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## Assessing Preventative Lifestyle Interventions in the Filipino-American Population to Decrease Risk of Type II Diabetes

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**Assessing Preventative Lifestyle Interventions in the Filipino-American Population to  
Decrease Risk of Type II Diabetes**

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Submitted in partial fulfillment of the requirements of the Nursing Department at Dominican  
University of California

2021

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## **Abstract**

### **Background**

Type II Diabetes is a concerning global health issue and must be addressed. Given the unfortunate risks of T2D in the Filipino populations, prevention efforts must begin in this select population. There is strong empirical support for utilizing lifestyle interventions such as nutrition and physical exercise to prevent these diseases in adults; but it is not clear whether the same holds true for Filipino populations.

### **Objective**

This thesis examines lifestyle management efforts such as weight reduction, family support, nutrition changes, and physical activity to prevent type 2 diabetes in Filipino-Americans.

### **Methods**

The methods of the thesis will present a literature review of primary research relating to preventative measures to decrease risk of T2D in the Filipino population. This paper will also include articles from the National Library of Medicine, randomized control trials, cohort studies, and nursing peer-reviewed journals to supplement content for Type II Diabetes lifestyle prevention. Also, the proposal will analyze which interventions benefit the two control groups through a T-test. It will analyze the pre and post outcomes of each lifestyle intervention.

**Keywords:** Diabetes, Risk factors, Lifestyle interventions, Filipino

#### Acknowledgments

I dedicate this paper to my family, Brando, Mildred, Zailea, Von, and Cebrina Flores. Thank you for all your love, support, and sacrifice.

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## Introduction

A nurse's role is to educate patients on preventative measures to help decrease risk of acquiring infectious, deficiency, hereditary, and physiological diseases. A significant chronic disease that may pose a significant health problem in younger individuals is Type II Diabetes. Therefore, due to the substantial causes of morbidity and mortality in having diabetes, nurses must make daily medical treatment decisions toward prevention. In the United States, diabetes is the seventh leading cause of death and the leading cause of kidney failure, pregnancy complications, blindness, foot amputation, and kidney failure (CDC et al 2017). With diabetes being a common metabolic disorder and high cause of death, several factors in diabetes prevention can greatly reduce incidence. The factors include diet modification, food preparation, physical activity, weight loss, and family support to name a few.

Type II Diabetes is a metabolic disorder caused by defective insulin secretion or inability of insulin-sensitive tissue to react to insulin. Being one of the major non-communicable, growing public health problems, it is also a medical condition difficult to treat, and expensive to manage. Asir et al (2014) states, "It has been estimated that the number of diabetes sufferers in the world will double from the current value of about 190 million to 325 million during the next 25 years" (p.1). With the high risk of developing a range of debilitating complications, it imposes important health and economic burdens. Genetic susceptibility, environmental influences, drastic increases of physical inactivity, obesity, and poor nutrition highlight the important factors responsible for the development of this health condition.

Therefore, this paper will investigate which preventative lifestyle measures such as diet and exercise are effective in preventing risk of type 2 diabetes in the Filipino-American population. Are health care teams effectively implementing preventative measures to help people reduce risk of T2D? Are they actually effective in describing the risks and benefits and what they need to do to take care of themselves? How do nurses implement prevention measures so that there is no bias or stigmatization of patients? What role does fats, carbohydrates, and proteins have in the management of type 2 diabetes? There is much research that needs to be done in the Filipino-American population to further learn the efficacy and ethical considerations of lifestyle changes in type 2 diabetes management. Further, there needs to be research on which lifestyle measures optimally lower the risk of developing type 2 diabetes.

### **Purpose Statement**

Few studies suggest that Filipino-Americans have an increased risk to develop Type II Diabetes. Filipino-Americans, an understudied population, have a high risk for obesity and metabolic dysfunctions (Huang et al., 2007). Little is known about the Filipino-Americans' risk for type II diabetes, considering the high prevalence. The research goal is to determine which preventative factors are optimal for type II diabetes prevention, perceived susceptibility, perceived severity, and self-efficacy toward the disease.

### **Research Question**

What role does lifestyle changes such as diet and exercise have in the prevention of type 2 diabetes in Older Filipino-Americans, and are there risks and benefits associated with particular approaches?

How effective are lifestyle changes contributing to decrease risk of Type II Diabetes?

Several sub-questions I hope to answer:

- Which risk factors increase risk of acquiring type 2 diabetes in Filipino-Americans?
- What is the prevalence of diabetes in the Filipino-American population?
- Are health care providers actually effective in describing the risks and benefits and what they need to do to take care of themselves?
- What role does fats, carbohydrates, and proteins have in the management of type 2 diabetes?

### **Literature Review**

The investigator explored the available literature related to the topic of study. The search terms included lifestyle prevention interventions, diabetes prevention, effects of lifestyle changes to decrease type 2 diabetes, and prevalence of diabetes in Filipinos. He found three themes within the literature: (1) Nutrition Management, Weight loss, and Physical Exercise; (2) Effect of Family Support to Prevent T2D; and articles that focus on the (3) Prevalence of Diabetes in Filipinos. The investigator was able to find connections to his own proposed research through

each article identified below. This information will help guide him in his study of preventative lifestyle changes to reduce risk of type 2 diabetes in Filipino-Americans. See literature review table for a summary of each article in Appendix A.

### **Nutrition Management, Weight loss, and Physical Exercise**

Uusitupa et al (2019) conducted a systematic review and meta-analysis of seven randomized control trials(RCT) of 4090 participants, predominantly middle-aged participants with glucose impairment. The purpose of the review was to determine whether lifestyle changes, diet, physical activity and early prevention of Type II Diabetes(T2D) would lower risk and prevent complications. Of the RCTs selected, the study-specific criteria of the groups included participants doing lifestyle interventions vs participants having no change in lifestyle modification. The seven RCTs used a 2 hour oral glucose tolerance test with a follow-up of 1-year to assess which lifestyle changes impacted diabetes management. Data extraction consisted of relevant data related to the topic which include: sample size, participant characteristics, study setting, monitoring habits, composition of diets, funding sources, and outcome data. To evaluate certainty of evidence in the systematic review, the GRADE approach was used. Although there were no major limitations of this review, there was only the issue of high heterogeneity.

In relation to my proposal of lifestyle interventions, the researchers found that, “The risk of T2D was 89% lower in individuals who were able to sustain weight loss of at least 5% over 3 years than in individuals without significant weight changes...Weight loss by means of a healthy diet with lower saturated fat intake, but rich in vegetables, fruit, and whole grain products is

beneficial in the prevention of T2D, especially when combined with physical activity” (Uusitupa et al 2019, p.13). Through the data obtained by this review, the strengths of this review alludes that weight loss is a significant factor in reducing risk of T2D. Weight loss is closely associated with changes in diet and physical activity. Diets that increase the risk of T2D include: consumption of processed and unprocessed red meat, white rice, high saturated fats, refined grains, and sugar-sweetened beverages. Whereas, optimal diets to decrease T2D risk and have cardiometabolic benefits include: green leafy vegetables, total dairy products, whole grains, moderate alcohol consumption, fruits rich in anthocyanin, legumes. The review explains the importance of lifestyle modification and recommends a diet moderate in fat, low in saturated fat intake, rich in fiber, whole grains, and fruit and vegetables, as well as a Mediterranean-type diet to decrease incidence of T2D (Uusitupa et al 2019).

Karlsen et al (2013) conducted a 1-year cohort study on predictors of weight loss under a residential intensive lifestyle intervention program (ILI). The sample included 200 participants who were morbidly obese and referred to a Norwegian rehabilitation center from public hospitals. The study was conducted from May 2006 to November 2010. Participants were all Caucasian with one participant leaving the program early, resulting in a sample size of 199. The participants consisted of 71% women, mean age of 45 years of age, and a body mass index of 42 kg/m<sup>2</sup>. The goal of the study is for participants to attain a weight loss of greater than or equal to 10% of the patient’s weight. Weight and body fat were measured by the Tanita Body Composition Analyzer TBF-310 in which weight is measured before breakfast, after urinating, and after a 20-minute walk. The study also used questionnaires such as the Obesity and Weight

Loss Quality of Life questionnaire, Weight Related Symptom Measure, and Medical Outcome study. All of the tools were deemed valid and reliable. Including several methods of data extraction was another strength of the study. The results of the study show that both male and females had substantial weight and fat loss. Also, women experienced an increase in emotional health related quality of life and a decrease in waist circumference. The limitations of the study include that the design was observational which minimizes ability to determine effects. Also, the lack of heterogeneity was found in that the participants were all Caucasian, limiting generalizability.

In relation to my thesis of lifestyle interventions, Karlsen et al (2013) states, “the between-person variances of weight loss following non-surgical weight loss programs vary greatly, suggesting such programs to be individualized rather than standardized” (p.7). The authors “found that personal factors like age, mental health-related quality of life (HRQL) and occupational status had a direct effect on 1-year excess weight loss (EWL)” (p.7). The study finds that significant determinants of weight loss are based on social and mental determinants. The social determinants include family support and follow-up visits with general practitioners. These factors hold patients accountable through the use of evidence-based care, education, and support. Mental determinants include self management of weight loss through the use of food diaries. Use of food diaries significantly showed high adherence by keeping the participants accountable for their lifestyle changes by use of a routine. Therefore, individualized programs rather than standardized programs influenced greater weight loss over a long term period.

Smith et al (2016) initiated a cohort study up to 675,496 people, with participants having cumulative type 2 diabetes incidence. The purpose of the study was to determine the prevalence of type 2 diabetes(T2D) associated with physical activity(PA) and amount of PA to lessen incidence of T2D. Follow-up time varied from 3 to 23.1 years and data extraction was through questionnaires and interviews. All information relied on self-reports, with 12 studies conducted in the USA, two in Australia, eight across Europe, and six in Asia. The strengths of the literature was the use of PA exposure dose in MMET h/week rather than MET h/week. This helped to ascertain that more intense physical activity harbored greater benefits in metabolic management. Limitations of this study include, high heterogeneity and self-reporting of physical activity behaviors. These factors may have distorted results due to diagnostic bias, different timeframes, and different units of physical activity.

In relation to my thesis of lifestyle interventions, Smith et al (2016) alludes that, “an activity volume which is commensurate with adherence to the current public health recommendations of 150 min of moderate to vigorous physical activity(MVPA) per week compared with sedentary individuals was associated with a reduction in the risk of type 2 diabetes by 26% (95% CI 20%, 31%) in the general population” (p.13). The literature states that inactivity increases the prevalence of diabetes. In fact, a sedentary lifestyle is associated with increased insulin resistance and poorer glycemic control. Therefore, physical exercise is a lifestyle intervention that allows the body to be more sensitive to insulin, keeping blood sugars under control. Moderate to vigorous exercise, helps one to manage diabetes or prevent incidence.

### **Effect of Family Support to Prevent T2D**

Vargas-Ortiz et al (2020) conducted a randomized control trial of six months and twelve month follow-up. The purpose of the study was to compare the impact of family support(FI) vs individual intervention(II) on T2D prevention. The sample included Mexican residents from Guanajuato state ages 18-60 years with the diagnosis of prediabetes as part of the University Cohort Project CARE-in-DEEP Study. The results show that patients who face the management to control glucose levels by themselves have poor blood glucose compliance. However, to influence continued medical compliance, family support is the causative factor to modify their lifestyle in diabetes prevention and management. In the study, there were significant dropouts out of the study due to change of address, new employment, and pregnancy. The low adherence was due to lack of availability or interest. Vargaz-Ortiz et al (2020) states, “Although some patients left the intervention due to specific causes such as pregnancy (one patient of the each group), change of address (one patient of the II group), new employment (one patient oh the FI group) and no localization (7 patients of the II group and 5 of the FI group), the highest proportion of drop-outs was due to lack of interest from the patients” (p.5). In fact, the low adherence of participants emphasized poor interest in diabetes prevention. Therefore, a key role in the metabolic control of the patients is family support. It provides a favorable environment that reduces stress and improves compliance. The strength of the study lies in the collection of anthropometric measurements, metabolic evaluation, and nutritional/physical activity questionnaires to assess the effect of lifestyle interventions. The limitations of this study include incomplete data on the change of caloric intake and physical activity of the participants at both

the 6 and 12 month follow up. Another significant limitation of the study was the high incidence of dropouts, reflecting lack of availability to invest time in health promotion and prevention of diabetes.

In relation to my proposal of preventative interventions, Vargas-Ortiz et al (2020) concluded that, “The family support on T2D management was associated with glucose levels < 140 mg/dl and improvements on metabolic outcomes. The family, as a universal social system, is the first contact with the patient and may have different influences. A lack or insufficient support from the nearest nucleus of the patient can predispose to metabolic decontrol by limiting or obstructing the adequate control and treatment of the disease. In the general population, there is a low adherence to treatment prescriptions and changes in lifestyle are extremely difficult sometimes due to lack of family support, which affects optimal control in patients with T2D” (p.2). At the six month follow-up, both groups of patients had significant improvements in all anthropometric measurements (height, BMI, waist circumference, and body composition). At twelve months, improvements continued to excel with the interdisciplinary family group (FI) and were lost with the individual group (II). Vargas-Ortiz states, “Family members of the FI group had improvements in triglycerides, total cholesterol, HDL and LDL, in contrast, lipid profile worsened in the II group; these improvements in total cholesterol ( $p = 0.01$ ) and LDL ( $p = 0.003$ ) were significantly better in the FI groups vs II group” (p.7). At 1 year of follow-up, family intervention influenced greater long term impact in improving lipid profile, body mass index, and anthropometric characteristics compared to individual intervention. In relation to my thesis, the presence of family support creates a favorable environment to optimize compliance in

diabetes management. Therefore, family support increases compliance with diabetes management.

### **Prevalence of Diabetes in Filipinos**

Fuller-Thomson et al (2017) conducted a population-based review based on quantitative research. The sample included 141,597 respondents over 18 years of age from 2007, 2009, 2011. There were 1,914 Filipino Americans and 92,703 non-Hispanic whites. The purpose of the study was to determine the prevalence of diabetes in non-obese Filipino Americans and determine risk factors in both men and women compared to non-Hispanic whites. To acquire data for the study, Fuller-Thomson et al (2017) gave a CHIS questionnaire to the participants. The results indicated that compared to non-Hispanic whites, Non-obese Filipino Americans had twice the odds of diabetes risk. Risk factors for non-obese Filipino men include: older age, poverty, cigarette smoking, and overweight. For Filipina women, old age was the only risk factor. The strengths of the study include the use of a population-based review and logistic regression analyses confirmed the high prevalence of diabetes in Filipino-Americans. Also, the use of the California Health Interview survey(CHIS), implemented random digit dialing to create population-based representative samples of Californian adults, decreasing bias. The limitations of the study include self-reports and lack of blood tests/chart review resulting in diagnostic and sampling bias.

In relation to the population of study in this thesis, Fuller-Thomson et al (2017) states, “In this representative community sample of non-obese Californians, the prevalence of diabetes among Filipino Americans was approximately three times higher than that of non-Hispanic

whites. Analyses conducted for the Filipino-only sample found that gender and poverty had a significant interaction” (p.4). The major risk factors are closely associated with health inequities. Poverty in any case may prevent one from seeking care and managing their conditions due to financial problems. Also, with financial problems, access to unhealthy nutrition may increase risk for disease such as diabetes. In the study, Fuller-Thomson et al (2017) adds that, “The prevalence of hypertension is very high among Filipino Americans” (p.6) This is largely due to poor nutrition and diets consisting of high salt contents such as traditional foods: fish sauce, fish paste, salted egg, and fried pork skin to name a few. Thus, high sodium intake increases risk of hypertension, heart disease, T2D, and stroke. Unhealthy diets may increase new onset of diabetes alongside other comorbidities. Therefore, cultural, sex-specific, socio-economic, and lifestyle factors increase prevalence of diabetes in Filipino-Americans.

Cuasay et al (2021) conducted a cross-sectional study in the Houston, Texas, metropolitan statistical area between September 1998 and March 2000. The sample included 831 Filipino-American participants aged 20-74 to determine the prevalence of diabetes and the risk factors that contribute to the disease. The major risk factors that were assessed include age, sex, family history of diabetes, socioeconomic status, obesity, acculturation, region of birth and history of gestational diabetes. To gather participants, posters and fliers were disseminated to local businesses by use of a convenience sample. In order to gather the information in their study, a questionnaire was developed to acquire health-related data and given to the Filipino-American community. Logistic regression analyses were used to calculate odds for each risk factor. The results of the study show that Filipinos are at greater risk of developing type 2 diabetes related to

determinants of age, family history, obesity, and low income. Strengths of this study was the use of posters and fliers to promote survey participation. The limitations of this study include use of a convenience sample and participation rate, leading to a participation bias/lack of representation.

In relation to the population of study in this thesis, Cuasay et al (2021) found that, “Type 2 diabetes prevalence rate of 16.1% was estimated from a convenience sample of Filipino-Americans in the Houston metropolitan statistical area (MSA)...In both populations, prevalence increased at every decade of life and was higher among individuals who were obese or with lower education” (p.2,3). The prevalence of diabetes in Filipino-Americans is vast in population with health inequities. Also, dietary patterns such as white rice consumption, insufficient sleep, and poor blood pressure management are significant risk factors that increase prevalence. The results show that Filipinos with comorbidities, unhealthy lifestyle behaviors, and inactive lifestyles may have diabetes in the future. Therefore, by seeing the high risk of diabetes in Filipinos, research must be conducted to implement interventions to decrease prevalence.

### **Literature Review Conclusion**

According to data collected during this literature review, lifestyle preventative interventions have been proven to have a positive outcome on people with risk and diagnosed with T2D. The studies found that individualized lifestyle interventions were found to improve patient outcomes. All articles showed improved glucose control, improvements in anthropometric measurements, and better health outcomes after lifestyle interventions were

implemented. Results showed promise for lifestyle preventative interventions as essential treatment for decreasing risk of T2D.

Further research is needed to study the long-term and short-term effects of lifestyle prevention interventions in Filipino-Americans. There is very little public health research on the rapidly growing population of Filipino-Americans and diabetes care/management. More research on the quality and types of lifestyle interventions plus effectiveness of interventions must be researched considering the high risk of diabetes in the Filipino-American population. Assessing dietary patterns, cultural factors that increase risk of diabetes, and having more research on Filipino-Americans and the high risks of diabetes, provides future researchers with data on diabetes risk in the Filipino-American population and which interventions most likely will decrease incidence.

Research on lifestyle preventative interventions shows that it can be applied to diabetes management but also to decrease risk of cardiovascular disease. The studies found in the literature review show promise for future research on figuring out how to promote awareness of the diabetes risk in this select population. Most importantly, positive outcomes from lifestyle prevention measures may easily and inexpensively influence implementation of therapies to decrease risk. This allows Filipino-Americans and other populations at risk to stray away from the expense of traditional methods of inpatient care. Lifestyle changes allow participants to target unhealthy behaviors, which strengthens health promotion and improves their quality of life.

### **Theoretical Framework**

Nola Pender, a widely renowned nursing theorist and educator, earned her Bachelor of Science in Nursing at Michigan State's School of Nursing. She is best known for her work in health promotion which is widely used in nursing research, education, and practice. Her research interests have focused on physical activity, adolescent health, health promotion and the factors that influence health behavior, and health behavior counseling (p.1). Nola Pender's influence in health promotion has helped nurses improve patient & client well-being with the use of positive health behaviors. The role of the nurse in the health promotion model is to assist the client in changing behaviors to achieve a healthy lifestyle. Her introduction of health promotion techniques into mainstream society has served as a foundation to promote well-being with healthy lifestyles.

A theoretical framework that supports preventative lifestyle interventions in T2D includes Nola Pender's theoretical framework of health promotion. Pender defines health as, "a positive dynamic state nor merely the absence of disease" (Parveen, 2021, p.3). Pender's ideology of health promotion is based on the individual and the behaviors they choose. The individual's way of life can either decrease or increase risk for disease. Therefore, the theoretical framework of health promotion emphasizes different major concepts which include: "Individual characteristics and experiences (prior related behavior and personal factors), Behavior-specific cognitions and affect (perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences), and Behavioral outcomes

(commitment to a plan of action, immediate competing demands and preferences, and health-promoting behavior)” (Pender, 2002, p.3). Through the use of the health promotion model, health care professionals understand the effect of social, cultural, socioeconomic, environmental, personal, and physical factors on a person’s health. Continued health promotion is vital to motivate/demotivate patients to decrease health risks.

### **Proposal for Further Study**

In order to improve outcomes in diabetes management and prevention, lifestyle interventions have proven to decrease prevalence of Type 2 Diabetes in the Filipino-American population. Also, this thesis determined there is a lack of research in the Filipino-American population, a high-risk population. Unhealthy behaviors and sedentary lifestyle choices are few of the factors that contribute to an increase of prevalence of type 2 diabetes. The research found in literature reviews show the effectiveness of lifestyle interventions such as exercise, nutrition, and family support. In order to assess the effectiveness of prevention in lifestyle changes in the Filipino-American population, the need for a longitudinal study is needed to determine the long-term effects of lifestyle changes and whether such preventative measures decrease risk of type 2 diabetes in the Filipino-American population. Also, better research follow-up with the treatment/non treatment groups during a long longitudinal study will help with gaps in previous studies. The difficulty lies with participant’s medical compliance to the study and to assess which lifestyle interventions should be attempted for T2D prevention. Research articles included in this

literature review provides excellent data on results and will help strengthen the design of future research studies on examining the long-term effects of lifestyle changes for T2D.

The research question being studied is- what are the effects of long-term vs. short-term lifestyle changes with a focus on prevention in older Filipino-Americans? This author hypothesizes that the group receiving long-term lifestyle therapy will exhibit more positive outcomes during assessment. The purpose of this study is to identify any positive, or negative, outcomes of Filipino-Americans receiving lifestyle prevention measures and assessing the quality of any positive and negative outcomes between the two groups.

This study will be quantitative, inferential statistics design, using the Diabetes Self-Management Questionnaire (DSMW) tool. This tool was developed at the Research Institute of Diabetes Academy Mergentheim which used questionnaires assessing self-care, regimen adherence, glycemic control, and behavior changes. This study is designed to target the older Filipino-American population by use of a convenience sample to target the desired population. This sampling technique will help acquire participants of the target desired population. In order to implement lifestyle interventions, use of a healthcare system that includes a high Filipino-American population would be necessary. Examples such as medical centers in the Bay Area (Kaiser South San Francisco and Seton Medical Center) that have several outpatient clinics throughout the San Francisco Bay Area could provide vital support for the study. Also, the study will not be enacted until approved by an institutional review board. Participants and patients will be required to sign a consent form explaining the study prior to their participation.

To acquire data for this study, participants must be screened to meet inclusion criteria and have Type 2 Diabetes or be at risk in the San Francisco Bay Area healthcare system. Inclusion criteria involve the patient being of Filipino-American descent, older adults ranging from age 45-64, family history of T2D, and current diabetes diagnosis. When patients are deemed eligible, the clinician overseeing study will explain the purpose of study to the participants, including expected requirements, hypothesized outcomes, and also acquire informed consent to participate.

### **The Convenience Sample Design**

- Includes 200 Filipino-Americans who meet inclusion criteria
- 2-year longitudinal study starting in June 2022
  - Gathering baseline data and anthropometric data(height, BMI, waist circumference, and body composition)
- Two groups
  - Long-term lifestyle modification group
    - Receiving 4, 1 hour sessions of education and lifestyle interventions(nutrition, family support, physical exercise) each month until 1 year follow-up.
  - Short-term lifestyle modification group
    - Receiving 2 sessions of education and lifestyle interventions(nutrition, family support, physical exercise) until 1 year follow-up.
- 1 year follow-up on June 2023, acquiring HbA1c levels and anthropometric data

- 2 year follow-up on June 2024, acquiring HbA1c levels and anthropometric data

Participants will be selected by use of a target sampling from the San Francisco Bay Area healthcare system. Patients will be asked at Seton and Kaiser facilities if they would like to participate. The comparative study will include an HbA1c test and implementation of the desired lifestyle intervention(exercise and nutrition). Patients will also be assigned lifestyle interventions to be practiced at home. Follow-up assessments will be done at the 1st and 2nd year mark. Also, by targeting Filipino-Americans with the use of a convenience sample, it will give researchers an efficient way to obtain basic data in terms of health management, reflects targeted population of the study, and obtains data on which lifestyle modifications could potentially decrease the risk of T2D in Filipino-Americans.

### **Analysis**

In order to analyze the data, a t-test will compare the means of the two groups to show how significant each lifestyle intervention affects anthropometric measurements. A T-test is essential to determine whether the process or treatment has an effect on the participants. Also, multiple regression analysis will be used to assess strength between lifestyle interventions(dependent variable) and independent variables of age, height, weight, and hours of implemented interventions. Multiple regression establishes validity by setting predictor variables on the dependent variables. By using multiple regression, it helps researchers to have a clear understanding of the association of each lifestyle factor with the outcome.

### **Conclusion**

Effective education and medical compliance is crucial in health promoting care and prevention. Therefore, Type 2 Diabetes is an urgent priority in most countries, and prevention is essential in order to halt this global health issue. A clinical trial devoted to Filipino-Americans at risk or diagnosed with diabetes must be assessed to promote a positive impact on the affected population. The use of individualistic and patient-centered approaches such as nutrition, physical exercise, family support, and weight loss are determinants that decrease risk of T2D. However, the effectiveness of lifestyle interventions and long-term/short-term effectiveness are largely unknown in the Filipino-American population.

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**Appendix A: Literature Review**

Author/ Citation	Purpose	Sample	Type of Study	Strengths & Limitations	Methods	Results
Uusitupa, M., Khan, T. A., Virgilio, E., Kahleova, H., Rivellese, A. A., Hermansen, K., Pfeiffer, A., Thanopoulou, A., Salas-Salvadó, J., Schwab, U., & Sievenpiper, J. L. (2019). Prevention of Type 2 Diabetes. <i>Nutrients</i> , <i>11</i> (11), 2611. <a href="https://doi.org/">https://doi.org/</a>	Determining whether optimal diet lowers risk of T2D.	7 randomized control trials included 4090 participants. It was conducted on people with impaired glucose tolerance with the use of an oral glucose tolerance test	RCT	Strengths: <ul style="list-style-type: none"> <li>• Inclusion of high quality RCT, gives protection of bias</li> <li>• Use of Random-effects</li> </ul>	RCT comparing effect of lifestyle intervention vs no lifestyle intervention with the use of a 2 h oral glucose tolerance test. Follow up for 1 year.	In seven trials involving 4090 participants, the study found that lifestyle intervention was a significant factor that decreased T2D risk.  (RR = 0.53(95% CI: 0.41, 0.67), p < 0.001).

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<p>Vargas-Ortiz, K., Lira-Mendiola, G., Gómez-Navarro, C.M. <i>et al.</i> Effect of a family and interdisciplinary intervention to prevent T2D: randomized clinical trial. <i>BMC Public Health</i> 20, 97 (2020). <a href="https://doi.org/10.1186/s12889-020-8203-1">https://doi.org/10.1186/s12889-020-8203-1</a></p>	<p>Compares the impact of an interdisciplinary family (FI) Vs individual intervention (II) on metabolic risk and management.</p>	<p>Inclusion criteria was 18–60 years with diagnosis of prediabetes: Inclusion criteria for OGTT glucose: 140 and 199 mg/dl. Participants from Guanajuato state, Mexican residents.</p>	<p>Randomized Control Trial of 6 months. Another follow-up at 12 months to assess effectiveness of interventions.</p>	<p>Strength:  <ul style="list-style-type: none"> <li>• Collection of anthropometric measures, metabolic evaluation, and nutrition physical activity questionnaires were effective measures to assess effect of lifestyle</li> </ul> </p>	<p>122 participants with prediabetes. Two control groups with the FI group receiving diet, exercise interventions, and support of family members. The II received the same interventions with no family support. Follow up at 12 months with glucose and pancreatic B-cell function assessed.</p>	<p>The FI group improved the area under the glucose curve. Improvements in weight and lipids were found at 6 months. They were lost in II group at 12 months.</p>
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<p>Smith, A.D., Crippa, A., Woodcock, J. <i>et al.</i> Physical activity and incident type 2 diabetes mellitus: a systematic review and dose-response of prospective cohort studies. <i>Diabetologia</i> 59, 2527–2545 (2016). <a href="https://doi.org/10.1007/s00125-016-4079-0">https://doi.org/10.1007/s00125-016-4079-0</a></p>	<p>Determining prevalence of T2D with physical activity (PA) and amount of PA to lessen risk of T2D.</p>	<p>Sample ranged from 916 to 675,496 people, with type 2 diabetes incidence. Follow-up for the study ranged from 3 to 23.1 years. Twelve studies were conducted in the USA, six in Asia, two in Australia and eight across Europe. All cohorts data was based on self-reported PA by use of questionnaires or interviews.</p>	<p>Cohort Study</p>	<p>Strength:</p> <ul style="list-style-type: none"> <li>• Expression of PA exposure dose in MMET h/week rather than just MET h/week.</li> </ul> <p>Limitations:</p> <ul style="list-style-type: none"> <li>• Limitations of this study include, the high heterogeneity and self-reporting of physical activity behaviors. These factors may have</li> </ul>	<p>Literature review search of 28 studies based on effects of PA and risk of type 2 diabetes. Physical activity was converted into metabolic equivalent(MET) of task hr per week and marginal MET h/wk.</p>	<p>Participants who achieved 11.25 MET h/week compared to inactive individuals saw a significant risk reduction. A risk reduction of 26% in type 2 diabetes was found.</p>
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Karlsen, TI., Søhagen, M. & Hjelmesæth, J. Predictors of weight loss after an intensive lifestyle intervention program in obese patients: a 1- year prospective cohort study. <i>Health Qual Life Outcomes</i> 11, 165 (2013). <a href="https://doi.org/10.1186/1477-7525-11-165">https:// doi.org/ 10.1186/1477 -7525-11-165</a>	Aim of prospectiv e cohort study was to identify predictors of weight loss after a 1-year partly residential intensive lifestyle interventi on program (ILI).	200 caucasian morbidly obese patients. 71% women and mean age of 45.2 years.	Cohort Study	Strength: The study also used questionnair es such as the Obesity and Weight Loss Quality of Life questionnair e, Weight Related Symptom Measure, and Medical Outcome study.  Limitations: All participants were Caucasian, reducing generalizabi lity to non- white groups. The selection of participants, morbidly	Patients referred to a Norwegia n rehabilitati on center (Evjeklini kken AS). Patients who met inclusion criteria of morbid obesity were recruited consecutiv ely from May 2006 to November 2010. Patients were all Caucasian. One patient dropped out, leaving n=199 eligible for analysis.	Factors of weight loss, having employment, lower mental health related quality of life and older age predicts larger weight loss after 1 year in morbidly obese patients following ILI. Not having type 2 diabetes, using a diary combined with regular GP follow- up influence the 12-week weight loss.

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<p>Fuller-Thomson, E., Roy, A., Tsz-Kit Chan, K., &amp; Kobayashi, K. M. (2017). Diabetes among non-obese Filipino Americans: Findings from a large population-based study. <i>Canadian journal of public health = Revue canadienne de sante publique</i>, 108(1), e36–e42. <a href="https://doi.org/10.17269/CJPH.108.5761">https://doi.org/10.17269/CJPH.108.5761</a></p>	<p>Determining prevalence of diabetes in non-obese Filipino Americans compared to non-Hispanic whites and the risk factors in both men and women</p>	<p>Includes 141 597 respondents over 18 years of age, with 51, 048 from 2007, 47 614 from 2009, and 42 935 from 2011.</p>	<p>Population based-Cohort Study</p>	<p>Strengths:</p> <ul style="list-style-type: none"> <li>• Population-based studies with the use of chi-square analysis</li> <li>• Use of California Health Interview survey which collects random digit dialing to create population</li> </ul>	<p>Secondary analysis of population-based data by use of the California Health Interview Survey (CHIS). The study sample focused on non-obese Filipino Americans (n = 1629) and non-Hispanic whites (n = 72 072). Key words search to gain information include: Diabetes; Filipino Americans ; non-obese; prevalence ; sex</p>	<p>Non-obese Filipino Americans had higher risk of diabetes compared to non-hispanic white. Risk factors for non-obese Filipino men include: older age, poverty, cigarette smoking, and being overweight. The only risk factor for women included older age.</p>
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<p>Cuasay, L. C., Lee, E. S., Orlander, P. P., Steffen-Batey, L., &amp; Hanis, C. L. (2001, December 1). <i>Prevalence and determinants of type 2 diabetes among Filipino-Americans in the Houston, Texas metropolitan statistical area</i>. <i>Diabetes Care</i>. Retrieved September 21, 2021, from <a href="https://care.diabetesjournals.org/content/24/12/2054">https://care.diabetesjournals.org/content/24/12/2054</a>.</p>	<p>To determine the major risk factors of type 2 diabetes among Filipino-Americans.</p>	<p>831 Filipino-American participants aged 20–74 years surveyed in Houston, Texas between September 1998 and March 2000.</p>	<p>Cross-Sectional Survey</p>	<p>Strength: Use of posters/fliers, and questionnaires to promote survey participation</p> <p>Limitations:  <ul style="list-style-type: none"> <li>• Use of a convenience sample and parti</li> </ul> </p>	<p>Cross-sectional survey conducted in Houston, Texas by use of a convenience sample. To gather participants, posters and fliers disseminated to newspapers/local businesses. Logistic regression analyses to calculate effectiveness for each risk factor.</p>	<p>The major risk factors assessed were age, sex, past family history of diabetes, socioeconomic status, obesity, sedentary lifestyle, region of birth and, in women, history of gestational diabetes and delivery of a baby weighing &gt;9 lb.</p>