Type 2 Diabetes in the Latino Population

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Abstract

The problem of this project is the rise of type 2 diabetes in the Latino community. There is little information available to successfully intervene control this condition for this population. This project involves extensive research to find successful intervention strategies and the characteristics involved that create positive behavior changes. Possible intervention strategies were studied in depth to determine which behavior change theories and models they are based on. Another part of this project is to provide a healthy ethnic recipe. Chicken fricassee was modified to make it compliant for Latino type 2 diabetics while keeping the recipe as traditional as possible.

The methodology included meeting with the grant committee which the project is based on to determine the required research. The literature review was conducted to explore background information of diabetes and Latinos. The behavior change theories and intervention strategies were then studied and paired together to determine how these interventions are successful. The recipe modification was completed in Product Development over a period of six classes.

Three intervention strategies were picked to research and the behavior change models and theories used were successful due to the way the education was presented, which was culturally sensitive. The strategies also included behavior modification components and offered social support for the participants.

The final recipe for chicken fricassee was altered and is lower in sodium, carbohydrates, and calories. A final taste panel and evaluation determined the final product. One recommendation for the recipe development is to include a larger taste panel from the target population and a have higher number of approval for the recipes chosen to modify.

The Rochester Diabetes Network now has three intervention strategies which have been analyzed in the white paper (appendix B) as a solution for the type 2 diabetics in the Rochester area. Recipe modification also offers improvements through diet to help control diabetes.

Table of Contents

List of Tables and Figures

Chapter 1: Introduction

Background

Diabetes is a chronic metabolic disorder characterized by elevated blood glucose levels. Insulin is a hormone that converts blood sugar, or glucose, into useable energy. Type 2 diabetes is a disease resulting from insulin resistance where there is a failure to use insulin properly, along with a deficiency of insulin produced by the body. Type 2 diabetes usually develops in adults after age forty. Individuals are commonly overweight, live a sedentary life style, and have a family history of the disease.

Type 2 diabetes has become a growing epidemic in the Latino community. High rates of the disease and disease related complications, limited access to care, and language and cultural barriers create significant challenges to the community. About 9-11% of Latinos in the United States have type 2 diabetes, which is about 2 million people and only half are diagnosed (D'Arrigo & Keegan, 2000).

The Diabetes Prevention Project grant funded by the Center for Disease Control (CDC) and administered by the NYS Department of Health (NYSDOH) has been awarded to the Rochester Diabetes Network. The purpose of this grant is to provide nutritional interventions to improve the health and quality of life for adult Latino persons who are 200% or more below the poverty level living in the Northeast of Rochester. Faculty in the Rochester Institute of Technology School of Hospitality and Service Management Department are working to meet the nutritional needs of the grant objectives. The end result of the research proposal will be to provide a wide range of nutritional interventions and recommendations for the Latino population in Rochester to help control their disease process.

This project is an excellent way to gain more knowledge about type 2 diabetes outside of the American culture and to develop experience in creating ways to successfully treat those in the local community who need resources to control their condition.

Problem Statement

Type 2 diabetes has become an epidemic in the Latino population due to lifestyle, limited access to care, genetics, language and cultural barriers. There is little information available related to disease treatment focusing on this population. What interventions and processes are successful to help the Latino population improve the management of their diabetes?

Purpose

One goal of this project is to take successful intervention strategies and pair them with empowerment strategies. The intervention strategies will be studied in depth to determine which theories and models they are based on. Another goal of this project is to provide a healthy ethnic recipe. This goal will be explored in detail by developing a new recipe from the traditional one to make it more appropriate for people with diabetes.

Scope and Limitations

The significance of this project is to address uncontrolled diabetes and the rise of the disease in the Latino community. Following the goals of the grant, researching strategies for treatment will help to provide nutritional interventions for Latino adults. Developing healthier recipes will also help to improve diet and eating habits. The target population for this project is limited to low-income Latino adults living in the Northeast of Rochester in zip codes 14621 and 14605.

A limitation of the project is time, which puts a restriction on how much can be done in 10 weeks. It is also questionable, due to a lack of time, if visiting a focus group can be accomplished for feed back on the chosen recipes that will be modified. Money is also a limiting factor. What can be done is limited mostly to research or other activities with low cost.

Methodology

The first step in the methodology will be meeting with the committee group to determine the purpose and background information of the grant. The needs and goals of the grant must also be known to begin research and to develop a plan to accomplish the goals. After meeting with the committee, the literature review will be conducted. In addition to background information on type 2 diabetes, such as prevalence, complications, treatments, and empowerment strategies will also be researched. Once successful intervention strategies are determined, the actual plan behind carrying out these interventions will be looked at and matched to an empowerment theory or process. These empowerment strategies strategies will be reviewed for potential for success for helping the Latino population.

The recipe development will include taking an ethnic recipe and first preparing it traditionally. Then the ingredients or cooking method will be examined to find alternate ways to prepare the same recipe in a healthier way with less calories, carbohydrates, and sodium, while trying to keep it as traditional as possible. The final product will be tested with a taste panel to receive feed back on taste, texture, and accuracy to the traditional Spanish cuisine.

If possible, an in person survey with a local focus group will be done before the recipe development piece. This visit will be helpful to determine the accuracy of the recipe selection

by Latinos in the Rochester community. Obtaining possible suggestions or additions of recipes will be helpful before beginning this part of the project. This visit may not be possible because of a strict time limit and conflicting schedules.

Chapter 2: Literature Review

TYPE 2 DIABETES

Diabetes mellitus is a group of diseases characterized by high glucose levels resulting from defects in insulin secretion and action. The metabolism of carbohydrate, protein, and fat are also abnormal. People with diabetes do not respond to or produce insulin, which is a hormone produced by the beta cells of the pancreas which is necessary for the use or storage of body fuels. Without proper insulin, hyperglycemia or increased blood glucose occurs which can lead to short and long term complications of the disease. (Escott-Stump & Mahan, 2004). About 15 million adults in 2000 in the United States age 18 years or older were diagnosed with diabetes which is a 7% increase in the number of diagnosed cases from 1990. Considering all undiagnosed cases, about 10% of American adults may have the disease (Burrows, Valdez, Geis, Engelgau, 2004).

Type 2 diabetes affects 90-95% of all cases diagnosed and its incidence is rising steadily. A combination of abnormalities is responsible for type 2 diabetes. The first metabolic defect is a decreased sensitivity to insulin, which is sometimes called insulin resistance. A second metabolic defect is decreased insulin secretion which is necessary for the development of type 2 diabetes. Too little insulin is supplied to keep up with the increased demand along with insulin resistance (Nathan, 1999).

Diagnosing

Diabetes can be diagnosed by three methods. One way is a fasting glucose test with a value of 126mg/dl or greater. A second way is a nonfasting plasma glucose value of 200mg/dl or greater in people with symptoms of diabetes. Third is an abnormal oral glucose tolerance test with a 2 hour glucose value of 200mg/dl or greater ("Diabetes in Hispanic Americans," 2002.)

Risk Factors

Insulin resistance and defective insulin secretion may both have a genetic basis. People with type 2 diabetes usually have a family history of the disease. Type 2 diabetes occurs in person's older than 50 years of age, but is now frequently diagnosed in youth and young adults. The prevalence is the highest in ethnic groups in the United States such as African Americans, Native Americans, Alaskan Natives, Pacific Islanders, Asian Americans, and in the Latino population. Other risk factors include physical inactivity, a prior history of gestational diabetes, and impaired glucose homeostasis, which is elevated blood glucose between normal concentrations and diabetes (Escott-Stump & Mahan, 2004). According to Nathan (1999), another important risk factor is obesity and distribution of body fat, with fat in the abdominal area increasing the risk for disease as well as a longer duration of obesity.

Symptoms

Persons with type 2 diabetes may or may not experience the classic symptoms of uncontrolled diabetes, and they are not prone to ketoacidosis which is more common in type 1 diabetes. It is common in many cases where the disease is present long before it is diagnosed. Possible symptoms of type 2 diabetes include hyperglycemia or high blood sugar, excessive

thirst, frequent urination, hunger, and weight loss. Excessive thirst, weight loss, hunger, or frequent urination result from the poor insulin utilization and the hyperglycemic state. The cells in the body are starved for energy even though there are plenty of carbohydrates, so the body must get energy from protein and fat. The protein is derived from muscle tissue causing muscle wasting and weight loss. Hunger results because the body is starving for energy and signals the brain to consume more energy. The excess glucose in the blood increases osmolality. Water diffuses out of the peripheral tissues into the vessels to compensate. This loss of water by the cells causes increased urination causing dehydration which leads to excessive thirst (Escott-Stump, 2004).

Disease Management

Diabetes is a chronic disease that requires changes throughout a lifetime. The management includes medical nutrition therapy, physical activity, medications, monitoring blood glucose several times a day, and education for self-management. Control of diabetes requires the normalization of carbohydrate, protein, and fat metabolism. The main goal of treatment is to provide the patient with tools to be able to control glycemia, lipidemia, and blood pressure to prevent, delay, or stop the progression complications of the disease. Weight gain, and hypoglycemia or low blood glucose should also be minimized (Escott-Stump & Mahan, 2004).

The main priority for people with type 2 diabetes is to make lifestyle changes and strategies. These strategies should be made a soon as the person is diagnosed. Small amounts of weight loss can improve insulin resistance and glycemia, and helps to correct abnormal lipid levels including cholesterol. A diet reducing total calories can have a regulatory effect on

glucose control. When energy intake is lessened, hyperglycemia can improve faster than with weight loss. A meal plan reducing total fat and saturated fat is also recommended. A DASH diet or dietary approaches to stop hypertension should be encouraged for patients with hypertension. This diet is low in sodium and high in plant based foods.

Increasing physical activity can improve insulin sensitivity and can lower blood glucose levels. Exercise can also help improve cardiovascular status but the highest effect occurs when physical activity is used along with other strategies, like calorie reduction. Education is also another necessary component to medical nutrition therapy. Patients should be taught which foods are sources of carbohydrates including fruits, grains, vegetables, milk, and sweets. It is also important to consider portion sizes, number of servings to select at meals, and ways of reducing fat intake. Patients also need to know how to adjust food, eating patterns, and medications with blood glucose monitoring (Escott-Stump, 2002).

Other treatments besides lifestyle modifications include oral glucose lowering medications. These medications can be used alone or in combination to help achieve normal blood glucose. Insulin may also be needed to restore blood glucose to near normal. Insulin has four properties including action, concentration, purity, and source. These properties determine onset, peak, and duration of action. Self-blood glucose monitoring is used on a day to day basis to manage diabetes. Blood glucose can be checked up to eight times a day to determine hyperglycemia or hypoglycemia, especially before and after meals, first thing in the morning and before bedtime (Escott-Stump & Mahan, 2004).

Short and Long Term Complications

Short-term complications include hypoglycemia and hyperglycemia. Hypoglycemia is

a common side effect from insulin therapy. It can also be caused from medication errors, inadequate food intake, or alcohol use without food. Signs include shakiness, hunger, and sweating. A large drop in blood glucose may cause confusion, fatigue, unusual behaviors, and unconsciousness. Hyperglycemia can lead to ketoacidosis which is a life threatening complication. Severe disturbances in fat, protein, and carbohydrate metabolism occur, but the condition is reversible. Symptoms include excess thirst, hunger, increased urination, and fatigue. Hyperglycemia can be caused by the wearing off of insulin action.

Hyperosmolar hyperglycemic state is another short-term complication which is having an extremely high blood glucose level, the absence or presence of small amounts of ketones, and extreme dehydration. Glucose levels are greater than 600-2000 mg/dl. Small doses of insulin and hydration treat this condition (Escott-Stump & Mahan, 2004).

Long term complications include macrovascular diseases of large blood vessels which are coronary artery disease, peripheral vascular disease, and cerebrovascular disease. These diseases are more common, happen at an earlier age, and are more severe in people with diabetes. Dyslipidemia or high cholesterol and hypertension are other macrovascular complications that can also occur.

Microvascular diseases involve the small blood vessels, which include renal and eye disease. Renal disease associated with diabetes accounts for 40% of end stage renal disease cases. This complication is caused from long term hyperglycemia which causes damage to the nerves and function of the kidney. Controlling hyperglycemia can prevent or delay this condition. Eye disease or retinopathy from diabetes is most common cause of blindness among adults age 20 to 74.

Chronic high levels of blood glucose also cause nerve damage of the eye. About 60 percent of patients with type 2 diabetes who have had the disease for twenty years or more have some type of retinopathy (Escott-Stump& Mahan, 2004).

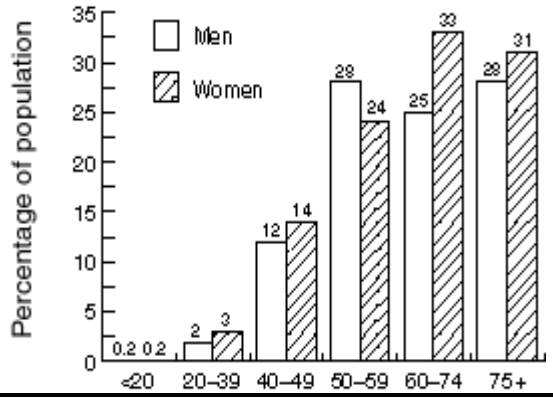
DIABETES IN THE LATINO POPULATION

Diabetes in Hispanics is a serious health challenge. The prevalence of diabetes in this population is increasing because of the greater number of risk factors for diabetes in Hispanics. The incidence of diabetes complications is higher than the general population, and there is a growing number of people of Hispanic ethnicity in the United States.

Prevalence

From the article, "Diabetes in Hispanic Americans" (2002), in 2000, two million out of the thirty million Latino Americans had been diagnosed with diabetes. About 10 percent of all Latino Americans have the disease. They are almost two times more likely to have diabetes than non-Latino whites of similar age. For those age fifty or older, about 25 to 30 percent have either diagnosed or undiagnosed diabetes. Figure 1 compares the number of Mexican Americans diagnosed and undiagnosed with diabetes.

Figure 1: Diagnosed and Undiagnosed Diabetes in Mexican Americans, U.S.



Source: Flegal et al., 1997.

Risk Factors

The frequency of diabetes in Latino Americans is influenced by almost the same factors that are associated with type 2 diabetes in other populations. One risk factor is genetics. A family history of diabetes increases the chance of developing the disease. Having American Indian or African genes is thought to be a factor that causes higher rates of diabetes in Latinos. Latinos have three groups of ancestors including Spaniards, American Indians, and Africans. Both American Indians and African have high rates of diabetes ("Diabetes in Hispanic Americans," 2002).

Another risk factor is lifestyle. A westernized diet, a sedentary life style, and obesity that results can increase the chance of developing type 2 diabetes in this population. Latinos are more likely to be overweight compared to non-Latino whites. Diabetes in Hispanic Americans (2002), reports "it is known that the prevalence of obesity is higher in Mexican Americans and they are known to be two to four times more likely to have type 2 diabetes than non Hispanic whites of similar weight." D' Arrigo & Keegan (2000) states that The National Council of La Raza Center for Health Promotion Hispanic Health Project reports that little value is placed on exercise as a health promoting activity, and many low-income Latinos are so overburdened by trying to make ends meet. They often work more than one or two jobs in areas of crime, and polluted inner city neighborhoods that concerns of physical health are of low priority.

Limited access to care is another factor affecting the Latino Community and there are a number of causes. In some areas, there is an overall lack of diabetes care, in rural areas as well as cities. There is also a lack of trained Latino professionals, or professionals who can

speak Spanish, which creates a language barrier for those in the community who cannot speak English. Many Latinos work at jobs that do not provide health insurance for their employees. These people may be highly motivated to take care of themselves, but cannot afford diabetes medications or supplies (D'Arrigo & Keegan, 2000).

Disease Complications

Diabetes complications also affect Latinos at a higher rate most likely due to uncontrolled diabetes. Diabetic retinopathy is one complication. A San Antonio Heart Study indicated that the rate of retinopathy in Mexican Americans was more than twice as that of non-Latino white Americans. For kidney disease, The San Antonio Heart Study also showed a more frequent rate of this complication in Mexican Americans with diabetes than in non-Latino whites. This study also found a higher rate of peripheral vascular disease in Mexican Americans. However for heart disease, according to Texas and Colorado studies, Mexican Americans with type 1 and type 2 diabetes had lower rates of myocardial infarctions than non-Latino white Americans ("Diabetes in Hispanic Americans," 2002).

LATINO DIET

Mexican-American Diet

In the United States, Mexican Americans make up 60% of the Latino population. The Mexican diet is rich in a variety of foods and dishes that represent a blend of pre-Columbian, Spanish, French, and American culture. The typical diet is rich in complex carbohydrates, which are provided mainly by corn, beans, rice, and breads. The diet contains an adequate amount of protein in the forms of beans, eggs, fish and shellfish, a variety of meats including

beef, pork, poultry, and goat. The Mexican diet is high in fat due to the extensive use of frying as a cooking method. Nutrients most likely to be deficient in the diet are calcium, iron, vitamin A, folate, and vitamin C (Warrix, 2000).

With immigration to the United States, major changes occur in the Mexican American's diet. Some of the less healthy changes include a severe decline in traditional fruit based beverages and an increase in high sugar drinks. An introduction of salads and cooked vegetables has increased the use of fats such as salad dressings, butter, and margarine. Consumption of inexpensive sources of complex carbohydrates such as and rice has also decreased as a result of acculturation. Research indicates that Mexicans in the United States eat more meat and saturated fats than non Latino whites, and use fewer low fat dairy products. Mexicans are also less likely to recognize high fat foods (Warrix, 2000).

Puerto Rican Diet

The typical Puerto Rican diet has many positive aspects. The diet is high in complex carbohydrates such as breads, cereals, rice, soda crackers, and corn meal. The diet typically includes some calcium and milk products. Legumes and beans are eaten often. Meats include chicken, pork sausage, beef, pork chops, spare ribs, and marinated pork. Fish is eaten but in smaller quantities compared to the other common meats. When available, viandras which are starchy vegetables are also included in the Puerto Rican diet. Viandras include plantains, green bananas, taniers, white and yellow sweet potatoes, and chayote squash. Lettuce salads with tomato are also popular. The diet overall is high in calories, carbohydrates, fat, and sodium. Increasing calcium intake and the variety of vegetables would generally help to improve the diet.

Puerto Rican foods are as spicy as Mexican foods, but they do have a mild distinctive taste. Common seasonings include sazon which is mostly MSG, annato, cilantro, and sofrito, which is a seasoning sauce used in cooking made from leaned cured ham, onion, green pepper, and garlic sautéed in oil.

The Puerto Rican diet, especially the diets of younger generations, has become Americanized. Favorite foods include pizza, hot dogs, canned spaghetti, and canned soups. Fast food restaurants have also become popular (Jones-Syracuse, 2000).

Diet Modifications

For both the Mexican and Puerto Rican diets, modifications can be made to lower the amount of fat, sodium, and sugar as well as adding in healthier choices. Nutrition objectives should involve encouraging to select foods from all food groups, drinking plenty of water, encouraging the use of low-fat dairy products and consumption of unsweetened fruit juice, teaching a wide variety of cooking methods other than frying, and introducing a greater variety of vegetables (Warrix, 2000). Lowering the consumption of cheese and eggs as well as substituting unsaturated fats for lard will help to lower fat content. To lower sodium intake, proper substitutions can include onion, garlic, thyme, oregano, mint, nutmeg, lemon, and parsley instead of salt or seasonings high in sodium (Hernandez, 1998).

EMPOWERMENT THEORIES

Knowing factors that affect food choices of people does not explain how people make their decisions. Some theories have been proposed to explain the decision making process as it relates to health. These theories are important because they help to understand why people

do what they do in terms of behavior change.

The first theory is the Stages of Change model. The most common form of this model is the Prochaska and DiClemente model which was originally developed to understand smoking cessation. This model is based on three assumptions. The first is behavior change involves a series of different steps or changes. The second assumption is there are common stages and processes of change across a variety of health behavior. Last is tailoring an intervention to the stage of change in which people are at the moment is more effective than not considering the stage people are in.

There are 5 stages through which people move. Relapses are common and movement is not always in a linear fashion. The first stage is precontemplation which is when the individual is unaware or not interested in making a change. Step 2 is contemplation. The individual is thinking about making a behavior change. Step 3 is preparation. The individual decides to make the change and is setting a plan. Step 4 is action. The individual is trying to make the behavior change and has begun to change the environment to support the change. Maintenance is the final step which is when the behavior change has become a part of the daily routine and the change has been made for 6 months or longer.

The Health Belief Model is a means of explaining why people, especially those in high risk groups fail to participate in programs designed to detect or prevent disease. Three Components of this model are the perception of a threat to health, an expectation of certain outcomes related to a behavior, and self-efficacy, or the belief that one can successfully execute the behavior required to reach the desired outcomes.

An example of an application to this model in the community is from The American

Cancer Society. They set recommendations in 2001 which include eating at least 5 or more servings a day of fruits and vegetables, limiting consumption of red meats high in fat, eating more whole grains, and adding physical activity in order to lower cancer risk.

The Theory of Reasoned Action, which is sometimes called the Theory of Planned Behavior, is based on the belief that behaviors are determined by a person's intentions to perform the behavior. A modification of this theory was made which is The Theory of Trying. It states that more is needed to produce a behavior change than just an expression of intention. For example, young adults, especially females are often dissatisfied with their bodies and express high intentions of dieting to achieve the body shape they desire. Research has shown that even with a high intention to diet, people have problems sticking to the diet or weight loss plan.

The Social Cognitive Theory explains behavior in terms of a model in which behavior, personal factors such as cognitions, and the environment interact constantly, such that a change in one area may affect another area. For example, a change in the environment can influence a behavior change. The theory tries to explain how people develop and maintain a behavior.

The theory behind The Diffusion of Innovation Model states people cannot or will not change their behavior, and many do not adopt innovations easily. The model explains how a product or an idea is accepted by a majority of consumers. The model has four stages. The first is knowledge. The individual is aware of the innovation and has acquired some information about it. Persuasion is stage 2 when the individual forms an attitude either in favor of or against the innovation. Stage 3 is decision. The individual performs activities that

lead to either adopting or rejecting the innovation. The last stage is confirmation, when the individual looks for reinforcement for the decision and may change it if exposed to counter reinforcing messages (Boyle, 2003).

The Consumer Information Processing Theory states that information must not only be available but also wanted or believed to be useful to the consumer, and the consumer must have time, energy, and a level of comprehension to process the information. The information must be presented at times when the consumer is the most receptive, and at a level that they can understand it. The more the provider is able to relate the patient's health concerns to his or her diet and is confident that the patient understands what is being said or taught, the more likely that the patient will be motivated to make and maintain dietary changes.

Behavioral Self-Management emphasizes behavior modification principles requiring increased awareness of the triggers that cue behavior and the consequences that reinforce it. Self-monitoring strategies are useful for enhancing the patient's awareness of triggers or high risk situations and reinforcers which short and long term consequences can maintain specific eating patterns. The patient can then decide whether to avoid a trigger, alter it, or substitute an incompatible behavior when the trigger occurs (Milagros et al., 2001).

Chapter 3: Discussion of Findings and Results

Intervention Strategy Analysis

Three studies were chosen which are intervention strategies that have shown success in improving health outcomes and diabetes management in the Latino population or

populations similar to Latinos. The behavior change models and theories discussed were paired to each intervention study to demonstrate specific characteristics that lead to success.

Project Dulce is a bilingual program which eliminated language barriers. Educational information was presented for low income Latinos at a level they could understand, and was delivered by culturally sensitive community health workers from the Latino community trained to be peer teachers for the diabetes self-management classes. These characteristics are from The Consumer Information Processing Theory. The Health Belief Model is evident in this intervention because participants believed that they had more personal control over their health especially those who received both nursing services and class room education. Encouragement from health workers also improves personal control (Philis-Tsimikas, 2001).

The Agurs-Collins study also uses The Consumer Information Processing Theory. The program is designed for older adults and used large print teaching materials, and presented a limited number of concepts to avoid information overload. Cultural references to make information more relevant to the population were used. For example, program materials showed African American individuals, families, and community settings with reflective language and social values. Guidance for foods, recipes, and flavorings were based on characteristics of the African American culture. Participants kept food and exercise diaries to help identify triggers and behavior patterns which is part of The Behavorial Self-Management Theory. Participants learned what triggers them to overeat or other behaviors leading to relapse so they could be avoided or altered.

The Starr County Border Health Initiative worked with Mexican Americans. Similar to the other interventions, The Consumer Information Processing Theory is shown by

employing bilingual Mexican American nurses and dietitians from the community. Written materials were minimized due to low literacy rates in the community and from diabetes related vision changes. The study focused on realistic heath recommendations consistent with Mexican American preferences. Typical dietary preferences and recipes were included. There was a major emphasis on social support which relates to the Social Cognitive Theory. Each subject was allowed to pick a family member or a close friend as a support person. Support was also given from the intervention team and community workers as a way to keep encouraging positive behavior change.

The positive results for these three interventions include lowering hemoglobin A1C levels, improving cholesterol and lipid levels, increasing physical activity, diabetes knowledge, and self management.

Recipe Modification

A significant part of managing diabetes is through diet. A way to improve diet is to make healthy recipes available for Latino diabetics while keeping the recipe as traditional as possible. For the recipe for chicken fricassee, nutrients were modified including sodium, carbohydrates, and calories. The control and six variables were tested. All variables were repeated. Figure 2 shows the control or traditional recipe. Table 1 shows the variables and ingredients for each one.

Figure 2
Traditional Recipe

1 lb chicken pieces
1 12 oz can tomato sauce
2 medium white potatoes
3 T sofrito
1 T oregano
2 packets sazon
2 garlic cloves
Adobo to taste

Cook in medium heat in a large skillet and cook for 20 minutes. Lower heat and cook for another 20 minutes.

Table 1
Variables and Ingredients Used

Ingredients	Control	1	2	3	4	5	6
Chicken	1 lb	1 lb	1 lb	1 lb	1 lb	1 lb	1 lb
tomato sauce	12 oz	no salt add 12 oz.	12 oz	12oz	12oz	12 oz	no salt added 12 oz
adobo	to taste	to taste	to taste	to taste	to taste	to taste	dash
sofrito	3 T	3 T	1 ½ T	3 T	3 T	1 T	2 T
Sazon packets	2	2	1	2	2	1	1
Garlic cloves	2	2	2	2	2	2	3
oregano	1 T	1 T	2 T	1 T	1 T	1T	1 T
white potatoes	2	2	2	2	2	2	1
red pepper	-	-	-	-	½	½	-
green pepper	-	-	-	-	½	½	½
white onion	-	-	-	½	½	1 cup	1 cup

Each variable was tested using nutrient analysis on Food Processor. A hedonic score card was used for the sensory evaluation with a taste panel to evaluate color, taste, texture and flavor. The score card is attached as appendix B. The control and variables 1 and 2 were evaluated at one time with a total of 15 evaluations. Variables 3, 4, and 5 were evaluated the following week with a total of 15 evaluations. Variable 6 was the final recipe with a total of 10 evaluations. This variable was presented by itself and final adjustments of ingredient amounts were determined. Table 2 shows average scores based on the Hedonic scorecard and nutrient values for each variable including traditional recipe.

Table 2
Averages of nutrient
Contents of recipe variables

Variable	Sodium	Calories	Carbohydrates	Color	Flavor	Texture	Overall
traditional	800mg	231	23g	7.47	6.93	7.13	6.53
1	400mg	231	23g	7.73	6.60	7.2	7.33
2	770mg	231	23g	7.67	7.66	7.47	7.60
3	760mg	230	26g	7.07	6.47	6.53	6.33
4	780mg	255	28g	7.06	6.47	6.67	6.33
5	760mg	237	28g	7.53	7.27	7.33	6.87
6	400mg	180	19g	8.3	8.30	7.90	8.30

Chapter 4: Conclusions and Recommendations

Recommendations

Recipe approval to make sure the recipes being modified were appropriate and typical for this population was given at the beginning of the project, but the approval was limited. It would have been more helpful if a larger number from the target population reviewed the recipes. Two Puerto Ricans who work at Strong Memorial Hospital were contacted and gave their approval of the recipes but it was not until after the recipe development had started.

A final evaluation of the recipe was given during a taste panel in Community Nutrition and the final changes were made. More of the target population should have been involved during the tasting evaluation throughout the modification process and not just at the end. Product Development classmates gave some feed back and suggestions that would have changed the recipe too much so that the target population would not have approved it. Only certain suggestions were considered. These circumstances were also limited due to time and availability. The initial plan to visit a focus group in Rochester to present the recipes to was not able to happen due to time.

Conclusions

The analysis of the three intervention strategies with the behavior change theories and models are three possible solutions for the Latino population in Rochester. Each study has shown positive outcomes and relate to the Latino Community at a low income level. These studies incorporated diet education, self-management, physical activity, and identifying behavior triggers to find root causes of personal behavior patterns. All three studies were

culturally sensitive, which made behavior change easier to achieve. The Rochester Diabetes Network can use one of these examples as an intervention. A white paper document was created as a summary of these findings with the results of each study in Appendix B.

Since diet is a major part of diabetes management, the Chicken Fricassee recipe has been changed and is now lower in sodium, carbohydrates, and calories. Other traditional recipes have also been modified by classmates. Several healthy ethnic recipes are now available to improve the Latino diet which contributes to controlling diabetes.

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Appendix A
Hedonic Score card

Chicken Fricassee

For each of the sample products write its code number closest to your preference. The same preference may be used more than once. Write the product code next to your selection in each category for that product.

Color	Flavor	Texture	Overall
Like Extremely	Like Extremely	Like Extremely	Like Extremely
Like Very Much	Like Very Much	Like Very Much	Like Very Much
Like Moderately	Like Moderately	Like Moderately	Like Moderately
Like Slightly	Like Slightly	Like Slightly	Like Slightly
Neither Like Nor Dislike	Neither Like Nor Dislike	Neither Like Nor Dislike	Neither Like Nor Dislike
Dislike Slightly	Dislike Slightly	Dislike Slightly	Dislike Slightly
Dislike Moderately	Dislike Moderately	Dislike Moderately	Dislike Moderately
Dislike Very Much	Dislike Very Much	Dislike Very Much	Dislike Very Much
Dislike Extremely	Dislike Extremely	Dislike Extremely	Dislike Extremely
Comments:	**Comments:**	**Comments:**	**Comments:**

Appendix B

White Paper
Type 2 Diabetes in the Latino Population

Abstract:

Type 2 diabetes in the Latino Community has become an epidemic. High disease rates and related complications, lifestyle, and language and cultural barriers create significant challenges to the community. There is limited information available related to successful disease treatment for this population. The Rochester Institute of Technology dietetic program is subcontracted for a grant funded to the RDN from the Centers for Disease Control (CDC) to provide nutritional interventions for adult Hispanic persons living in the Northeast of Rochester. The target population for this project is based on the low income population 200% or more below the poverty level in the Rochester area in zip codes 14621 and 14605.

Analysis:

Three intervention studies proven to be successful for this population were selected from a list of eight studies as possible interventions to be used. These three studies are arranged in the attached chart which pairs theories and models relating to behavior change. The theories are the basis of the intervention strategy and help to explain how the interventions are carried out. There is an increased probability of desired behavior change when using these theories and models.

Study	Theories/Models	Application	Results
Project Dulce	Consumer Information Processing Theory	Info presented at a level participants can understand, bilingual program, delivered by culturally sensitive community health workers	A culturally sensitive program has improved medical conditions by lowering HgA1C, cholesterol and triglyceride levels significantly upon completion of 12 week program
	Health Belief Model	Participants believe they have more personal control over their health especially when receiving both nurse services and class room education	
Agurs-Collins	Consumer Information Processing Theory	Designed for elderly African Americans: writing in large print, limited number of concepts presented at a time to avoid information overload, cultural references of program materials depicting language, social values, foods and recipes	Lifestyle interventions presented in a culturally sensitive way that combined counseling for dietary, weight management, and increased physical activity significantly lowered HgA1C levels
	Self-Behavioral Management	increasing awareness and identifying triggers that cue eating behaviors by keeping food and exercise diaries to help identify triggers and behavior patterns, identify ways to control or avoid these triggers to prevent relapse	
Starr County Border Health Initiative	Consumer Information Processing Theory	Culturally competent in terms of language, diet, and social factors, used Mexican American dietary preferences and recipes, minimized written materials due to low literacy rates	Showed the effectiveness of culturally component diabetes self-management education along with numerous sources of support to participants by lowering HgA1C and fasting blood glucose at 6 and 12 months and obtaining more diabetes knowledge
	Social Cognitive Theory	Emphasis on social support, allowed each subject to pick a family member or close friend as a support person, intervention team and community workers also a source of support for encouragement	

Conclusion:

These behavior change theories and models are the foundation of these three intervention studies. Having a culturally sensitive program including language and life style components with an emphasis of social support, counseling, and identifying root causes to behaviors can lead to improvement in patients with type 2 diabetes.