ethnic groups:**
 - African American
 - Hispanic/Latino
 - American Indian
 - Asian American
 - Pacific Islander
- ✓ An **immediate family member** has diabetes such as a mom, dad, brother, or sister
- ✓ You had "**gestational diabetes**" during pregnancy

Things we CAN Change
to decrease our risk

- ✓ Overweight or obese



- ✓ High blood pressure



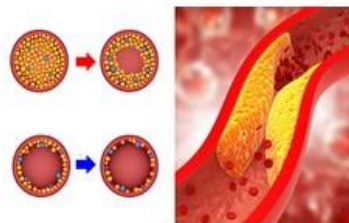
- ✓ Little or no exercise



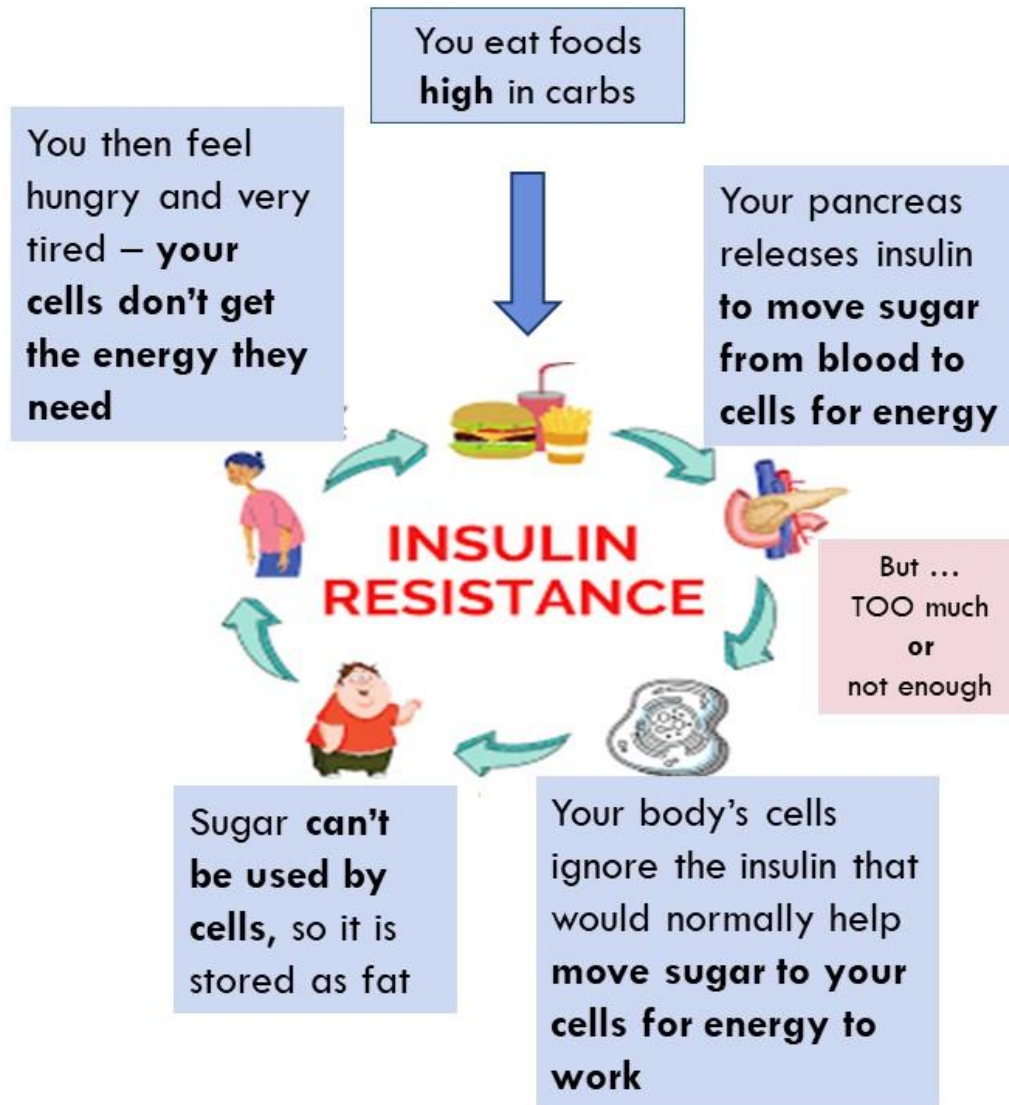
- ✓ Smoking



- ✓ High Cholesterol



What is “Insulin Resistance” and how does it affect me?



Are there symptoms to diabetes?

Most often:
**No
Symptoms**

But, as blood sugar increases, symptoms **may appear**



Symptoms can include:

Increased thirst



Need to pee more



Increased hunger



Feeling tired



Blurry vision



Medications

Medications depend on:

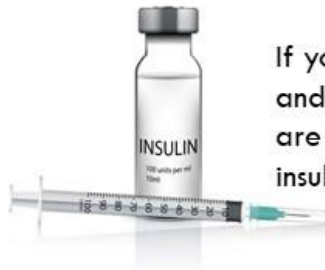
- your blood sugar control (A1c) - and -
- type of diabetes you have



Type 2 diabetes:
most common
medication is an oral
pill like **Metformin**



Type 1 diabetes:
you need insulin.



If you have type 2 diabetes and **your** blood sugar levels are too high, **you may need** insulin.



Insulin may be prescribed in a pen-form. **This may be** easier for you.

Best place for insulin is in the abdomen.
Remember to rotate injection sites!

Best treatment for type 2 diabetes is lifestyle change!



Exercise



Exercise
(every day)

Some Tips

- ✓ Doesn't have to be all at once - break it into 10- minute chunks
- ✓ **10,000 steps per day**
- ✓ Anything that gets you moving is good! Lots of things count !
- ✓ **Dance** while cooking – make it fun!
- ✓ Include your children, as a family
- ✓ **Brisk walking** – with friends, family
- ✓ **Make a PLAN** – get into a routine
- ✓ **START – SLOWLY** - increase your time if you are not active now

Recommended:	...so 5 days a week...
150 minutes/week (if Moderate)	30 minutes/day "easy to talk & exercise"
75 minutes/week (if More active)	15 minutes/day "harder to talk & exercise"

How much **physical activity** do you need?

Here are the American Heart Association recommendations for adults.



Fit in 150+

Get at least 150 minutes per week of moderate-intensity aerobic activity or 75 minutes per week of vigorous aerobic activity (or a combination of both), preferably spread throughout the week.



Move More, Sit Less

Get up and move throughout the day. Any activity is better than none. Even light-intensity activity can offset the serious health risks of being sedentary.



Add Intensity

Moderate to vigorous aerobic exercise is best. Your heart will beat faster, and you'll breathe harder than normal. As you get used to being more active, increase your time and/or intensity to get more benefits.



Add Muscle

Include moderate- to high-intensity muscle-strengthening activity (like resistance or weight training) at least twice a week.



Feel Better

Physical activity is linked with better sleep, memory, balance and cognitive ability. And less risk of weight gain, chronic disease, dementia and depression. It's one of the most important things you can do for your health and well-being.



Move more, with more intensity, and sit less.

Find out how at heart.org/movemore.

Diet – My Plate

Some Tips

- ✓ **Eat MORE** vegetables
- ✓ **Eat FEWER** carbs – at least half should be “whole grains”
- ✓ **Eat LEAN** protein – fish, chicken, turkey – LESS red meat
- ✓ **Drink more water** – no sugary drinks (Try to decrease one at a time)
- ✓ **Read Food Labels**
- ✓ **Watch your portion size** – eat less
- ✓ **AVOID** – fast food, chips, processed foods
- ✓ **AVOID** “added sugars”- often hidden in foods – and alcohol...
- ✓ Foods with “**Low glycemic index**” → best



½ plate non-starchy vegetables
 ¼ plate Lean Protein
 ¼ plate Grains or starchy vegetables



“High Glycemic Index”
 Cause high blood sugar spikes:
 Corn, Rice, White bread

“Low Glycemic Index” Cause lower blood sugar spikes, keep blood sugar normal

Heart Healthy Oils & Fats	AVOID these oils
Olive Oil	Lard
Canola Oil	Shortening
Peanut Oil	Butter

How to read a Nutrition Facts Label and how it can help with what I eat

The Nutrition Facts Label Look for It and Use It!

Information you need to make healthy choices throughout your day

Found on all packaged foods and beverages

Use it to compare foods!

Choose the foods that are high in nutrients to get more of, and low in nutrients to get less of.

If you consume more calories than you burn, you gain weight.

400 calories or more per serving is high; 100 calories per serving is moderate.

Calories

Check the serving size on food packages. The information listed on the Nutrition Facts Label is based on **one** serving. Servings are shown in common measurements like cups, ounces, or pieces.

Serving Size & Servings Per Container

2SERVINGS=CALORIESX2

Nutrition Facts	
Serving Size 1 package (272g) Servings Per Container 1	
Amount Per Serving	
Calories 300	Calories from Fat 45
	% Daily Value*
Total Fat 5g	8%
Saturated Fat 1.5g	9%
Trans Fat 0g	
Cholesterol 30mg	10%
Sodium 430mg	18%
Total Carbohydrate 55g	18%
Dietary Fiber 6g	25%
Sugars 23g	
Protein 14g	
Vitamin A	80%
Vitamin C	35%
Calcium	6%
Iron	15%

*Percent Daily Values are based on a diet of other people's secrets.

	Calories: 2,000	2,500
Total Fat	Less than 65g	80g
Saturated Fat	Less than 20g	25g
Cholesterol	Less than 300mg	300mg
Sodium	Less than 2,400mg	2,400mg
Total Carbohydrate	300g	375g
Dietary Fiber	50g	50g

Nutrients

+ Nutrients To Get More Of

Get 100% DV of these:

- Calcium
- Dietary Fiber
- Iron
- Vitamins A & C

- Nutrients To Get Less Of

Get less than 100% DV of these:

- Cholesterol
- Saturated Fat
- Sodium
- Sugars and Trans Fat are nutrients to get less of, but they have no %DV. Use grams to compare!

To meet these goals, eat a variety of foods, including:

- fruits and vegetables
- lean meats and poultry
- beans and peas
- whole grains
- eggs
- soy products
- fat-free or low-fat milk/ milk products
- seafood
- unsalted nuts and seeds

%DV When comparing nutrients in foods, use %DV.

%DV = Percent Daily Value

5% DV or less per serving is low

20% DV or more per serving is high

%DV is based on "Daily Values" – the amounts of nutrients recommended for Americans aged 4 and older to eat every day.

Nutrition Facts
Read the Label

www.fda.gov/nutritioneducation

Percent Daily Values on the Nutrition Facts Label are based on a 2,000 calorie diet; however, your Daily Values may be higher or lower depending on your calorie needs. Calorie needs vary according to age, gender, and physical activity level. Visit www.choosemyplate.gov to find your calorie needs.

CDC Recommends food portion control for diabetic and prediabetic patients

[1] Palm of hand (no fingers)

3 ounces of meat, fish, or poultry (= 3 "servings")

[2] Thumb (tip to base)

1 ounce of meat or cheese

[3] Fist

1 cup or 1 medium fruit

[4] Cupped hand

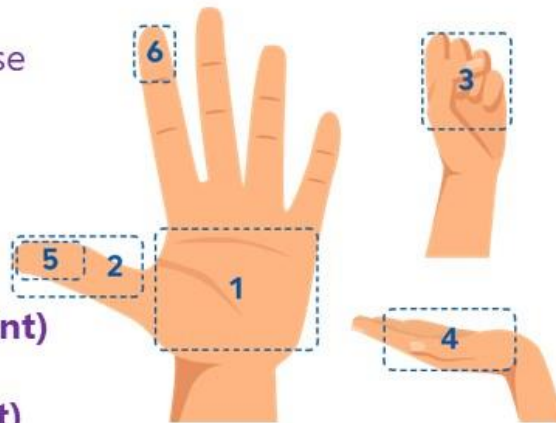
1–2 ounces of nuts or pretzels

[5] Thumb tip (tip to 1st joint)

1 tablespoon

[6] Fingertip (tip to 1st joint)

1 teaspoon



“Portions” are not the same as “Servings”

- ✓ We often eat LARGER portions than we should. Especially for GRAINS and STARCHY VEGETABLES...
- ✓ So, pay attention to how much you eat.
- ✓ Smaller portions may be the best way to lose weight!

How much sugar is in drinks?

How much sugar in your drink?



World Health Organization - recommends maximum **ADDED SUGAR** per day....

Women & older children:

25 grams/day
[~6 tsp]

Men:

38 grams/day
[~9 tsp]

Avg American:
17 tsp /day
(68 grams)

Drink Tap Water instead
0 Sugar

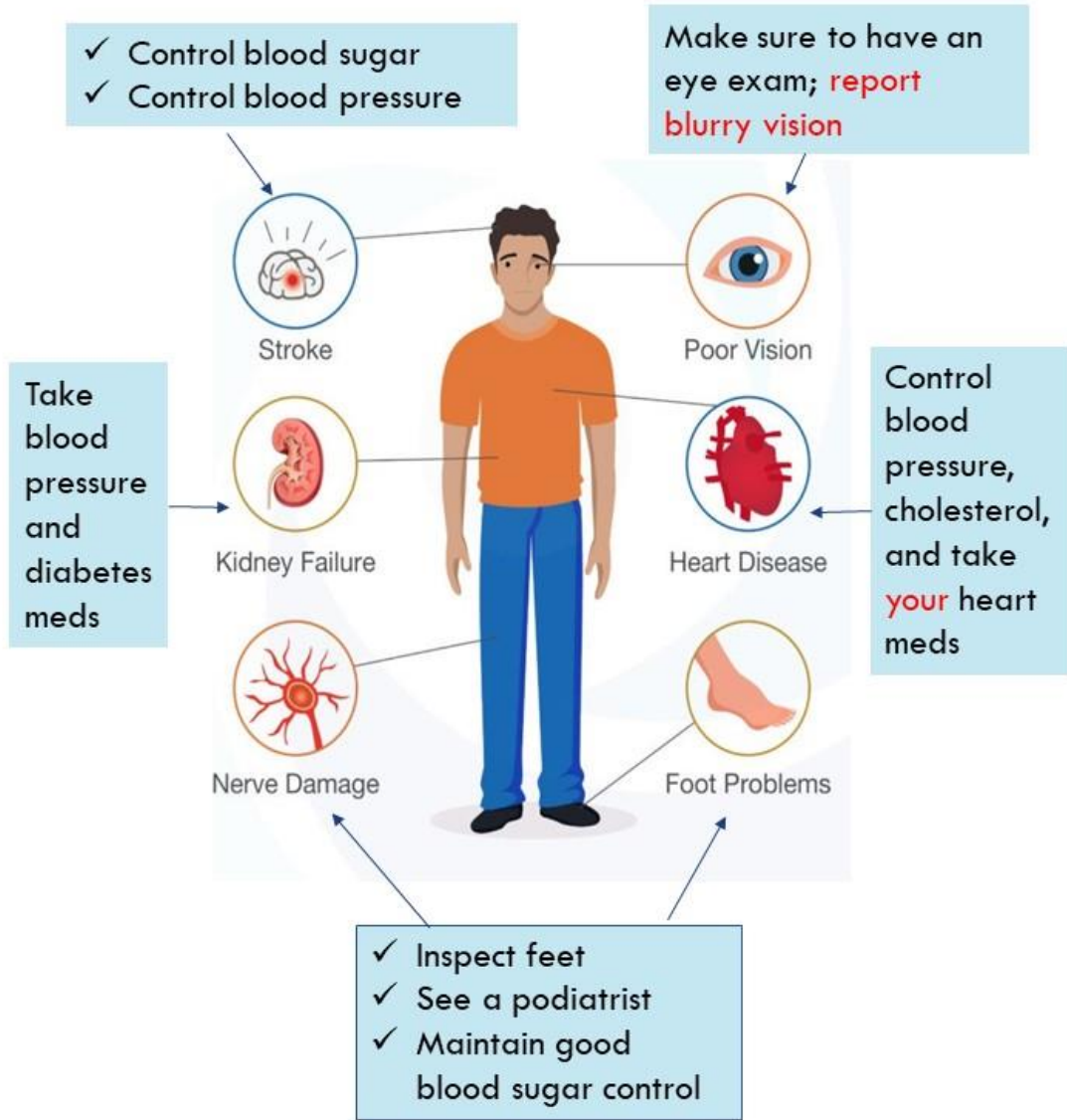
Best for teeth



- ✓ Check **serv**ing size (some have MORE than 1 serving!)
- ✓ How many **teaspoons** of sugar? Find **grams** of sugar and **divide by 4** (ex: 24 grams = 6 teaspoons)

Complications of Type 2 Diabetes

Many are preventable with good control of you blood pressure and your blood sugar!



Diabetes Tipo 2: Que es?

*...Y lo que puedo hacer para
evitar las complicaciones de la
diabetes*

CARINA GUERRA, APRN FNP-C

ESTUDIANTE DNP



Marzo 17, 2022

Prediabetes y Diabetes: Que es la diferencia?



Un examen que se llama **“Hemoglobina A1c [“HbA1c”]** nos dice que estable esta su azúcar sobre los últimos 3 meses.

Prediabetes

**HbA1c entre
5.7% - 6.4%**

Su A1c es más alto que lo normal:

- Pero todavía no es lo suficiente para ser diabetes
- Esto puede conducir a la diabetes - PERO

Si hace cambios en su estilo de vida ahora, puede evitar tener diabetes tipo 2.

Diabetes

**HbA1c
sobre 6.5%**

- Su **A1C** es muy alto
- Su páncreas hace una hormona que se llama **insulina**, que ayuda en mantener sus niveles de azúcar normalizados.
- Su cuerpo hace menos insulina con diabetes; **entonces no puede mantener su azúcar normalizada o su cuerpo no puede usar insulina correctamente**
- **Necesita mantener su A1c bajo para que no dañe su cuerpo**



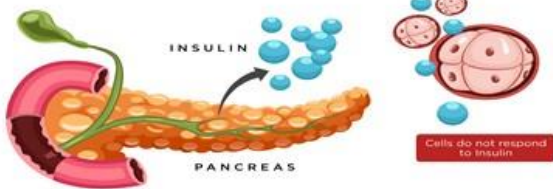
Signs of Diabetes



Tipo 1 contra Diabetes tip 2?

Diabetes Tipo 1

Pancreas hace muy poco o nada de insulina



Necesita inyecciones de insulina para vivir



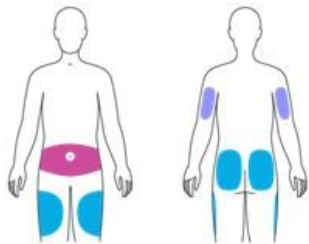
Diabetes Tipo 2

Pancreas todavia hace insulina, pero su cuerpo tiene dificultad en usarlo

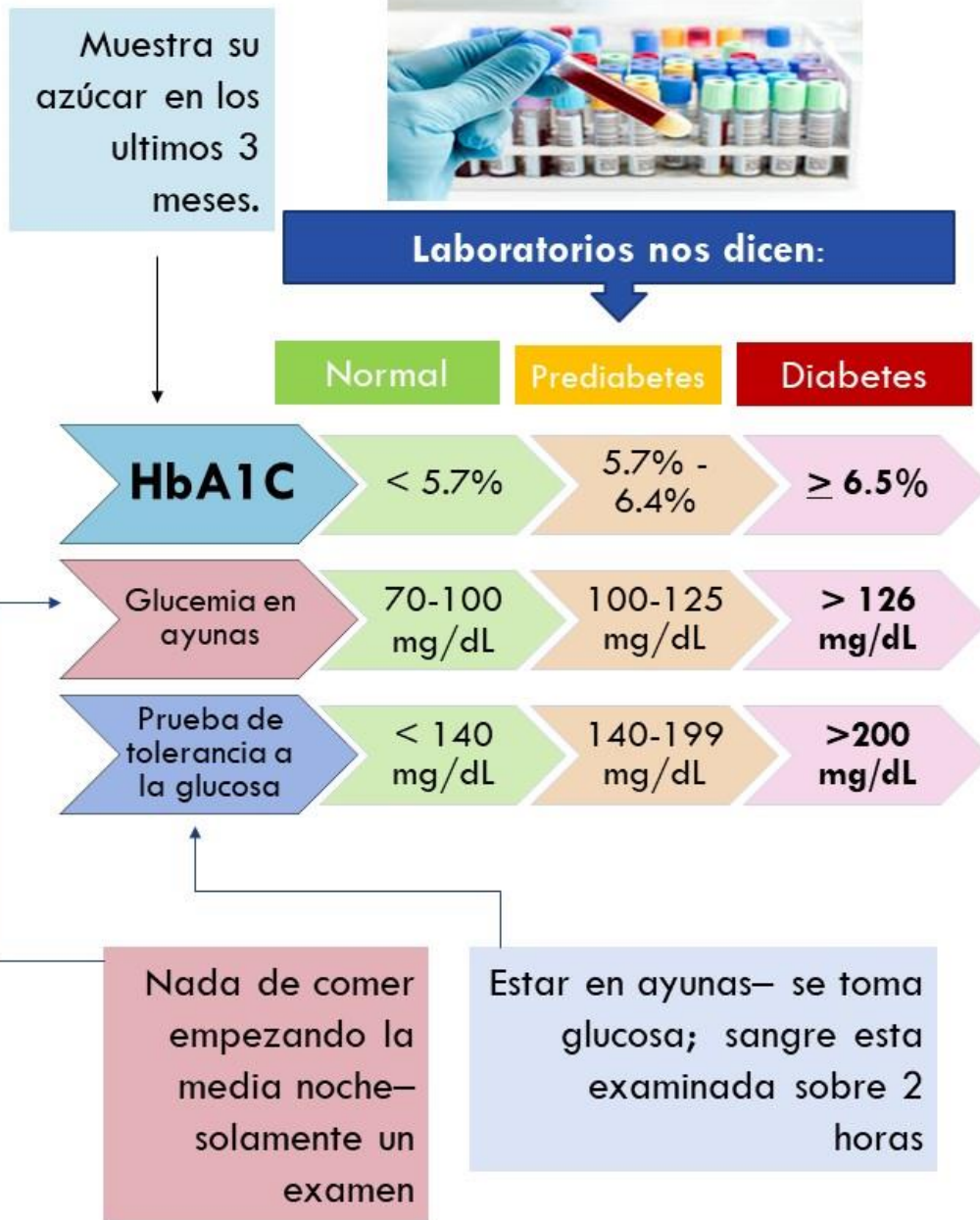
Usar solamente pastillos- o – si la azúcar no esta controlada, va necesitar insulina



! Si va usar insulina: Rotar sitios! (Previene el tejido cicatricial)



Es Prediabetes o Diabetes ?



Cosas que se pueden cambiar Y cosas que no se pueden cambiar

Cosas que no se pueden
cambiar...
Pero nos ponen a riesgo

- ✓ **Edad:** 45 o mas
- ✓ Ciertos **grupos etnicos:**
 - Africanos Americanos
 - Hispano/Latino
 - Nativos Americanos
 - Asianos Americanos
 - Isleño del pacifico
- ✓ Un **familiar directo** tiene diabetes como una mama, un papa, hermano, o hermana
- ✓ Tuvo "**diabetes gestacional**" durante su embarazo.

Cosas que es pueden hacer
para bajar el riesgo

- ✓ Sobre peso o obesidad



- ✓ Presion alta



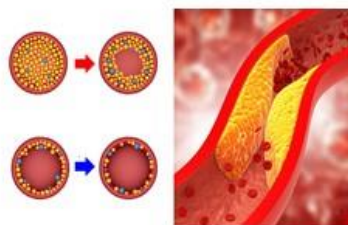
- ✓ Poco o nada de ejercicio



- ✓ Fumar



- ✓ Cholesterol alto



Que es “Resistencia de insulina” y como me afecta?



Ay síntomas con diabetes?

Normalmente:
**No hay
síntomas**

Pero, a medida que aumenta de azúcar en la sangre, **pueden aparecer síntomas.**



Síntomas pueden incluir:

Mucha sed



Necesidad de orinar



Mucha hambre



Azúcar alta

Fatiga



Vision borrosa



Medicamentos

Medicamentos dependen en:

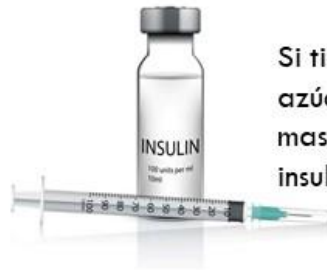
- Control de su azúcar (HbA1c) - y -
- Tipo de diabetes que usted tiene



Diabetes Tipo 2
medicamento mas comun es **Metformina**



Diabetes Tipo 1:
Se necesita insulina.



Si tiene diabetes tipo 2 y su azúcar esta muy alta (HbA1c mas de 10) pueda necesitar insulina.



Insulina puede ser recetada en forma de lapizero

Mejor lugar de insulina es el estomago. Se absorbe mejor.

Mejor tratamiento para diabetes es cambio de estilo de vida!



Exercicio



Hacer ejercicio
(cada día)

Algunos Consejos

- ✓ No tiene que ser todo a la vez- divídalo en partes de 10 minutos
- ✓ **10,000 pasos por day**
- ✓ ¡Cualquier cosa que te ponga en movimiento es buena! ¡Cuentan muchas cosas!
- ✓ **Bailar** mientras cocinas – hazlo divertido!
- ✓ Incluir a sus hijos, como una familia
- ✓ **Caminar a paso ligero**– con amigos y familia
- ✓ **Hacer un PLAN** – entrar a una rutina
- ✓ **EMPEZAR – DESPACIO** - aumente su tiempo si no está activo ahora

Recomendado:	...pues 5 días a la semana...
150 minutos/semana (Si Moderada)	30 minutos/día "facil de hablar y ser ejercicio"
75 minutos/semana (Si es más activo)	15 minutos/día "mas dificiil para hablar y ser ejercicio"



¿Qué cantidad de actividad física es necesaria?

A continuación, le presentamos las recomendaciones de la American Heart Association para personas adultas.



+150 min de ejercicio

Realice, como mínimo, 150 minutos de actividad aeróbica moderada o 75 minutos de actividad aeróbica intensa a la semana (o una combinación de ambas) y, preferiblemente, distribúyalas a lo largo de la semana.



Muévase más, siéntese menos

Levántese y muévase durante el día. Un poco de actividad física es mejor que nada. Incluso una actividad de poca intensidad puede compensar los graves riesgos que el sedentarismo tiene para la salud.



Aumente la intensidad

Lo mejor es realizar un ejercicio aeróbico de intensidad media-alta. Su corazón latirá más rápido y respirará con mayor intensidad de lo normal. A medida que se vaya volviendo más activo, aumente el tiempo o la intensidad para obtener más beneficios.



Gane músculo

Incluya actividades de fortalecimiento muscular de intensidad moderada-alta (como resistencia o entrenamiento con pesas) al menos dos veces a la semana.



Siéntase mejor

La actividad física está relacionada con una mejora del sueño, la memoria, el equilibrio y la capacidad cognitiva, así como con un menor riesgo de sobrepeso, enfermedades crónicas, demencia o depresión. Se trata de una de las decisiones más importantes que puede tomar para su salud y bienestar.



Muévase más, de manera más intensa, y siéntese menos.

Descubra cómo en [heart.org/movemore](https://www.heart.org/movemore).

Dieta – Mi Plato

Consejos

- ✓ **Comer mas vegetales**
- ✓ **Eat menos carbohidratos**
- ✓ **Comer carne magra – pescado, pollo, pavo – menos carne roja**
- ✓ **Tomar mas agua**
- ✓ **Leer la etiqueta de informacion nutricional**
- ✓ **Watch your portion size – eat less**



$\frac{1}{2}$ plato de vegetales
 $\frac{1}{4}$ plat
 $\frac{1}{4}$ plato de granos



**Aceite y
gorduras
sanas**

Oliva
Canola
Mani

**No
saludable**

Manteca
Margarina

Como leer la etiqueta de infomacion nutricional

La etiqueta de Información Nutricional ¡Búscala y úsala!

Información que necesitas para tomar decisiones saludables a lo largo del día



Está en los envases de alimentos y bebidas



¡Úsala para comparar los alimentos!



Escoje los alimentos altos en nutrientes que debes consumir en mayor cantidad y bajos en nutrientes que debes consumir en menor cantidad.

Calorías

Si consumes más calorías de las que quemas, aumentas de peso.

400 calorías o más por porción es un contenido alto; 100 calorías por porción es un contenido moderado.

Tamaño de la ración y raciones por envase

Fijate en el tamaño de la ración en los envases de los alimentos. La información en la Etiqueta de Información Nutricional está basada en una porción. Las porciones se indican en medidas comunes como tazas, onzas o unidades.

¡Un envase puede contener más de una porción! Si comes múltiples porciones, también multiplicas las calorías y los nutrientes.

2PORCIONES=CALORÍASX2

Datos de Nutrición

Tamaño por Ración (228 g)
Raciones por Envase 2

Cantidad por Ración		Calorías de grasa 110	
Calorías 250			
		% Valor diario*	
Grasa Total 12g		24%	
Grasa Saturada 3g		6%	
Grasa Trans 3g		6%	
Coolesterol 30mg		60%	
Sodio 410mg		82%	
Carbohidrato Total 37g		74%	
Fibra Dietética 0g		0%	
Azúcares 5g		10%	
Proteínas 5g		10%	
Vitamina A		4%	
Vitamina C		2%	
Calcio		20%	
Hierro		4%	

* Los porcentajes de Valores Diarios están basados en una dieta de 2,000 calorías. Sus Valores Diarios pueden ser mayores o menores según sus necesidades calóricas.

	Calorías	2,000	2,500
Grasas totales	Menos de	65g	80g
Grasas saturadas	Menos de	20g	25g
Coolesterol	Menos de	300mg	300mg
Sodio	Menos de	2,400mg	2,400mg
Carbohidratos totales	300g	370g	
Fibra dietética	50g	80g	

Nutrientes

Nutrientes a consumir en mayor cantidad

Consumo el 100%VD de los siguientes:

- Calcio
- Fibra dietética
- Hierro
- Vitaminas A y C

Nutrientes a consumir en menor cantidad

Consumo menos del 100% VD de los siguientes:

- Coolesterol
- Grasa saturada
- Sodio

Los azúcares y las grasas trans son también nutrientes a consumir en menor cantidad, pero de los que no existe un %VD. ¡ÚNTE los gramos para compararlos!

Para alcanzar estos objetivos, **aliméntate de forma variada incluyendo:**

- frutas y verduras
- granos integrales
- leche y productos lácteos sin grasas o bajos en grasas
- carnes magras y aves
- huevos
- pescados y mariscos
- frijoles y chicharos
- productos de soja
- y frutos secos y semillas sin sal

%VD

Usa el %VD para comparar los nutrientes de los alimentos.

% VD = Porcentaje de Valor Diario.


El %VD está basado en los **Valores Diarios**; las cantidades de nutrientes que los estadounidenses de 4 años en adelante deben consumir cada día.

5% VD o menos por porción es bajo

20% VD o más por porción es alto

Información Nutricional

Lee la etiqueta



www.fda.gov/nutritioneducation

Los porcentajes de los Valores Diarios en la Etiqueta de Información Nutricional están basados en una dieta de 2,000 calorías; sin embargo, tus valores diarios pueden ser mayores o menores según tus necesidades calóricas. Las necesidades calóricas varían según la edad, el género y el nivel de actividad física. Visita www.choosemyplate.gov para saber cuáles son tus necesidades calóricas.

CDC Recomendaciones para cantidad de comida

[1] Palma de mano (no dedos)

3 onzas de carne, pescado, o pollo (= 3 "porciones")

[2] Pulgar (punta a base)

1 onza de carne o queso

[3] Un puño

1 taza or 1 fruta mediana

[4] Mano ahuecada

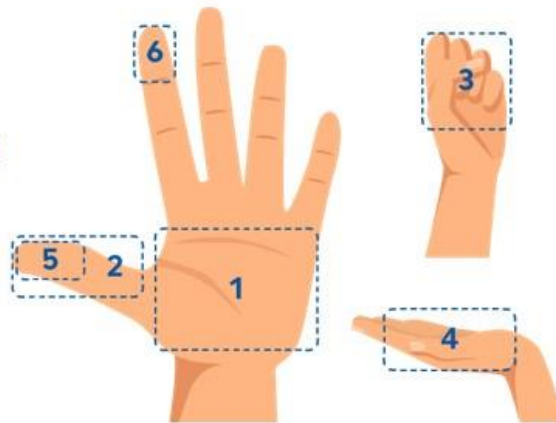
1–2 onzas de nueces o pretzels

[5] Punta de pulgar

1 cucharada

[6] Punta del dedo

1 cucharilla



- ✓ Normalmente comemos mas de la cuenta
- ✓ Pongan attention a lo que comen
- ✓ Porciones pequeñas el la mayor manera de perder peso

Cuanto azúcar hay en su bebida?

Cuanto azúcar hay en su bebida?



WHO recomienda
azúcar añadida
máxima por día...

Mujeres y niños
mayores: 25
gramos/day (~6
cucharaditas)

Hombres: 38
gramos/día (~9
cucharaditas)

Americano en
average: 68
gramos/día (17
cucharaditas)

Tomar agua
mejor en vez de
bebidas
con mucha
azúcar que
pueda hacerle
peor su salud.
-Mejor para
sus dientes

Leer etiquetas → - Verifique el tamaño de la porción
- Cuantas cucharaditas de azúcar? Buscar
gramos de azúcar y dividir por 4 (24 gramos = 6 cucharaditas)

Complicaciones de la Diabetes

Muchas son prevenibles con buena dieta y ejercicio!

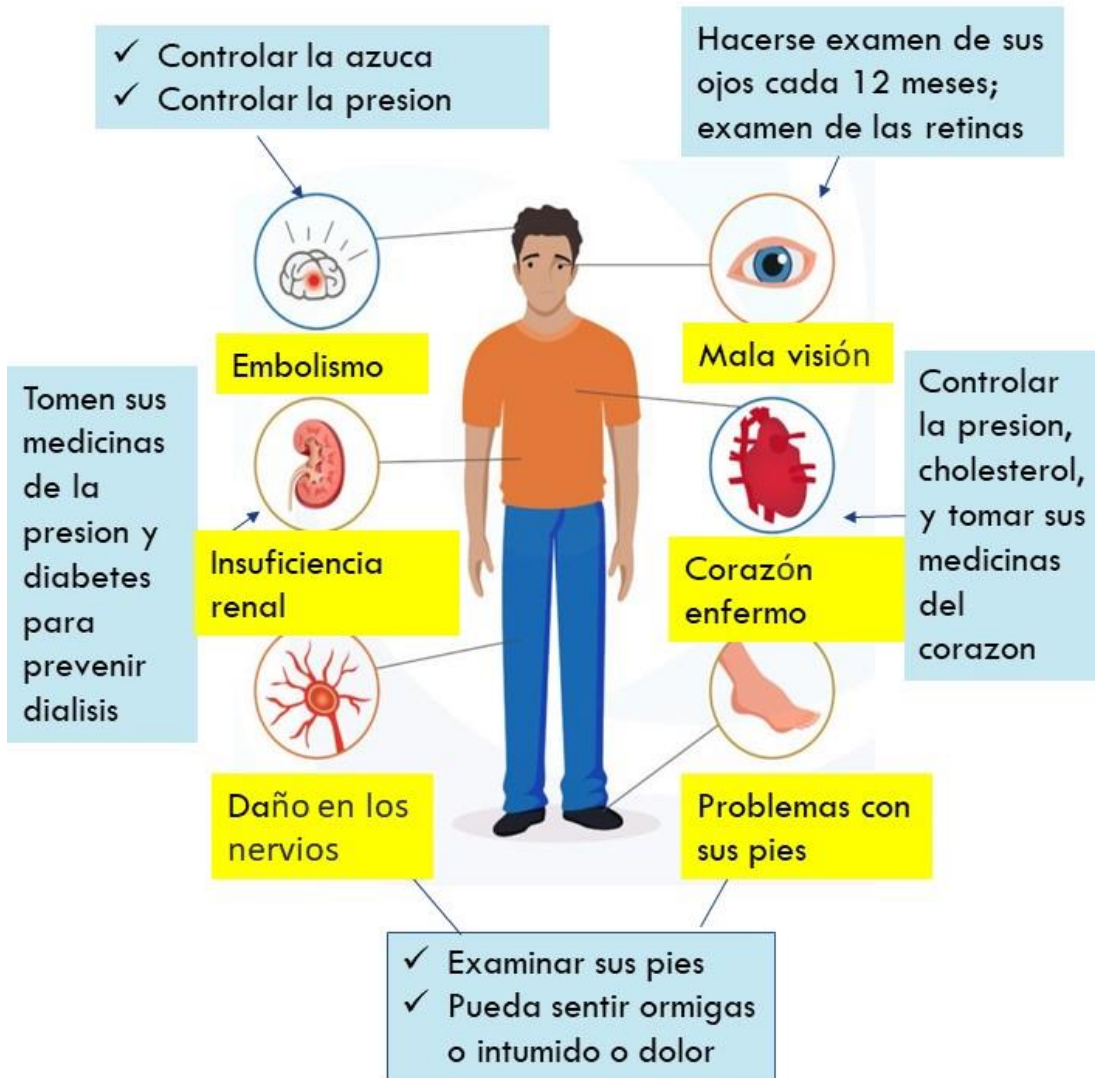


TABLE OF EVIDENCE

The care-related question for this project is: What is the effect of diabetes education combined with a nurse-led, telephonic coaching program in comparison to education plus telephone follow-up with provider referral for problems (*check in*), as the standard of care, on knowledge and lifestyle behaviors for T2DM-affected adults? For all participants, the outcomes of interest include improved HbA1c, body mass index (BMI using body weight (lbs.) and height (inches)), and T2DM knowledge measured at baseline and three months following the educational intervention for all participants. For telephone coaching participants, food consumption recorded using a daily (food) diary, self-administered point-of-care blood glucose (daily log) measured at baseline and throughout the three months of follow-up will be described.

Author, Year	Purpose	Sample & Setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Ruiz-Gonzalez, I., Fernandez-Alcantara, M., Guardia-Archilla, T., Rodriguez-Morales, S., Molina, A., Casares, D., & De los Santos-Rog, Macarena. (2016). Long-term effects of an intensive-practical diabetes education program on HbA1c and self-care. <i>Applied Nursing Research</i>, 31(2016), 13-18. http://dx.doi.org/10.1016/j.apnr.2015.12.008</p>	<p>implement an intensive, yet practical diabetes education program and to evaluate its long-term effects on HbA1c, technical knowledge, self-efficacy as well as to identify a decrease in overall BMI and LDL cholesterol</p>	<p>-40 adult Hispanics with Type 1 DM participated and attended to the outpatient clinic of San Cecily University Hospital in Granada, Spain. -Exclusion criteria included: 1) physical impairment 2) psychological impairment 3) recent diagnosis of DM</p>	<p>-Cross-sectional study, repeated measures design -All participants received a booklet prior to the education program that included all the questionnaires that would be asked of them -DM education sessions were 3 sessions conducted by a diabetes educator -included in sessions: illness, diet, exercise, insulin, & hypoglycemia. Also, self-care management. -Knowledge of DM was measures via the</p>	<p>-Results showed positive effects towards DM knowledge, self-care management, and self-efficacy -Participation in the DM education program was correlated with decreased levels of HbA1c at six-month and one-year follow-up; [F_{2,72}=15.61, p < 0.000], mean = 8.99 mmol/l (SD = 1.28) at pretest and 8.07 mmol/l (SD = 1.26) at one-year follow up, effect size $\eta^2 = 0.30$.</p>	<p>-There were no significant changes in factors related to cardiovascular risk (i.e., indices of total cholesterol and LDL cholesterol or BMI). These appeared to be related to participants' lifestyle, specifically with diet and physical exercise, which, did not significantly change after the DM education program. -To attain changes in the indicators associated with these variables it may be</p>

		4) not being a native Spanish speaker	<p>ECODI instrument which consists of 24 multiple-choice questions</p> <p>-Summary of DM Self-Care Activities (SDSCA) is a self-report measure of the frequency of DM self-care tasks</p> <p>Questionnaire on self-efficacy – 20 questions via Likert scale</p>	<p>-No changes noted on BMI or cholesterol within 6 months and 1 year</p> <p>-Self-efficacy, DM knowledge, and self-management showed a significant change that continued over time. The power of those tests was greater than 0.80.</p>	<p>necessary for DM education programs to include specific areas on teaching patients' skills that enable self-care in these particular areas.</p> <p>-The most problematic areas (diet and exercise) appeared to be the most difficult to change.</p>
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Author, Year	Purpose	Sample & Setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Castillo, A. C., Giachello, A., Bates, R., Concha, J., Ramirez, V., Sanchez, C., Pinsker, E., & Arrom, J. (2010). Community-based diabetes education for Latinos: The diabetes empowerment education program. <i>The Diabetes Educator</i>, 36(4), 586-594. DOI: 10.1177/0145721710371524</p>	<p>conduct a diabetes education program provided by community health workers (CHWs) in community settings and to evaluate its effectiveness in improving glycemic control and self-management skills in Hispanics/Latinos with T2DM.</p>	<p>-A total of 47 Hispanic/Latinos from Southeast Chicago communities who had a non-recent Dx of DM; aged 18 and older -Participants were identified via Health fairs and screenings; visits to schools, senior centers, and Young Men's Christian Associations (YMCAs) -Done within 2 community healthcare centers -CHWs were trained by research staff at the University of Chicago to provide education on DM self-management and HbA1c</p>	<p>-Qualitative Pretest-Posttest Research Design -3-month study -2-hour group sessions done each week over a span of 10 weeks -Education provided by CHWs -Education included: DM knowledge, self-care behaviors, depression, HbA1c, weight/BMI -DM knowledge was measured using the Diabetes Knowledge Questionnaire (DKQ-24) that provides true/false questions regarding DM, its diagnosis, complications, and treatment -Self-care was measured using the Summary of DM Self-Care Activities (SDSCA), which consists of 11-questions regarding healthy eating, physical activity, blood glucose testing, foot care, and smoking -Depression was measured via PHQ-9 -Self-efficacy was measured through the Diabetes Empowerment Scale-Short Form (DES-SF) consisted of</p>	<p>-Results showed a positive incline towards DM knowledge overall -Mean HbA1c dropped from 8.39 to 7.79. (p<.001) -DM knowledge increased overall (p<.000) -Levels of self-care (mean standard deviation pretest was done for each self-care activity, including following a healthy meal plan, spacing carbs throughout the day, 30 min of daily exercise, checking BG, feet, and compliance with meds; posttest mean standard deviation increased) and self-efficacy increased with a pretest mean standard deviation of 27.8 and posttest mean of 30.5 -Depression levels decreased from 8.15 mean standard deviation to posttest 6.2.</p>	<p>-Participants reported feeling upset that there were no future sessions stating that they enjoyed learning about diabetes -The males, in particular, enjoyed learning how DM affects the pathophysiology of the human body -Limitations non comparison group design, high attrition rate, and missing data from participants that did not complete their questionnaires completely -Future implications justify the need for future similar research with a larger sample size and a randomized controlled research design.</p>

			eight questions, rated 1-5, on self-efficacy -Height, weight, HbA1c, self-monitored glucose, and BP were obtained pre-and post study.		
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Author, Year	Purpose	Sample & Setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Azami, G., Soh, K. L., Sazlina, S. G., Salmiah, M. S., Aazami, S., Mozafari, M., Taghinejad, H. (2018). Effect of a nurse-led diabetes self-management education program on glycosylated hemoglobin among adults with type 2 diabetes. <i>J Diabetes Res.</i> 8,4930157. doi: 10.1155/2018/4930157. PMID: 30225268; PMCID: PMC6129337.</p>	<p>-to identify the effectiveness of a nurse led T2DM self-management education on HbA1c as the main outcome and blood pressure, body weight, and self-management behaviors as secondary outcomes.</p>	<p>-142 adults diagnosed with T2DM were randomized into either the control (72 adults) or intervention group (72 adults). -Medical records shows that all participants have an HbA1c of $\geq 8\%$.</p>	<p>-The control group received the standard T2DM care which consisted of 20-30 minutes of individualized education at three-monthly intervals; medication management, examination, and a pamphlet with T2DM information were provided during these meetings. -The interventional group would receive the standard T2DM care as well as a 12-week nurse-led T2DM self-management and education and motivational interviewing. This group obtained an information booklet that provided information regarding T2DM self-management, they were shown four 10-minute videos on T2DM self-management, participated in four weekly educational sessions in person, and</p>	<p>- Results showed that 21.1% of the participants in the intervention group obtained an HbA1c of less than 7% in comparison to no change in the control group at 24 weeks ($p < 0.001$).</p>	<p>-These calls provided motivational interviewing which aided participants in continuing their agenda on maintaining healthier lifestyle changes. Reflective listening, providing empathy in the discussion, and reinforcing positive lifestyle changes encouraged the interventional group to maintain effective lifestyle changes for the betterment of their T2DM</p>

			<p>received weekly telephone calls from the nurse.</p> <ul style="list-style-type: none">-The four weekly sessions were 120 minutes long and consisted of peer support, setting goals, and how to problem-solve.-After the group discussions were completed, the follow-up calls were initiated, lasting between 15-20 minutes each.		
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Author, Year	Purpose	Sample & Setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Brunk, D. R., Taylor, A. G., Clark, M. L., Williams, I. C., & Cox, D. J. (2017). A culturally appropriate self-management program for Hispanic adults with T2DM and low health literacy skills. <i>Journal of Transcultural Nursing</i>, 28(2), 187-194. DOI: 10.1177/1043659615613418</p>	<p>adapting a patient-centered educational intervention for T2DM self-management Hispanics with low health literacy skills.</p>	<p>- nine Hispanic adults from a rural community health center -Inclusion criteria included: Dx of T2DM, Spanish-speaking, 18-years old or older, and not pregnant -Setting took place in a rural community health care center that serves the underserved population.</p>	<p>-Descriptive Qualitative Research Design -Four weekly, 2-hour evening DM education classes provided in Spanish -Session 1: Intro and blood glucose-self monitoring with discussion on lifestyle change -Session 2: Low glycemic load diet -Session 3: Physical activity -Session 4: Review and putting everything learned together -The Patient-Centered Model of DM self-management was used for the DM educational sessions and pertained to 5 pertinent aspects to encouraging awareness of DM knowledge and lifestyle change. These include: 1) Cognitive – knowledge of the dx of DM 2) Attitudinal – readiness to change 3) Instrumental – skills attained to perform the lifestyle change</p>	<p>- Participants’ feedbacks were focused on four major themes: 1) info and knowledge about T2DM, 2) motivation and barriers to changing lifestyle behaviors 3) experiences with new self-management behaviors, and 4) personal responsibility for disease management. -Overall, the sessions brought out detailed discussions on personal and past experiences with regards to their diabetes -Patients gained knowledge and support from their peers to want to commit to making a change in lifestyle.</p>	<p>-Limitations include the possibility for biases related to participant self-selection and the fact that the Spanish-speaking group mediator also was one of the presenters. -Participants had a lower level of health literacy skills than expected, which provided difficulty in presenting the educational criteria as well as in collecting the qualitative data.</p>

			4) Behavioral – setting goals, coping, and problem-solving skills needed to maintain the lifestyle changes 5) Social – social support and utilization of needed resources to make and maintain the lifestyle changes.		
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Author, Year	Purpose	Sample & Setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Vaughan, E.M., Johnston, C. A., Cardenas, V. J., Moreno, J. P., & Foreyt, J. P. (2017). Integrating CHWs as part of the team leading diabetes group visits: A randomized controlled feasibility study. <i>The Diabetes Educator</i>, 43(6), 580-599. DOI: 10.1177/0145721717737742</p>	<p>assess the probability of incorporating Community Health Workers (CHWs) as part of the team leading diabetes group visits for a Hispanic population.</p>	<p>-A total of 50 Hispanic adults from a free community clinic in southwest Houston, Texas which consists of over 98% of Hispanic patients. -1/3 of patients have less than a High School degree. -Participants were referred to the study via provider, CHWs, and word of mouth -Criteria included: 1) Hispanic adults over the age of 18 2) Dx of T2DM or prediabetes</p>	<p>-Randomized Controlled Research Design -Two groups of 25 participants each (one control group that receives no intervention and continues regular follow-up with PCP and one intervention group that receives DM education session. -Baseline BP, weight, HbA1c, lipid panel obtained, then at 3 and 6 months -Experimental group received 3-hour, monthly education sessions. Education criteria: medical management, social support, and mental health -weekly f/u calls with research group only were made</p>	<p>-Overall reduction in HbA1c for in experimental group compared to control group within six months. -57.1% of the experimental group attained target HbA1c levels compared to 25% of the control group (P<.05). -There was an overall decrease in both systolic and diastolic BP in the intervention group compared to the control group -Minimal reduction in overall mean BMI (32.2) at 6 months compared to the control group at 6 months (34.6).</p>	<p>-ADA guidelines reveal that diabetes education is imperative for diabetes prevention for prediabetics and important for disease complications for diabetics. -Weekly contacts was helpful to address patient questions and concerns. -A major limitation is the short 6-month timespan of the study which is not enough time to assess clinical outcomes for a lifelong disease.</p>

Author, Year	Purpose	Sample & Setting	Methods/ Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>DeWalt, D. A., Malone, R. M., Bryant, M. E., Kosan, M. C., Corr, K. E., Rothman, R. L., Sueta, C. A., & Pignone, M. P. (2006). A Heart Failure Self-Management Program for Patients of All Literacy Levels: A Randomized, Controlled Trial [Isrctn11535170] . <i>BMC Health Services Research</i>, 6, 30. https://doi.org/10.1186/1472-6963-6-30</p>	<p>-To compare the effectiveness of a heart failure self-management program to usual standard-of care</p>	<p>-Participants included those between the ages of 30-80 - criteria included: being diagnosed with heart failure, patient is taking Lasix (Furosemide)</p>	<p>- Randomized trial that evaluated structured, tailored telephone coaching as the primary intervention (education plus coaching). - Control group received standard of care education from the primary care provider (PCP) along with a heart failure education pamphlet written at the seventh-grade level - the education plus coaching group received an initial one-hour educational session led by a clinical pharmacist or educator, and received the educational booklet designed for low-health literacy - Teach-back and brainstorming strategies were used with the education plus coaching group... -At 12 months, DeWalt and colleagues report a</p>	<p>- DeWalt. and colleagues (2006) report as many as eight telephone coaching calls in the first eight weeks, lasting 5 to 15 minutes, to motivate and reinforce self-care education. These approaches are embraced in <i>this</i> T2DM lifestyle modification protocol. A - at 12 months there is nearly three-fold lower rate of hospitalization or death among low-health literacy adults treated with education and coaching compared to the control group (Incidence Rate Ratio (IRR)=0.39, 95%CI: 0.16, 0.91). - At one year, knowledge as 12-percentage points higher for the education plus coaching group than measured among controls (95% CI: 6%, 18%; p<0.001). reporting systems used effectively by DeWalt and colleagues (2017)</p>	<p>- An intervention patterned to match the <i>education plus coaching</i> approach informs this T2DM-lifestyle quality improvement project and a weekly food diary and daily blood glucose monitoring mirror the reporting systems used</p>

			<p>nearly three-fold lower rate of hospitalization or death among low-health literacy adults treated with education and coaching compared to the control group (Incidence Rate Ratio (IRR)=0.39, 95%CI: 0.16, 0.91). At one year, knowledge as 12-percentage points higher for the education plus coaching group than measured among controls (95% CI: 6%, 18%; p<0.001) (DeWalt et al., 2006). An intervention patterned to match the <i>education plus coaching</i> approach informs this T2DM-lifestyle quality improvement project and a weekly food diary and daily blood glucose monitoring mirror the reporting systems used effectively by DeWalt and colleagues (2017) (Appendix A and B).</p>	
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Author, Year	Purpose	Sample & setting	Methods Design Interventions Measures	Results	Discussion, Interpretation, Limitation of Findings
<p>Possin, K. L., Merrilees, J. J., Dulaney, S., Bonasera, S. J., Chiong, W., Lee, K., Hooper, S. M., Allen, I. E., Braley, T., Bernstein, A., Rosa, T. D., Harrison, K., Begert-Hellings, H., Kornak, J., Kahn, J. G., Naasan, G., Lanata, S., Clark, A. M., Chodos, A., Gearhart, R., Ritchie, C., & Miller, B. L. (2019). Effect of Collaborative Dementia Care Via Telephone and Internet on Quality of Life, Caregiver Well-Being, and Health Care Use: The Care Ecosystem Randomized Clinical Trial. <i>JAMA Internal Medicine</i>, 179(12), 1658-1667. https://doi.org/10.1001/jamainternmed.2019.4101</p>	<p>Purpose is to detect whether the Care Ecosystem, a telephone and internet-based coaching system, is successful in meeting the needs of can improve outcomes for PWDs), caregivers, and payers.</p>	<p>512 participants were part of the Care Ecosystems group, and 268 participants were part of the usual care group.</p>	<ul style="list-style-type: none"> - Telephone-based dementia care in a collaborative approach - Team consisting of an APRN, social worker, and pharmacist. - Care plan protocols included immediate needs, medication reconciliation, safety screening, referrals, and caregiver education and well being, behavior management, and advanced care planning 	<p>- Results show that the Care Ecosystem enhanced PWD quality of life ($\beta=0.53$, 95% CI, 0.25 – 1.30; $p = 0.04$), decreased amount of emergency room visits ($\beta=0.14$, 95% CI: -2.15 to -0.13; $p = 0.03$), and decreased caregiver burden ($\beta=-1.90$, 95% CI: -3.89 to -0.08; $p = 0.046$) (Possin et al, 2019).</p>	<p>-Result support positive health outcomes with telephonic coaching to improve of quality of life for dementia-affected adults and their caregivers and holds promise for T2DM-affected adults.</p>

Note: BMI = Body Mass Index; LDL = low-density lipoprotein; DM = Diabetes Mellitus; ECODI = Escala de Conocimientos de Diabetes (Scale of Diabetes Knowledge); SDSCA = Summary of Diabetes Self-Care Activities; CHW = Community Health Workers; YMCA = Young Men's Christian Association; DKQ-24 = Diabetes Knowledge Questionnaire – 24; PHQ-9 = Patient Health Questionnaire-9; DES-SF = Diabetes Empowerment Scale-Short Form; BP = Blood Pressure; RN = Registered Nurse; T2DM = T2DM Mellitus; Dx = Diagnosis

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