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Electronic Benefit Transfer: Food Choices, Food Insecurity, and Type 2 Diabetes

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Walden University
2015

Abstract

Electronic Benefit Transfer: Food Choices, Food Insecurity,

and Type 2 Diabetes

by

Diana L. Malkin-Washeim

MPH, New York University, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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August 2015

Abstract

The purpose of this research was to examine food security for people with prediabetes participating in the Supplemental Nutrition Assistance Program (SNAP), focusing on their food choice decisions and coping strategies over a 30-day benefit cycle that potentially increases the risk of Type 2 diabetes. A cross-sectional, quantitative design based on food choice process model constructs was used. SNAP participants ($n = 36$) with prediabetes, aged 21–70 years, were recruited as outpatients from Bronx Lebanon Hospital and completed self-reported questionnaires on demographics and health, food security, and food frequency. Descriptive statistics, Pearson chi square tests, and regression analysis were performed using SPSS. Also, independent t test, and Levene's test were used for ad hoc analysis to assess variation of food choice decisions over 30 days. Of the sample, 5% had low and 95% very low food secure status. Food security status did not predict coping strategies ($p = .724$); however, food security status and type of coping strategy had a moderate relationship ($p < 0.01$; $r = .60$). Food choices of 11 food categories changed over a 30-day cycle with greatest variation for Week 1, compared to Weeks 2–4 ($p < .005$). Use of coping strategies to minimize hunger was limited. Very low food security associated with certain coping strategies disrupted eating patterns. Disrupted eating patterns affect food variation over time, increasing the intake of non-nutrient-dense foods and the risk of obesity and Type 2 diabetes. The implications for positive social change include the potential to change SNAP's benefit allotments, make nutrition education mandatory, and create a nutrition package, thereby lowering food insecurity and the risk of Type 2 diabetes.

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Dedication

I would like to dedicate this study to all of the researchers before me. Their work enabled me to conduct this research study in order to see clarity in the dilemma of human existence living on the edge of hunger among unlimited food.

"There are people in the world so hungry, that God cannot appear to them except in the form of bread." — Mahatma Gandhi (1869–1948)

"True individual freedom cannot exist without economic security and independence. People who are hungry and out of a job are the stuff of which dictatorships are made." — Franklin Roosevelt

As I worked on this dissertation research, the Centers for Disease Control and Prevention (CDC, 2014b) published the following statistics: The total number of people in 2012 with diabetes is 29.1 million, up 13% from 25.8 million children and adults in the United States in 2010; 8.3% of the population has diabetes; the number of adults aged 20+ years with prediabetes has increased 9% from 79 million to 86 million; the number of new cases of diabetes per year is 1.7 million, down 10% from 1.9 million; of the 29.1 million with diabetes, 21.0 million are diagnosed and 8.1 million have diabetes but do not know it. 27.8% of people with diabetes are undiagnosed. The 8.1% million represents a 16% increase in the number of undiagnosed people with diabetes.

"Overweight and obesity, influence by poor diet and inactivity, are significantly associated with an increased risk of diabetes, high blood pressure, high cholesterol, asthma, joint problems and poor health" (CDC, 2008).

Acknowledgments

If it were not for my family and friends, this scholarly journey I took for the last few years would not have occurred; so, thank you. My upmost gratitude goes out to Ellen Kagan, who encouraged me and provided peace of mind through some significant life changes; she taught me what a true friend is with her daily voice of comfort and support and encouraged my perseverance. I want to acknowledge my old friend Scott Carberry who has been a blessing when I needed a good laugh, a run in the woods, a day at the beach, skiing at the golf course, or just hanging out. I am blessed to have my two children, Torin and Kira, who are my heart and soul and forever with me as I worked through the darkest moments of this journey. My mom and brothers have been an endless support; without them, this journey would have been truly challenging.

There is not a day that goes by that I am not inspired and blessed to know every single one of my patients. I am very aware and cognitively in tune with what goes on: the strain of their lives that are nothing short of being challenged on a daily basis. I am in awe of their resilience and strength to keep on going in times of stress and disorder.

I could not have finished without the help of Dr. Shirley Gerrior, my chair who has inspired, supported, and grounded me when there was always one more thing to do, and Dr. Diane Cortner, my methodologist who reminded me of finding a back up plan just in case. I would like to acknowledge Kristal Michalatos, R.D. who referred many of the participants for this study, and Dr. Morris, who provided a significant idea of how to look in different ways at the data that I collected. I am forever humbled by this process and journey that kept me up day and night thinking about how, why, where, and who.

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Chapter 1: Introduction to the Study

Introduction

The purpose of this research was to examine the status of food security of people who have prediabetes participating in the Supplemental Nutrition Assistance Program (SNAP), focusing on their food choice decisions and coping strategies over a 30-day benefit cycle that potentially increases the risk of Type 2 diabetes. Approximately 47.6 million people living in 23.1 million households participate in SNAP (U.S. Department of Agriculture [USDA], 2014). SNAP's purpose is to supplement the ability of individuals and families to purchase food with benefit allotments; however, despite this monthly allotment to supplement the food budget, food insecurity continues to be prevalent in households enrolled in SNAP, especially in those areas with higher food prices, such as in the Northeast versus the Midwest (USDA, 2014).

Included in Chapter 1 are a background on the phenomenon of obesity defined as "abnormal or excessive fat accumulation that may impair health" or a body mass index greater than 30 (World Health Organization, 2015, para 2), definition of food security status and food cycles, the problem statement, the purpose of the research study, how the variables under study align with the food choice process model (FCPM), the theoretical framework, the nature of the study, definition of terms, and the characteristics of the study.

Background

Although there is an association between obesity and food insecurity in SNAP households (Haldeman, 2006; Nord & Golla, 2009; Olson, 1999; Food Research and

Action Center, 2013, para 2), less is known about the cycle of food consumption, food

choice decisions, and coping strategies that people in SNAP households use when food is

limited (Center for the Study of Presidency and Congress, 2012, p. 16; USDA, 2013a, p.

xi). There is also a lack of research of SNAP participants with prediabetes who are at risk

for developing Type 2 diabetes. A person with prediabetes is at risk for developing Type

2 diabetes and increased risk for cardiovascular and microvascular complications

(Buysschaert & Bergman, 2011). The transition from the physiological state of

prediabetes to Type 2 diabetes may take years (Buysschaert & Bergman, 2011, p. 293).

Approximately 70% of people with prediabetes will develop Type 2 diabetes

(Buysschaert & Bergman, 2011, pp. 293–294). Targeting participants with prediabetes

who participate in SNAP, exploring their food choice decisions and coping strategies in

relation to food security, offered insights into risky food choice decisions that increase

the risk of developing Type 2 diabetes; this study thus helps prevent future complications

associated with Type 2 diabetes and comorbidities, such as cardiovascular disease,

hypertension, and hyperlipidemia, as well as Type 2 diabetes itself. SNAP participants

with prediabetes are a significant population for whom a modified lifestyle (an increase

of physical activity along with greater intake of vegetables, fresh fruits, and lean protein

sources and less intake of processed foods, high fat foods, and sweetened beverages) can

prevent development of Type 2 diabetes.

      SNAP benefits are intended to increase the access of people in eligible low-

income households to a nutritious diet and to improve food security. There are two areas

of focus for SNAP-Education (SNAP-ED), a federal/state partnership that supports

nutrition education for participants of SNAP (USDA, 2009): (a) to promote a healthy eating and an active lifestyle, and (b) to support primary prevention of chronic diseases (USDA, 2012g), such as Type 2 diabetes. SNAP-ED helps people participating in SNAP who have risk factors for diet-related chronic diseases, such as prediabetes, prevent the onset of Type 2 diabetes by supporting a healthier life style (USDA, 2012g). With nutrition education that addresses diet quality, food shopping, budgeting and physical activity, this information encourages wellness among SNAP participants.

This research study is important because it considers the role of SNAP in relation to the 30-day benefit cycle in food choice decisions and food security status. Obesity may result from an adaptive physiological response to episodic food insecurity that can lead to binge eating when food is plentiful and is associated with various coping strategies (Dinour, Bergen, & Yeh, 2007, p. 1958) to compensate for the lack of food (Maxwell, 1996) when food security is challenged. Consuming high caloric foods increases adipose tissue and decreases lean muscle mass, leading to insulin resistance and the risk for the development of Type 2 diabetes (Srikanthan & Karlamangla, 2011). There are no data on the risks for developing Type 2 diabetes based on food choices in relation to food insecurity among SNAP participants during the 30-day benefit cycle. Thus, the 30-day benefit cycle was explored because this is the time frame between SNAP benefit allotments, and there is thus the possibility that food choice decisions vary between the beginning of the month and the end of the month. In this study, I provided outcome data regarding why and when SNAP participants made particular food choice decisions. The findings of this study have the potential to change SNAP's benefit allotments, make

nutrition education mandatory, and create a nutrition package, lowering food insecurity

and risk of Type 2 diabetes.

Problem Statement

Contrary to the theoretical and economic assumption that SNAP improves food

security, food insecurity has been consistent and prevalent in households enrolled in

SNAP. The reason for this anomaly is not entirely clear (Nord & Golla, 2009). Little is

known about the food choice decisions (FCD) and food patterns of SNAP participants

with prediabetes over the 30-day benefit cycle, specifically the latter half of the month

and how these FCD influence decisions that put this population at risk for Type 2

diabetes. The 30-day benefit cycle is significant because less is known about what food

choices are made during the latter half of the benefit allotments from SNAP and whether

these food choices increase participants' (with prediabetes) risk for developing Type 2

diabetes. This study addressed the relationship of SNAP participants' food choices in

relation to food security status and coping strategies and how this relationship may

contribute to the risk of Type 2 diabetes among SNAP participants with prediabetes to

help fill the knowledge gap.

Researchers have examined the relationship between SNAP participation and

food choices and weight (Haldemen, 2006) and SNAP and food insecurity (Nord &

Golla, 2009). This focus included the examination of the food stamp cycle and obesity

status (Dinour et al., 2007), how food choices impact obesity (Ben-Shalom, Fox, &

Newby, 2012; Nestle et al., 1998), and hunger and obesity (Dietz, 1995; Olson, 1999;

Townsend, Peerson, Love, Achterberg, & Murphy, 2001; Scheier, 2005). Also of concern

were grocery shopping behavior and food stamp usage in relation to food choices on a limited budget (Wiig & Smith, 2008), food insecurity and health outcomes (Olson, 1999), and risk factors for diabetes (Goran, Ulijaszek, & Ventura, 2012; International Diabetes Federation [IDF], n.d.). For this research study, I explored variables of continued interest to SNAP participation and policy to supplement previous research on food choices, coping strategies, and food security; I focused on these variables among SNAP participants with prediabetes and whether there is a potential risk for developing Type 2 diabetes.

Purpose of the Study

The CDC (2014b) reported, "Eighty six million Americans" (p.3) or "more than 1 out of 3 adults have prediabetes" (CDC, 2015b, para 3), 9 out of 10 do not know they have it, and 15-30% of people with prediabetes will develop type 2 diabetes within 5 years. The purpose of examining SNAP participants with prediabetes was to obtain a better understanding of FCD by those who are participating in SNAP and their food security status. By identifying when and how SNAP recipients who have prediabetes make food choices, it may be possible to prevent Type 2 diabetes in this population.

Food security was the independent variable among the study's participants who were SNAP benefits recipients with prediabetes. The dependent variables were FCD, coping abstrategies over a 30-day benefit cycle as determined by food choices, food expenditures, and perceptions of personal health that are influential in FCD as related to food security status. Both the independent and dependent variables were examined in this research study as per the following research questions.

Research Questions, Research Hypothesis, and Null Hypothesis

Building upon the theoretical model, food choice process model (FCPM), I developed research questions to address what, how, and possibly why certain factors influence FCD, expanding on the variables under study and the FCPM.

Primary Research Question

1. Does the level of food insecurity experienced by SNAP participants who have prediabetes, associated with food choice decisions and coping strategies over a 30-day benefit cycle, potentially increase the participants' risk of Type 2 diabetes?

Ha_1: Food security in relation to food choices and coping strategies change over the 30-day benefit cycle among SNAP participants who have prediabetes and potentially increase their risk for Type 2 diabetes.

Ho_1: Food security in relation to food choices and coping strategies do not change over the 30-day benefit cycle among SNAP participants who have prediabetes and do not potentially increase their risk for Type 2 diabetes.

Subordinate Research Questions

2. Do SNAP participants who have prediabetes exhibit different food choice decisions or patterns between the beginning of the 30-day benefit cycle versus the later part of the 30-day benefit cycle?

H_{a2}: SNAP participants who have prediabetes make different food choice decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle.

H_{o2}: SNAP participants who have prediabetes do not make different food choice

decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle

3. Are there coping strategies used by SNAP participants who have prediabetes when making food choice decisions for each week during the 30-day benefit cycle?

H_{a3}: There are coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

H_{o3}: There are no coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

The basis for the primary research question (RQ1) was to explore the transitory aspect of food security, which overlaps the two components of the FCPM: influences and personal food systems. This question was addressed with the use of the Dietary History Questionnaire (DHQ 2; National Cancer Institute, 2015) and Current Population Survey: Food Security Supplement (CPS: FSS) questionnaire (USDA, 2014a). In Questions 2 and 3, I explored possible food consumption patterns and cycles of eating. These two questions were addressed with the use of DHQ 2 questionnaire. In Research Question 3, I explored coping strategies that occurred at various times of the 30-day benefit cycle in relation to food security. This question was addressed with the use of the CPS: FSS questionnaire. Overall, in questions 1 through 3, I reflected upon the FCPM's component, life course, that looks at people's food choice trajectories that may lead to habitual food decisions that can affect how people adjust to life course transitions. All three research questions were addressed with data obtained from the DHQ 2 and CPS: FSS questionnaires.

Theoretical Framework for the Study

The FCPM provided the framework for this study. The FCPM is an adaptation of the conceptual model of food choice, and both were developed by the Cornell Food Choice Research Group (Furst, Connors, Bisogni, Sobal, & Falk, 1996; Sobal & Bisogni, 2009). Both models have the following three components: life course, influences, and personal food system. A constructionist approach was influential in the development of the FCPM, meaning that "knowledge is created by the interaction of individuals within society"(Andrews, 2012, para 6). Furst et al. (1996) initially depicted the model as a funnel-shaped figure with three components leading to food choice decisions. These are life course, the "past influences of personal experiences and historical eras, current involvement in trends and transitions and anticipations of future events" (Furst et al., 1996, p. 252). Included also are the influences (the ideals, personal factors, resources, social framework, and food context) and the personal food systems (the value negotiations, such as sensory perceptions, monetary considerations, quality, managing relationships, convenience, and health and nutrition). The FPCM encompasses an overall view of FCD (Sobal & Bisogni, 2009) rather than simply food access or availability as reflective of other food decision models. This theoretical framework was applicable to the research study because I explored multiple variables that affect and influence food choices that include FCD, food cycle, the environment, food access, and food availability.

Nature of the Study

In this quantitative study, I targeted a multiethnic population participating in

SNAP who receives care from Bronx Lebanon Hospital, a nonprofit healthcare system that services the South and Central Bronx in New York. There were three sources of data collected as self-administered questionnaires: (a) a demographics and health questionnaire (Appendix C) targeting sociodemographic characteristics including age, gender, SNAP participation, perception of personal health, country of origin, ethnicity, race, living situation, height, weight, and education; (b) The Current Population Survey: Food Security Supplement (Appendix D), and (c) the Diet History Questionnaire 2 (Appendix E). Food security is the independent variable, and FCD, coping strategies over a 30-day benefit cycle as determined by food choices, and perception of health are the dependent variables.

The rationale for the study was to collect primary data of FCD using all three questionnaires. As such I was able to collect social demographics and dietary intake data to their explore relationships with food security, food cycles and/or patterns of food consumption, FCD, and perception of personal health and whether there was a possible increase risk of developing Type 2 diabetes. In brief, data were collected from SNAP participants from Bronx Lebanon Hospital (see Appendix F for IRB approval letter), which was referred to me by five primary care providers, three adult endocrinologists, and one registered dietitian. I screened the recruited participants and if eligible, they received a booklet with an adult consent form and the three self-administered questionnaires enclosed.

I used the statistical software program SPSS to analyze descriptive statistics on social demographics, food security status, and body mass index and linear regression

analysis to assess an association between the dependent and independent variables under study. A bivariate analysis was used to examine correlation of food security status with coping strategies and Pearson chi square tests to assess categorical variables such as food security status against coping strategies, use of food assistance programs, and frequency of food variation over a 30-day benefit cycle. In addition, the Friedman's test was used to explore differences between food groups; a post hoc test the Wilcoxon signed rank test was used to explore where differences actually occurred between the food groups,;and an independent t test, Levene's test for quality of variance, was also used.

Operational Definitions

For the purposes of this study, the following terms were defined:

A1C: The A1C measures a person's average blood glucose control for the past 3 months. Hemoglobin, a protein linked with glucose (sugar), is found in the red blood cells and carries oxygen from the lungs to all the cells of the body. Uncontrolled diabetes is too much glucose in the bloodstream. The extra glucose enters the red blood cells and glycates (attaches/sticks) with the hemoglobin molecules. The more glucose in the blood, the more hemoglobin gets glycated with the glucose. The A1C is a percentage and the higher the percentage the higher the blood sugar is in the body (American Diabetes Association, 2013).

Adaptation strategy: A long-term or permanent change in the way households and individuals acquire food sufficiently (Maxwell, 1996).

Allotment: The amount of benefits the SNAP household gets (USDA, 2013b).

Coping strategy: A short-term mechanism for insufficiency of food (Maxwell,

1996).

Dietary Guidelines for Americans: A federal overview of the dietary guidance for the U.S. public based on scientific evidence and medical knowledge from specific committee members (Caswell & Yaktine, 2013). The Dietary Guidelines are issued by both the U.S. Department of Health and Human Services and the USDA, and these guidelines are revised every 5 years (Caswell & Yaktine, 2013).

Electronic benefit transfer (EBT): An electronic system that authorizes a transfer of government benefits from a federal account to a SNAP recipient's account to pay for products allowed (Caswell & Yaktine, 2013).

Fast foods: Foods that have low preparation time and are in a package form. These types of foods are preheated or have precooked ingredients and are served to the consumer in a packaged form for takeaway (e.g., chicken nuggets and French fries); "Food that can be prepared quickly and easily and is sold in restuurants and snack bars quick meal or to be taken out" (Vogli, Kouvonen, & Gimeni, 2014, p. 99).

Food access: Sufficient resources for a nutritious diet (World Health Organization [WHO], 2012).

Food availability: A sufficient quantity of food on a consistent basis (WHO, 2012).

Food cycle behavior: An act of binging or overeating when food is abundant and/or a preoccupation with food, stress, and depression when food is limited (Dinour et al., 2007).

Food insecurity: Not having enough resources such as available food and/or

money to purchase food in order to meet basic nutritional needs to live an active lifestyle; this situation may or may not include hunger; to either have low food security (without hunger) that reports of reduced quality, variety, or desirability of diet and/or little or no indication of reduced food intake; or to have very low food security (with hunger) that reports multiple indications of disrupted eating patterns and reduced food intake (USDA, 2014b). However, for the purposes of the study, it is a 30-day benefit cycle from when EBT benefits are received and reallocated.

Food security: The economic and physical access to food that meets the needs of people's dietary and food preferences (WHO, 2012). It is built on the foundation of three variables—food availability, food access, and food use—and is a developmental and sustainability issue that is closely linked to a person's health (WHO, 2012).

Food Security Supplement (FSS): Caswell et al. (2013) defined this as a "national survey of a sample of households derived from those eligible for the basic Current Population Survey (CPS)" (p. A-3). FSS is used to obtain information about household food expenditures, food program participation, food sufficiency, ways of coping and concerns with food insecurity, and food security (Caswell et al., 2013, p. A-3).

Food use: Where basic nutrition knowledge is appropriate or satisfactory, including adequate water and sanitation (WHO, 2012).

Foods with high sugar: Provide 20% or more of the daily value of sugar per serving (Academy of Nutrition and Dietetics, 2013). For the purpose of this study, those foods with 5 grams or more of sugar per serving are high in sugar.

Gross income: A household's total, nonexcluded income, before any deductions have been made; "A household's gross income before taxes in the previous month must be at or below 130 percent of the poverty line ($2,116 per month in fiscal 2014 for a three-person household); to the gross income test, a household must have net monthly income at or below the poverty line" (USDA, 2014c).

High food security: No reported indications of food access problems or limitations (USDA, 2014b).

Healthy eating index (HEI): A measure of diet quality that assesses the standards to federal dietary guidance (Caswell & Yaktine, 2013).

Low fat: 3 grams fat or less per serving (United States Food and Drug Administration, 2013).

Low food security: Reporting reduced quality, variety, or desirability of diet, and little or no indication of reduced food intake; or is without hunger (USDA, 2014b).

Marginal food security: Anxiety over food sufficiency or shortage of food in the house, and little or no indication of changes in diet or food intake (USDA, 2014b).

Measurement error model: Estimates correlations between nutrient intakes measured by FFQ and truth (Subar et al., 2001). Such correlations in most foods and nutrients are in the range of 0.40–0.70 (Subar et al., 2001).

Monthly cycle: "SNAP benefits are limited to a 3-month period, at which point the recipient will have to submit a renewal application. Most households receive benefits for a 6-month period before requiring renewal. Benefit periods can range from 1 month to 3

years" (SNAP to Health, 2015, para 8). For the purpose of this research study, a 30-day benefit cycle is from when EBT benefits are received and reallocated.

National Health and Nutrition Examination Survey (NHANES): A comprehensive survey assessing the nutritional status of adults and children in the United States. It includes data on demographics, socioeconomics, and dietary related questions (Caswell & Yaktine, 2013). There is an examination component that included medical, dental, and physiological components. In addition, there are laboratory tests (Caswell & Yaktine, 2013). The NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations (CDC, 2013).

National poverty threshold: Issued by the Department of Health and Human Services, this threshold is used to determine the monthly net income limits for SNAP (Caswell & Yaktine, 2013).

Net income: Gross income minus allowable deductions (United States of Agriculture, 2013).

Net income limit: The amount of monthly income below which households are eligible to receive SNAP benefits, as determined by household size (Caswell & Yaktine, 2013). The limit equals or is less than 100% of the national poverty threshold (Caswell & Yaktine, 2013).

Nutrient-poor foods: Highly refined products containing added sugars, saturated fats and alcohol (Nestle, 2008).

Supplemental Nutritional Assistance Program: A program subsidized by the federal government however run by state agencies (USDA, 2014a). The program offers nutrition assistance to millions of eligible, low-income individuals and families, and it is the largest program in the domestic hunger safety net (USDA, 2014a). SNAP, formerly called the Food Stamp Program provides monthly benefits for eligible households to purchase preapproved food items at authorized food stores. Participants qualify for the program based on household income, assets, and certain expenses. In 2010, the average benefit was approximately $134.00 per person per month (Coleman-Jensen, Nord, Andrews & Carlson, 2011, p. 24).

Very low food security: Reporting of multiple indications of disrupted eating patterns and reduced food intake as well as indications of hunger (USDA, 2014b).

Assumptions

I assumed that produce such as fresh fruits and vegetables were not consumed because of taste and cost; however, other variables such as availability, access, lack of knowledge (cooking skills, nutrition knowledge, what to purchase in season), limited equipment (stove, hot plate, refrigeration), and transportation costs all may factor into the limited consumption of produce. In addition, SNAP heads of households may underreport or incorrectly report dietary information due to memory or recalling of information as estimates. This in fact may be a limitation to the accuracy of the data that were collected. I also assumed that the participants answered truthfully, remembered accurately, and have food preparation knowledge. These assumptions are significant because taste, cost,

underreporting, or incorrect reporting as well as food preparation knowledge all are variables that factor into the data that were collected.

Scope and Delimitations

The targeted population were SNAP participants with prediabetes of Hispanic American, European American, and African American descent in the South and Central Bronx, New York where buses, trains, and subways are the primary modes of transportation. The majority of the population in this area are Hispanic American (60%) and African American (39%; Zimmerman, Naphtali, & Restrepo, 2009). If the study was conducted in a suburban or rural area, there would likely have been more access to vehicles to get to a variety of grocery stores, and the level of food access and availability would be different.

It is possible that my study can be generalized to other parts of the country where the population is as ethincally diverse as is the South and Central Bronx and participants of SNAP also have prediabetes. "Thirty nine percent of this population is Black and 60% is Hispanic. This represents a higher percentage of Blacks and Hispanics than resides in Bronx County, the City, or New York State" (Zimmerman et al., 2009, para 3). The growth in the South Bronx between 1990 and 2000 was 11.8%, which was slightly higher than that of Bronx County, 10.7%, and New York City, 9.4%, and double that of New York State, 5.5% (Zimmerman et al., 2009). Between 1990 and 2000, the Black population declined by 3.5%, and the Hispanic population increased by 18.8% (Zimmerman et al., 2009). According the to the United States Census (2015), as of 2013, Bronx County is 54.6% Hispanic or Latino as compared to 18.4% in New York City

(NYC) and 43.3% Black or African American, alone versus 17.5% in NYC. Overall, in the United States, there are roughly 54 million Hispanics or 17% of the United States (CDC, 2015). By 2060, the Hispanic population will reach an estimated 128.8 million, or 31% of the U.S. population (CDC, 2015). As of July 1, 2013, California has the largest Hispanic population with 14.7 million, and New Mexico has the highest percentage of Hispanic population with 47.3**%** (CDC, 2015); thus, parts of California or New Mexico may be able to use the results of this study to understand a similar population of SNAP participants who have prediabetes and to reproduce this research stduy.

Limitations

The limitations to the research study were several. The limitations include the study's design; sample size; the length of the questionnaires; self-reported height and weight to calculate the body mass index (BMI); food related decisions; ambiguity of certain questions from the questionnaire, DHQ 2; and the validity of statistics regarding food security and the independent t test. The study design was cross-sectional, and thus causation cannot be inferred. The sample size, $N = 36$, was small and was limited by sample characteristics; thus the findings cannot be generalized beyond the group under study. The small sample size limits the power of the study to show whether the outcome results are a real effect or by chance. In addition, my sample size was limited by the expense of the research study, including 36 Metrocards ($5.00 each), 36 gift cards ($25.00 each), and the creation of the bound questionnaire booklets.

The questionnaires and consent forms were in both English and Spanish, and the readability of the documents ranged from third through sixth grade level. However, the

literacy rate of the sample population was limited to secondary education (47.2%). In addition, more than 50% did not graduate from high school, and only 25% had some college education. It is possible the sentence structure of the questionnaires was confusing or misinterpreted. Some individuals took 1 to 1.5 hours hours to complete the questionnaires, which possibly introduced fatigue. With increased fatigue, it is possible that the participants inadvertently checked the wrong boxes or selected incorrect answers. Other factors that contributed to fatigue were the wait time and location of where they filled out the questionnaires, a public waiting room with the television on and people talking.

Another limitation was with missing height and weight data that affected the calculation of the body mass index. The body mass index was calculated by self-reported heights and weights with 30 out of 36 participants reporting data. Both the self-reported and the missing data may have affected the distribution of body mass index in terms of food security status.

The coding of DHQ 2's questions, 111–121 were problematic due to multiple responses increasing the potential for unreliable or inaccurate entries. The instructions as well as the questions might have been confusing for the participants as they were requested to check off more than one response as applicable. The responses were not definite as to whether participants consumed more, less, or the same amount of food at any given week during the 30-day benefit period. As a result, some participants provided multiple responses to the same questions. Analysis of these data may have been skewed due to the coding of multiple responses to some of the questions. In addition, questions

about frequency of shopping over a 30-day benefit cycle may have been confusing. For questions such as, "Do you shop infrequently" (USDA, 2014a), it was a challenge to assess definitely whether there was a deficit or an increase in certain foods that would increase a risk for obesity and Type 2 diabetes.

Also stated in terms of a 30-day benefit cycle were questions about coping strategies to determine a transition time when coping strategies were used. Based on the responses received, I could not determine an exact point in time, over the 30-day benefit cycle, if there was a transition from marginal to low food security or from low food security to very low food security status. In addition, it was difficult to correlate the exact point in time over a 30-day benefit cycle when there was more of a risk for food choices potentially associated with an increase risk for obesity and Type 2 diabetes.

The validity of food security status and transitions from one point in time to another was limited because the participants were responding to 30 days and not weekly. Therefore, it was challenging to assess exactly whether there was a transition and if so, at what point in time during the 30 days did a transition from high, marginal, low, to very low food security occurred. In addition, the outcome data on specific coping strategies, a supplement to the measurement of food security status, were limited to not knowing the severity of food security status, whether the participant was marginal, low, or very low food secure. This could be due to the small sample size, potential language barrier, not understanding the questions, or fatigue to answering the all of the questions with the same amount of energy.

The independent *t* test, Levine's test for quality of variance, was conducted to look at food choice variation over a 30-day benefit cycle. Despite the small sample size, the assumption was that the data had a normal distribution and homogeneity of the variance. Because the sample was small it is more challenging to achieve normality and the *t* test results could be misleading.

Implications for Positive Social Change

The potential social change implications of the study are that the findings may lead to changes in benefit allotments, food and nutrition education policy, and a mandatory nutrition package. Informed policy makers may be influenced to rethink how the EBT allotments are allocated in order to alleviate food insecurity. This could include providing the benefit allotments over the course of the month rather than the current policy of providing allotments once in the 30-day benefit cycle and creating a mandatory food package that would allow for the purchase of fresh or frozen fruits and vegetables as part of a healthy and balanced diet. In addition, the findings of this study could influence decision makers to make nutrition education mandatory as part of the nutrition package. These three important changes in SNAP would help with FCD among people with prediabetes who participate in SNAP and possibly lower their risk of Type 2 diabetes.

Summary

Food choice decisions are fundamental to how and why people eat certain foods. They are influenced by a multitude of things such as environment, finances, social settings, demographics, culture, and food security. Although there is an association between obesity and food insecurity in SNAP households, less is known about the cycle

of food shopping and food decisions in SNAP households with at least one person

diagnosed with prediabetes or the coping strategies as used by those households when

food is limited. Neither has the food shopping behavior nor food consumption decisions

of SNAP households with at least one person with prediabetes been examined to

determine the extent to which these choices increase the risk of those who have

prediabetes in the household in developing Type 2 diabetes. The potential of food

insecurity among SNAP participants with prediabetes to increase the risk of Type 2

diabetes is not clear. Thus, I addressed and examined the use of the EBT benefit

allocations by SNAP households with at least one member with prediabetes to determine

food choice variations over the 30-day benefit cycle and their coping strategies to

determine food security status. The data collected were from a demographic and health

questionnaire, a food security questionnaire, and a dietary food frequency questionnaire.

Additional analyses were conducted on data collected that included consumption of sugar

sweetened beverages and fats and perception of personal health in relation to body mass

index and food security status.

The FCPM provided the theoretical framework for this study. It has three

components—life course, influences, and personal food system—all of which depict

FCD. This model is broad in its view of FCD and is not limited to just food access and

availability. The variables under study that affect and influence food choices included the

independent variable (food security) and the dependent variables (food choice decisions,

coping strategies over a 30-day food cycle as determined by food choices, food

expenditures, and perception of personal health). Chapter 2 is the literature review,

including the literature search strategy used, the history of SNAP, food security definition

and significance, coping strategies and impact on food choices, the components of the

theoretical design for this research study, an overview of diabetes, and relevance to food

choices in relation to food security.

Chapter 2: Literature Review

Introduction

The SNAP supplements the ability of individuals and families to buy food with a benefit allotment in the form of an EBT. Despite this benefit, food insecurity continues to be prevalent in households enrolled in SNAP (Nord & Golla, 2009). The reason for this insecurity is not entirely clear but may be due to in part to FCD and timing of the monthly benefit (Nord & Golla, 2009). Poor FCD within a benefit month may contribute to a cycle of food insecurity. In turn, cycles of food insecurity may be a factor in advancement of risk factors for chronic but preventable diseases, such as Type 2 diabetes (Seligmen, Laraia, & Kushel, 2010). To help fill this knowledge gap in the understanding of this relationship, I examined the use of the EBT allocations by SNAP participants who have prediabetes to determine food choices made over a 30-day benefit cycle in relation to food security status, and whether the FCD are associated with a potential risk for developing Type 2 diabetes. The benefit of studying this select group, SNAP participants who have prediabetes, is to identify their FCD in relation to food security status, perception of health, and coping strategies over a 30-day benefit cycle, that may contribute to the prevention Type 2 diabetes.

In this chapter, I reviewed the relevant literature on households participating in SNAP in relation to food security status, FCD, and risk factors associated with Type 2 diabetes such as high fructose corn syrup (HFCS), as potential indicators for obesity. In addition, included is a discussion of the FCPM and its three components as used for the theoretical framework for this study; knowledge and food choices/behavior; prevalence

and incidence of diabetes; and an overview of diabetes including prediabetes and Type 2 diabetes. An exploration of the interplay between various factors that change or influence behavior that leads someone to specific FCD is provided as FCD are complex, and therefore, it is important to better understand the fundamental aspects of FCD and their potential relationship to Type 2 diabetes.

Literature Search Strategy

The search engines, library databases, and websites used to find articles for the literature review were Google Scholar, PubMed, National Institutes of Health (NIH), National Cancer Institute (NCI), American Diabetes Association, and International Diabetes Federation (IDF), the WHO, the USDA, and the United Nations's Universal Declaration of Human Rights. Keywords used in the literature review search were *food security, food insecurity, prediabetes, Type 2 diabetes, food choice process model, hunger, human rights, conceptual models/frameworks, constructionist, diabetes criteria, standards, food patterns, monthly cycle, food stamps,* and *food knowledge*. In order to include some seminal literature, my scope of the literature search was between 1981 through 2013.

Supplemental Nutrition Assistance Program: History, Eligibility, Participation, and Food Allowed

History

SNAP plays a vital role in helping to improve nutrition in low-income individuals through the SNAP-ED program. The goal of SNAP-ED is to improve healthy food choices within a limited budget among those individuals eligible for SNAP and help them

choose an active lifestyle consistent with the current Dietary Guidelines for Americans and MyPlate (USDA, 2014c). Although nutrition education is a significant component in the program, the food purchases do not have to meet any nutritional requirements (SNAP to Health, 2010-2015). thus foods high in sugars and fats may be purchased just as easily as fruits and vegetables. The consumption of foods high in sugars and fats with limited physical activity contributes to weight gain, which is a risk factor for Type 2 diabetes (Goran, Ulijaszek, & Ventura, 2012, p. 6).

According to the Center on Budget and Policy Priorities (CBPP, 2015, para 1), in 2014, the SNAP program helped approximately 46 million people in the United States to obtain food within a month. However, food pricing and availability present a different way to view the relationship between hunger and obesity from an environmental perspective, such as the purchasing power among low-income households in SNAP, the association with poor dietary intake, and being overweight or obese. The association with poor dietary intake and being overweight may be due to the food stamp cycle with individuals feasting in the beginning of the month and with famine at the later part of the month, hence the possibility of an altered metabolism resulting in obesity (Wiig & Smith, 2008). Obesity increases insulin resistance, contributing to the risk for Type 2 diabetes (Kahn, Hull, & Utzschneider, 2006, p. 840).

In the1980s, there was severe hunger in the United States, which led to changes in the Food Stamp Program (FSP), such as the elimination of sales tax on food stamp purchases, eligibility for the homeless, and an expansion of nutrition education. Due to The Hunger Prevention Act (HPA, 1988), and the Mickey Leland Memorial Domestic

Hunger Relief Act (1990), there was an improvement of the FSP. Legislation in 1988 and

1990 increased benefits, authorized nutrition education grants, and established an EBT as

an issuance alternative (USDA, 2012a).

EBT is an electronic system that allows a recipient to authorize transfer of their

government benefits from a federal account to a retailer account to pay for products

received. In 1984, the EBT began in Reading, Pennsylvania and as of July 2004, EBT

was used in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and

Guam (USDA, 2012). The food stamp benefits are deposited once per month in a

personal account, a plastic card is issued, and a personal identification number (PIN) is

assigned or chosen by the recipient to give access to the account (USDA, 2012a). The

EBT is used in programs such as the USDA's Special Supplemental Nutrition Program

for Women, Infants and Children (WIC), and the Temporary Assistance to Needy

Families (TANF) program.

The Farm Bill (2002) reauthorized the FSP, and The Personal Responsibility and

Work Opportunities Reconciliation Act (PRWORA, 1996) changed transitional benefits

for participants leaving TANF (USDA, 2012). By 2000, participation reached 29 million

people per month due to the Farm Bill (2002) that expanded the food stamp benefits

based on an economic slowdown in the United States and a rise in unemployment. The

Farm Bill (2008) increased the commitment to federal food assistance programs by

changing the name, food stamps, to SNAP as of October 1, 2008. The name was changed

to address the stigma that was attached to food stamps (USDA, 2012a).

Financial Eligibility

Households have to meet gross and net income eligibility to receive SNAP (see

Table 1), unless members are receiving TANF or SSI. A household with an elderly

person or a person who is receiving certain types of disability payments only has to meet

the net income test.

Table 1

SNAP Eligibility: Oct. 1, 2012 through Sept. 30, 2013

Household Size	Gross Monthly Income (130 percent of poverty)	Net Monthly Income (100 percent of poverty)
1	$1,211	$931
2	1, 640	1,261
3	2,069	1,591
4	2,498	1,921
5	2,927	2,251
6	3,356	2,581
7	3,785	2,911
8	4,214	3,241
Each additional member	+429	+330

Note. From United States Department of Agriculture: Supplemental Nutrition Assistance Program:

Eligibility, 2012.

SNAP Eligibility: Oct. 1, 2014 through Sept. 30, 2015

Household Size	Gross Monthly Income	Net Monthly Income
1	$1,265	$973
2	1,705	1,311
3	2,144	1,650
4	2,584	1,988
5	3,024	2,326
6	3,464	2,665
7	3,904	3,003
8	4,344	3,341
Each additional member	+440	+339

Note. From United States Department of Agriculture: Supplemental Nutrition Assistance Program:

Eligibility, 2014. Retrieved from http://www.fns.usda.gov/snap/eligibility

The gross income is a household's total nonexcluded income, before any deductions have been made; it is gross income minus allowable deductions (USDA, 2012d). In Alaska and Hawaii, the SNAP gross and net income limits are higher (USDA, 2012d).

Participation

Because the USDA's Food and Nutrition Service (FNS) administers SNAP, the agency also sets the amounts of benefits and establishes the program's rules. Each state is responsible for the day-to-day operations, eligibility, and benefits according to the federal rules (Andrews & Smallwood, 2012). In 2010, approximately half of the participants receiving benefits were children, 11% were the elderly or disabled individuals living alone, and in 30% of households, there were at least one member employed (Andrews & Smallwood, 2012). Andrews and Smallwood reported since 1980, a 1 percentage point increase in the national unemployment rate is associated with about 1 to 3 million additional SNAP participants. Between 2003 and 2007, the unemployment rate fell 1.4 percentage points, SNAP caseload increased 22% (or by 4.8 million participants), the poverty level rose by 4%, and the SNAP participation rate rose 56 to 69% (Andrews & Smallwood, 2012, p. 2). Between 2007 and 2010, the unemployment rose, the SNAP caseload increased, and the poverty level increased (Andrews & Smallwood, 2012, p. 2). Finifter and Prell (2013) reported an estimated 13.4% of unemployment insurance households received SNAP in 2009, an increase of one fifth over the estimate of 11.1% from 2005.

The Farm Bill (2008) provided provisions to increase federal spending on the

program over 10 years. Consequently, there was more support for working poor families, and the program raised its standard deduction and minimum benefits, allowing for the rise in food prices and cost of living. However, the indexation of the maximum benefit was not changed so when food prices rose in 2007–2008, the purchasing power of the SNAP maximum benefits fell by 9% because of the benefit adjustment lag (Andrews & Smallwood, 2012). In April 2009, the maximum benefit levels for SNAP were increased by 13.6%, which was equivalent to $80.00 per month for a four-person household (Andrews & Smallwood, 2012).

Andrews and Smallwood (2012) concluded that the SNAP enhancements increased food spending by 2.2% between 2009 and 2010, which affected and improved food security. However, to date, 1 out of 6 persons in the United States face food insecurity, and 2 out of 3 adults are overweight (SNAP, 2013). Although the Farm Bill (2012) was passed, it included $23.6 billion in cuts over the next 10 years; $4.5 billion of these cuts came from nutrition programs. The $4.5 billion in nutrition cuts came from changes to SNAP, through modifying the "heat and eat" categorical eligibility with the Low Income Home Energy Assistance Program (LIHEAP; National Conference of State Legislation [NCSL], 2012, para. 2). On March 29, 2012, the House passed a budget resolution that proposed $33 billion in cuts to SNAP (NCSL, 2012). With 1 out of 6 persons in the United States already facing food insecurity, food insecurity may increase.

According to the 2013 Household Food Security in the United States report (Jensen, Gregory, & Singh, 2014), the percentage of U.S. households that were very low food secure essentially was unchanged from 2012 to 2013; however, food insecurity

declined from 2011 to 2013. Jensen et al. reported that in 2013, 85.7% of U.S.

households were food secure throughout the year; however, 14.3% (17.5 million

households) were food insecure. In addition, in 2013, 5.6% of U.S. households (6.8

million) had very low food security, essentially unchanged from 5.7% in 2011 and 2012

(Jensen et al., 2014). In this food security status, "the food intake of some household

members was reduced and normal eating patterns were disrupted at times during the year

due to limited resources" (Jensen et al., 2014, para. 3).

Food Eligibility

Based on the Food and Nutrition Act (2008), eligible food items in SNAP are

breads, cereals, fruits, vegetables, meats, fish, poultry, dairy products, pumpkins, seeds

and plants that produce food for the household to eat, and energy drinks that have

nutrition labels on them. Birthday and other special occasion cakes are eligible if the

value of the nonedible decorations does not exceed 50% of the purchase price of the cake

(USDA, 2012e). SNAP foods that are ineligible for purchase are beer, wine, liquor,

cigarettes or tobacco, soft drinks, candy, snack crackers, ice cream, steak, seafood,

bakery cakes, energy drinks that have a supplement facts label (classified by the FDA as

supplements), inedible gourds and pumpkins that are used solely for ornamental

purposes, and gift baskets that contain both food and nonfood items if the value of the

nonfood items exceeds 50% of the purchase price (USDA, 2012e). Also ineligible for

purchase are nonfood items, such as pet foods, paper products, households supplies,

vitamins and medicines, food that will be eaten in the store, hot foods, grooming items,

cosmetics, and live animals (USDA, 2012e). The quality of health of individuals in

households participating in SNAP may increase if the eligible foods are consumed on a regular basis, along with physical activity.

Supplemental Nutrition Assistance Program Expenditure

The environment is significant when it comes to food purchase. For example, the location of food retailers may influence what is purchased due to the convenience of the store in a specific location, and the cost of transportation to a food retailer with quality foods may affect personal finances if the food retailer is at a distance. SNAP households allocate approximately 22% of their total household expenditures for food (Caswell & Yaktine, 2013). As household income rises, the amount of that income spent on food rises as well; however, the proportion of income spent on food declines. SNAP households spend 24% more on food than eligible nonparticipating households (Caswell & Yaktine, 2013). SNAP households spend 5% less on food consumed at home than those ineligible households (Caswell & Yaktine, 2013). In contrast, SNAP participants spend less on food consumed away from home (Caswell & Yaktine, 2013). Wiig and Smith (2008) noted that "store accessibility, food prices and food stamp policies" (p. 1731) affected where SNAP participants shopped. The monthly food cycle regarding SNAP benefits, the rise of food expenditures per person at home in the first 3 days (Wilde & Ranney, 1998, p. 11), and shopping frequency (Wilde & Ranney, 1998, p. 18) may play a role in FCD and shopping behavior.

Food Security: Fuel versus Food Strategies

Food permeates human existence, whether for pleasurable consumption, medical necessity, or due to hunger. It is the right of everyone to be able to eat. According to the

Universal Declaration of Human Rights, a standard of living is a right, which includes

adequate healthcare and food (as cited in United Nations Cyberschoolbus, 2012). Food

security is "when all people at all times have access to sufficient, safe, nutritious food to

maintain a healthy and active life" (WHO, 2012, para. 1). This standard is more than just

meeting a current nutritional status but "capturing the vulnerability of future disruptions

in the access to adequate and appropriate food" (Barrett, 2010, p. 825). Conceptually,

food security aligns along availability, access, and use—it is hierarchical in nature.

Availability is necessary; however, it is not sufficient to ensure access, and in turn,

necessary but not sufficient for effective use (Barrett, 2010, p. 825).

Food security is the economic and physical access to food that meets the needs of

people's dietary and food preferences. According to the WHO (2012), food security is

built on the foundation of three variables: *food availability*, where there is a sufficient

quantity of food on a consistent basis; *food access*, when there are sufficient resources for

a nutritious diet; and *food use*, where basic nutrition knowledge is appropriate or

satisfactory, including adequate water and sanitation.

Food security is a developmental and sustainability issue that is linked to a

person's health. The WHO (2012) argued that food security may be a distribution issue

and explored whether there is enough food to feed everyone worldwide, whether food

security is a production issue, or whether the population food needs can be met in the

future. The WHO also explored whether food security is a global trade and/or a

globalization issue, and whether "globalization is leading to a persistence of food

insecurity and poverty in rural communities" (para 4). The USDA's (2006) labeling and

definitions for food security are *High food security* (no reported indications of food-access problems or limitations) and *Marginal food security* (anxiety over food insufficiency or shortage of food in the house, where there is little or no indication of changes in diets or food intake). The label and definitions for food insecurity are *Low food security* (the old label was food insecurity *without hunger,* reporting of reduced quality, variety, or desirability of diet, and little or no indication of reduced food intake); and *Very low food security* (the old label was food insecurity *with hunger*, reporting of multiple indications of disrupted eating patterns and reduced food intake; USDA, 2014b).

In looking at the assessment of the USDA's concept of food security, the Committee on National Statistics (CNSTAT; USDA, 2012c, 2014d) looked at definitions of hunger, the relationship between hunger and food insecurity, and whether the definitions were appropriate for the policy context in which food security statistics are used. Hunger was referred to as a consequence of food insecurity that, due to prolonged, involuntary lack of food, results in discomfort, illness, weakness, or pain. The panel realized that to measure hunger in its truest sense, it would require a collection of more detailed information on physiological experiences of individual household members (see Figure 1). The CNSTAT recommended that the USDA should continue to measure and monitor food insecurity regularly in household surveys and that a national assessment of hunger be conducted using a survey of individuals rather than households. Because hunger is not usually assessed in food security surveys, the CNSTAT panel recommended that the USDA consider alternative labels to convey the severity of food insecurity without using the word hunger. The USDA agreed, and consequently there was

the new labeling of low food security (LFS) or food insecurity without hunger and "very

low food security" (VLFS) or food insecurity with hunger in 2006 (USDA, 2012c).

Percentage of households reporting indicators of adult food insecurity, by food security status, 2011

Source: Calculated by ERS using data from the December 2011 Current Population Survey Food Security Supplement.

Figure 1. Households with very low food security (food insecurity with hunger) compared with food-secure households and with households with low food security (food insecurity without hunger). United States Department of Agriculture: Economic Research Service (2012e): Household food security in the United States in 2011. Retrieved from http://www.ers.usda.gov/media/884525/err141.pdf

Within the VLFS household, sometimes during the year, the food intake of household members is reduced, and their eating patterns are disrupted due to lack of money. In Figure 1, the VLFS households experienced all of the 10 conditions whereas the LFS households only experienced 8 of the 10 conditions, and the food secure households experienced 3 out of the 10 conditions with less than 10% being worried food would run out, that food did not last, and that they could not afford balanced meals. Both the VLFS and LFS households experienced 3 of the 10 conditions; 75-95%, worried that their food would run out before they got money to buy more, the food they bought did not last and they did not have money to get more, and they could not afford to eat balanced meals. All households without children that were classified as having VLFS reported at least six of these conditions, and 66 % reported seven or more; households with children that were food insecure followed a similar pattern (USDA, 2012f). Although VLFS is defined with hunger, specific coping strategies are apparent to prevent suffering from deprivation; however there is still hunger among VLFS households. Households do not have to have hunger to experience some of the indicators that are experienced among the VLFS households.

The combination of food insecurity, hunger, and obesity has been a curious phenomenon and the issue of weight cycling as the possible cause has been explored. The paradox of food insecurity and obesity was originally discussed first by Dietz in the 1990s, with a case study of a 7- year old 220% above her ideal body weight who was living on food stamps (1995). Olson (1999) explored food insecurity and hunger among women of childbearing age and found that 37% of women in food insecure households

had a BMI >29 (obese) as compared to 26% of women in food-secure households (p.

522S). Likewise, Townsend, Peerson, Love, Achterberg, and Murphy (2001) found the

relationship between food insecurity and overweight, as measured by BMI, as "mildly

food insecure women were 30% more likely to be overweight than those who were food

secure" (p. 1738). Scheier (2005) argued that economics influences what food is

available and affordable, where families can purchase foods, and where families can

afford to live (p. 884). The economic factor points to the environment in terms of

proximity to food stores and fast food restaurants, as well as its impact on physical

activity and transportation patterns. It is feasible to associate the relationship between

those who are financially limited with where they live thus influencing food choices or

behavior based on proximity of food stores or transportation costs to where they have to

travel in order to purchase food. Individuals may not be food insecure but overweight due

to possibly choosing foods that are available, however unhealthy, such as high in

saturated fats and sugars.

Fuel Versus Food

With the rising cost of fuel to heat homes, people are making sacrifices by

choosing fuel over food, which means that people are spending less on food for the

household. The National Energy Assistance (NEA) (United States Department of Health

and Human Services, 2015) documented changes in the affordability of energy bills and

noted that approximately one third reported that they went without food, over 40 % cut

back on medical care and there was someone in the home that became sick due to the

cold temperature in the house. The policy Heat and Eat coordinates SNAP and the

LIHEAP, where it would relieve many households from choosing between paying for food or paying for heat. Cash through LIHEAP is provided directly to SNAP households (Food Research and Action Center, n.d.). The choice of paying for fuel may be an over-riding influence in FCD and could affect a household's food security status.

Psychological Strategies

Food access reflects the demand for food and food insecurity becomes a focal point for various behavior strategies in order to get food. Food access is influenced by a multitude of variables, such as unemployment, food prices, and storage (Maxwell, 1996). Access of food is different than food availability. When there is access to food, the question is whether the consumption of food is nutritionally sound. However when food access is limited there are various coping or adaptation strategies that are used to over compensate for the limitation. The difference between a coping strategy and an adaptation strategy is that the former is a short term mechanism for insufficiency of food and the later is a long term or permanent change in the way households and individuals acquire food sufficiently (Maxwell, 1996). Food insecurity can be short term or long term, thus making food insecurity transitory. Maxwell (1996) noted that food security is an element of livelihood security and that people who are financially limited need to balance "competing needs for asset preservation, income generation, and food supplies in complex ways, and there may be hunger up to a point to meet other objectives" (p. 293). Maxwell found six short term, food-based coping strategies relevant to food insecurity, ranked from least to most severe:

1.   Eating foods that are less preferred as a way of adapting to lower incomes

2.   Limiting portion sizes: however, this varied depending on the individual

3.   Borrowing food or money to buy food, a common practice, either a local merchant would extend credit and/or use a credit card

4.   Maternal buffering, a practice when a mother limits her own intake in order to ensure that her children have enough food especially for younger children

5.   Skipping meals

6.   Skipping eating for whole days, which was practiced by VLI groups of people.

Other coping strategies found were stealing food or abandoning children. These coping strategies were identified in urban or periurban areas (Maxwell, 1996, p. 295). These strategies as short term behaviors help transition from being food insecure to food secure.

In food insecure households, adults are more likely to have symptoms of depression that may lead to negative health behavior, as well as negative parent child interactions (Brontel-Tinkew, Zaslow, Capps, Horowitz, & MvNamara, 2007, p. 2161). Consequently, there are various strategies used to overcome economic barriers, such as seeking federal or emergency food assistance programs, looking for sales and price matching techniques by comparing food items and food stores, planning menus, making shopping lists, relying on household food storage, and bulk buying (Darko, Eggett & Richards, 2013, p. 24).

There are 46.6 million SNAP recipients in the United States (Ludwig, Blumenthal, & Willett, 2012). This is reflective of the economic status in this country

where there needs to be food aid to households, hence an influence in dietary behaviors (Leung, Williams & Vilamor, 2013). Food insecurity in the United States is not a picture of a thin-framed person, but rather an overweight or obese person due to consuming poor quality and a limited variety of foods. The population of lowest income has the highest rate of obesity, and the challenge is access to high quality foods, not necessarily quantity (Ludwig et al, 2012, p. 2567).

Irregular intervals of fasting will increase body weight. Ludwig et al. (2012) conducted a study on animals that were fasted. Ludwig et al. found that the intermittently fasted animals had an increased expression of a hunger-stimulated brain neuropeptide and a decreased body temperature. These biological changes predispose these animals to weight gain. With households on SNAP having limited financial resources, they may be experiencing a cyclical variation in food availability where at the beginning of the month they may over consume foods and then are deprived by the end of the month when the benefits are exhausted (Ludwig et al, 2012, p. 2567). With the transition of food security to food insecurity over time, not only are food choices and behavior affected but, physiologically there are changes that affect weight.

Monthly Food/Benefit Cycle

There has been an increased need for food stamps as a supplement to family food budgets; however, the distribution of benefits has not paralleled the need. Consequently, there has been an increase in food insecurity, possibly due to the food consumption cycle. SNAP participation has nearly doubled since 1997 along with the change in those receiving them (Wilde & Ranney, 1998). In 1997, there were over 25 million participants

or 1 out of 10 persons in the United States who were participating in the FSP (Wilde &

Ranney, 1998, p. 9). In 2010, 40.3 million people living in 18.6 million households

received SNAP benefits in the United States, of which 48% were children, 44% were

nonelderly adults, and 8% were ≥60 years, due to the economic downturn (USDA,

2012g). In October 2011, 46.2 million people in the United States were participating in

SNAP or one out of seven people (Andrews & Smallwood, 2012). As the economy in the

United States continues to shift and there is uncertainty to financial stability, more and

more people will be participating in SNAP. The possibilty of transitioning from being

food secure to food insecure may cycle asset preservation of self and family, and the

indicators or strategies for coping will continue, making public health interventions that

more challenging.

SNAP participants receive their benefits within the first 2 weeks of the month

(Darko, Eggett, & Richards, 2013). Wilde and Ranney (1998) concluded that food

expenditure per person at home rises in the first 3 days after food stamps are received and

then flattens out over the course of 3 - 4 weeks (p. 11). The timing of SNAP benefits and

economics influence shopping behavior. When food is eaten outside the home the food

purchases are steady throughout the 4 week cycle (Wilde & Ranney, 1998, p. 11).

Consumption patterns are influenced by the frequency of shopping, which is influenced

by store accessibility, food prices, and food stamp policies. Shopping frequency is

associated with dietary quality, specifically an increase of calcium, fiber, and beta-

carotene (Wiig & Smith, 2008). Frequent shopping helps low income households

maintain a consistent supply of perishable food items, such as milk and fresh vegetables

and fruits. Wiig and Ranney (2008) noted that produce was too expensive to consume throughout the month (p. 1731). What may offset the expense of produce throughout the month is for households in SNAP to purchase produce in season, eliminating the transportation costs built into the produce that is out of season, and to purchase frozen vegetables as a way to increase the vegetable's longevity.

Various incomes affect SNAP benefits. Wilde and Ranney (1998) found that families who were recipients of Aid to Families with Dependent Children (AFDC) received more food stamp benefits than non AFDC recipient families because the AFDC recipients rarely had other income. There were differences in their food intake patterns but not in food expenditures because both groups spent a lot of money in the first 3 days of the month (Wilde & Ranney, 1998, p.11). Children showed a steady food intake over the course of 4 weeks whereas adults had a significant drop in food intake. The frequency of shopping makes a difference in food intake over the course of 4 weeks. Those individuals in households that shop more frequently had a steady food intake over the whole 4 weeks versus those who shop less frequent (Wilde & Ranney, 1998, p.18). In addition, different foods may reflect different monthly cycles because some foods are more perishable or more expensive (Wilde & Ranney, 1998, p. 21). Meats and dairy products make up a higher proportion of food intake in the beginning of the food cycle as well as fruit juice, potatoes and tomatoes. However, food expenditures in general are much lower at the end of the month for all food groups. Grains are the most significant expenditure drop because they are nonperishable and are usually purchased at the beginning of the month and saved for later. Those that shop more frequently, more than

one time per month, experience no drop in food intake at the end of the month (Wilde & Ranney, 1998). For those that shop infrequently, the drop in food intake is usually in food categories of dairy and fruits (Wilde & Ranney, 1998, p. 26) and consequently calcium and Vitamin C are significantly lower than the recommended daily allowance (RDA) on average at the end of the month (Wilde & Ranney, 1998, p.35). As part of the nutrition education package through SNAP-ED (USDA, 2012g), it would be advantageous for participants to learn how to shop and what to purchase that bring each household to the next benefit allotment without resorting to cheaper high density types of foods to fill the hunger gap and to reduce the coping strategies that induce psychological stress and possible weight gain from over compensating from the feel of feel insecurity.

Food choices need to be explored in order to carve out a basis for a possible association with food restriction and being overweight. Dinour, Bergen, and Ming-Chen (2007) proposed a conceptual framework based on the food stamp cycle and obesity. Dinour et al. stated that "Cyclical food restriction has been associated with an increase in body adipose, a decrease in lean muscle mass, and a quicker weight gain with a response to refeeding …an example of the feast famine cycle has been linked with food stamps" (p. 1958). This is referring to a period of 3 weeks of over eating, followed by 1 week of involuntary food restriction due to the depletion of food sources; then the cycle resumes once the benefits from SNAP resumes. Over eating will increase adipose tissue and when there is an increase of adipose, there is a decrease of lean muscle mass, contributing to insulin resistance, which then contributes to the risk for developing Type 2 diabetes (Srikanthan & Karlamangla, 2011). It is this behavior of food choices that occur

throughout the 30-day benefit cycle that needs to be explored among SNAP participants to prevent possible over consumption of empty caloric foods that may give rise to obesity, support the physiology of prediabetes, and increase the risk for Type 2 diabetes.

SNAP benefits are intended to increase the access of eligible low-income households to a nutritious diet and to improve food security. Dinour et al. (2007) argued that when people transitioned between food security to food insecurity, with or without hunger, coping strategies are used depending on the time of the month; however, there is an inability of SNAP to bring all households to a level of food security. This might have been a result of insufficient SNAP benefits, the duration of monthly benefits, inefficient household budget management or inadequate nutrition education. Food insecurity, with or without hunger, forces individuals to cope with one or multiple coping strategies due to physiological changes during childhood, economic changes, psychological changes, parental protection, and physical adaptation to the feast/famine cycle (Dinour et al, 2007, p.1959). For example, they may skip meals and/or cut down the size of the meals. During the most severe time of food insecurity, many adults go hungry. Although food insecurity may be short in duration, the dietary changes associated with food insecurity may persist over a longer period of time because food insecure households often experience repeated food budget shortages. On average, households that report being food insecure are food insecure for 7 months out of the year (Seligmen et al., 2010, p. 304). The monthly food cycle in SNAP is associated with obesity and food insecurity, thus increasing the risk for Type 2 diabetes.

Food insecurity may be associated with gender and ethnicity. Caswell and Yaktine (2013) argued that food insecurity is common among SNAP households. Caswell and Yaktine found that approximately 48% of SNAP households were food secure, with 29% having low food security and 23% having very low food security (pp. 3 - 27). Those most likely to be food insecure included female-headed households with children and African American and Hispanic American-headed households. Caswell and Yaktine (2013) argued that without SNAP benefits, food insecurity among participants would be even more severe, and if the benefits increased, food insecurity would decrease, and that SNAP benefits do help alleviate food insecurity (p. 3-27). There is a need to readdress the nutritional needs of female-headed households with children to prevent the hunger-obesity paradox, which may increase the risk factors in the development of Type 2 diabetes.

To ensure healthy food choices throughout the month, and minimize the incidence of food insecurity, SNAP-ED's nutrition education encourages healthy food choices within a limited budget and to choose physically active lifestyles that are consistent with the dietary guidelines for Americans and MyPlate. Although there is nutrition education in all states, it is optional, not mandatory and the main focus is on fruit and vegetable consumption and activities that promote a healthy weight (USDA, 2012g). Some states partner with community health programs that target low income households on a limited budget. For example, the program, Generation With Promise (GWP) is part of the Henry Ford Health System, grant-funded in part by USDA SNAP through the state of Michigan. GWP focuses on empowering youth and families to increase their consumption of healthy

foods, how to shop on the budget, and how to increase physical activity and balance caloric intake (Henry Ford Health System, 2013). SNAP-ED supplements SNAP participants with nutrition education, however, instead of making nutrition education optional, states should make it mandatory for each household and emphasize frequent shopping to increase the intake of certain nutrients, such as protein, calcium, Vitamins A, C, D, and fiber. In addition, having an optional food allotment plan per month would benefit SNAP participants by giving them a choice. For example, the option of receiving the SNAP benefits either once or twice per month. This optional allotment may decrease the risk of food insecurity, weight gain, skipping meals toward the end of the month, decrease high fat and high density foods, increase produce and quality nutrition, and decrease the risk for developing Type 2 diabetes.

Theoretical Design: Food Choice Process Model

There are many models and frameworks that can be used to examine food choices and security, such as the economic model of food consumption, which has been adapted to include neighborhood effects, and the food choice process model (FCPM). In the economic model of food consumption neighborhood food access is examined, linking access to consumption or health outcomes, where the premise is that environments influence behavior. The economic model or theoretical framework is limited because it is adapted to neighborhoods' environment in relation to food access and does not include food security, food choice behavior, and monthly food cycle in relation to SNAP.

The FCPM is an adaptation of the conceptual model of food choice and both were developed from the Cornell Food Choice Research Group (Furst, Connors, Bisogni, Sobal, & Falk,1996; Sobal & Bisogni, 2009). Both models have three components, *life course*, *influences*, and *personal food system*. A constructionist approach was influential in the development of the FCPM, meaning that "knowledge is created by the interaction of individuals within society"(Andrews, 2012, para 6). The FCPM was developed through interviewing male and female adults, aged 20 - 70 years, middle class European Americans, inside and outside of grocery stores. By taking a constructionist approach, Furst et al., (1996) was able to get a realistic expression of how and why people engage in their food choices, food negotiations, and the "range and strength of the factors affecting food choice" (p. 248). The FCPM was developed by a team of researchers who agreed upon components that were developed from the interview data and the relationships that were examined among the categories.

Food choice behaviors are complex and multifaceted. Furst et al (1996) first described the conceptual model of food choice development, and categorized three major components: life course, influences, and personal food systems. Furst et al. initially depicted the model as a funnel-shaped figure that included the three components. The life course includes "past influences of personal experiences and historical eras, current involvement in trends and transitions and anticipations of future events" (Furst et al., 1996, p. 252). The influences include ideals, personal factors, resources, social framework, and food context and the personal food systems, includes value negotiations, such as sensory perceptions, monetary considerations, quality, managing relationships,

convenience, and health and nutrition, all components leading to food choice decisions

(Furst et al., 1996). In 2009, FCPM was developed from the Cornell Food Choice

Research Group (Sobal & Bisogni, 2009), and encompasses a more overview of FCD

rather than the limitations of access to environmental situations, such as retail food

establishments and/or transportation.

FCDs are frequent, multifaceted, situational, dynamic, and complex. Sobal et al.

(2009) noted that FCPM was developed through a "constructionist social definition

perspective" (p. S37). Similar to FCD, food behavior is multifaceted, each component

overlapping. For example, a decision about what to eat is often linked to a decision about

where to get the food and how to prepare it. When a person has to make a decision about

acquiring the food, this may be connected to making decisions about where to store the

food and how to serve it thereafter. Food decisions may be situational with a

contextualized process when the decisions involve thinking about location, with whom

the food consumption will be, time it takes for food to be prepared and eaten, what type

of foods to be consumed, how much food to acquire, and how the food will be acquired.

Other FCD may also include preparation and serving, and this may get complex when it

involves others outside of the immediate family. There are potential issues of food

storage, sharing food with others and the need to consider how much to share, and the

cleaning up process (Sobal & Bissogni, 2009, p. S38).

FCD can change over historical and individual time, based on people's

personal development as they pass through various stages of life and settings. This

could be over the course of weeks, months or years. Moods affect food choices

whether or not to eat and when to eat and/or with whom to eat with (Sobal, 2009, p. S38). People's judgments may include taste, health, convenience, cost, ethics, and ecology.

Life Course, Influences, Personal Food System

  Life course component. Life course refers to people's life stages and their development (Sobal, Bisogni, Devine, & Jastra, 2006, p. 2) This is affected by time and is shaped by their environment, past and current eating experiences, situations and expectations about future possibilities (Sobal et al., 2006, p. 3). People's life stages include childhood, adolescents, adulthood and old age, all of which affect a person's food choice trajectory. Food choice trajectories are defined as a central concept in life course thinking, which includes a person's "persistent thoughts, feelings, strategies, and actions over the lifespan" (Sobal et al., 2006, p. 3). Food choice trajectories may lead to habitual food selections that can affect how people adjust to life course transitions, such as aging, health, and major life events, like a change in personal relationships, changing schools, illnesses, change of employment) (Sobal et al., 2006, p. 4). The timing of a transition or turning point in someone's life may in turn affect or influence FCD (Sobel et al., 2006, p. 4).

  As people grow and develop into adults, life styles change over time from many influences. Contexts represent the "environments within which life course changes occur, including social structure, economic conditions, historical eras and the changing physical environment" (Sobal et al., 2006, p. 5). A person born in one period of time would have a different food trajectory than a person born in a different time and place. Consequently,

personal FCD are subject to change in relationship to life transitions that are experienced

at different times. In addition, contexts are the broader environment, such as the physical

surroundings and behavior settings, social institutions and policies, and the seasonal and

temporal climate (Sobel et al., 2006, p. 5). The food and nutrition system determines

which foods are available for individuals to choose from, how and where they are

prepared, served and eaten (Sobel et al., 2006, p. 5). An example would be the work place

and home where FCD are made, each potentially different however may be an overlap

between the two settings.

Influences component. FCPM includes the various influences that shape food

choices. There are five factors that influence FCPM: ideals, personal factors, resources,

social factors and contexts, each fluctuate over a life time when making FCD (Sobal et

al., 2006, p. 5). People's ideals are learned over time through family. Standards are

learned through socialization and acculturation and consequently influence FCD.

Personal factors influence FCD, such as characteristics of individuals, a person's sensory,

genetics, preferences, personalities, moods, phobias, identities, and self conceptulization.

These personal factors are developed over time and are the basis for the uniqueness and

individualized construction of FCD. People may develop a self-identity or an image by

the foods that they choose to eat, which in turn shapes their specific food selection.

Resources can be tangible or intangible assets that are available for making FCD.

The tangible assets would include money, equipment, transportation and space. The

intangible assets are time, skills, and knowledge. There are intangible social capital assets

that include help from others, advice and emotional support. Some people make FCD

based on certain barriers (cost, transportation, cooking skills and/or limited resources equipment). Sobal et al. (2006) argued that low income people manage food choices according to their changing financial situation as they "experience greater or lesser food insecurity" (p. 6). Consequently, food security is transient and strategies to cope facilitate various food choice decisions and thus affect health outcome short and long term.

Social factors include relationships that are influential in FCD. These relationships are family, peers, networks, organizations, communities and other social units that provide opportunities and obligations for eating relationships and FCD. An eating relationship is "crucial and often part of the food choice process…with whom someone eats often governs where, when, how and what they eat" (Sobal et al., 2006, p. 6). An eating relationship with others can affect whether someone gains or loses weight, modifies tastes, or justifies certain food choices and behavior influencing long term health conditions over the course of someone's lifetime. Determinants of food choices are multilayered and permeate biological, psychological, geographical, cultural, economic, political, behavioral, historical, and environmental.

Personal food system component. FCPM includes the personal food system, which is the mental process where people take their influences of FCD into how and what they eat in particular situations (Sobal et al., 2006, p. 7). There are options, trade-offs, and personal boundaries given the food choices that are made. The personal food systems construct food choice values by classifying foods and situations according to the values (Sobel et al., 2006, p. 7). There is a development of strategies for food selections and the locations of where to eat. The details of the personal food system include the

development of food choice values which are dynamic, changing over time with life course events (managing relationships, health, taste, and cost, convenience), the classifications of foods and situations, value negotiation, balancing competing values, and strategies for recurring events.

Investing in the future of one's health and outcome is to increase the value and significnace of health for all. Health values are important to Furst et al., (1996) who noted the personal system as having two components: value negotiations weighing in different considerations and strategies that involve choice patterns based on previous deliberations that have become habitual. There are six values that are most noted when negotiating values "sensory perceptions, monetary considerations, convenience, health/nutrition, managing relationships and quality" (Furst et al., 1996, p. 257); however there are also ethics, tradition and familiarity values (Furst et al., 1996, p. 257). Personal values are learned and change over time as a person matures, hence setting the stage for choices, specifically FCD.

People will negotiate food values based on food patterns (Furst et al., 1996, p. 257). The strength of these values being negotiated during specific FCD may vary according to particular social contexts (Furst et al., 1996, p. 262). For example, when someone is in his or her own home or someone else's house, FCDs vary depending on comfort and relationship. Also, value negotiation may occur when there are resource decisions to make, such as financial constraints. Furst et al. (1996) argued that the negotiation of values were significant in the food choice process and also noted that the "hierarchy of values' (p. 263) needs more information from the individual's perspective

(p. 263). The primary care taker in families have the ability to influence children's values and thus impact their food patterns, however food security is dependent on the social context (financial resources).

Advantages, Application, and Limitations of Food Choice Process Model

In the FCPM, information is elicited from consumers about their FCD and this feedback is linked to concepts that construct a framework that reflects consumers' perspectives of food decisions. The benefit of induction is that the information is about those being studied; however, the limitation is that it only is relevant to those who participate (Sobal & Bisogni, 2009). The application of FCPM can be beneficial in a research setting by identifying specific issues. For example, it is useful in manipulating and considering an analysis of food selections. FCPM could be applied in clinical, community and policy work settings. In regards to policy work, the researcher can consider how to "leverage social and economic changes to improve healthy eating in populations and to target particular subgroups" (Sobal et al., 2006, p. 15). Furst et al. (1996) highlighted applications for the use of the FCPM that included a range of influences and values that are negotiated by diverse people in variety of settings that can help policy makers, educators, and clinicians be holistic in their viewpoints of food practices and efforts to improve dietary behaviors. The model is an aid to learning, discovering or problem solving, and it can be used to evaluate different interventions, identify barriers, set expectations for the impact of an intervention, and develop measures for evaluation outcomes (Furst et al., 1996, p. 263). FCPM may help a person better understand his or her own FCD and be able to identify his or her behaviors and/or

facilitate behavior change(s). Winter Falk, Bisogni, and Sobal (1996) used FCPM to explore food choices among older adults, 65 years and older whom lived independently. The FCPM was used to highlight FCD by identifying beliefs, life course events, characteristics of foods and meals shaped during childhood, social structure, sensory perceptions, financial status, convenience, and physical well being.

The limitation of the FCPM is that it was developed by exploring food choices of individuals (Furst et al., 1996, p. 263). It may need to be elaborated to examine collective food choices of families and other multiperson units involving group decision-making. The model was developed and applied in the postindustrial Western society in the late 20th and early 21st century and it may need to be adapted to serve other cultures, places and historical eras. In addition, the model may not be applicable if multiple food options are not available, such as when there are famines, within specific cultures and/or when there are fixed menus. This may be a limitation among SNAP participants in its use because one of the reasons for applying for federal assistance is due to financial constraints and/or foods that are fixed or culturally specific to certain ethnic groups.

The FCPM can be used to address a gap of knowledge seen in previous work on behavioral and social influences on food choice and eating behavior. Nestle et al. (1998) focused on physiologic and psychological determinants, with limited exploration given to the cultural, historical, social, and demographic considerations. Culture is one of the most pervasive foundations for food choices, and SNAP participants in the Bronx, NY are culturally diverse by being European American, African American, Native American,

Alaska Native, Asian American, and Hispanic American (State of New York

Comptroller, 2013).

Although many cultures sustain their cultural food identity when coming to a new

country, there is also an adaptation to food acculturation as people integrate. Nestle et al.

(1998) argued that as people from varied societies enter the food system of the West,

there is a nutrition transition or dietary shift to consume more energy dense fats, saturated

fats, and sugars, moving away from coarse grains and starchy roots. This trend may then

"drive a taste-mediated desire for a more varied and energy-dense diet" (Nestle et al.,

1998, p. S51). An increased consumption of meat, dairy products, and fresh produce will

also give rise to a consumption of dietary sugars and fats. Urbanization plays a role in

nutrition transition where availability of processed foods increases foods that are energy

dense (sugar, salt and fat). Other influences to FCD are perceptions, beliefs, and attitudes

based on cultural values (Nestle et al., 1998, p. S52).

Learned behavior about food occurs during the first 5 years of life (Nestle et al.,

1998, p. S53). Foods that are energy dense produce positive feelings of satiety, which

serves as unconditional stimuli learned preferences (Nestle et al., 1998, p. S54). In

situations where foods are rewarded for certain behaviors and these foods are high in fats,

salt, sugar and/or are processed, the functions of these foods can be confusing (Nestle et

al., 1998, p. S54). When hunger is part of the sequence of food choice, a learned

preference is to choose energy dense, high fat foods versus a fat free version of the same

food, and this was demonstrated in rats (Nestle et al., 1998, p. S54) and later on among

children (Birch & Fisher, 1997). Adult food patterns can be learned through the

understanding of food preferences among children, possibly explaining how and/or why there is an inconsistent or contradictory FCD when compared to the dietary recommendations.

FCD influence a person's self identity. Bisogni, Connors, Devine, and Sobal (2002) focused on a theoretical understanding of identities related to eating. Bisogni et al. (2002) grouped three types of identities in relation to eating, "identities related to eating practices, personal characteristics, and related to reference groups and social categories" (p. 135). This research is consistent with the FCPM, where life course processes influence individuals; these processes may influence current food choice practices (Bisogni et al., 2002, p. 136). The influences for self-identity is an evaluative dimension, where a person is seeking identities that are viewed as desirable and avoiding those identities that may be viewed as negative (Bisogni et al., 2002, p. 135). Past and present environments are influential in an individual's self identify as well as an increase in an individual's self esteem (Bisogni et al., 2002, p. 136). Certain cultures have specific foods that are ethnically driven and thus serve as self identification. The three research questions addressed food choices decisions and coping strategies over a specific time frame, 30-days, thereby building upon the existing theory that explores "life course, influences, and personal food system.

The Nutritional Status of the United States

The quality of diets in the United States is parallel with the rate of obesity and food insecurity regarding access to quality foods, which has affected and compromised the variety of foods and meal plans in households. Ben-Shalom, Fox, and Newby (2012)

analyzed the NHANES 1999 - 2005 for individuals from households with incomes below 200% of the federal poverty level. Ervin (2011) reported that most adults in the United States fell short of the dietary guidelines based on scores from the Healthy Eating Index – 2005.

The HEI is a 100 - point scoring system that measures how well populations adheres to the *Dietary Guidelines for Americans* (USDA, 2012b). The dietary patterns of adults and children, 2 to 18 years, were similar among the subgroups of SNAP participants, income eligible nonparticipants, and other low income participants. Healthy eaters, both adults and children, were more likely to eat breakfast; consume three meals per day; drink milk; eat fresh fruits and fruit juice, vegetables, and whole grains; have smaller portions; and overall have nutrient rich diets. On the other hand, the less healthy eaters were more likely to eat in restaurants, consume sweetened beverages, obtain larger shares of calories from snacks, have mixed dishes, consume foods with added sugars and fats, drink high fat milk, consume sweetened breakfast foods, and overall have lower nutrient diets (USDA, 2012f; Ben-Shalom et al., 2012). This pattern of eating among the less healthy eaters contributes to weight gain and to the risk of Type 2 diabetes development.

There is limited consumption of fruits and vegetables in the diet of the American people. These foods are significant to people's health however the conversation is to strategize in getting more American people to consume them. Krebs-Smith, Guenther, Subar, Kirkpatrick, and Dodd (2010) argued, "Nearly the entire U.S. population consumes a diet with fewer vegetables and whole grains than recommended and that a

large majority under consume fruits, milk, and oils relative to recommendations" (p.

1836). Data from the 2001-2004 NHANES (2010) for 16,338 person's aged ≥2 years

were analyzed and the majority of the population did not meet recommendations for all of

the nutrient rich food groups, except total grains, meat and beans. Krebs-Smith et al.,

(2010) concluded that there was an overconsumption of energy from solid fats, added

sugars, and alcoholic beverages. Over 80% of people age ≥71 years and over 90% of all

other sex age groups had intakes of empty calories that exceeded the discretionary calorie

allowances (Krebs-Smith et al., 2010). Although SNAP prevents the purchase of "soft

drinks" (USDA, 2012e), the program has no regulations in the FCDs or influence of these

types of beverages being purchased. These sweetened beverages contribute to the

excessive discretionary caloric intake and may contribute to food insecurity as being not

a good source of nutrition but rather as part of dietary intake.

Knowledge and Food Choice Decisions

There are mixed results regarding whether knowledge is linked to diet and health

and changing FCD. Nestle et al., (1998) argued for the most part people have knowledge

of health however they do not know how to apply it nor are they motivated to change (p.

S54). Worsley (2002) claimed that although nutrition knowledge is significant, this may

not be sufficient enough to change food behavior. Food behavior is influenced by a series

of environmental and intraindividual factors, including motivation. The interplay between

motivational factors and information processing is important for health care providers, as

is the distinction between declarative and procedural knowledge. Declarative knowledge

is an awareness of things and processes and procedural knowledge is knowing how to do

things (Worsley, 2002, p. S579). Declarative knowledge, for example, is a person knowing that oranges have Vitamin C and procedural knowledge is knowing how to choose certain utensils, to lay them out for a meal.

Although there are some similarities between healthy and less healthy eaters, there are specific differences between the two groups. Ben-Shalom et al. (2012) pointed out specific dietary pattern differences between SNAP participants who are healthy eaters versus those who are less healthy eaters. The healthy eaters consumed fewer calories on average, and the high-fat milk or sweet breakfast foods were more frequently consumed among the less healthy eaters. However, this dietary pattern of high fat and sweetened breakfast foods was also present among the healthy eaters. In addition, both healthy and less healthy eaters have patterns of intake of sweetened beverages (USDA, 2012b). Fifty nine randomly selected recipients of the Expanded Food and Nutrition Education Program (EFNEP) explored nutrition knowledge at entry into the program and at 1 year follow up. Overall, the participation in EFNEP led to an increased nutrition knowledge and food management skills among low income women; however, the long-term effects of knowledge still need to be researched and among more diverse populations (Greenwell & Sobal, 2000). It is significant to implement nutrition education as a supplemental component among SNAP participants, thus encouraging nutrition education as mandatory versus optional when receiving allotments when the next Farm Bill comes up for revision.

Knowledge can be used to explain various aspects of the world, and provides predictability to events. Knowledge provides the need for cognitive predictability.

However, knowledge is a system of beliefs (Worsley, 2002, p. S580), not just facts.

Beliefs are dynamic, not static, and a person's experiences, social surroundings, peer

involvement, and physical and biological environments, may be influential and

consequently influence knowledge and FCD. Chawick, Crawford, and Ly (2013) argued

that knowledge is not sufficient in order to make changes in food choices and behavior,

but instead is dependent on familiarity, good tasting, the taste of sweetness, and

environmental influences, such as purchasing and preparation and strength of habit.

Chawick et al. (2013) stated "Habitual patterns of behavior develop when behavioral

sequences are repeated sufficient times in the same environment to form an association

between the two in memory" (p. 38). Educational and persuasive interventions are

significant in improving people's intention to change their behavior; however, they are

poor at producing behavior change, especially those behaviors that can be classified as

habitual.

Application of Food Choice Process Model to Research Study

In this study, I examined the food security status of recipients who have

prediabetes participating in SNAP associated with food choice decisions and coping

strategies over a 30-day benefit cycle that potentially increases the risk of Type 2

diabetes. I explored food consumption patterns, food cycles, frequency of food shopping,

and whether a person who exhibits various levels of food security affects FCD. "The

biggest determinant of what an individual eats is availability" (Rozin, 2006, p. 19), and

food related behaviors are probably the "third most time consuming following sleep and

work" (Rozin, 2006, p. 20). The research questions were aligned with the goals of the

study regarding EBT use, food security status and food choice decisions over a 30-day

benefit cycle. To build upon this theoretical model, I addressed certain factors that

influence FCD, and expanded upon the variables under study. Although the sample was

limited in size, I was able to aggregate the data to explain the transitory levels of food

security, which overlaps the two components of the FCPM, influences and personal food

systems. There were enough data from the sample size to explore consumption patterns

and cycles of eating, coping strategies in relation to food security status. The FCPM's

component, life course, I explored the participant's food choice trajectories exploring

food choices that highlighted or affected how people adjust to life course transitions

when there was limited financial funds.

I measured the social demographics, which included age, weight, height, living

situation, and education in relation to SNAP participation and food security status using

descriptive statistics, hence showing the summary of the data. The statistical testing

included but not limited to a distribution of the data.

A regression analysis was used to assess or estimate an association (and forecast)

among variables under study, such as the independent variable, food security; and the

dependent variables, food choice decisions, coping strategies, and perception of personal

health that evolved from the descriptive statistics, estimating the relationships among

variables.

A Pearson chi square test was used to test the null hypothesis and to assess

categorical data or variables such as FCD (included high fat foods, sugary beverages, and

cultural based foods) education, use of food assistance programs, and the frequency of food consumption over a 30-day benefit cycle.

Overview of Diabetes

Prevalence of Diabetes

Race and ethnicity are both risk factors in contributing to Type 2 diabetes, which is significant because of the large population of Hispanic Americans and African Americans in the South Bronx, NY. Katzmarzyk and Staiano (2012) reported that the age-adjusted prevalence of total diagnosed and undiagnosed diabetes differs by race and ethnicity. In the 2003 – 2006 NHANES (Katzmarzyk et al., 2012) African Americans (14.9%) and Mexican Americans (15.6%) had approximately double the prevalence of diabetes as European Americans (7.6%). In the National Health Interview Survey (2008), ethnic disparities were evident in the number of cases, diagnosed with diabetes (p.2). Age-adjusted prevalence of diagnosed diabetes for adults was 11.0% in African Americans, 10.7% in Hispanic Americans, 8.2% in Asian Americans, and 7.0% in European Americans (Katzmarzyk et al., 2012). It is possible that the higher the prevalence of prediabetes among African Americans and Hispanic Americans, the greater the lifetime risk of developing Type 2 diabetes among these ethnic groups than in European Americans (Katzmarzyk et al., 2012, p. 2). Race and ethnic differences in diabetes prevalence were also seen in subgroups, such as Mexican Americans. The prevalence of Type 2 diabetes is two- to three-fold higher among Native Americans and African American youth compared to Asian American and Hispanic American youth, and nine-fold higher than in European American youth (Katzmarzyk et al., 2012). The

diabetes prevalence among immigrants in the U.S. increases as length of residence

increases, independent of age or BMI (Katzmarzk et al., 2012, p.2).

The characteristics of my SNAP study participants in the South Bronx, NY,

parallel the characteristics of the ethnic groups who have prediabetes and diabetes. My

target population is in one of the poorer sections of the five boroughs of NY, and

according to the USDA (2012g), the demographics among SNAP participants for this

area are 16.5% White, 30.4% Black or African American, 0.3% American Indian and

Alaska Native, 1.1% Asian, 0% Native Hawaiian and other Pacific Islander, 49.9% some

other race, 2.3% two or more races, 71.8% Hispanic or Latino origin, and 1.7% White

alone, not Hispanic or Latino (USDA, 2012i).

Risk Factors

The risk factors that contribute to the development of Type 2 diabetes are the

result of impaired metabolic health, such as obesity and insulin resistance, an increase

consumption of high fructose corn syrup (HFCS) in processed foods (Goran, Ulijaszek, &

Ventura, 2012, p. 6), fat distribution and impaired glucose tolerance (IGT), which is

reaching proportions globally (International Diabetes Federation, n.d.). Also, researchers

have explored the impact of obesity among adolescents in puberty and whether these

children are more prone to insulin resistance as they go through a growth spurt, since the

prevalence of Type 2 diabetes, prior to puberty is much less (American Diabetes

Association [ADA], 2012a).

There are other risk factors that contribute to the development of Type 2 diabetes

such as family history; race; inactivity; age (as one ages, there is loss of muscle mass and

possible weight gain); prediabetes which reflect higher than normal blood sugars and gestational diabetes (Mayo Clinic, 2012). Activity increases the sensitivity of cells to use insulin and controls weight however, researchers also found that muscle mass was associated with insulin sensitivity and prediabetes risk and observed an inverse relationship between insulin resistance and muscle mass (Srikanthan & Karlamangla, 2011). Srikanthan et al., 2011 stated, "For every 10% increase of skeletal muscle index, there was an 11% reduction in insulin resistance" (p. 2898), and this finding may have a similar relationship between a person's social economic status and health (p. 2902). Consequently, the association between activity and an increase of lean muscle mass will decrease insulin resistance and decrease the risk for Type 2 diabetes. All households participating in SNAP should be participating in a health program that includes low-aerobic activity as well as mandatory nutrition education.

Type 2 Diabetes

Type 2 diabetes has become a household name and unfortunately it is all to common that people know at least someone in their family who has Type 2 diabetes. Type 2 diabetes is a "polygenetic disorder where both hereditary and environmental or acquired factors are involved and both of these factors can affect beta cell function and insulin sensitivity" (Gerich, 2002, p. S117). This condition is a group of diseases that is characterized by high blood glucose levels that result from defects in the body's ability to produce and/or use insulin satisfactory (ADA, 2012b). The type of diabetes is based on cause and is classified as prediabetes, Type 1 (autoimmune), Type 2 (life-style), gestational, latent autoimmune diabetes and maturity onset diabetes of youth (MODY).

The diagnosis is based on an A1C level, fasting or random blood glucose level, and/or an oral glucose tolerance testing. Refer to Table 2, Table 3, and Table 4 for values (Pate, & Macerollo, 2010). When blood sugar is elevated and chronic, diabetes is associated with long term damage and failure of various organs, such as the eyes, kidneys, nerves, heart and blood vessels (ADA, 2012c, p. S64).

Diabetes is the seventh leading cause of death in the U.S., a cause of heart disease, leading cause of kidney failure, nontraumatic lower limb amputations, and new cases of blindness. The total number of people with diabetes is 29.1 million, up 13% from 25.8 million children and adults in the U. S. (2010) or 8.3% of the population have diabetes. The number of new cases of diabetes per year is 1.7 million, down 10% from 1.9 million (ADA, 2014b). Of the 29.1 million with diabetes, 21.0 million are diagnosed and 8.1 million are undiagnosed (CDC, 2014b). Type 2 diabetes is the most common form of diabetes in the U.S. (ADA, 2014a). By the year 2050, 1 out of 3 persons in the U.S. will have diabetes and obesity rates are projected to double over the next 30 years (Sakiyama, 2012). In 2010 among U.S. adults, aged $\geq$65 years, 10.9 million, or 26.9% had diabetes (CDC, 2011). We are at a very pivotal point in time where across the spectrum of disciplines, such as public health, clinical and academic professionals such as physicians, dietitians, nurses, and schoolteachers need to emphasize and make an effort in not only intervening with healthy strategies but to also create strategies to prevent the prevalence of obesity and Type 2 diabetes. This also would include policymakers that decide on budgets for specific programs that affect the health of the American people.

Prediabetes

There are many people in the U.S. who are unaware they have prediabetes. The

number of adults aged 20 + years with prediabetes has increased 9% from 79 million to

86 million from 2010 to 2012 (CDC, 2014b). Prediabetes is a condition in which

individuals have blood glucose or A1C levels higher than normal; however not

significant enough to be diagnosed with Type 2 diabetes, but are at risk for developing

Type 2 diabetes, heart disease, and stroke (CDC, 2011). With life-style modification,

such as weight lose and physical activity, Type 2 diabetes can be prevented or delayed,

and it is possible that the blood glucose levels can be reduced to insignificant levels

(CDC, 2011). Figure 2 shows a time line of physiological changes leading to the

progression of Type 2 diabetes when there is beta cell failure, insulin resistance,

microvascular and macrovascular changes.
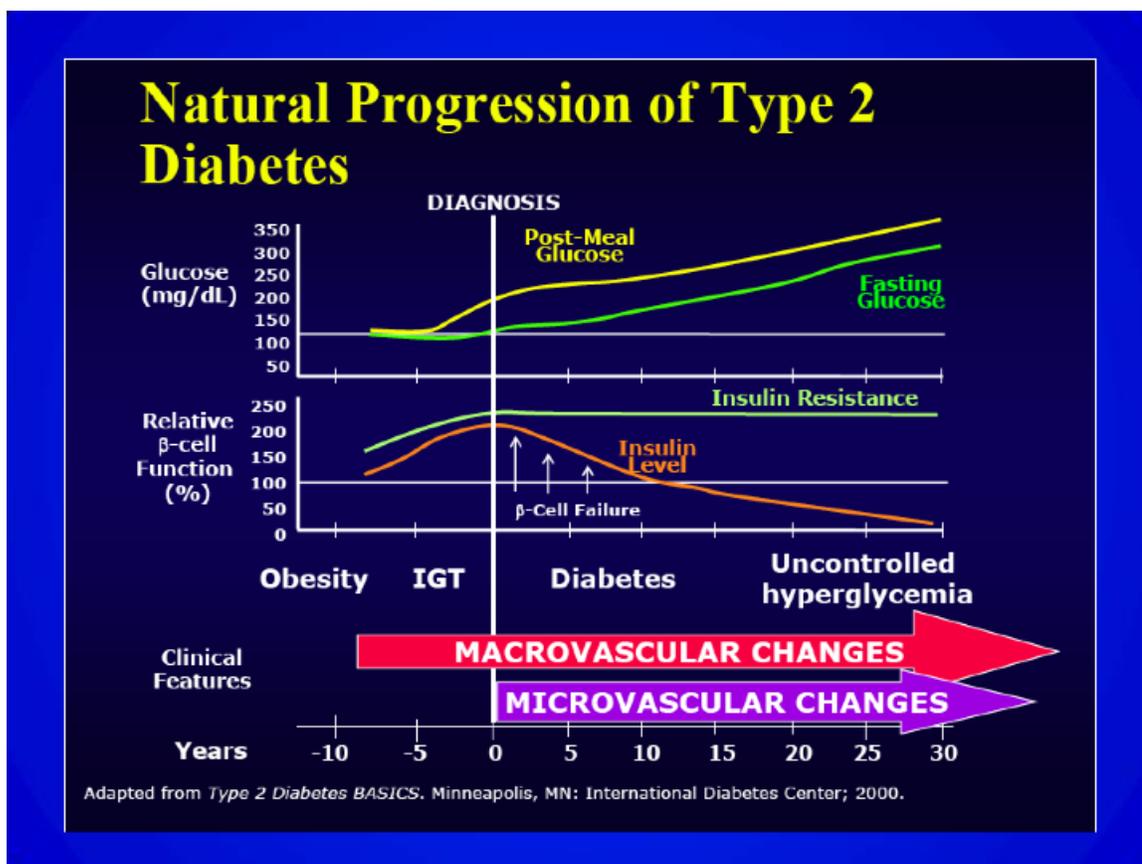
Figure 2. Progression of Type 2 diabetes.The risk factors, obesity, and impaired glucose tolerance that lead up to beta-cell failure over time eventually leads to the diagnosis of Type 2. With underlying insulin resistance, and uncontrolled hyperglycemia, microvascular and macrovascuilar complications can occur. Reprinted with permission. Schauer, P. (2013). Bariatric surgery and its impact on patients with diabetes [PowerPoint slides]. Retrieved from http://www.meetingproceedings.com/2013/winthrop-diabetes/winthrop-diabetes.asp

Insulin secretion is biphasic. In the first phase, insulin gets secreted by the pancreas, it spikes and lasts 10 minutes, a response to a "square-wave hyperglycemic stimulus" (Gerich, 2002, p. S117). It is then followed by a second phase or spike reaching a plateau at 2 to 3 hours (Gerich, 2002). The defect in the beta cells on the pancreas that produces insulin is due to the reduction of the first phase insulin release

(Gerich, 2002). However Gerich's (2002) study suggested that impaired beta cell function precedes insulin resistance in those with a genetic predisposition to develop Type 2 diabetes and that impaired beta cell function is the primary defect for Type 2 diabetes. Gerich argued that certain individuals are born with genetically abnormal islets and that this abnormality may be a reduction of islet cell mass, thus this predisposition limits the ability to compensate for insulin resistance. A person may not develop Type 2 diabetes until later on in years due to the deterioration of the beta cell function; however, other people who are inactive, over weight, or consume high fat diets are prone to insulin resistance and at risk for Type 2 diabetes (Gerich, 2002, p. S120).

The progression from prediabetes to Type 2 diabetes is preventable. Bodinham, Smith, Wrighht, Frost, and Robertson (2012) studied resistant starch as a dietary component to improve the first phase of insulin secretion. Resistant starch is a form of dietary fiber. While the mechanism as to why the resistant starch improved first insulin secretion is not totally clear, Bodinham et al. eluded to the mechanism of diabetes medication, sulphonylurea and how it binds to the beta cell membrane receptors, which results in the increase of insulin secretion, and hypothesized that the mechanism of resistant starch may be similar. Although Bodinham et al. did not show insulin sensitivity, Bodinham et al. concluded that overweight individuals consuming resistant starch might have a decrease risk for Type 2 diabetes. See table 2 for levels reflecting normoglycemia.

Table 2

Blood Glucose Classification: Normoglycemia* and Prediabetes**

_____

Blood Glucose	Level /Range	Classification
Fasting plasma glucose	<100mg/dL	Normoglycemia
2-hour plasma glucose	<140mg/dL	Normoglycemia
Fasting plasma glucose: (Impaired fasting glucose)	100 mg/dl (5.6 mmol/l) to 125 mg/dl (6.9 mmol/l)	Prediabetes Prediabetes
2-hour Plasma glucose (Impaired glucose tolerance) (in 75g OGTT)	140 mg/dl (7.8 mmol/l) to 199 mg/dl (11.0 mmol/l)	Prediabets Prediabetes
A1C	5.7–6.4%	Prediabets

_____

*Note. Sakiyama, R. (2012). Diabetes update 2012 [PowerPoint slides]. Retrieved from http://www.uclahealth.org/workfiles/primary-care-update-2012/Type-2-Diabetes-Sakiyama.pdf
** *Note*. American Diabetes Association (2012c). Clinical Practice Recommendations: Diagnosis and Classification of Diabetes Mellitus *Diabetes Care* 35, S64-S71. D*oi:10.2337/dc12-s064*

There are categories that define an increased risk for prediabetes (see Table 2) and that diagnose individuals with diabetes (see Table 3). These categories are helpful in screening for prediabetes and the prevention of Type 2 diabetes. As Gerich (2002) argued, people are at risk for developing prediabetes or insulin resistance with a life style of inactivity and high fat food choices (p. S120).

Table 3.
Criteria for the Diagnosis of Diabetes*

_____

A1C: 6.5%. The test should be performed in a laboratory using a method that is NGSP certified and standardized to the DCCT assay.

OR

FPG: 126 mg/dl (7.0 mmol/l). Fasting is defined as no caloric intake for at least 8 h.**

OR

2-h plasma glucose $200 mg/dl (11.1 mmol/l) during an OGTT. The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.

OR

In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose >200 mg/dl (11.1 mmol/l)

_____

*In the absence of unequivocal hyperglycemia, criteria 1–3 should be confirmed by repeat testing
**Note. American Diabetes Association (2012c). Clinical Practice Recommendations: Diagnosis and Classification of Diabetes Mellitus *Diabetes Care* 35, S64-S71. D*oi:10.2337/dc12-s064*

High Fructose Corn Syrup

There is speculation that HFCS is contributing to the obesity rate in the U.S.

based on how it is metabolized in the body. In addition, the consumption is aggravated by

the large production in the U.S. Goran, Ulijaszek, and Ventura (2012) reported that 6.4%

of the world population has diabetes and by year 2030, this estimate will rise to 7.7%.

With the global prevalence of obesity and Type 2 diabetes, Goran et al. (2012) reported

that specific dietary patterns have resulted from an increase in processed foods that are

energy dense, contain refined carbohydrates (sugar), and that which has become popular

in many countries. Specific concerns are the increase of sweetened beverages that have

been linked to a rise in obesity and Type 2 diabetes (Goran et al., 2012, p. 1-2). There is a

hypothesis that HFCS affects metabolic health, increasing the risk for type 2 diabetes

(Goran et al., 2012). HFCS is not disclosed in sweetened beverages, thus the

consumption of HFCS may possibly be higher than is reported (Goran et al., 2012).

HFCS-55 is used in the production of food and beverages and contains 10% more

fructose than sucrose (Goran et al., 2012, p. 2). As part of nutrition education among SNAP participants, it is imperative to educate how to read food labels and what is in the ingredients, not just to look at the fats, carbohydrates, protein and sodium, as many consumers do.

There has been a great deal of interest in HFCS over time paralleling the rise in obesity and Type 2 diabetes. Goran et al. (2012) looked at changes in diet and Type 2 diabetes in the U.S. from 1900 through 1999. HFCS was identified as a nutrient component associated with the increasing prevalence of Type 2 diabetes. The U.S. is the largest producer of HFCS, 24.78 (kg per ear per capita) as well an exporter to Mexico and other countries (Goran et al, 2012, p. 2-4). Goran et al. (2012) conducted a cross nation comparison of obesity and diabetes in relation to HFCS, at the country level. Goran et al. found that those countries choosing to use HFCS in their food supply have diabetes prevalence 20% higher than in those countries that do not use HFCS (Goran, et al., 2012, p. 5). Hence, it is in the best interest of the general population to consume fresh produce and limit processed foods, decreasing the consumption of HFCS.

As people increase their sweetened beverage intake more sugar is consumed and with HFCS consumption, the potential for an increase of body weight will potentially increase the risk for prediabetes and Type 2 diabetes (Goran et al., 2012, p. 6). Fructose, a monosaccharide, is absorbed by a different pathway than glucose (a monosaccharide). Fructose is absorbed through the GLUT-5 receptor in the gut and is metabolized in the liver by a pathway that is not dependent on insulin, does not stimulate insulin secretion or leptin production by adipose tissue, and thus contributes to more weight gain. HFCS is

shown to be lipogenic that produces fat and associated with insulin resistance (Goran et al, 2012, p. 6). A viable solution in limiting the consumption of HFCS is to decrease processed foods as well as to decrease the consumption of all sweetened beverages. By modifying this life style behavior, caloric intake will be less, facilitating weight loss, hence lowering the risk for developing Tye 2 diabetes.

Literature Related to Key Variables and Research Questions

Throughout the literature review it was apparent that the general population's views of FCD and behaviors as well as knowledge about healthy eating, and nutrition and health are different from the views of health care professionals. Health care professionals and health educators use knowledge as an intervention in the hopes of behavior change. However, the general public's views and decisions about food are not exclusively from nutrition education and information as is marketed to them, but rather from a combination of individual habits, food familiarity, and taste preferences (Chawick et al, 2013), self-identity (Bisogni et al, 2002), and life long influences. Thus, knowledge as a main intervention is not necessarily satisfactory as a way to influence people's FCD or to motivate a person to change negative behavior (Worsley, 2002, & Chawick et al, 2013) and/or attitudes in order to improve health or reduce risk factors for chronic disease. In addition, culture may play a supportive role in a person's FCD and healthy eating, which may serve as a change agent for a household. Therefore, it is imperative to examine and better understand the variables understudy, food choice decisions, food insecurity, and coping or adapting strategies among SNAP participants.

The goal of this study is to examine the level of food insecurity of recipients who have prediabetes participating in SNAP associated with FCD and coping strategies over a 30-day benefit cycle that increases the potential risk of type 2 diabetes. Understanding FCD by uncovering new insights as it relates to food insecurity will help nutritionists and others to reach out to SNAP participants with prediabetes and/or to food and nutrition policy makers to better educate and transfer information about FCD and why they are made. Consequently, the information will provide an opportunity to make social changes by influencing food and nutrition policy makers to rethink how the EBT allotments are allocated in order to alleviate food insecurity, and to create a mandatory package for household participants to purchase either fresh or frozen fruits and vegetables as part of a healthy and balanced diet. This research study's outcome may highlight how best to influence FCD, influencing public policy on a national level and influence food choices on an individual level.

To examine the variables under study, the FCPM was used. This model is an adaptation of the conceptual model of food choice (Sobel & Bisogni, 2009) and its use is appropriate because it targets three components of food behavior: *life course, influences and personal food systems* (Furst et al, 1996, p. 252). Bringing together three multifaceted components for analysis within the model will help facilitate interpretations and management of conflicting priorities, such as major life events, economic conditions, cooking skills, transportation, the transient nature of food insecurity as dependent on income, social factors, (Sobal et al, 2006, pp. 3-6), negotiating values (sensory perceptions, monetary considerations, convenience, health and nutrition, managing

relations and quality) (Furst et al, 1996, p. 257), and the competing needs for asset preservation (Goran et al, 2012), in relation to food choice decisions.

The literature pointed to food insecurity as a factor causing various coping strategies (Maxwell, 1996, Seligman et al, 2010) that resulted in FCD that could compromise someone's health, cause possible harm, such as abandoning of children or stealing (Maxwell, 1996) and increase levels of psychological stress and anxiety that would justify the consumption of high fat and caloric dense type foods to satisfy hunger. Also, when resources were limited, the choice of skipping meals or not eating for a day was often the only option (USDA, 2013a). In addition, Seligman et al. (2010) showed an association between food insecurity and diabetes, such as elevated A1C and BMI. While the BMI was used as a covariant, it did not change the outcome or association between obesity and hypertension or hyperlipidemia. The BMI, as a covariant, did however have an association between food insecurity and clinical diabetes pointing to diet as a possible significant variable, since the BMI measures body fat based on weight and height (Seligman et al., 2010). Seligman et al. (2010) looked at laboratory data and used the Food Security Survey Module (FSSM) to assess food insecurity. Seligman et al., (2010) did not conduct any form of dietary intake consumption, thus providing a gap as to understand why and how FCD were made. Hence, this study will be looking at food patterns and behaviors.

FCD as to why, how and where a person consumes foods may influence the risk factors of prediabetes, hence giving potential rise to Type 2 diabetes in the U.S. (CDC, 2011), and the various dietary modalities to treat. It is important to explore prediabetes on

multifactorial levels, for example, the clinical, environmental and behavioral arenas.

Clinically, the loss of first phase insulin secretion is indicative of Type 2 diabetes

(Bodinham et al, 2012, p. 1; Gerich, 2002, p. S117) and Bodinham et al (2012) argued

that resistant starch might be significant in the prevention of the defect of this first phase

insulin secretion (pp. 1-5), thus providing an opportunity for health care providers to

educate SNAP participants in the use of resistant starch as a supplement to one's meal

plan. Resistant starch is a type of fiber and an alternative means to lower the risk for

developing type 2 diabetes (Bodhinham et al, 2012), and to look to future education, it

may be significant among SNAP participants should be aware of this type of food which

may be an influence in their FCD.

The literature points to the association of food insecurity and obesity (Dietz

(1995, Olson (1999), Townsend et al, 2001, and Scheier, 2005), in relation to the monthly

food cycle (Dinour et al, 2007) that SNAP participants engage in. Consequently, this

approach to food purchasing may possibly affect FCD that perhaps increase the risk for

developing type 2 diabetes.

In this quantitative study, I wish to better understand FCD by uncovering new

insights as it relates to food security. As such, food security as the independent variable

was expected to change as SNAP participants move in and out of food insecurity, thus

making it transitory. Four levels of food security as identified and supported by

researchers as relevant to SNAP were investigated in this study. The four levels of food

security, high, marginal, low, and very low food security (USDA, 2014b) were associated

with the dependent variables, FCD, coping strategies to the 30-day food cycle as

determined by food choices, food expenditures, and perception of personal health. I

looked at predefined characteristics of a representative sample of SNAP participants in

terms of these variables.

Literature Related to Instruments for Research Study

There were three self-administered questionnaires used in this research study: the

demographics and health questionnaire, the National Cancer Institute's Diet History

Questionnaire 2 ([DHQ 2] (National Cancer Institute, 2012) and a food frequency

questionnaire (FFQ) from the Current Population Survey: Food Security Supplement

([CPS-FSS], USDA, 2014a) the U.S. Department of Agriculture Food Security Survey

Module ([FSSM], USDA, 2014a). The demographics and health questionnaire is a one

page tool created by this researcher to capture socio-demographics. The other two

questionnaires, the DHQ2 and the CPS-FSS are validated instruments; however, modified

here to capture the variables under study. See the instrumentation and operationalization

of constructs in Chapter 3, page 86 for additional details.

<p align="center">**Summary and Conclusions**</p>

The purpose of this quantitative study was to examine the status of food security

among SNAP participants with prediabetes associated with food choice decisions and

coping strategies over a 30-day benefit cycle that possibly increases the risk of Type 2

diabetes. Of importance to this research study is the exploration of variables of interest to

the federal program, SNAP and policy changes, such as to supplement previous research

on food choices, coping strategies, and food security status among SNAP participants

with prediabetes. To examine the variables under study, the food choice process model

was used. This model is an adaptation of the conceptual model of food choice (Sobel et al, 2009) which targets three components of food behavior: *life course, influences and personal food systems* (Furst et al, 1996, p. 252). The literature pointed to food insecurity as a factor causing various coping strategies (Maxwell, 1996, Seligman et al, 2010) that resulted in FCDs that could compromise someone's health by consuming high fat type foods. Seligman et al (2010) showed an association between food insecurity and diabetes, such as elevated A1C and BMI. The BMI, as a covariant, did have an association between food insecurity and clinical diabetes pointing to diet as a possible significant variable, since the BMI measures body fat based on weight and height (Seligman et al., 2010). Seligman et al. (2010) looked at laboratory data and used the Food Security Survey Module (FSSM) to assess food insecurity; however, they did not conduct any form of dietary intake consumption, thus providing a gap as to understand why and how FCDs were made.

The IOM in its meta-analysis of the adequacy of SNAP's allotments, and the impact of achieving food security, noted that further research is needed to examine food security and access to a healthy diet among participants and to explore the impact of SNAP benefits on outcomes (as cited in Caswell, 2013, p. 3-26). With findings from this study, I hope to influence the policy makers in the Federal government to adjust the current policy for SNAP benefit allotments from once per month to a choice of biweekly or monthly allotments as well as to make nutrition education mandatory, and mandate a food package for those households participating in SNAP.

In the United States, the prevalence of diabetes was 29.1 million Americans, or

9.3% of the population in 2012 of which, 21.0 million were diagnosed, and 8.1 million were undiagnosed. In addition, 86 million Americans age 20 and older have prediabetes, which is up from 79 million in 2010 (ADA 2014b). It is imperative that additional research facilitates lifestyle modification that would include specific changes of food choice decisions, to prevent Type 2 diabetes among SNAP participants. The identification and understanding of food cycles and variation among SNAP participants with prediabetes in relation to food security status. will help address the gap in the literature related to food choice decisions and coping strategies among SNAP participants with prediabetes and the possible risks for developing Type 2 diabetes.

Chapter 3: Research Method

Introduction

The purpose of this quantitative study was to examine the status of food security of people who have prediabetes participating in the SNAP, focusing on their food choice decisions and coping strategies over a 30-day benefit cycle that potentially increase the risk of Type 2 diabetes. This study was significant because little is known about the food choices made by SNAP participants with prediabetes, food insecure over a 30-day benefit cycle and how these FCD possibly increase the risk of Type 2 diabetes. The findings have the potential to change SNAP's benefit allotments, make nutrition education mandatory, create a food package, and hence possibly lower food insecurity and the potential risk of Type 2 diabetes.

The study data were collected from individuals with prediabetes participating in SNAP, living in the South and Central Bronx, NY. Three self-administered tools were used to collect data: (a) a demographics and health questionnaire to collect social demographics, (b) a food frequency questionnaire (FFQ) from the National Cancer Institute – the Dietary Health Questionnaire 2, targeting specific foods and macronutrients (fat and carbohydrates), all beverages, fruits and vegetables, and (c) a food security questionnaire validated by the USDA. The food security survey tool is the Food Security Survey Module (FSSM) questionnaire that is the subset of the Current Population Survey Food Security Supplement (CPS-FSS) (USDA, 2014a). A 30-day reference period was used versus the 12 month reference period in the FSSM (USDA, 2014a, para 6) to address the 30-day benefit cycle.

A benefit of the study was to better understand SNAP household FCD by disclosing or revealing coping strategies as it relates to food security and whether the food choices increase the risk for possibly developing Type 2 diabetes. The contribution to the literature influences the federal government to reassess the frequency of benefit allotments. As it stands the benefit allotments are every 30 days.

In this chapter, I discuss the methodological components of the research study as well as the study limitations, the threats to internal and external validity, and ethical concerns.

Research Design and Rationale

Study Variables

This is a quantitative research study with food security as the independent variable among households participating in SNAP. Food security as experienced by households in SNAP is transient as they move from food security to food insecurity throughout the 30-day benefit cycle (Seligman, Laraia, & Kushel, 2010, p. 304). The four levels of food security are identified and defined (USDA, 2014b) in chapter one (See operational definitions, pp. 12-15) as very low, low, marginal and high food security, with or without hunger. The four levels of food security was associated with the dependent variables, food choice decisions, coping strategies to a 30-day benefit cycle as determined by food choices, food expenditures, and perceptions of personal health that are influential in FCD as it relates to food security status.

I used a cross-sectional design for this quantitative research study. Descriptive statistics were used to assess the population in terms of demographics, health, and dietary

food intake/patterns. Inferential statistics were used to show an association between both, food choice variation over time and food security status and possible risk for Type 2 diabetes, accounting for food choice decisions, coping strategies to a 30-day benefit cycle, and perceptions of personal health as determined by body mass index.

Research design and its connection to the research questions.

The premise of the research study was to capture and measure food choice decisions in relation to food security. The use of a cross-sectional study was appropriate, since I explored relationships of variables involved. To build upon the theoretical model, FCPM, the research questions (RQ) addressed factors that influence food choice decisions and food pattern consumption with the use of the questionnaires, DHQ2 and CPS: FSS; and addressed coping strategies over specific time frames with the use of the CPS: FSS. The alignment to personal food systems and influences, components of the FCPM was addressed with research questions that assessed the transitory aspect of food security. In addition, the other two components of the FCPM, life course that looks at people's life stages and their development, and the food choice trajectories that may lead to habitual foods elections that can affect how people adjust to life course transition were also assessed with the research questions. The research questions were designed to capture possible consumption patterns, cycles of eating, and explore coping strategies that might occur as part of influences to food security. The three research questions are the following:

Primary research question.

1.   Does the level of food insecurity experienced by SNAP recipients who have

        prediabetes associated with food choice decisions and coping strategies over a 30-

        day benefit cycle potentially increase the recipient's risk of Type 2 diabetes?

Subordinate research questions.

2.   Do SNAP participants who have prediabetes exhibit different food choice

        decisions or patterns between the beginnings of the 30-day benefit cycle versus

        the later part of the 30-day benefit cycle?

3.   Are coping strategies used by SNAP participants who have prediabetes when

        making food choice decisions for each week during the 30-day benefit cycle?

Time and Resource Constraints

        The time and resource constraint of this research design was my time I spent

collecting data, which was during and after work. Due to the effort and burden of the

participants completing three self-administered questionnaires, there was an issuance of

metro cards, $5.00 for a round trip and a $25.00 food gift card from Key Foods located in

multiple areas from Bronx Lebanon Hospital. I realized quickly that the food gift cards

were not readily available from all of the grocery stores in the nearby areas from the

hospital however limited to Key Foods, a chain grocery store that I used. This chain

grocery store was convenient for the participants because of their locations. However I

had to make sure that all of the Key Foods were able to receive the gift cards and that

they worked because one participant had trouble with their gift card. I had to replace the

card with a gift card that worked. In addition, each gift card prior to being purchased had

to be coded and swiped through a machine at the issuance store, 256 E. 167th Street, Bronx, NY. The metro and the food gift cards came from my personal assets.

A nonprobability sample was used since it was not possible that all units of the targeted population could be involved due to time, language and financial constraints. In addition, I anticipated not all people from all ethnic backgrounds would be available to participate in the research study. Purposeful sampling was used and included in the selection of sample units that appear to be representative of the target population (Franfort-Nachmias, & Nachmias, 2008, p. 168).

Methodology

Population

The target population was defined as individuals who have prediabetes, that is an A1C between 5.7-6.4% and diagnosed with Impaired Glucose Tolerance (IGT) and not diagnosed with gestational diabetes, Type 2 or Type 1 diabetes. For the purpose of this study, individuals were eligible who met prediabetes criteria, participated in SNAP, were 21 years of age or older, and literate in English or Spanish.

Sampling and Sampling Procedures

The sample was a subset of the population of interest and a basis for potential generalization (Franfort-Nachmias, & Nachmias, 2008, p. 163). The target population was geographically defined to those individuals with prediabetes who participated in SNAP, male or female, and living in South and Central Bronx, NY. The sample for the study was drawn from existing patients diagnosed with prediabetes or impaired glucose tolerance from Bronx Lebanon Hospital (see Appendix F: Bronx Lebanon Hospital IRB

#09 12 13 07). For the purpose of this study the participants were identified through

the primary care physicians (PCP), the adult endocrinologists and a registered dietitian

(R.D.) in the Health and Wellness Center at Bronx Lebanon Hospital and referred to me

(see Appendix A: Invitation to participate in the research study) based on the study's

criteria. The participants had an A1C between 5.7-6.4%, and with a diagnostic code of

ICD-9-CM-code of 790.29. The sample target size was at minimum, 35 individuals (See

Figure 3. Flow of Data Collection: Participant's Referral and Recruitment).

Sampling Frame

Only individuals who were 21 years or older, lived in the South and Central

Bronx, NY, participated in SNAP, diagnosed with prediabetes, and were literate were

eligible for study. For the purpose of this study, those households participating in SNAP

were defined as men or women who were either married, divorced, single or widowed

and had or did not have children. Adults that were nondocumented citizens, did not speak

nor read English or Spanish, illiterate, and women who were pregnant or breastfeeding

were excluded.

A total population of 594 was diagnosed with prediabetes between January 2011

and May 2013 and the basis for the sample population that I used. This population was

targeted for a lifestyle modification class that I was supposed to conduct; however this

class was put on hold and will be conducted later. I estimated 35 individuals were needed

for my sample. This number was determined with a confidence interval of 16, confidence

level of 95%, significance level of p value = 0.05, and 50% effect size (Creative Research

Systems: The survey system, 2012). I used a one tail test with a significance of .05

because I was interested in a relationship and a one tail test, tests for the possibility of

the relationship in one direction and does not consider a relationship in the other

direction. The effect size was determined by Cohen's d 0.50 and a power of 0.85 thus

sample size of 30 was determined based on a one-tailed chart (Berry College, 2013).

Procedures for Recruitment, Participation, and Data Collection

Permission to recruit volunteers on premise in collaboration with hospital staff

had been authorized by the IRB of Bronx Lebanon Hospital on September 26, 2013 (See

Appendix F). The recruitment flyer (see Appendix A) was distributed by approximately

eight health care providers for interested volunteers and then referred to me. See Figure 3,

Flow of Data Collection: Participant's Referral and Recruitment.

Although 594 people were identified with prediabetes from January 2011 through

May 2013 in the Adult Clinical Network of Bronx Lebanon Hospital (at the time of the

writing of the proposal; since moved to the Health and Wellness Center where the data

were collected), the sample population for my study was through a selection process from

the PCPs, the adult endocrinologists, and R.D., each knowledgeable of the inclusion

criteria through a flyer that I developed (Appendix A). This flyer included information on

the purpose of the research study, and the inclusion and exclusion criteria, which helped

facilitate the selection process for the participants for the research study. The inclusion

criteria addressed on the flyer indicated demographics, age, ethnicity, literacy in English

and Spanish, and participation in SNAP. The PCPs and adult endocrinologists see

patients within the Bronx Lebanon Health system, but these patients do not necessarily

live within the South and Central Bronx area, hence those participants selected and

referred to me were screened for demographics. In addition, I screened referrals on the inclusion criteria. I discussed the research study and its' benefits and risk to each eligible participant.

A booklet was given to each eligible participant. The booklet included a consent form and the three self-administered questionnaires, the demographics and health, CSP: FSS, and the DHQ2 questionnaires. Prior to completing the self-administered questionnaires, the eligible participant read and acknowledged participation in the research study on consent form found on the first page of each booklet. The consent form described the premise of the research study and provided a brief explanation of each questionnaire that the participant was complete (See Appendix B). The informed consent was discussed and it took approximately 10 -15 minutes. (see Appendix B).

The booklets were in English and Spanish and time was included for completion of the questionnaires that allowed me to answer any questions that each participant might had. The benefits and risks of participating in the study were addressed and discussed with each participant prior to the start. I made sure each participant was aware that he or she was able to opt out of the study at any time. Each participant was told that they were eligible for a $5.00 round trip metro card for transportation and a $25.00 food gift card with the completion of the questionnaires for their time and effort. To avoid personal bias each eligible participant did not have any prior history with me such as being a previous patient. However if the participant wanted to see me as a patient then he or she was able to make a separate appointment as a patient at a later date with a scheduled appointment. After the participant completed the three self-administered questionnaires each booklet

was identified with a specific number. I reviewed each participant's questionnaire for completeness and then each booklet was put into a secure box and brought to my house. Thereafter, each participate received a $5.00 metro card and a $25.00 food gift card as indicated above.
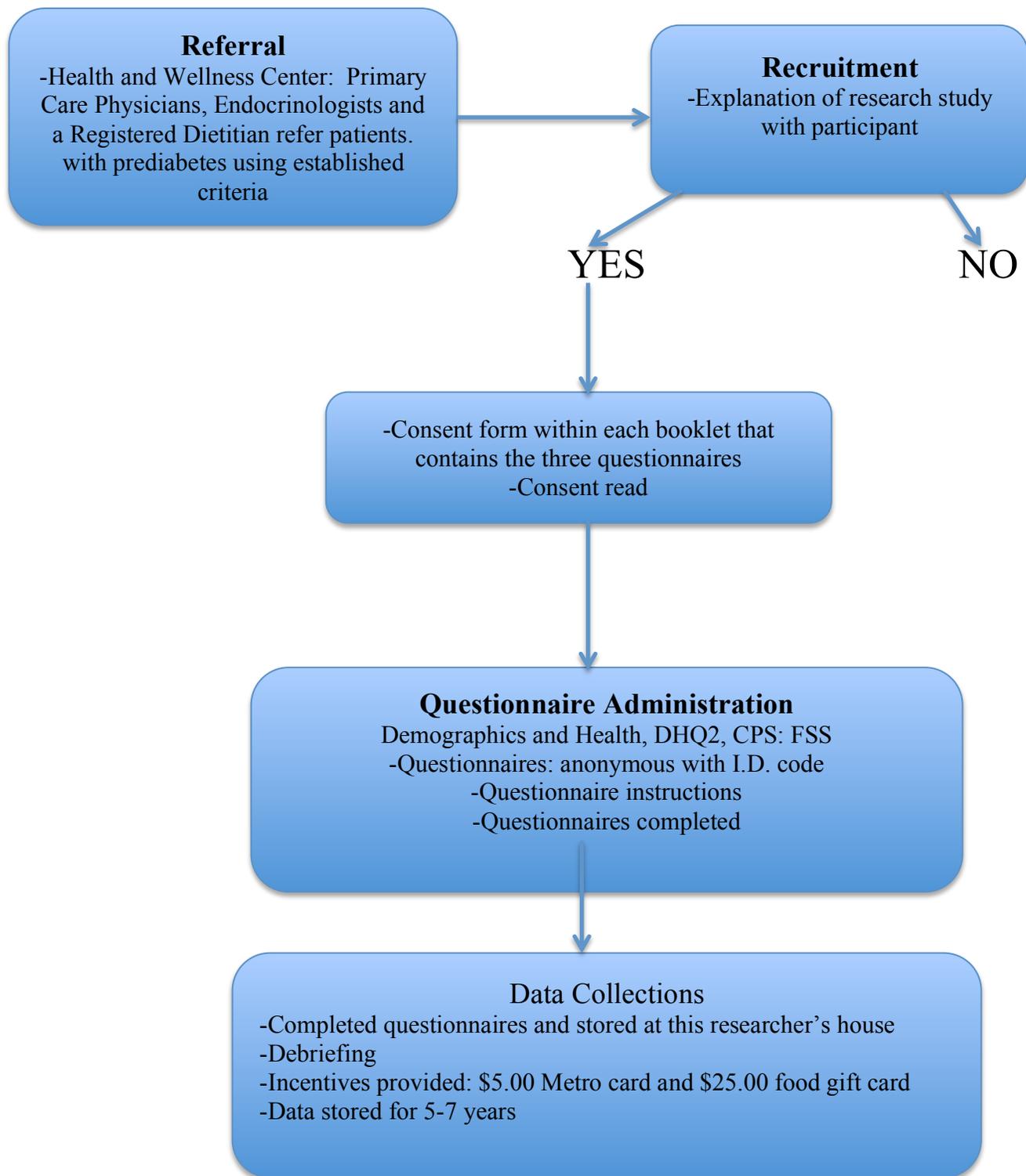
Figure 3. Flow of data collection: Participant's referral and recruitment.

Data Collection

A booklet was created that had the three self-administered questionnaires, in order, (a) demographics and health questionnaire, (b) the diet health questionnaire 2 (FFQ), and (c) the Current Population Survey: Food Security Supplement (food security). The demographics and health questionnaire was created and used to collect information on social demographics, such as self-reported age, weight and height to determine their body mass index (BMI), participation in SNAP, perception of health, ethnicity and race and education level. The demographic and health questionnaire took 10 - 15 minutes to complete. The FFQ was used to collect information on certain foods, macronutrients such as fats and sugary beverages regarding frequency, per day, weekly or monthly; and food variation over a 30-day benefit cycle. This questionnaire took approximately 45 - 60 minutes to complete. Measuring cups and spoons were shown as reference points regarding portion sizes. The food security questionnaire was used to assess food security status; how much money was spent for food; minimum spending to have enough food; other food programs that supplement food intake; how long food lasts; and coping strategies that are used when there is not enough food. This questionnaire took approximately 35 - 45 minutes to complete. Pencils were given to each participant. During the time frame there were unlimited breaks to avoid fatigue.

After the completion of the three self-administered questionnaires there was a debriefing process where each person was told that if they wanted to know about the results and interpretation of the research study that they should check back with me in the next few months. A $5.00 metro card and a $25.00 food gift card were given to each participant.

Instrumentation and Operationalization of Constructs

As stated above, the three surveys used in this research were self-administered. The demographic and health questionnaire was created by me, The National Cancer Institute's (NCI), Diet History Questionnaire (DHQ) 2 and the the Current Population Survey: Food Security Supplement (CPS: FSS): the U.S. Adult Food Security Module are federally sponsored, established and verified instruments.

The National Cancer Institute's (NCI), Diet History Questionnaire (DHQ) 2.

The National Cancer Institute's DHQ 2 (NCI, 2010c) is based on the Block and Willett food frequency diet-based questionnaires (FFQ) commonly used for epidemiological investigations of the relationships between diet and chronic disease states (Mares-Perlman, et al., 1993, p. 489). The two FFQs, Block and Willet rank individuals on the basis of nutrient intake (Mares-Perlman et al. 1993, p. 489) however no details regarding cooking methods, and portion sizes are included as they are "designed to capture usual dietary intake" (Subar, et al., 2001, p. 1089). When compared to the 1995 Block FFQ and the Willett FFQ the NCI DHQ is a "cognitively based" FFQ (National Cancer Institute, 2010a para 1). The DHQ was designed for easy administration for collecting data on a large number of people, and to capture individual's frequency of dietary intake over the course of a specific time frame (NCI, 2010b).

Subar et al (2001) argued that the DHQ improved the FFQ in three areas. The first is cognitive changes in the FFQ by increasing the comprehension of food items, intake of seasonal foods, and intake averages from multiple food items, from "intensive cognitively interviewing people ages 50 - 70 years, varying in income, education and

ethnicity" (p. 1090). This change improved the validity of frequency estimates (p. 1090). The second change was the use of foods and portion sizes specifically looking at low fat food choices and the use of fats in food preparation, developed from dietary data from the USDA's 1994 - 1996 Continuing Survey of Food Intakes by Individuals (United States Environmental Protection Agency, 2007). The third was the conversion of FFQ responses into daily nutrient intake estimates, a refinement of the Block method, to develop a FFQ nutrient database (p. 1090) versus the use of the national dietary database.

The Eating at America's Table (EATS) study, conducted 1997 to 1998 (NCI, 2010a) was to determine correlations between nutrient intakes estimated between the three FFQs, Block, Willett, and DHQ and to find the "truth" (Subar et al, 2001, p. 1090) and compare the correlations between the three instruments. The "true" intakes were estimated using a measurement error model based on repeat 24 hour recalls collected over the course of one year, as the reference instrument (Subar et al, 2001, p. 1090). In the EATS study, two short dietary assessment instruments were developed, called "short screeners" (NCI, 2007), designed to measure usual fruit and vegetable intake. They are called the "All-Day Screener," and the "By-Meal Screener." The "By-Meal Screener," which queries consumption for three discrete time periods, morning, afternoon, and evening, however will not be used for this study because the same information is within the longer version of the DHQ2. The nutrient and food group database is based on the national dietary intake data from the 1994 - 1996 US Department of Agriculture's CSFII, and the 24 hour dietary recall data were used to decide which foods to include on the DHQ and what the portion sizes should be (NCI, 2010c).

DHQ has been validated through the study, EATS, that compared the DHQ's tool to two specific FFQs, the 1995 Gladys Black and Walter Willett. The DHQ proved to be overall better, however "data showed that the DHQ and the Block FFQ are better at estimating absolute intakes than the Willett FFQ but that, after energy adjustment, all three were more comparable for purposes of assessing diet disease risk" (Subar et al. 2001, abstract).

Diet History Questionnaire 2: 194 questions. The NCI's DHQ 2 is a FFQ that is available to the public, developed by the Risk Factor Monitoring and Methods Branch (RFMMB). This FFQ can be used without permission (NCI, 2010a) since it is a federally sponsored survey. The original DHQ I was based on cognitive research findings. It included 124 food items with portion sizes and dietary supplement questions. The next revision, DHQ 2 includes 134 food items based on more current data, and 8 dietary supplement questions. The food data used with the DHQ are based on the National Health and Nutrition Examination Surveys (NHANES) data collected from 2001 through 2002, 2003 through 2004, and 2005 through 2006 (NCI, 2010b).

Based on previous use, the DHQ I, the paper version took about 1 hour to complete however for the revised version, DHQ II no testing had been done. I assumed it was going to take approximately the same amount of time, give or take an additional 30 minutes. If I used the web based version it would have taken less time however for the purpose of this study, a paper version was used because computer access was limited in the targeted population. Unlike, DHQ I, there are four different versions of DHQ II. The four versions differ by time frame and portion size questions. The versions include, (a)

the standard FFQ format in past year, with portion size: requests food intake over the

past year and includes portion size questions, (b) format requests past year, without

portion size: requests usual food intake over the past year however excludes questions

about portion size, (c) format past month, with portion size: requests food intake over the

past month, includes questions about portion size, and (d) format past month, without

portion size: requests usual food intake over the past month however excludes questions

about portion size (NCI, 2010b). The DHQ II version that I used was the format

regarding food intake requesting portion sizes over the past month, however the portion

sizes were collected on high fat foods, sugary beverages and desserts. The analysis of the

DHQ II data (paper format) was coded and analyzed with the use of the statistical

program, SPSS. For the purpose of this study I renamed the DHQ II to DHQ2 since the

numeral 2 is understood between English and Spanish. The DHQ 2 was modified to my

research study as needed, such as eliminating portion sizes from many of the questions

and adding certain foods that are reflective of the cultures that were sampled. In addition,

I added to the DHQ 2 frequency questions during the course of the 30-day eating cycle,

such as how frequently certain foods are eaten during the 1st week of the month, the 2nd

week of the month, the 3rd week of the month, or the 4th week of the month (end of the

month) or every week of the month. Food of interests were sweetened beverages, dairy

type foods, meat (beef, hotdogs, bacon, cold cuts or luncheon meats, other meats

(chicken, pork, fish, ground beef), fast foods at certain restaurants, starchy vegetables,

fruits, breads and pastas, desserts of any kind, and non-starchy vegetables.

Three separate studies were conducted to assess validity and showed that the DHQ I (past year time frame, with portion size questions) provided reasonable nutrient estimates (NCI, 2010c; Thompson, et al., 2002; Subar, et al., 2001; Subar, et al., 2003). There were no plans to validate the updated DHQ 2; however, there were few major changes to the overall food list, such as adding those foods that were culturally sensitive to the target population that was under study. The affects of excluding portion size or asking about the past month versus the past year had not been evaluated. As part of my study, information on food item portion sizes was collected however only on high fat foods, sugary beverages and high fat and sugary desserts as these food types contribute toward weight gain and being overweight or obese is a risk factor for insulin resistance and prediabetes.

The first validation of DHQ I used a checklist approach (NCI, 2010b) and the authors concluded that the cognitive enhancements in the DHQ I were an improvement compared to the 1992 NCI: Block FFQ (NCI, 2010a). During 1997 - 1998, the second validation was conducted and compared the DHQ I tool with the two FFQs, the 1995 Block and Willett FFQs. The 24 hour dietary recalls were validated and used as reference data. The conclusion was that the DHQ I was as good if not superior to the Block and Willett instruments for most nutrients (NCI, 2010a). The third validation study compared food intake of energy and protein estimated on the DHQ I with unbiased biomarkers of intake, doubly labeled water (for energy expenditure) and urinary nitrogen (for protein). Authors showed significant underreporting and measurement error for the DHQ I (NCI, 2010b; Subar, et al., 2003).

Although the FFQ is used for economic and practical reasons in collecting

dietary intake over a specified time period, it is important to assess the collected data

against another dietary tool. To include a biomarker in the assessment is just as

significant because serum markers reflect habitual intake or a consistent state of nutrient

intake and metabolism (Dixon et al., 2006, p. 3054). Dixon et al., 2006 compared

carotenoids and tocopherols, from the NCI DHQ and 4, 24 hour dietary recalls with

serum biomarkers, carotenoid and tocopherol concentrations in EATS participants

(provided 1 fasting sample) (p. 3054). According to the investigators, "the NCI DHQ

produced reliable and valid estimates for dietary carotenoids and tocopherols and diet

serum correlations with strong validity coefficients, demonstrating its comparability to

other FFQs for use in large epidemiological studies of diet and health" (Dixon et al.,

2006, p. 3060).

Current Population Survey: Food Security Supplement; U.S. Adult Food Security Survey Module: 50-items

The food security survey tool in this research study was not used to measure

starvation. "Starvation is the characteristic of some people not having enough food to eat,

and not a matter of there *being* not enough food to eat" (Sen, 1981, p. 434). The food

security tool was to measure food security or lack of however to date, there is not a

universal tool to measure food security. The choice of indicators involves tradeoffs and

consequently, the "objective necessitating measurement commonly drives the choice of

indicator" (Barrett, 2010, p. 826). Survey tools can target coping strategies index, food

expenditures, and dietary diversity that measure responses to past consumptions (p. 826).

Using aggregate food availability is not a good predictor of a food insecurity indicator,

since the undernourished population has increased by 9% globally in relation to a 12%

rise in global food production per capita since 1990. In addition, food insecurity is

seasonal or irregular, dependent on unemployment, status of health and other adverse

events, such as disability, surgical procedures and/or drug abuse. Food security is

enhanced when there are policies in place through employment promoting poverty

reduction and putting in place safety nets for the vulnerable non-poor households (p.

827), such as SNAP. If tools for food security measure a diagnosis, then researchers need

to look at what will measure the greatest response to food insecurity.

Certain sections of the CSP: FSS tool were used along with the 10 item U.S. adult

food security survey module, which is a subset to the CPS: FSS tool. The 10 item survey

module is technically a subset of the 18 item survey module, also a subset to the CPS:

FSS survey module. The United States Department of Agriculture (USDA, 2014a)

developed the CPS: FSS and the 10 item tools. The specific sections from the CPS: FSS

that were used allowed me to collect information concerning different locations that food

is purchased, actual versus usually money spent on food at specific locations, money

spent on nonfood items, minimum spending needs to have enough food, coping

strategies, with not having enough food, and supplemental food program participation.

The 10 item survey module allowed me to collect information regarding the variables of

interest, such as coping strategies and food security status. Both survey modules in

Microsoft word format allowed me to edit and code responses, and calculate food

security scale scores and food security status. By using these standardized modules, I was

able to "strengthen the validity and reliability of the resulting measures and assure

maximum comparability with national statistics on food security and hunger" (USDA,

2014a, para 3).

The two questionnaires were appropriate for my study because they captured

overall food frequency and food security over the 30-day benefit cycle. The 10 item

survey module was modified on capturing data from 12 months to 30 days that queried

for example, the frequency of not eating for a whole day over a 30-day benefit cycle,

such as three or more days or one or two days within the benefit cycle.

Variables Operationalization

The variables under study were an independent variable, food security among

participants with prediabetes participating in SNAP; and dependent variables were food

choice decisions, and perception of personal health that are influential in food choice

decisions as it relates to food security status. The independent variable, food security, at

four different levels, (a) high, (b) marginal, (c) low, and (c) very low with and/or with out

hunger, were explored in relation to food choice decisions and possible risk for Type 2

diabetes. See Table 4, Variables under study in relation to the demographics and health,

DHQ 2 and CSP: FSS. The food security status calculated based on the collection of data

from the 10 item Food Security Survey Module questionnaire where dependent on the

defined food security status determined for responses by study participants. For example,

0 responses equal high food security; 1 - 2 responses equal marginal food security; 3 - 5

responses equal low food security and 6 - 10 responses equal very low food security. Any

item not filled in was considered negative versus missing. The household's scale value

(See Appendix H) depends on the number of affirmative responses regarding food

insecurity that the household has experienced, as indicated by the survey questions.

Table 4

Variables under Study in Relation to the Demographics and Health, DHQ 2, and CSP: FSS Questionnaires

Research Question	Variables under Study Independent Variable (I.V.) Dependent Variable (D.V.)	Questionnaire	Questionnaire's Number
Is the level of food insecurity experienced by SNAP participants who have prediabetes associated with food choice decisions and coping strategies over a 30-day benefit cycle potentially increase the participant's risk of Type 2 diabetes?	I.V. Food security D.V.: Food choice decisions D.V.: Coping strategies	CPS: FSS DHQ 2 CPS: FSS	All 50 questions All 194 questions SC1, SC2, SC3, SCF3 SC3A, SC4, SCF4, SCM4
	D.V.: Perception of personal Health	Demographic and health	3
Do SNAP participants exhibit different food choice decisions or patterns between the beginning of the 30-day Benefit cycle versus the later part of the 30-day benefit cycle?	D.V.: Food choice decisions D.V.: Coping Strategies	DHQ 2 CSP: FSS	111-121 SC!, SC2, SC3, SCF3 SC3A, SC4, SCF4, SCM4
Are coping strategies used by SNAP Participants who have prediabetes when making food choice decisions for each Week during the 30-day benefit cycle?	D.V.: Coping Strategies	DHQ 2 CSP: FSS	111-121 SC1, SC2, SC3, SCF3 SC3A, SC4, SCF4, SCM4

For the dependent variable, food choice decisions was measured over a 30-day

benefit cycle with the food frequency questionnaire, DHQ 2 using 194 foods based on

times consumed. See Table, Variables under study in relation to the demographics and

health, DHQ2, and CSP: FSS Questionnaires. In addition, portion sizes for high fat and

sugary beverages and other food items were collected and calculated over a 30-day

benefit cycle.

The CPS-FSS aligned with the problem statement, which explored the

relationship of food security status and food choices, and how a cycle of food insecurity

may contribute to a change in food choice decisions. The two questionnaires, the dietary

food frequency and food security captured the data on the independent and dependent variables. Zizza, Duffy, and Gerrior (2008) examined the association between total daily energy intakes and food insecurity among American adult men and women by using both a 24 hour dietary questionnaire and the 18 item Food Security Survey Module and concluded that total energy intakes were indifferent with food insecure individuals and that snacks and meal behaviors were different (p. 1912). Coleman, Nord, Andrews, & Carlson (2011) explored household food security in the U.S. in 2010 from data collected from the Current Population Survey conducted in December 2010.

Data Analysis Plan

I coded all three self-administered questionnaires, the demographics and health questionnaire, the food frequency questionnaire and the food security questionnaire. The statistical software program, SPSS for analysis was used, version 21. Although there are two distinct software programs that were designed for the food security and food frequency questionnaires, the unfamiliarity of each supports the former plan of coding each query from each survey tool and running SPSS to analyze the data collected. In addition, because I modified the DQH 2, using the statistical software program, SPSS was more applicable than the original software program.

For the DHQ 2, the Diet Calc Software, was released in 2012 (NCI, 2012). The software program generates nutrient and food group intake. It has three main components, that is generating nutrient estimates based on the food frequency data collected on the DHQ form however the information collected has to be coded and stored in an ASCII text file. The text file is created by scanning the paper forms. The second

component is the Data Dictionary Editor, which is accessed through the Edit menu of the Diet*Calc Analysis program. Diet*Calc interprets DHQ data files using information stored in the Questionnaire data Dictionary files. The third component is the database utility, a separate program installed with the Diet*Calc software, that allows for the import of nutrient data into the Diet*Calc food database. The database utility converts nutrient values expressed as nutrient per 100 grams into the nutrient per serving size format required by Diet*Calc.

The software program, used for the food security questionnaire, the Rasch Software is to scale households with missing items, assess data quality and assess validity of the national scale for special population groups (Bickel, Nord, Price, Hamilton & Cook 2000, p. 64). The Economic Research Service did not run my food security data due to the very small sample size (Bicket et al., 2000, p. 38), hence I did not use this software program.

Given the complexity and specificity of each of the above software programs, SPSS, version 21 was an appropriate choice and used to conduct the following analysis:

1. Descriptive Statistics: social demographics which would included age, weight, height, living situation, education, SNAP participation, and food security status

2. Regression Analysis: to assess an association among variables under study (food security [independent variable], food choice decisions, coping strategies, and perception of personal health [dependent valuables] that evolved from the descriptive statistics

3. Pearson chi-square tests: to assess categorical variables such as gender, food choice decisions, education, use of food assistance programs, high fat foods, sugary beverages, and frequency food consumption over a 30-day benefit cycle.

4. Friedman's test, a non-parametric test and Wilcoxon signed-rank test, post-hoc: the former used to test differences between mean groups of foods; and the later to explore or explain where the differences actually occurred between means

As noted in the variables operationalization section, the food security status or categories: food secure, food insecure without hunger, food insecure with hunger (moderate), and food insecure with hunger (severe) were based on households with complete responses corresponding to the number of affirmative responses (see Appendix G). For example, a score of 0 is reflective of high food security among adults, 1 - 2 reflects marginal food security among adults, 3 - 5 reflects low food security among adults and 6 - 10 reflects very low food security among adults. The missing items were considered negative versus missing and any item with a response of "yes" will be considered affirmative (Bickel, Nord, Price & Hamilton, 2000).

Just a single indicator cannot capture the range of food insecurity and hunger. Rather, a "household's level of food insecurity or hunger must be determined by obtaining information on a variety of specific conditions, experiences, and behaviors that serve as indicators of the varying degrees of severity of the condition." (Bickel, et al., 2000, p. 8). The CSP: FSS includes questions on household conditions, events, behaviors, and subjective reactions, and anxiety that the household food budget or food supply may be insufficient to meet basic needs. The questionnaire also includes questions about the

experience of running out of food or being without money to obtain more food as well as perceptions that the food eaten by household members was inadequate in quality or quantity. There are questions related to adjustments to normal food use such as substituting fewer and cheaper foods than usual or reduced food intake by adults in the household, and/or consequences of reduced intake such as the physical sensation of hunger or loss of weight.

There is a continuous linear scale (see Appendix H) which measures the degree of severity of food insecurity/hunger experienced by a household in terms of a single numerical value. The scale values vary across a wide range that expresses the full range of severity of food insecurity/hunger as observed in U.S. households. The standard U.S. food security scale is expressed by numerical values ranging from 0 to 10.12.

The statistical procedure that determines a household's scale value depends on the number of increasingly severe indications of food insecurity that the household has experienced, as indicated by affirmative responses to the increasingly severe sequence of survey questions. For example, a household with a scale value of 6, has responded affirmatively to more, and typically to more severe, indicators of food insecurity than a household with a scale value of 3 as noted in the previous section, variables operationalization. A household that has not experienced any of the conditions of food insecurity covered by the core module questions will be assigned a scale value of 0, while a household that has experienced all of them will have a scale value close to 10.

Responses to individual items in the questionnaire are not meaningful measures of food insufficiency, food insecurity, or hunger, and will not be used in such a manner. In

interpreting the scale, it also is important to remember that what it measures is the sufficiency of household food as directly experienced by household members and not necessarily the nutritional adequacy of diets. It is reasonable to expect that households with higher scale values have nutritionally less adequate diets than households with lower scale values, but one cannot draw that conclusion from the scale values alone. In addition, the scale represents the condition of household members as a group, not necessarily the condition of any particular person in the household. There are questions that reflect the household and some that ask about the experience of the adults in the household. The questionnaire does reflect the number of adults experience the specific conditions.

The research questions that I used were built upon the theoretical model, FCPM, to address what, how and possibly why certain factors influenced food choice decisions, expanding on the variables under study and the FCPM.

Primary Research Question

1. Does the level of food insecurity experienced by SNAP participants who have prediabetes, associated with food choice decisions and coping strategies over a 30-day benefit cycle, potentially increase the participants' risk of Type 2 diabetes?

Ha_1: Food security in relation to food choices and coping strategies change over the 30-day benefit cycle among SNAP participants who have prediabetes and potentially increase their risk for Type 2 diabetes.

Ho_1: Food security in relation to food choices and coping strategies do not change over the 30-day benefit cycle among SNAP participants who have prediabetes and do not potentially increase their risk for Type 2 diabetes.

Subordinate Research Questions

2. Do SNAP participants who have prediabetes exhibit different food choice decisions or patterns between the beginning of the 30-day benefit cycle versus the later part of the 30-day benefit cycle?

Ha_2: SNAP participants who have prediabetes make different food choice decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle.

Ho_2: SNAP participants who have prediabetes do not make different food choice decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle

3. Are there coping strategies used by SNAP participants who have prediabetes when making food choice decisions for each week during the 30-day benefit cycle?

Ha_3: There are coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

Ho_3: There are no coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

The basis for the primary research question (RQ1) was to explore the transitory aspect of food security, which overlaps the two components of the FCPM, influences and personal food systems. This question was addressed with the use of the DHQ 2 and CPS: FSS

questionnaires. In question 2, I explored possible consumption patterns and cycles if

eating over a 30-day benefit cycle. This question was addressed with the use of the DHQ

2 questionnaire. In question 3, I explored coping strategies that occurred at various times

over a 30-day benefit cycle associated with food security status. This question was

addressed with the use of the CPS: FSS questionnaire. Overall, in questions 1 through 3, I

reflected upon the FCPM's component, life course, that looks at people's food choice

trajectories that possibly leads to habitual food decisions that can affect how people

adjust to life course transitions. All three research questions were addressed between both

questionnaires, DHQ2 and CPS: FSS.

Threats to Validity

The selection of the sample and time were potential threats to the internal validity

of the study. The sample was composed of individuals with different characteristics, such

as age, gender, education, and literacy. The intent was to collect data from those

participants whom I had never seen as patients that were selected and referred to me from

the physicians and R.D. This excluded any personal bias. There was no threat of personal

bias during the data collection process hence did not to have another professional

administer the questionnaire booklet.

An additional limitation was the unanticipated events, such as participants not

completing the surveys. Every participant did complete the three questionnaires however

there were some gaps in certain variables such as the calculation of the body mass index

because not all of the heights and weights were filled in. Maturation (Indiana University,

2007, [power point slides], p. 6) was a threat to the internal validity because there was

fatigue in completing the questionnaires in a timely manner of 60 - 90 minutes. There were unlimited breaks and plenty of time allowed to complete the three questionnaires and for questions, however the reading and comprehension did instill fatigue among some participants. As an incentive to complete all three questionnaires and to ease the burden of the transportation strain, I provided a $5.00 metro card and a $25.00 food gift card for their participation.

The external validity can be generalized across individuals, settings, and times. The external validity can also be specified in two groups, population and ecological (Indiana University, n.d.). To avoid the threat of the sample not being representative of the population I targeted patients from Bronx Lebanon Hospital, which geographically is in the South/Central Bronx, NY where the research study was conducted.

An ecological threat to the external validity would be the interactive effect of testing. For example, the reactive effect to any of the participants' inability to read the instructions, too much assistance and the potential of providing answers for the participant without the participants thinking it through. To avoid this threat I carefully reviewed the questionnaires' content and format to anticipate any questions that the participants would have had. In addition, for selection of instruments, I consulted with subject matter experts to ensure that the questionnaires' content, format, and readability were appropriate for the targeted participants.

Questions and answers were built into the time frame while filling out the questionnaires. Experimental mortality would have been a threat in which there would of been a potential drop out if I split up or staggered the questionnaires. In other words, to

have the participants take each of the questionnaires at different times. To prevent

the loss to follow up, I had each of the recruited participants complete the three

questionnaires on the same day.

If there are threats to the external or internal validity, it will then compromise the

confidence in whether there is a relationship that exists between the independent (food

security) and dependent variables (food choice decisions, coping strategies to the 30-day

benefit cycle as determined by food choices, and perception of personal health) and

whether the study's results are applicable to other populations.

Ethical Procedures

The protocol, the data collection process and the subjects were approved by the

Institutional Review Board (IRB) of the Bronx Lebanon Hospital (see Appendix F) (#09-

12-13-07) and the IRB from Walden University on April 8, 2014 (#04-07-14-0161967).

The ethical concerns were related to the collection of data and the psychological

components, (a) fatigue and (b) psychological distress while filling out both

questionnaires, the DHQ 2 (food frequency) and the CSP: FSS (food security status). I

believe when the participants did fill out the questionnaire, CSP: FSS, it was possible

that some negative emotions were generated, such as reminding them of their own

personal vulnerability to being food insecure as well as possibly feeling the inability of

providing for their family. One participant did write a letter in the booklet noting the way

certain families or individuals have to eat or rather not eat due to limited financial

resources and having to purchase high fat and sugary foods because they are cheaper. The

participant did go on to state that this research study was significant and thanked me.

The targeted population has limited access to computers thus conducting the surveys online was neither feasible nor applicable; hence the participants were solicited and invited by PCPs, an adult endocrinologist and a R.D. Then each potential participant was referred to me for screening and to fill out three anonymous self-administered questionnaires, demographics and health questionnaire, the DHQ 2 and the CSP: FSS.

One way of reducing potential fatigue in filling out the questionnaires was to stress salience of the content (Porter, Whitcomb & Weitzer, 2004, p. 66). Those participants who might of experienced psychological distress while filling out the questionnaires were given the opportunity to voice their concerns by having me listen to their stresses and how they were feeling to avoid (Jones & Cutcliffe (2009) or reduce the stress. This did not occur among the participants however I felt distressed in reading the responses while coding. One incident occurred when the participant needed assistance in filling out the questionnaire toward the end of the CSP: FSS because she was tired, thus I read the questions to her and she provided the answers. I felt distressed hearing she was not eating for a whole day for 1 to 2 days out a 30-day benefit cycle. This information is significant and will be shared among all of the PCPs, Endocrinologists and R.D.s in the health system.

An additional ethical concern was the participant completing the surveys by providing information that was not totally reflective of the phenomenon, rather information based on what the participant thinks that I might of wanted to read, hence not reflective of the phenomenon in the household or foods consumed over a 30-day benefit cycle. I resolved this event by emphasizing that there was no right or wrong answer and

to provide answers that were reflective of what was true for them. In addition, I emphasized that each booklet that contains the three self-administered questionnaires was anonymous. I emphasized to the participants that there was neither judgment nor opinions with any of the answers provided and I stressed the significance, importance and value of the information provided. I reiterated that the information on behavior food choices over the 30-day benefit cycle was to contribute to possible public health changes to the federal program, SNAP regarding the frequency of benefit allotments. The data collected, in the bound booklets will be housed in my residence for the next seven years as a form of protection of the data.

Summary

The research design for this study was a quantitative and cross-sectional design. Electronic benefit transfer allotments among households participating in SNAP, the impact on food choices, food security and Type 2 diabetes were the key study variables. The independent variable, food security, given its four levels (with or without hunger) as high, marginal, low, and very low food security, was explored with the dependent variables, food choice decisions, coping strategies over the 30-day benefit cycle, and perception of personal health. The dependent variables were influential in food choice decisions as it related to food security status. The research questions helped me explore a phenomenon that currently exists and infer from food security status to the dependent variables, hence explored the relationship of the variables. The premise of the research questions was to build upon the theoretical model, food choice process model addressing specific factors that influence food choice decisions and the transitory aspect of food

security, capturing consumption food patterns and cycles of eating that possibly put people at risk for Type 2 diabetes.

The validated survey tools were used to collect information to address the research questions on food security status, food variation over a 30-day benefit cycle, coping strategies, perception of health, the types and frequency of consumption of fast foods, high fat foods, sugary beverages, and supplemental food programs among SNAP participants with prediabetes over a 30-day benefit cycle that potentially increases the risk for developing Type 2 diabetes.

SPSS was used to analyze the information that was collected from study instruments relevant to demographics and health, food security and food frequency. Chapter 4 addresses the data collection process and the results of the reported descriptive statistics analyzed, illustrated with tables and figures.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to examine the status of food security of recipients who have prediabetes participating in the of SNAP, focusing on their food choice decisions and coping strategies over a 30-day benefit cycle that potentially increase the risk of Type 2 diabetes. Explored are the transitory aspects of food security and differences in consumption patterns and in coping strategies that might occur over a 30-day benefit cycle in relation to food security among SNAP participants with prediabetes. A brief review of the primary and subordinate research questions is provided in this chapter as well as a description of the recruitment and data collection process, a summary of the sample demographics, and analysis of the data with outcomes to the primary and two subordinate questions.

Research Questions and Hypotheses

Primary Research Question

1. Does the level of food insecurity experienced by SNAP participants who have prediabetes, associated with food choice decisions and coping strategies over a 30-day benefit cycle, potentially increase the participants' risk of Type 2 diabetes?

Ha_1: Food security in relation to food choices and coping strategies change over the 30-day benefit cycle among SNAP participants who have prediabetes and potentially increase their risk for Type 2 diabetes.

Ho_1: Food security in relation to food choices and coping strategies do not change over the 30-day benefit cycle among SNAP participants who have prediabetes and do not potentially increase their risk for Type 2 diabetes.

Subordinate Research Questions

2. Do SNAP participants who have prediabetes exhibit different food choice decisions or patterns between the beginning of the 30-day benefit cycle versus the later part of the 30-day benefit cycle?

H_{a2}: SNAP participants who have prediabetes make different food choice decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle.

H_{o2}: SNAP participants who have prediabetes do not make different food choice decisions or patterns between the beginnings of the 30-day benefit cycle versus the later part of the 30-day benefit cycle

3. Are there coping strategies used by SNAP participants who have prediabetes when making food choice decisions for each week during the 30-day benefit cycle?

H_{a3}: There are coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

H_{o3}: There are no coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

The basis for the primary research question (RQ1) is to explore the transitory aspect of food security, which overlaps the two components of the food choice process model, influences and personal food systems. This question was addressed using the

DHQ 2 and the CSP: FSS questionnaires. In research question 2, the DHQ 2

questionnaire was used to address this question regarding differences in consumption

patterns over the 30-day benefit cycle. In research question 3, I explored coping strategies

that might occur at various times of the 30-day benefit cycle in relation to food security.

This question was addressed with the use of the CPS: FSS questionnaire. Overall, for

research questions 1 through 3, I reflected upon the FCPM's component, life course, that

looks at people's food choice trajectories that may lead to habitual food selections that

can affect how people adjust to life course transitions.

Recruitment and Data Collection

The protocol, data collection process and subjects were approved by the

Institutional Review Board (IRB) of the Bronx Lebanon Hospital (see Appendix F) and

the IRB from Walden University on April 8th 2014 (#04-07-14-0161967). Participants

were compensated with a $5.00 Metro card and a $25.00 Food gift card.

The data collection at Bronx Lebanon Hospital was at the Health Wellness Center

and began the week of May 5th 2014 and ended 2.5 months later, the week of July 14th

2014. Copies of flyers (See Appendix A) were developed in English and Spanish to

recruit participants for the research study. Flyers were placed out in the waiting rooms, in

the male and female bathrooms and with the primary care physicians, adult

endocrinologists and a registered dietitian. Inclusion criteria were only individuals who

were 21 years or older, lived in the South and Central Bronx, NY, participated in SNAP,

diagnosed with prediabetes, and are literate were eligible for study. For the purpose of

this study, those households participating in SNAP were defined as men or women who

were either married, divorced, single or widowed and had or did not have children. Adults that were nondocumented citizens, did not speak nor read English or Spanish, illiterate, and women who were pregnant or breast-feeding were excluded, elevated blood sugars or diagnosed with prediabetes, age of 21 years or older; participating in SNAP, living in the South or Central Bronx, and being able to read and write English or Spanish. Individuals having any previous contact with this researcher, diagnosed with Type 2 diabetes, pregnant, younger than 21 years of age, and/or illiterate were not eligible to participate.

On average, 2 - 4 participants were recruited per week. During the recruitment process, there were 25 people that were referred from the PCPs, adult endocrinologists or the R.D. however they were illiterate and were not eligible for this research study. Their illiteracy was unknown to the referring practitioners. This issue highlighted the need to change how one communicates or assess this population and the type of literature provided. In addition, specific instructions to eligible participants on how to complete each of the questionnaires played a key role in the accuracy of the responses once the individuals were enrolled in the study.

Sixty-one patients with prediabetes were referred to the study. Of these, 35 met the criteria for eligibility with the exception of one participant who lived in a shelter and was in between receiving SNAP benefits. He completed the three questionnaires resulting in 36 participants participated. The response screening rate for those recruited and eligible for the study was 57% (61 referred, 35 were eligible). The response rate for those

eligible who completed the survey was 97% because one participant filled out the survey however did not participate in SNAP.

To ensure the sample recruited for this study was adequate and to show meaningful relationships, a Cohen's d or effect size was calculated to see how large the effect is between means, using SPSS, a statistical software program and selecting the independent samples t-test. For analysis, this researcher wanted to compare food choice variation over time and thus created a "control" group, using Week 1 from "more" consumption over the 30-day benefit period comparing to Weeks 2, 3, 4 of "more" (experimental group) from DHQ 2 questions, 111 – 121 (see Table 5**)**. The response rate for week 1 from "more" was 54.1% whereas the responses to Weeks 2, 3,and 4 were 27.3%, 10.3%, and 8.2% respectively (see table 16). Also, Week 1 from "more" was used as the "control" group for comparing to "less" and "same" for Weeks 1, 2, 3, and 4 (see Table 6). For this comparison, the following food categories were used: sweet beverages; dairy; meat; cold cuts; chicken, fish, pork and ground beef; fast foods; starchy vegetables; fruits; breads, rice, rolls, spaghetti and macaroni; desserts; and non-starchy vegetables.

The web site, www.uccs.edu/~faculty/lbecker/ was used to calculate the effect size and for interpretation of the data. The following threshold for interpreting effect sizes was used, d = .2, small effect; d = .5, a moderate effect; and .8, a large effect (Ellis, P.D., 2009).

Table 5

Cohen's d Analysis: Effect Size and Interpretation

Repeated measures Independent *t*-test Food Choice Variations Over Time "More" versus "Less" and "Same" (Control grp)	Mean	Std. Dev.	Cohen's d	Interpretations
Sweetened Beverages			0.95	Large effect
- Less	1.00	1.49		
- Same	0.00	0.000		
Dairy*			1.21	Large effect
- Less	1.45	1.695		
- Same	0.00	0.00		
Meat: beef, hotdogs, bacon			1.10	Large effect
- Less	1.22	1.563		
- Same	0.00	0.000		
Cold Cuts			0.94	Large effect
- Less	1.00	1.500		
- Same	0.00	0.000		
Chicken**			0.78	Moderate effect
- Less	0.56	1.014		
- Same	0.00	0.000		
Fast foods			0.97	Large effect
- Less	1.29	1.890		
- Same	0.00	0.000		
Starchy Vegetables			1.01	Large effect
- Less	1.08	1.505		
- Same	0.00	0.000		
Fruits			1.04	Large effect
- Less	0.92	1.240		
- Same	0.00	0.000		
Breads^			0.98	Large effect
- Less	1.10	1.595		
- Same	0.00	0.000		
Desserts			1.35	Large effect
- Less	1.60	1.673		
- Same	0.00	0.000		
Non-Starchy Vegetables			0.73	Moderate effect
- Less	0.73	1.421		
- Same	0.00	0.000		

*Dairy: cheese, milk, yogurt, milk-based desserts, puddings, ice-cream and frozen yogurt
**Chicken: included with fish, pork and ground beef as part of the category
^Breads include rice, rolls, spaghetti and macaroni

The effect size between the means of each of the food categories is moderate or

large, indicative of a consistent difference between the group means. See table 6.

Table 6
Independent t-test: Levene's test for Quality of Variance

Repeated measures Independent *t*-test Food Choice Variations Over Time "More" versus "Less" and "Same" (Control grp)	Sig.	T	df	Sig. (2-tailed)	Result
Sweetened Beverages					
- Less	.036	-1.22	17	.239	no statistically significant difference*
- Same	.001	5.29	16	.001	*t* (16) = 5.29, p <.05**
Dairy^					
- Less	.103	-.88	25	.385	no statistically significant difference*
- Same	____	3.19	25	.002	*t* (25) = 3.19, p <.05**
Meat: beef, hotdogs, bacon					
- Less	.0367	-.35	20	.726	no statistically significant difference*
- Same	.000	3.09	20	.003	*t* (20) = 3.09, p <.05**
Cold Cuts					
- Less	.619	.276	19	.786	no statistically significant difference*
- Same	.000	2.02	19	.058	no statistically significant difference*
Chicken^^					
- Less	.189	-.80	21	.433	no statistically significant difference*
- Same	.000	5.49	21	.000	*t* (21) = 5.49, p <.05**
Fast foods					
- Less	.182	.131	21	.897	no statistically significant difference*
- Same	.000	1.46	21	.410	no statistically significant difference*
Starchy Vegetables					
- Less	.229	-.311	20	.759	no statistically significant difference*
- Same	____	3.30	20	.015	*t* (20) = 3.30, p <.05**
Fruits					
- Less	.564	-.694	24	.494	no statistically significant difference*
- Same	.000	6.37	24	.000	*t* (24) = 6.37, p <.05**
Bread, rice, roll, spaghetti, macaroni					
- Less	.815	.255	27	.801	no statistically significant difference*
- Same	.000	3.22	27	.000	*t* (27) = 3.22, p <.05**
Desserts					
- Less	.916	-.502	22	.620	no statistically significant difference*
- Same	.000	1.83	22	.002	*t* (22) = 1.83, p <.05**
Non-Starchy Vegetables					
- Less	.110	-.740	24	.466	no statistically significant difference*
- Same	.000	5.28	24	.000	*t* (24) = 5.28, p <.05**

*No statistically significant difference between the means of the "more" and "less"
**Statistically significant differences between the means of the "more" and "same"
^Dairy: cheese, milk, yogurt, milk-based desserts, puddings, ice-cream and frozen yogurt
^^Chicken: included with fish, pork and ground beef as part of the category

The Levene's test for "more" comparing to "same" is statistically significant p

<.05; d = .80. The effect size of the means and was found to exceed Cohen's d (1988)

convention for a large effect (d = .80) with the exception of the food categories of "same"

cold cuts and fast foods.

Demographics

There were 36 subjects of whom 26 (72.7%) were female and 10 (27.8%) were male. The sample consisted of more middle age aged (41-50 years) and (51-60 years), 61.2% (each at 30.6%) and older adults (61-70 years), at 22.2%, than younger adults, (22-30 years), at 5.6% and (31-40 years), at 11.1%. Of the sample, 97.2% participated in SNAP because one participant reported to living in a shelter and did not receive SNAP benefits however I included this participant because of his diagnosis, income and housing situation. In addition, there was a gap in his participation in SNAP. Of the sample, 66.7% reported being Hispanic/Latino, 36.1% lived alone, and half the sample (52.8%) did not graduate from high school. Twenty-five percent attended some college; however, 72.2% did not have any college. Of the sample, 83.4% perceived their health as fair to poor. The heights and weights were collected and the body mass index ($kg \times 703/ht^2$) was manually calculated. Of the sample, 5.6% were of normal weight ($18.50-24.99kg/m^2$), 19.4% were overweight ($25.0-29.99kg.m^2$), 22.2% were obese class I ($30.0-34.99kg/m^2$), 13.9% were obese class II ($35-39.99kg/m^2$), and 22.2% were extremely obese class III ($\geq 40kg/m^2$). See Table 8 for the sociodemographc characteristics. A relation between perception of health status and body mass index was not statistically significant ($p > .05$, r 0.059). See Table 7.

Table 7.

Perception of Health Status and Body Mass Index

Correlation: Perception of Health and BMI		Health Status: Excellent, good, fair, or poor	Body Mass Index
Health Status: Excellent, good, fair, or poor	Pearson Correlation	1	.059
	Sig (2-tailed)	35	30
	N		
Body Mass Index Up-dated	Pearson Correlation	.059	1
	Sig (2-tailed)	.759	
	N	30	30

Note. The relation between perception of health status and body mass index (BMI) was not statistically significant, p >.05 with r-value of 0.059

The 83.4% of the sample who perceived their health status to be fair or poor were either American or originally from the Dominican Republic (see Tables 8 and 9).

Table 8

Socio-Demographic Characteristics of the Health and Wellness Center at Bronx Lebanon Hospital (South/Central, Bronx, NY)

Characteristics	N	%
Age (y)		
<21	0	0
22-30	2	2.6
31-40	4	11.1
41-50	11	30.6
51-60	11	30.6
61-70	8	22.2
Gender		
Female	26	72.7
Male	10	27.8
SNAP/Food Stamps		
Yes	35	97.2
No^	1	2.8
Perception of Health		
Excellent	1	2.9
Good	4	11.1
Fair	15	41.7
Poor	15	41.7
Missing	1	2.8

(table

continues)

Chracteristics	N	%
Country of Origin		
United States	11	30.6
Puerto Rico	5	13.9
Dominican Republic	11	30.6
Haiti	2	5.6
Mexico	2	5.6
Other	4	11.1
Missing	1	2.8
Ethnicity		
Hispanic/Latino	24	66.7
Non-Hispanic/Non-Latino	3	8.3
Black American	7	19.4
Missing	2	5.6
Living Situation		
Alone	13	36.1
With wife	2	5.6
With husband	9	25.0
With children	10	27.8
With friend	5	13.9
Adult Weight Status		
Normal (18.50-24.99kg.m^2)	2	5.6
Overweight (25.0-29.99kg/m^2)	7	19.4
Obese Class I (30-34.99kg/m^2)	8	22.2
Obese Class II (35.0-39.99kg/m^2)	5	13.9
Extreme Obesity Class III ($\geq$40kg/m^2)	8	22.2
Missing	6	16.7
Last Grade of Schooling Completed		
1st – 6th grade	7	19.4
7th – 9th grade	11	30.6
10th – 12th grade	17	47.2
Graduated High School		
Yes	16	44.4
No	19	52.8
Missing	1	2.8
Attended Some College		
Yes	9	25.0
No	26	72.2
Missing	1	2.8
Graduated College		
Yes	5	13.9
No	29	80.6
Missing	1	2.8

^ One participant lived in a shelter and was in-between in receiving SNAP benefits however participated in the research study.

Table 9

Perception of Health and Country of Origin

Perception of Health	Country of Origin						
	U.S.	P.R.	D.R.	Haiti	Mexico	Other	Total
Excellent	0	0	1	0	0	0	1
Good	2	1	0	0	0	0	3
Fair	4	1	7	0	2	1	15
Poor	4	3	3	2	0	3	15
Missing							2
Total							36

Note. U.S.=United States; P.R.=Puerto Rico; D.R.=Dominican Republic; Other=Cuba

Sample Representativeness

I targeted patients from Bronx Lebanon Hospital, which geographically is in the South

and Central Bronx, New York, where the research study was conducted. The 36 subjects

who participated in the study were representative of the larger population of the South

and Central Bronx. The sample was multiethnic, participated in SNAP (with the

exception of one subject who was in between services), and received care from the Bronx

Lebanon Hospital, a nonprofit healthcare system, that services the South and Central

Bronx in New York. The target population was geographically defined to those

individuals with prediabetes who participate in SNAP, are either male or female, and

living in South and Central Bronx, NY. The sample for the study was drawn from

existing patients from Bronx Lebanon Hospital (see Appendix F: Bronx Lebanon

Hospital IRB #09 12 13 07) who had been diagnosed with prediabetes or impaired

glucose tolerance. The participants were identified through the primary care physicians

the adult endocrinologist and a registered dietitian in the Health and Wellness clinic at

Bronx Lebanon Hospital and referred to me (see Appendix A: Invitation to participate in

the research study) based on the study's criteria. The sample target size was 35

individuals at minimum. A total population of 594 diagnosed with prediabetes between

January 2011 and May 2013 that was targeted for a lifestyle modification class that I was

supposed to conduct; however has been put on hold. This is the basis for the sample

population that I used. This number was determined with a confidence interval of 16,

confidence level of 95%, significance level of p value = 0.05, and 50% effect size

(Surveysystem, 2012). The effect size was determined by Cohen's d 0.50 and a power of

0.85 thus sample size of 30 was determined based on a one-tailed chart (Berry College,

2013).

The external validity may be generalized to other groups of people and other

conditions. The external validity can be divided in two groups, population and ecological

(Michael, 2004). Population validity refers to how representative the sample is of the

population whereas ecological validity is present to the degree that a result generalizes

across settings; that the phenomenon of a research study would naturally occur. This

includes but is not limited to interaction effect of testing, selection bias, or reactive

effects of experimental arrangements, such as the Hawthorne effect, in which subjects

know they are participating in an experiment and experience the novelty of it (Indiana

University, n.d.).

An ecological threat to the external validity was the interactive effect of testing.

For example, the reactive effect to any of the participants' inability to read the

instructions, too much assistance and the potential of providing answers for the

participant without the participants thinking it through. I reviewed the questionnaires'

content and format to anticipate any questions that the participants would have. In

addition, for selection of instruments, this researcher consulted with subject matter

experts to ensure that the questionnaires' content, format and readability were appropriate

for targeted participants.

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Data Analysis

</div>

Additional Data Procedures

       Food security status: Calculation. In addition to the planned analysis described

in Chapter 3, the calculation of the food security status was necessary to answer questions

pertaining to coping strategies. The U.S. Adult Food Security Module uses a 10 item

questionnaire for coding food security responses of participants (USDA, 2012c).

However, I included two additional subquestions to reflect the frequency of how often

participants "ate less over the last 30 days because there was not enough money for food"

and "how often the participant experienced hunger over the last 30 days because there

was not enough money for food." Thus, there were 12 questions used for coding the raw

scores among adults. The raw scores were assigned the following codes to determine

food security among adults: raw score 0 = high food security; raw score 1 - 2 = marginal

food security; raw score 3 - 5 = low food security; raw score 6 - 12 = very low food

security. See table 10. The responses of "yes," "often true," "sometimes true," "almost

every month," and "some months but not every month" were coded as an affirmative

response.

Table 10

Food Security Status: Raw Scores

Food Security	N	%
High	0	0.00
Marginal	0	0.00
Low food security	2	5.60
Very low food security	34	94.59

Note: The 36 subjects who participated in this research study were either low or very low food secure

I ran a descriptive analysis (frequency) exploring food security status (see Table 10) and BMI (see Table 8) and 21.42% through 28.57% participants were very low food secure and either over weight, obese, class I, II or extremely obese class III, respectively (see Table 11).

Table 11

Food Security Status and Body Mass Index (BMI)

	Food Security Status			
	Low Food Security		Very Low Food Security	
Weight Classification BMI (kg/m^2)	N	%	N	%
Normal (18.50 – 24.99)	0	0	2	7
Over weight ($\geq$25.00)	1	50	6	21.42
Obese class I (30.00 – 34.99)	1	50	7	25
Obese class II (35.00 – 39.99)	0	0	5	17.85
Extreme obesity class III ($\geq$40.00)	0	0	8	28.57
Total	2		28	

Note. *Low food security*: reporting of reduced quality, variety, or desirability of diet, and little or no indication of reduced food intake; and *Very low food security:* reporting of multiple indications of disrupted eating patterns and reduced food intake (USDA, 2012).

The statistical program, SPSS version 21 was used to sum affirmative responses to the 10 questions plus the 2 subquestions in the U.S. Adult Food Security Module and

to calculate the participants' raw score, which enabled this researcher to assign

affirmative responses to each user (see Table 12). Specifically, the steps taken to sum the

affirmative responses were to recode the question variables, then go to "transform" to

compute the new variable which was renamed to Food Security, sum the recoded

variables, such as xx + xx + xx and ran the summed data per user ID. I recoded the

affirmative responses as 0 - 2 = 1(affirmative or food insecure) and 3 - 6 = 0 (not

affirmative or food secure). Responses of 3 days or more were coded as "affirmative"

responses. In summary, the steps to the affirmative responses were to recode the response

to the number of days and then recoded that group of responses to narrow it down to how

many participants had affirmative responses based on the raw score of 0 - 2 days =

nonaffirmative or negative and $\geq$3 days = affirmative responses.

Table 12

Responses that are 3 Days or More in Regards to the Number of Days Cutting Size of or Skipping Meals,

Days Eating Less, Days that are Hungry, and Not Eating for a Whole Day over a 30 day Food Cycle.

Responses	N=36	%
Affirmative	9	25.0
Negative	27	75.0

Note. The affirmative response reflects food insecurity although limited to how severe,
whether the participant was marginal food secure, low food secure and/or very low food
secure.

Coping strategies: Response analysis. The analysis of responses to varied food

coping strategies over a 30-day benefit cycle provided information relevant to SNAP

food choices. Responses measured were based on the particular strategy of interest, such

as, often true, sometimes true, never true, that pertain to questions asking whether "food

will run out" or "food did not last and no money to buy more", or "could not afford to eat

balance meals." The yes or no responses were specific to questions asking about "cutting size of or skipped meals," "stretched food or money," "ate less," "did not eat for a whole day," "meals delivered to home," "went to a community program," "received emergency food, " or received meals at soup kitchen or shelter"). The responses, almost every month, some months but not every month, only 1 or 2 months pertained to specific questions asking "did not eat for a whole day," "hungry but did not eat because no money for food," "eating less because there was not enough money for food," and "cutting the size of or skipping meals." The two subquestions that were used to code food security responses were "ate less over the last 30 days because there was not enough money for food" and "how often the participant experienced hunger over the last 30 days because there was not enough money for food." For these questions, the "ate less" queried was a yes or no response and the "experience hunger" question queried, response was "almost every month, some months but every month, only 1 or 2 months."

Table 13

Responses to Coping Strategies: Food Run Out, Food Did Not Last, and Could Not Afford Balanced Meals

Coping Strategies	Often True		Sometimes True		Never True		Missing	
	N	%	N	%	N	%	N	%
Worried whether food would run out	12	33.3	19	52.8	5	13.9		
Food bought did not last and no money to buy more food	9	25.0	19	52.8	7	19.4	1	2.8
Could not afford to eat balanced meals	12	33.3	16	44.4	7	19.4	1	2.8

Table 14

Coping Strategies: In Response to Food Budgeting Over a 30-day Benefit Cycle

Coping Strategies	Yes		No	
	N	%	N	%
Cut size or skipped meals (SH2)	20	55.6	14	38.9
Stretch food or money (S8E)	8	22.2	24	66.7
Ate less (SH3)	22	66.1	12	33.3
Did not eat for a whole day (SSH1)	9	25.0	22	61.1
Meals delivered to the home (SC1)	4	11.15	31	86.1
Went to a community program (SC2)	4	11.15	32	88.9
Received emergency food (SC3)	9	25.0	27	75.0
Received meals at soup kitchen or shelter (SC4)	5	13.9	31	86.1

Note. SH2, S8E, SH3, SSH1, SC1, SC2, SC3, SC4 from the Current Population Survey: Food Security Supplement; Meals delivered to home from community programs; Emergency food from church, a food pantry or food back

In looking at additional coping strategies this researcher explored different responses, such as almost every month, some months but not every month, only 1 or 2 months. Over the 30-day benefit cycle, 36.1% ate less because there was not enough money for food, 30.6% participants cut the size of or skipped meals, 13.9% were hungry however did not eat, and 8.3% did not eat for a whole day because not enough money for food as shown in table 15.

Table 15

Coping Strategies: In Response to Food Budgeting Over a 30-Day Benefit Cycle

Coping Strategies	Almost every mo.		Some mos., but not every mo.		Only 1 or 2 mos.		Skipped*		Missing	
	N	%	N	%	N	%	N	%	N	%
Cutting the size of or skipped meals	11	30.6	10	27.8	1	2.8	14	38.9		
Eating less because there was not enough money for food	13	36.1	7	19.4	3	8.3	12	33.3	1	2.8
Hungry but did not eat because not enough money for food	5	13.9	9	25.0	3	8.3	19	52.8		
Did not eat for a whole day because not enough money for food	3	8.3	8	22.2	1	2.8	22	61.1	2	5.6

*Participate was instructed to skip this answer if responded "no" to the question, e.g., SSH1, "In the last 30 days did you or other adults in your household ever not eat a whole day because there wasn't enough money for food?" – from the CSP: FSS questionnaire.

Food Choice Decision Variation over Time: Control group

To examine the variation of food choice decisions over time and address research questions 1 and 2, I created a control group. I did this after exploration of the data in terms of frequency of foods consumed over the 30-day benefit cycle. This modification to the research design improved my ability to assess the impact of the independent variable, food security status. The "more" consumption during Week 1 was designed as the control group based on food category frequency outcome data as shown in table 17, and "more" consumption 2,3, and 4 was designed as the experimental group, based on results on the exploratory analysis. For this additional analysis, I ran a non-parametric test, Friedman's test and a post-hoc test using the Wilcoxon signed-rank test. The Friedman test is used to test for differences between dependent variables/groups, which are measured at the ordinal level (Laerd Statistics, 2013).

Table 16
Food Categories as per "more" of Weeks 1,2, 3, and 4

Category	N	%
More 1st week of the month	105	54.1
More 2nd week of the month	53	27.3
More 3rd week of the month	20	10.3
More 4th week of the month	16	8.2

Note. 105 responses were "more" during the 1st week of the month and less than 10% were during the 4th week of the month.

Based on the food choices made as shown in table 16, the Week 1 "more" consumption control group had significantly more consumption of food choices in the beginning of the month versus the 2nd, 3rd and 4th week of the month.

Results

Research Question 1 (RQ1) and Hypothesis Food Security and Coping Strategies

Does the level of food insecurity experienced by SNAP recipients who have prediabetes associated with food choice decisions and coping strategies over a 30-day benefit period potentially increase the recipient's risk of Type 2 diabetes?

*Ha*₁: Food security in relation to food choices and coping strategies will change over the 30-day benefit period among SNAP participants who have prediabetes and will potentially increase their risk for Type 2 diabetes.

*Ho*₁: Food security in relation to food choices and coping strategies will not change over the 30-day benefit period among SNAP participants who have prediabetes and will not potentially increase their risk for Type 2 diabetes.

Food security status among SNAP participants in this research study was either low or very low food secure (5% and 95%, respectively) (see Table 10). Therefore only these two levels of food security were analyzed in relation to coping strategies (see Table 17.) practiced over 30 days. The recoded food security raw scores (see Table 10) were compared with the eight coping strategies from the food security module (see Appendix D., p. 212) using a chi-square analysis (Table 19) to test the null hypothesis. Table 18 shows the cross tabulation with food security status against coping strategies. The practice of coping strategies, over the 30 day benefit cycle, was dominated by "stretching money for food" (budgeting very tightly for food), "cutting food into smaller pieces or skipping meals," and/or "eating less because there was no money for food." However, there were no statistically significant differences between the level of food security and

use of coping strategies by SNAP participants (Tables 17 and 18**)**. When looking at

food security status against coping strategies (Table 17) the expected count is less than 5

or not >20% of the expected count. In this case, the chi-square status test (Table 19) is

75% or >20% which violates the assumption (the 3 cells have an expected count less than

5). The asymptotic significance along the line of the likelihood ratio is .628 hence >.05.

In addition, the Pearson chi-square value of .724 is >.05, hence accepting the null

hypothesis that food security does not affect coping strategies over a 30-day benefit

cycle.

Table 17

Coping Strategies used by Participants in the Supplemental Nutrition Assistance Program Reporting Low Food

Security or Very Low Food Security Over the Last 30 Days.

Coping Strategies	Low Food Security		Very Low Food Security		P*
	Yes		Yes		
	N	%	N	%	
(S8E) Run short of money and try to make food or money to go further	1	3.0	23	72.0	.557
(SH2) Adult cut the size of the meals or skip meals because there wasn't enough money for food	0	0.0	20	59.0	.081
(SH3) Ate less because there wasn't enough money for food	1	3.0	22	65.0	.654
(SSH1) Not eat for a whole day because there wasn't enough money for food	0	0.00	9	29.0	.516
(SC1) Received meals delivered to the home from community program	0	0.0	4	11.0	.843
(SC2) Went to any community program or senior center to eat prepared meals	0	0.0	4	11.0	.607
(SC3) Received emergency food from church, a food pantry or food bank	0	0.0	9	25.0	.401
(SC4) Received any meals from a soup kitchen or shelter	0	0.0	5	14.0	.559
Coping Strategies: Food Security	0	0.0	2	5.50	.724

Table 18

*Security * Coping Strategies Cross Tabulation*

			Coping strategies		Total
			No	Yes	
Security	Low food security	Count	0	2	2
		Expected Count	.1	1.9	2.0
	Very low food security	Count	2	32	34
		Expected Count	1.9	32.1	34.0
Total		Count	2	34	36
		Expected Count	2.0	34.0	36.0

Table 19

Chi-Square Tests

	Value	df	Asymp. Sig (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.125[a]	1	.724		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.235	1	.628		
Fisher's Exact Test					
Linear-by-Linear Association	.121	1	.728		
N of Valid Cases	36				

a. 3 cells (75.0%) have expected count less than 5. The minimum expected count is .11.

b. Computed only for a 2x2 table

I ran a linear regression on the independent variable, food security status and the eight coping strategies (dependent variable) and only 3.1% of the variance in coping strategies can be explained by food security status (see Table 20). The ANOVA model is not significant, $F(1,34) = 2.119$, $p = .155$. The p-value is >.05. With a .155 significant value, food security is not a good predictor of coping strategies (see Table 20).

Table 20

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.242[a]	.059	.031	1.69392

[a] Predictors (Constant), security

Note. 3.1% of the variance in coping strategies can be explained by the independent variable, food security.

Table 21

ANOVA Model

ANOVA[a]					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	6.080	1	6.080	2.119	.155[b]
1 Residual	97.559	34	2.869		
Total	103.639	35			

a. Dependent Variable: RQ4SNAPcoping

b. Predictors: (Constant), security

Table 22

Linear Regression: Coefficient Model

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2.588	3.640		-.711	.482
Security	1.794	1.233	.242	1.456	.155

a. Dependent Variable: RQ4SNAPcoping

Based on the results of the regression analysis, food security status is not a good predictor of coping strategies. However, I looked at the strength of the relationship between food security status and coping strategies, coded the eight coping strategy variables, and then ran a bivariate analysis to see if there was a correlation of food

security status with coping strategies using the Pearson correlation analysis (see Table

23). In this case, there is significance at p< 0.01 level (2-tailed) with Sig (2-tailed) .000

and an r value of 0.597.

Table 23

Relationship: Food Security Status and 8 Coping Strategy Variables

Correlations			
		SNAP coping	Food Security Status
SNAP coping	Pearson Correlation	1	.597[**]
	Sig. (2-tailed)		.000
	N	36	36
Food Security Status	Pearson Correlation	.597[**]	1
	Sig. (2-tailed)	.000	
	N	36	36

**. Correlation is significant at the 0.01 level (2-tailed).

Food Choices over the 30-day Benefit Period/Food Cycle. To answer research

questions 1 and 2 as to food choices over time, I ran a frequency analysis looking at

questions 111 – 121 (see Appendix E) from DHQ 2 questionnaire. The majority of

participants consumed more beverages and food items during the first week of the month

or 30-day benefit period than the other three weeks (see Table 24).

Table 24

Food Choices over Time

Sweetened Beverages – More, Less, Same					
	More		Less		Same	
	N	%	N	%	N	%
Not checked	9	25.0	19	52.8	22	61.1
1st week of the month	10	27.8	3	8.3		
2nd week of the month	7	19.4	3	8.3		
3rd week of the month	2	5.6	2	5.6		
4th week of the month	2	5.6	3	8.3		
Same					7	19.4
Missing					7	19.4

| Total | 36 | | 36 | | 36 | |

Frequency Dairy Products: Cheese, milk, yogurt, milk-based desserts – puddings, ice cream and frozen

	More		Less		Same	
	N	%	N	%	N	%
Not checked	16	44.4	18	50.0	25	69.4
1st week of the month	11	30.6	7	19.4		
2nd week of the month	4	11.1	1	2.8		
3rd week of the month	1	2.8	3	8.3		
4th week of the month	1	2.8	4	11.1		
Same					8	22.2
Missing	3	8.3	3	8.3	3	8.3
Total	36		36		36	

Meat: beef, hotdogs and bacon

	More		Less		Same	
	N	%	N	%	N	%
Not checked	13	36.1	19	52.8	26	72.2
1st week of the month	9	25.0	3	8.3		
2nd week of the month	7	19.4	3	8.3		
3rd week of the month	4	11.1	3	8.3		
4th week of the month			4	11.1		
Same					7	19.4
Missing	3	8.3	3	8.3	3	8.3
Total	36		36		36	

Cold cuts or luncheon meats

	More		Less		Same	
	N	%	N	%	N	%
Not checked	12	33.3	15	41.7	26	72.2
1st week of the month	9	25.0	8	22.2		
2nd week of the month	6	16.7	1	2.8		
3rd week of the month	3	8.3	3	8.3		
4th week of the month			3	8.3		
Same					4	11.1
Missing	6	16.7	6	16.7	6	16.7
Total	36		36		36	

Chicken, pork, fish or ground beef

	More		Less		Same	
	N	%	N	%	N	%
Not checked	14	38.9	29	80.6	25	69.4
1st week of the month	9	25.0	4	11.1		
2nd week of the month	7	19.4	1	2.8		
3rd week of the month	3	8.3	2	5.6		
4th week of the month	3	8.3				
Same					11	30.6
Missing						
Total	36		36		36	

Fast Foods

	More		Less		Same	
	N	%	N	%	N	%
Not checked	16	44.4	10	27.8	22	61.1
1st week of the month	7	19.4	7	19.4		
2nd week of the month	2	5.6	2	5.6		
3rd week of the month			3	8.3		
4th week of the month	1	2.8	4	11.1		
Same					4	11.1
Missing	10	27.8	10	27.8	10	27.8
Total	36		36		36	

Starchy vegetables: Potatoes, yam or sweet potatoes or peas						
	More		Less		Same	
	N	%	N	%	N	%
Not checked	10	27.8	20	55.6	27	75.0
1st week of the month	12	33.3	4	11.1		
2nd week of the month	6	16.7	1	2.8		
3rd week of the month	2	5.6	4	11.1		
4th week of the month	2	5.6	3	8.3		
Same			4	11.1	5	13.9
Missing	4	11.1			4	11.1
Total	36		36		36	
Fruits – any types						
	More		Less		Same	
	N	%	N	%	N	%
Not checked	14	38.9	27	75.0	24	66.7
1st week of the month	12	33.3	2	5.6		
2nd week of the month	6	16.7	2	5.6		
3rd week of the month	1	2.8	3	8.3		
4th week of the month	2	5.6	1	2.8		
Same					11	30.6
Missing	1	2.8	1	2.8	1	2.8
Total	36		36		36	
Breads, rice, rolls, spaghetti or macaroni						
	More		Less		Same	
	N	%	N	%	N	%
Not checked	19	52.8	20	55.6	24	66.7
1st week of the month	10	27.8	4	11.1		
2nd week of the month	2	5.6	1	2.8		
3rd week of the month	2	5.6	4	11.1		
4th week of the month	1	2.8	5	13.9		
Same					10	27.8
Missing	2	5.6	2	5.6	2	5.6
Total	36		36		36	
Desserts						
	More		Less		Same	
	N	%	N	%	N	%
Not checked	19	52.8	13	36.1	19	52.8
1st week of the month	5	13.9	5	13.9		
2nd week of the month	1	2.8	4	11.1		
3rd week of the month	1	2.8	1	2.8		
4th week of the month	1	2.8	4	11.1		
Same					8	22.2
Missing	9	25.0	9	25.0	9	25.0
Total	36		36		36	
Non-starchy Vegetables						
	More		Less		Same	
	N	%	N	%	N	%
Not checked	15	41.7	26	72.2	24	66.7
1st week of the month	11	30.6	4	11.1		
2nd week of the month	5	13.9	1	2.8		
3rd week of the month	1	2.8	2	5.6		
4th week of the month	3	8.3	2	5.6		
Same					11	30.6
Missing	1	2.8	1	2.8	1	2.8
Total	36		36		36	

Food choices descriptive analysis. During the 1st week of the month, 27.8% of the

participants consumed sweetened beverages, 30.6% consumed dairy products, 25.0%

consumed meat items (beef, hotdogs, and bacon), 25.0% consumed cold cuts, 19.4%

consumed fast foods, 33.3% consumed starchy vegetables (potatoes, yam, peas), and

33.3% consumed fruits (see Table 24).

A number of the sample reported the same frequency of food consumption over

the 30 day cycle for each particular food group: 30.6% for chicken, pork, fish and ground

beef, 30.6% for nonstarchy vegetables; 30.3% for fruits; 22.2% for desserts, and cold

cuts, fast food restaurants and starchy vegetables, each at 11.1%. There were similarities

during the 1st week and the same week of the month regarding breads, rice, rolls,

spaghetti and macaroni, and nonstarchy vegetables as well (see table 24).

Food Choices: Additional Analysis. I explored variation of food choices over time

with a control group, "more" consumption during Week 1 and compared "more" Week 1

to "more" Weeks 2,3 and 4. The Friedman's test, a "non-parametric alternative to the

one-way ANOVA with repeated measures" (Laerd Statistics, 2013, p 1) was used to test

differences between groups when the dependent variable is measured as an ordinal

variable. The Friedman's test was used because it passed the following four assumptions,

one, the group is measured on three or more different occasions; two, the group is a

random sample from the population; three, the dependent variable is measured at the

ordinal level; and four, the sample does not need to be normally distributed (Laerd

Statistics, 2013).

Table 25

Friedman's Test: DHQ2 Questions 111 – 121 "More"

Queries – "more"	Mean Rank
(111) Sweetened beverages	6.76
(112) Dairy	6.48
(113) Meat	7.19
(114) Cold cuts	6.05
(115) Chicken	6.19
(116) Fast food restaurants	4.90
(117) Starchy vegetables	6.64
(118) Fruits	6.31
(119) Breads	4.83
(120) Desserts	4.55
(121) Non-Starchy vegetables	6.10
N	21
Chi-Square	23.480
Df	10
Asymp. Sig.	.009

Note. Dairy includes cheese, milk, yogurt, milk-based desserts-puddings, ice-cream and frozen yogurt; Meat includes beef, hotdogs, and bacon; Chicken includes pork, fish, ground beef; Starchy vegetables includes potatoes, yam or sweet potatoes, peas; and Breads includes rice, rolls, spaghetti, macaroni

There was a statistically significant difference of food times consumed based on which week of the month was compared as seen by X^2 (2) = 23.480, p = .009 between related groups as shown in table 25, however this researcher does not know exactly where those differences lie. Hence, I ran the Wilcoxon signed-rank tests as post-hoc to explore or explain where the differences actually occur with a Bonferoni correction was applied, using a significant level of p<.005. Prior to the Wilcoxon signed-rank test this researcher calculated by hand the Bonferoni Adjustment. .05/10 (# of tests ran) = .005, hence the new significant value. The Friedman analysis was on the variables 111-121 from DHQ2 "more" only.

Wilcoxon Signed-Rank Test

This researcher compared, "more" weeks: Week 1 to Week 2, Week 1 to Week 3, Week 1 to Week 4, Week 2 to Week 3, Week 2 to Week 4, and Week 3 to Week 4 to

determine differences between groups over the 30-day food cycle for 11 food

categories using weeks 1 through 4 as data points. See tables 26 - 28.

Table 26

Eleven Food Groups As Reported Consumed Per Week: Control Group, Week 1 Comparison to Weeks 2, 3, and 4

Control Group (wk.1)	Compared Group	Z	Asymp. Sig. (2-tailed)
Sweetened beverages	Sweetened beverages, wk. 2	-2.353	.019
Dairy	Dairy, wk. 2	-4.131	.000
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 2	-2.785	.005
Cold cuts	Cold cuts, wk. 2	-2.887	.004
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 2	-2.921	.003
Fast food restaurants	Fast food restaurants, wk. 2	-4.200	.000
Starchy vegetables	Starchy vegetables, wk. 2	-3.024	.002
Fruits	Fruits, wk. 2	-3.536	.000
Bread, rice, rolls	Bread, rice, rolls, wk. 2	-4.849	.000
Desserts	Desserts, wk. 2	-4.600	.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 2	-3.772	.000
Sweetened beverages	Sweetened beverages, wk. 3	-3.710	.000
Dairy	Dairy, wk. 3	-4.914	.000
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 3	-3.530	.000
Cold cuts	Cold cuts, wk. 3	-3.674	.000
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 3	-3.922	.000
Fast food restaurants	Fast food restaurants, wk. 3	-4.796	.000
Starchy vegetables	Starchy vegetables, wk. 3	-4.082	.000
Fruits	Fruits, wk. 3	-4.811	.000
Bread, rice, rolls	Bread, rice, rolls, wk. 3	-4.849	.000
Desserts	Desserts, wk. 3	-4.600	.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 3	-4.811	.000
Sweetened beverages	Sweetened beverages, wk. 4	-3.710	.000
Dairy	Dairy, wk. 4	-4.914	.000
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 4	-4.690	.000
Cold cuts	Cold cuts, wk. 4	-4.583	.000
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 4	-3.922	.000
Fast food restaurants	Fast food restaurants, wk. 4	-4.491	.000
Starchy vegetables	Starchy vegetables, wk. 4	-4.082	.000
Fruits	Fruits, wk. 4	-4.536	.000
Bread, rice, rolls	Bread, rice, rolls, wk. 4	-5.112	.000
Desserts	Desserts, wk. 4	-4.600	.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 4	-4.271	.000

Table 27

Eleven Food Groups As Reported Consumed Per Week: Week 2 Comparison to Weeks 3 and 4

Group (wk.2)	Compared Group	Z	Asymp. Sig. (2-tailed)
Sweetened beverages	Sweetened beverages, wk. 3	-1.667	.096
Dairy	Dairy, wk. 3	-1.342	.180
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 3	-0.905	.366
Cold cuts	Cold cuts, wk. 3	-1.000	.317
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 3	-1.265	.206
Fast food restaurants	Fast food restaurants, wk. 3	-1.414	.157
Starchy vegetables	Starchy vegetables, wk. 3	-1.414	.157
Fruits	Fruits, wk. 3	-1.890	.059
Bread, rice, rolls	Bread, rice, rolls, wk. 3	.000	1.000
Desserts	Desserts, wk. 3	.000	1.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 3	-1.633	.102
Sweetened beverages	Sweetened beverages, wk. 4	-1.667	.096
Dairy	Dairy, wk. 4	-1.342	.180
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 4	-2.646	.008
Cold cuts	Cold cuts, wk. 4	-2.449	.014
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 4	-1.265	.206
Fast food restaurants	Fast food restaurants, wk. 4	-0.577	.564
Starchy vegetables	Starchy vegetables, wk. 4	-1.414	.157
Fruits	Fruits, wk. 4	-1.414	.157
Bread, rice, rolls	Bread, rice, rolls, wk. 4	-0.577	.564
Desserts	Desserts, wk. 4	.000	1.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 4	-0.707	.480

Table 28

Eleven Food Groups As Reported Consumed Per Week: Week 3 Comparison to Week 4

Group (wk.3)	Compared Group	Z	Asymp. Sig. (2-tailed)
Sweetened beverages	Sweetened beverages, wk. 4	.000	1.000
Dairy	Dairy, wk. 4	.000	1.000
Meat: beef, hotdogs	Meat: beef, hotdogs, wk. 4	-2.000	.046
Cold cuts	Cold cuts, wk. 4	-1.732	.083
Chicken, pork, fish, beef	Chicken, pork, fish, beef, wk. 4	.000	1.000
Fast food restaurants	Fast food restaurants, wk. 4	-1.000	.317
Starchy vegetables	Starchy vegetables, wk. 4	.000	1.000
Fruits	Fruits, wk. 4	-.0577	.564
Bread, rice, rolls	Bread, rice, rolls, wk. 4	-.0577	.564
Desserts	Desserts, wk. 4	.000	1.000
NonStarchy vegetables	Nonstarchy vegetables, wk. 4	-1.000	.317

For Week 1 "more" and Week 2 "more" comparison, there is significance for all

of the food categories at 0.005 with the exception of sweetened beverages, p value .019 >

.005 – see table 27. There is significance between all food categories for "more"

Week 1 and "more" Week 3: p value .000 < .005 and significance between all of the food

categories between "more" Week 1 and "more" Week 4 as p value .000 < .005. There are

no significance differences for the food choices between Weeks 2 and 3, between Weeks

2 and 4 and between Weeks 3 and 4 – see table 27 and table 28.

Based on the above data analysis, I accept that food security in relation to food

choices and coping strategies will change over the 30-day benefit cycle, among SNAP

participants who have prediabetes and will potentially increase their risk for Type 2

diabetes. I reject the null hypothesis that food security in relation to food choices and

coping strategies will not change over the 30-day benefit period, among SNAP

participants who have prediabetes and will not potentially increase their risk for Type 2

diabetes.

Sweetened Beverages and Fats: Potential contributors to risk of Type 2 Diabetes;
and Artificial Sweeteners. The sample participants reported specific beverages and food

items over the 30-day benefit cycle that may contribute to obesity. Obesity is a risk factor

for Type 2 diabetes (CDC, 2014) and because SNAP participants tend to consume lower-

quality diets (Mancino & Guthrie, 2014), I explored sweetened beverages consumed

(including milk) and fat used in cooking over a 30-day benefit cycle as reported in the

DHQ 2 questionnaire.

Seventeen to twenty-eight percent of the sample reported consuming 100% fruit

juice, 1 - 3 times per month, and 19%, 1 - 2 times per week. This is more that those who

reported consuming vegetable juices at 14-19%, 1 - 3 times per month, and 8%, 1 - 2

times per week. Eleven percent of the sample drank milk once per day. A larger

percentage (17%) of the sample reported drinking milk 1 -3 times per month and

somewhat less, between 11 - 14% drank milk 1 – 4 times per week (see Table 29)

     Fruit drinks were consumed more frequently, 1 - 3 times per month, 11% - 19%

or 1 - 2 times per week by 11%, as compared to regular soda, consumed 1 - 3 times per

month, 19 - 22%, however slightly similar to sports drinks, consumed 1 time per month

by 19%; and energy drinks, consumed 1 time per month by 17% (see Table 29). Sixteen

percent of the sample reported drinking alcoholic beverages, such as beer, wine or wine

coolers and 8.3% reported drinking hard liquor (see Table 29).

Table 29

Frequency of Selected Beverages Consumed Over a 30-day Benefit Cycle

Beverages	1 time in past month		2-3 times in past month		1-2 times per week		3-4 times per week		1 time per day		2-3 times per day		4-5 times per day		6 or more times per day	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
100% Fruit Juice	6	16.7	10	27.8	7	19.4	1	2.8	3	8.3	2	5.6	2	5.6		
Vegetable Juice	7	19.4	5	13.9	3	8.3	1	2.8	1	2.8	2	5.6			1	2.8
Milk	6	16.7	6	16.7	5	13.9	4	11.1	4	11.1					9	25.0
Water	3	8.3	3	8.3	3	8.3	__		1	2.8	5	13.9	9	25.0		
Fruit Drinks	4	11.1	7	19.4	4	11.1	__	__	__	__					1	2.8
Soda reg.	7	19.4	8	22.0	2	5.6	3	8.3			__					
Sport Drinks	7	19.4	2	5.6	3	8.3	__				__					
Energy Drinks	6	16.7	__	__	__	__	1	2.8	__	__						
Beer	6	16.7	3	8.3	1	2.8	1	2.8			__		1	2.8		
Wine or wine cooler	6	16.7	1	2.8	1	2.8	__				__					
Liquor	3	8.3											1	2.8		

     Over three-fifths of the sample reported almost never or never consuming

artificial sweeteners (63.9%) or ice-tea presweetened with sugar or artificial sweeteners

(61.6%) (see Table 31). Of those who did consume artificial sweeteners, 19.4%

consumed Splenda, as compared to 11.1% who consumed Equal, 8.3% Sweet-N-Low,

8.3%, and Herbal Extracts, 2.8% (see Table 30).

Table 30

Artificial Sweeteners

	N	%
Equal	4	11.1
Sweet-N-Low (Saccharin)	3	8.3
Splenda (Sucralose)	7	19.4
Herbal Extracts	1	2.8
Skipped	19	52.8
Missing	1	2.8

Note. Consumption of Splenda at 19.4% is the artificial sweetener of choice

On the other hand, over one-third of the sample (36.1%) reported almost always or always using sugar or honey in their coffee or tea (see Table 31).

Table 31

Sweeteners

	Artificial Sweeteners		Ice-Tea presweetened sugar or A.S.*		Sugar or Honey to Coffee or Tea	
	N	%	N	%	N	%
Almost never or never	23	63.9	22	61.6	2	5.6
About ¼ of the time	4	11.1	4	11.1	7	19.4
About ½ of the time	2	5.6	3	8.3	1	2.8
About ¾ of the time	1	2.8	3	8.3	2	5.6
Almost always or always	6	16.7	2	5.6	13	36.1
Skipped					8	22.2
Missing			2	5.6	3	8.3
Total	36		36		36	

*A.S. = Artificial Sweeteners
Note. Sample reported almost never or never consuming artificial sweeteners.

When cooking meat, poultry or fish, fats are used and the sample reported using mostly corn oil, 38.8%, canola oil, 33.3%, olive oil, 25%, and margarine, 22.2% as compared to butter, 16.7%, lard, fatback or bacon fat, and oil spray, 2.8% (see Appendix I). When cooking vegetables, participants reported using mostly olive oil, 41.7%, margarine, 30.6%, corn oil, 25%, butter, 22.2%, canola oil, 16.7% as compared to oil spray, not at all and sour cream, 2.8% (see Appendix J).

Fats mostly added to vegetables after cooking or at the table are salad dressing, 30.5%, margarine, 22.2%, butter, 19.4% as compared to lard, fatback or bacon fat, white sauce or sour cream, 2.8% (see Appendix K). Butter or margarine was almost always or always added to cooked cereal or potatoes while cooking or at the table by 13.9% and mayonnaise is added to breads by 19.4% of the sample (see Appendix L) as compared to butter, cream cheese or margarine that was almost never or never added to breads by 33.3% and 22.2% respectively (see Appendix L). Cheese or cheese sauce added to cooking or at the table was reported as to almost never or never by half the sample (52.8%) (see Appendix L).

Research Question 2 (RQ2)

2. Do SNAP participants who have prediabetes exhibit different food choice decisions or patterns between the beginnings of the 30-day food cycle versus the later part of the 30-day food cycle?

Ha2: SNAP participants who have prediabetes will make different food choice decisions or patterns between the beginnings of the 30-day food cycle versus the later part of the 30-day food cycle?

H_{o2}: SNAP participants who have prediabetes will not make different food

choice decisions or patterns between the beginnings of the 30-day food cycle

versus the later part of the 30-day food cycle.

As previously noted for RQ1 results from the Friedman and Wilcoxon tests

comparing "more" week 1 and week 4 were significant, between all food groups with a p

value .000 <.005. Hence, for RQ2, the null hypothesis is not accepted. The only food

category, sweetened beverages was insignificant with a p value is .019 > .005. In

addition, I analyzed the questions 111 through 121 from the DHQ2 using a multiple

response analysis by using SPSS statistical software, going into the analysis tab, scrolled

down to multiple variables. I separated the variables between 1st week of the month

through the 4th week of the month by "more" and "less" as well as "same" for all weeks

and ran a frequency under multiple variables. Table 16 reflects 105 (54.1%) responses

that were "more" during week 1 of the 30-day food cycle in relation to the 2nd, 3rd and 4th

week, 27.3%, 10.3% and 8.2% respectively. More specifically in looking at specific food

categories in the control group, "more" Week 1, with the exception of desserts at13.0%,

all of the other food categories ranged from 19% - 30.6% compared to Weeks 2, 3 and 4

which ranged from 2.8% - 19.4% as shown in table 32. The determination of frequency

for food categories, "more" supplements the Friedman and Wilcoxon analyses, exploring

the control group, "more" Week 1 to the "more" Weeks, 2, 3, and 4 reflecting variation of

food choices over time during the 30-day benefit cycle.

Table 32

Most Frequency for "more" Food Groups from DHQ2: #111 -121

	Week 1		Week 2		Week 3		Week 4		Not Checked		Total	Missing	
	N	%	N	%	N	%	N	%	N	%		N	%
Sweetened Beverages	10	27.8	7	19.4	2	5.6	2	5.6	9	25.0	30	6	16.2
Dairy	11	30.6	4	11.0	1	2.8	1	2.8	16	44.4	33	3	8.3
Meat	9	25.0	7	19.0	4	11.1	__	__	13	36.1	33	3	8.3
Cold Cuts	9	25.0	6	16.0	3	8.3	__	__	12	33.3	30	6	16.7
Chicken*	9	25.0	7	19.0	3	8.3	3	8.3	14	38.9	36	__	__
Fast Foods	7	19.4	2	5.6	__	__	1	2.8	16	44.4	26	10	27.8
Starchy Veg.	12	33.3	6	16.7	2	5.6	2	5.6	10	27.8	32	4	11.1
Fruits	12	33.3	6	16.7	1	2.8	2	5.6	14	38.9	35	1	2.8
Breads**	10	27.8	2	5.6	2	5.6	1	2.8	19	52.8	34	2	5.6
Desserts	5	13.9	1	2.8	1	2.8	1	2.8	19	52.8	27	9	25.0
Nonstarchy Vegetables	11	30.6	5	13.9	1	2.8	3	8.3	15	41.7	35	1	2.8

*Chicken, pork, fish, and ground beef; **Breads, rice, rolls, spaghetti, and macaroni
Tabs: missing data: skipped over the question entirely and not checked: participant responded to the question however did not check off that week of the month
Note. This table reflects SNAP participants with prediabetes consume "more" of various foods during the 1st week of the month.

Table 33

Most Frequency for "less" Food Groups from DHQ2: #111 -121

Food Categories – "less"	Week 1		Week 2		Week 3		Week 4		Not Checked		Total	Missing	
	N	%	N	%	N	%	N	%	N	%		N	%
Sweetened Beverages	3	8.3	3	8.3	2	5.6	3	8.3	19	52.8	30	6	16.7
Dairy	7	19.4	1	2.8	3	8.3	4	11.1	18	50.0	33	3	8.3
Meat	3	8.3	4	11.1	3	8.3	4	11.1	19	52.8	33	3	8.6
Cold Cuts	8	22.2	1	2.8	3	8.3	3	8.3	15	41.7	30	6	16.7
Chicken*	4	11.1	1	2.8	2	5.6	__	__	29	80.6	36	__	__
Fast Foods	7	19.9	2	5.6	3	8.3	4	11.1	10	27.8	26	10	27.8
Starchy Veg.	4	11.1	1	2.8	4	11.1	3	8.3	20	55.6	32	4	11.1
Fruits	2	5.6	2	5.6	3	8.3	1	2.8	27	75.0	35	1	2.8
Breads**	4	11.1	1	2.8	4	11.1	5	13.9	20	55.6	34	2	5.6
Desserts	5	13.9	4	11.1	1	2.8	4	11.1	13	36.1	27	9	25.0
Nonstarchy Vegetables	4	11.1	1	2.8	2	5.6	2	5.6	26	72.2	35	1	2.8

*Chicken, pork, fish, and ground beef; **Breads, rice, rolls, spaghetti, and macaroni
Tabs: missing data: skipped over the question entirely and not checked: participant responded to the question however did not check off that week of the month

Table 34

Most Frequency for "same" Food Groups from DHQ2: #111 -121

Food Categories – same"	Same		Not Checked		Total	Missing	
	N	%	N	%		N	%
Sweetened Beverages	7	19.4	22	61.1	29	7	19.4
Dairy	8	22.2	25	69.4	33	3	8.3
Meat	7	19.4	26	72.2	33	3	8.3
Cold Cuts	4	11.1	26	72.2	30	6	16.7
Chicken*	11	30.6	25	69.4	36		
Fast Foods	4	11.1	22	61.1	26	10	27.8
Starchy Veg.	5	13.9	27	75.0	32	4	11.1
Fruits	11	30.6	24	66.7	35	1	2.8
Breads**	10	27.8	24	66.7	34	2	5.6
Desserts	8	22.2	19	52.8	27	9	25.0
Nonstarchy Vegetables	11	30.6	24	66.7	35	1	2.8

*Chicken, pork, fish, and ground beef; **Breads, rice, rolls, spaghetti, and macaroni
Tabs: missing data: skipped over the question entirely and not checked: participant
responded to the question however did not check off that week of the month

I accept that SNAP participants who have prediabetes will make different food choice decisions or patterns between the beginnings of the 30-day food cycle versus the later part of the 30-day food cycle and rejects the null hypothesis that SNAP participants who have prediabetes will not make different food choice decisions or patterns between the beginnings of the 30-day food cycle versus the later part of the 30-day food cycle.

Research Question 3 (RQ3)

2. Are coping strategies used by SNAP participants who have prediabetes when making food choice decisions for each week during the 30-day food cycle?

H_{a3}: There are coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

H_{o3}: There are no coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle.

The eight variables used to assess coping strategies in tables 14 were from the CPS: FSS questionnaire (see Appendix D). Each of the variables that had a yes or no response was coded as 1=Yes and 2=No. The question labeled S8E came from section II, "Minimum Spending Need to have Enough Food from the CPS: FSS questionnaire and the other seven questions labeled as SH2, SH3, SSH1, SC1, SC2, SC3, and SC4 came from section IV Food Sufficiency and Food Security. I recoded 1 = Yes and 0 = No based on being able to calculate which were affirmative responses to a coping strategy. See Table 12.

The coping strategies used by the sample studied as noted previously had limited use over a 30-day benefit cycle with affirmative response of 25% and 75% as negative. The coping strategies queried were whether participants ever run short of money and tried to make food or food money go further; ever cut the size of meals or skipped meals because there wasn't enough money for food; ever was hungry and didn't eat because there wasn't enough money for food; ever did not eat for a whole day because there wasn't enough money for food; whether received meals delivered to the home from community programs, such as "meals on wheels"; go to a community program or senior center to eat prepared meals; ever get emergency food from a church, a food pantry or food bank; and/or ever eat meals at a soup kitchen or shelter.

I ran a frequency analysis on the eight coping strategy variables identifying them as "makefoodlast," "cutmeals," "lesseating." "wholedaynoteating," "mealsdelivered," "preparedmeals," "churchfoodpantryfoodbank," and "soupkitchenshelter," respectively. I also ran descriptive data using a standard deviation, variance, minimum, maximum, mean, median and mode as well as created a bar graph that depicted percentages of

frequency of consumption, for responses of almost every month, some months but not every month, and only 1 or 2 months.

Of the sample, the following four coping strategies were used by SNAP participants in the study: 66.1% ate less; 55.6 % cut the size of meals or skipped meals; 25% did not eat for a whole day; and 25% received emergency food. The other 4 coping strategies were reported at a frequency of <25% (stretch food or money; meals delivered to the home; went to a community program; and received meals at a soup kitchen or shelter).

After recoding the above eight variables that reflected coping strategies, this researcher ran an analysis to correlate food security status using a bivariate analysis as shown in Table 33. There is a significant correlation between food security and coping strategies over a 30-day benefit period, p value .000 <.005. Thus, this researcher accepts that there are coping strategies used by SNAP participants who have prediabetes during the 30-day benefit cycle and rejects the null hypothesis that there was no coping strategies used by SNAP participants with prediabetes during the 30-day benefit cycle.

Table 35

Bivariate Analysis: Correlate Food Security Status against Coping Strategies

Correlations			
		SNAP coping	Food Security Status
SNAP coping	Pearson Correlation	1	.597[**]
	Sig. (2-tailed)		.000
	N	36	36
FoodSecurityStatus	Pearson Correlation	.597[**]	1
	Sig. (2-tailed)	.000	
	N	36	36

** Correlation is significant at the 0.01 level (2-tailed).

Summary

In this chapter, I described details of the research study, data collection, and data analysis. Data analyzed were relevant to the increased risk for Type 2 diabetes in this study of SNAP participants who were either overweight or extremely obese, very low food insecure, and reported their health as fair or poor. The food choices they made changed over a 30 –day benefit cycle, with more variation within 11 food categories in the first week than the other three weeks of the month; however, the use of coping strategies to help minimize food insecurity and hunger were limited over the 30-day cycle. Although food security is not a good predictor of coping strategies there is a relationship that food security status influences coping strategies. Over a 30-day benefit cycle, there is a significant correlation between food security and coping strategies. While there is no statistically significant association for participant perception of health and BMI, findings from these analyses are useful to understanding these factors in a population with prediabetes. In Chapter 5, I interpret the data analyses, describe ways the findings confirmed, disconfirm, or extend knowledge in the discipline by comparing the data with what has been found in the peer-reviewed literature described in Chapter 2. Limitations of the findings, such as, generalizability, and validity that arose from execution of the study are discussed as are potential positive social change, implications and recommendations for practice.

Chapter 5: Discussion, Conclusion, and Recommendations

Introduction

The purpose of this quantitative study was to examine the status of food security of recipients who have prediabetes participating in SNAP, focusing on their food choice decisions and coping strategies over a 30-day benefit cycle that potentially increase the risk of Type 2 diabetes. This study examined food security levels in relation to coping strategies, food choice variation over a 30-day food cycle, and the coping strategies utilized over a 30-day benefit cycle in SNAP adult participants. There was one primary research question with two subordinate related questions that were examined. The food choice process model was the theoretical framework used to examine food choice decisions and to explore food security status over a 30-day benefit cycle. The study was conducted because there is limited information known about food security status and food choice decisions made by individuals with prediabetes participating in SNAP over a 30-day benefit cycle and if these food choice decisions potentially influence the risk for Type 2 diabetes.

Summary of Key Findings

This research study was a cross-sectional design based on the food choice process model with data from three questionnaires: demographics and health; a food frequency (NCI: Diet Health Questionnaire II) and food security (CPS: FSS). The sample consisted of adult SNAP participants (*N=36*); aged 21 - 70 years from Bronx Lebanon Hospital, NY. In Chapter 4, details of the research study, data collection and data analysis were presented and relevant to the increased risk for Type 2 diabetes for these SNAP

participants who were either overweight or extremely obese, very low food insecure,

and reported their health as fair or poor. The food choices they made changed over a 30

–day benefit cycle, with more variation within 11 food categories in the first week than

the other three weeks of the month. While SNAP participants used coping strategies to

help minimize food insecurity and hunger, they were limited to cutting the size or

skipping meals, eating less, stretching money for food or not eating for a whole day,

rather than using community programs to supplement food intake over the 30-day benefit

cycle. Although food security status was not a good predictor of coping strategies, it was

significantly associated with coping strategies over the 30-day benefit cycle.

Interpretation of the Findings

The following information is used to interpret the results from chapter 4 with a

focus on participant demographics and research questions 1, 2 and 3. Findings are

compared to the peer-reviewed literature presented in Chapter 2.

Demographics

I was able to capture those most at risk for Type 2 diabetes characterized by age

>41 years (83.4%); ethnicity, Hispanic/Latino (66.7%); and weight classification, as

obese class I or extremely obese class III (22.2%) or obese class II (13.9%). Findings for

age and ethnicity are similar to the data in the *National Diabetes Statistics Report:*

Estimates of Diabetes and Its Burden in the United States, 2014 (CDC, 2014) where

prediabetes was reported in 37% of adults 20 years or older in the United States and 51%

of those were 65 years or older. This prevalence was similar for non-Hispanic whites,

non-Hispanic blacks, and Hispanic, at 35%, 39%, and 38%, respectively. However, in

this research study the sample was predominately 66.7% Hispanic/Latinos and 100%

of the participants had prediabetes.

Food Security

Exploring food security status as it relates to the SNAP population in this study

is important because there is a gap in the literature on food security status, food choice

decisions and risk for Type 2 diabetes. SNAP participants need to balance food choices

to avoid an under consuming of fruits, whole grains, and nonstarchy vegetables while

consuming empty calories (Mancino & Guthrie, 2014, p. 2). SNAP benefits help

alleviate food insecurity among participating households (Mancino & Guthrie, 2014)

and may provide an opportunity for individuals to improve dietary quality and health

through balanced food choice decisions. Food security status is a sustainability issue

that is linked to a person's health; hence, perception of health is influenced by food

choice decisions.

The USDA defines four levels of food security, (a) high, as no reported

indications of food access problems or limitations, (b) marginal, as little or no indication

of changes in diets or food intake, (c) low, as reduced quality, variety, or desirability of

diet, and (d) very low, as multiple indications of disrupted eating patterns and reduced

food intake (USDA, 2014b). The World Health Organization defines food security as,

"when all people at all times have access to sufficient, safe, nutritious food to maintain a

healthy and active life" (WHO, 2012, para1). Conceptually, food security aligns along

availability, access, and use – it is hierarchical in nature (Barrett, 2010, p. 825).

Availability is necessary; however, it is not sufficient to ensure access, and in turn, necessary but not sufficient for effective use (Barrett, 2010, p. 825).

According to the WHO (WHO, 2012), food security is built on the foundation of three variables: *food availability*, where there is a sufficient quantity of food on a consistent basis; *food access*, when there are sufficient resources for a nutritious diet; and *food use*, where basic nutrition knowledge is appropriate or satisfactory, including adequate water and sanitation. These concepts supplemented how food security status was determined in this study. My analysis of the food security data from this research study showed an insufficient amount of food availability; SNAP participants consumed more foods during week one compared to Weeks 2, 3, and 4 over a 30-day benefit cycle. Reported intake for most foods was inconsistent from week to week with the exception of the breads rice, rolls, spaghetti, macaroni, and non-starchy vegetables categories with similar in consumption Week 1 and "same" each week. Also there was a limited use of food access, as participants did not use some of the resources that would supplement food intake, as seen by the limited use of food pantries, soup kitchens, and community programs and meals being delivered to the home. This may be due to timing as to when food insecurity exists and when there is the need to access food and nutrition assistance programs. Although timing may be a consideration for access, the findings are contradictory to what was reported in the publication, *Household Food Security in the United States in 2013* (Coleman-Jensen, Gregory, & Singh, 2014). Per this publication, "An episode of food insecurity may have occurred at a different time during the year than use of a specific food and nutrition assistance program" (Coleman-Jensen, Gregory,

& Singh, 2014, p 28) however when the authors explored within 30 days, "Food

insecurity and reported use of food and nutrition assistance programs are more likely to

refer to contemporaneous conditions when both are referenced to the previous 30 days"

(p. 29). Of the individuals living in food insecure households, 62% reported that in the

month prior to the survey, they participated in SNAP, National School Lunch Program,

and the Women, Infants and Children (WIC) (Coleman-Jensen, Gregory, & Singh,

2014, p. vi).

In my study, supplemental food resources, by SNAP participants was not related

to food security status over time, ($p = .401 – .843$). Only 22 to 25% accessed the food

assistance programs, as compared to 60% who used any of the Federal food nutrition

assistance programs (SNAP, WIC and/or Free or reduced-price school lunch) in the

Household Food Security in the United States in 2013. A possible reason for the limited

use of food resources to supplement food intake over the 30-day benefit cycle in the

current study is timing. The timing when food insecurity occurs over 30 days versus the

access to supplemental resources may be due to limited knowledge of such resources by

SNAP participants; however this was not queried.

In this research study, a 30-day cycle rather than a 12-month period was explored.

In comparison to the 2011 data from the USDA's Economic Research Service (ERS)

(USDA, 2012e), 7 out of the 10 coping strategies conditions were measured. Most of the

sample, 94.59% were very low food secure. Of these, 72% ran short of money and tried

to make food or money go further; 59% cut the size of the meals or skipped meals

because there was not enough money for food; 65% ate less because there was not

enough money for food, 29% did not eat a whole day because there was not enough

money for food. For the 5.60% identified as low food secured, 3% reported running short

of money and tried to make food or money go further, and ate less because there was not

enough money for food. No other coping strategies were reported. Even though food

security status was not predictive of coping strategies used by food insecure SNAP

participants in this study, the participants did experience conditions related to hunger in

the 30-day cycle. For example, 66.1% ate less, 55.6% cut size of or skipped meals, 33.3%

worried whether food would run out and could not afford to eat balanced meals, 25% did

not eat for a whole day, 25% ran out of food and had no money to buy more food, and

13.9% were hungry but did not eat because of not enough money for food almost every

month.

With the research study of 30 days, I found similar results to specific coping

strategies to being food insecure, as did the ERS (USDA, 2012f); however, the

percentages of people reporting varied per condition. Within the very low food security

household, sometimes during the year, as per the ERS, the food intake of household

members is reduced, and their eating patterns are disrupted due to lack of money. In the

ERS study (Figure 1, chapter 2), the very low food secure households experienced all of

the 10 coping strategies whereas the low food secure households only experienced eight

of the 10 coping strategies. Also, the food secure households experienced three out of the

10 coping strategies with less than 10% being worried food would run out, that food did

not last, and that they could not afford balanced meals. The very low food secure and low

food secure households experienced common coping strategies. Three-fourths of those

surveyed reported that they were worried that their food would run out before they

got money to buy more, the food they bought did not last and they did not have money to

get more, and they could not afford to eat balanced meals (USDA, 2012f).

Very low food secure is defined with hunger, and specific coping strategies are to

prevent suffering from deprivation; however, households that do not have hunger can

experience some of the indicators that are experienced among the very low food secure

households. I looked at environmental resources, such as meals being delivered to homes,

community programs, and/or food pantries or soup kitchens to which the majority

participants did not access completely. As noted above there was a void in food access

where supplemental resources to food intake was under-utilized possibly due to being

unaware of the availability of the resources, timing of when the individual/household was

food insecure, and language, as a possible barrier. The sample was 52.77% Spanish-

speaking participants. Haldeman, Gruber, and Ingram (2007) reported limits to asking for

and receiving community food assistance, as well as, the misunderstanding of printed and

verbal information among Hispanic/Latino immigrant households, thus, affecting how

and where food shopping occurs (para 2). However, the negative response to accessing

supplemental resources differs from information in the *Latino Hunger Fact Sheet*

(Feeding America, 2015), "Latinos are nearly two times as likely to receive charitable

food assistance as their Caucasian peers" (para. 4).

In this study 5 out of the 8 coping strategies, were used by a number of very low

food secure SNAP participants. These are running short of money for food, cutting the

size of or skipping meals, eating less because no money for food or not eating for a whole

day, and receiving emergency food from a church, a food pantry or food bank. Two

of these coping strategies, running short of money for food and eating less because no

money for food were used by low food secure participants, however only by 3%. For the

very low food secure participants 22% received meals delivered to their homes (Meals on

Wheels) or went to a senior center, and 14% received meals from a soup kitchen whereas

none of the low food secure participants responded to using these supplemental food

resources. It appears that the very low food secure participants are more likely to seek

out and access the food assistance programs compared to the low food secure

participants, possibly due to having less financial resources (no money) as the definition

would indicate.

The use of coping strategies by these SNAP participants may be limited due to

lack of money management skills and possibly not being educated on what or where the

resources are in the community. Another possibility, which is beyond the scope of this

research study, is that the influence of culture and language may inhibit or create a barrier

for someone to seek out various resources. As reported in the *Household Food Security in*

the United States in 2013 (USDA, 2014), it could be a situation of timing, when food

insecurity occurs and when there is use of specific food assistance programs.

Food Security and Coping Strategies

Food insecurity can be short-term or long-term, thus making food insecurity

transitory. Maxwell (1996) noted that food security is an element of livelihood security

and that people who are financially limited need to balance "competing needs for asset

preservation, income generation, and food supplies in complex ways, and there may be

hunger up to a point to meet other objectives" (p. 293). Maxwell determined and

ranked from less to most severe, six short-term, food-based coping strategies relevant to

food insecurity. These coping strategies are eating foods that are less preferred as a way

of adapting to lower incomes; limiting portion sizes; borrowing food or money; a local

merchant would extend credit; maternal buffering (a practice when a mother limits her

own intake in order to ensure that her children have enough food); skipping meals; and

not eating for whole days, which was practiced by very low food secure groups of people.

This research study measured similar conditions with the exception of exploring maternal

buffering and borrowing food or money. Similar to Maxwell's findings were the

identification and participant reporting of three specific coping strategies: 55.6% cut the

size of or skipping meals, 66.1% ate less, and 25% did not eat for the whole day. In the

20 years since Maxwell (1996) published the human existence in relation to coping and

adaptation, the human response to coping when there is short-term insufficiency of food

has not changed. He reported that these strategies are short-term behaviors to help

transition from being food insecure to being food secure (Maxwell, 1996). However, this

transition was not seen in this study in which 94.59% of the sample were very low food

secure. There is a possibility that the participants were food insecure prior to the research

study and while they reported using three different coping strategies over a 30-day

benefit cycle, the use of these strategies did not improve their food security status

because 94.59% of the sample was were very low food insecure with disrupted eating

patterns, reduced food intake and limited financial resources over the 30-day benefit

cycle.   Of the sample, 72.2% were classified as over weight or obese and were very low

food secure, similar to what is in the literature (Olson, 1999). Obesity and prediabetes are both risk factors for developing Type 2 diabetes, which will be explored in the next section.

Food Security and Body Mass Index

The combination of food insecurity, hunger, and obesity has been a curious phenomenon and the issue of weight cycling as the possible cause has been explored. Olson (1999) explored food insecurity and hunger among women of childbearing age and found that 37% of women in food-insecure households had a body mass index (BMI) greater than 29 (obese) as compared to 26% of women in food-secure households (p. 522S). Likewise, Townsend, Peerson, Love, Achterberg, and Murphy (2001) found a relationship between food insecurity and overweight, as measured by BMI, as "mildly food insecure women were 30% more likely to be overweight than those who were food secure" (p. 1738). Wilde & Petermen (2006) reported women in households that were marginally food secure and food insecure without hunger were significantly more likely to be obese as compared to women in households that were food secure. Similarly, I found 28.57% of the participants who were very low food secure to be extremely obese class III as compared to 7% who were normal weight. The participants who were very low food secure were also either overweight (21.42%); obese class I (25%); or obese class II (17.85%) as compared to the low food secure participants, either overweight or obese class I, (n = 2, 50%), however no one was of normal weight, obese class II or extremely obese class III.

The results are supportive of Leung et al. (2012) who reported an association among Hispanic men and women who were very low food secure with a higher prevalence of obesity, 36% and 22%, respectively as compared to non-Hispanic whites, African Americans, Asian men, or multi-racial women who were food insecure, however had no association. The similarity was solely based on ethnicity, food security status and BMI not food security, BMI and participating in SNAP. In addition, there is similarity to Ludwig's portrait of the insecurity status of the under-served population in the U.S. He suggested that food insecurity is an overweight or obese person who is consuming poor quality and a limited variety of foods. The population of lowest income has the highest rate of obesity, and the challenge is access to high quality foods, not necessarily quantity (Ludwig et al, 2012, p. 2567).

The concept of cyclical eating is a pattern of eating for a specific period of time and then due to a restriction of food based on limited resources there is very limited food consumption. This has been known to increase body fat with overeating. Dinour et al. stated that "Cyclical food restriction has been associated with an increase in body adipose, a decrease in lean muscle mass, and a quicker weight gain with a response to re-feeding …an example of the feast-famine cycle has been linked with food stamps" (p. 1958). This is referring to a period of 3 weeks of over eating, followed by 1 week of involuntary food restriction due to the depletion of food sources; then the cycle resumes once the benefits from SNAP resumes.

Over eating will increase adipose tissue, and when there is an increase of adipose and a decrease of lean muscle mass, this scenario contributes to insulin resistance, which

then contributes to the risk for developing Type 2 diabetes (Srikanthan &

Karlamangla, 2011). In this study food choice variation over a 30-day benefit cycle was

greatest for week 1 with SNAP participants reporting the most foods consumed (54.1%)

compared to Week 2 (27.3%), Week 3 (10.3%), and Week 4 (8.2%). All foods were

consumed more in week 1 than other weeks with the exception of sweetened beverages

consumed in the same amount during Weeks 1 and 2. Implications are that there is

overeating during weeks 1 and 2 with SNAP participants utilizing some coping strategies

until the next benefit allotment from SNAP. In addition, specific foods and beverages

selected may contribute to higher BMIs and increase the risk for Type 2 diabetes in this

population. For example, sweetened beverages, such as 100% juice, and fruit drinks are

consumed 1 – 4 times per week and fats are often used in cooking and at the table. While

a variety of fats and oils are used in cooking, those fats used at the table are saturated fats,

such as salad dressing, margarine, butter, and mayonnaise. In contrast, light low-fat or

fat-free fats, margarine, cheese, salad dressing, sour cream, mayonnaise or butter are

never consumed. In addition to obesity, the risk factors that contribute to the

development of Type 2 diabetes are the result of impaired metabolic health, such as

obesity and insulin resistance, an increase consumption of high fructose corn syrup in

processed foods (Goran, Ulijaszek, & Ventura, 2012, p. 6), fat distribution and impaired

glucose tolerance (International Diabetes Federation, n.d.).

Sugary beverages have been explored in relation to weight and the authors of the

scientific literature points to an association between non-nutrient dense sugary beverages,

weight gain, and risk for Type 2 diabetes. Malik, Popkin, Bray, Despres, & Hu, (2011)

reported that sugary sweetened beverages "contribute to weight gain due to their high added sugar content, low satiety and potential incomplete compensation for total energy leading to increased energy intake" (p. 1356). The authors argue that sugary sweetened beverages rapidly absorb as a form of carbohydrate (high fructose corn syrup) and if consumed in large quantities "may increase Type 2 diabetes and cardiovascular risk, *independent* of obesity as a contributor to a high dietary glycemic load leading to inflammation, insulin resistance, and impaired ß-cell function" (p. 1356).

In addition, as noted in the literature review, Goran et al. (2012) looked at changes in diet and Type 2 diabetes in the United States from 1900 through 1999 and high fructose corn syrup was identified as a nutrient associated with the increasing prevalence of Type 2 diabetes. High fructose corn syrup as an ingredient in sugary sweetened beverages contributes to lipogenesis that produces fat and associated with insulin resistance (Goran et al., 2012, p. 6). Fructose is a monosaccharide that is absorbed differently than glucose (also a monosaccharide), by the GLUT-5 receptor in the gut and is metabolized in the liver by a pathway that is not dependent on insulin, hence does not stimulate insulin secretion nor leptin production by adipose tissue, thus, fructose in the fructose corn syrup, contributes to weight gain (p. 6) increasing the risk for developing Type 2 diabetes among the population sub-group who have prediabetes. For the current study, SNAP participants reported drinking100% fruit juice, fruit drinks, regular soda, and sports and energy drinks 1-3 times in the past month with the consumption ranging from less than half a cup to 2 cups, depending on the beverage, see Appendix I**.**

Malik et al. (2010) conducted a meta-analysis and concluded those individuals consuming sugary sweetened beverages, 1-2 servings per day, had a 26% greater risk of developing Type 2 diabetes than those drinking none or 1 serving per day. In addition there is weight gain and an association with the development of metabolic syndrome, two risk factors for Type 2 diabetes. In my study, the sugary sweetened beverages were consumed approximately 1 time per week, with half a cup to 2 cups per serving, potentially increasing the risk for Type 2 diabetes since the participants had prediabetes and overweight.

Perception of Health Status

SNAP participants perceived their health as excellent (2.8%), good (11.1%), fair and poor (83.4%), however the relation between this perception and their BMI was insignificant (p >.05, r = 0.059). This conflicts from Yan et al. (2012) who reported there was an association with lower perception of health status and obesity among ≥65 years and older among a sample from the Chicago Heart Association Detection Project in Industry Study (1967 to 1973). However, my results correspond to those reported in the community profiles from the New York City Department of Health and Mental Hygiene (2006) in that three in 10 adults in Fordham and Bronx Park consider themselves to be fair or poor health. Based on my data, there is no association that would suggest that perception of health status is a contributory factor to a person's BMI. However it s unclear whether there are other variables not measured here in this study that would contribute to perception of health, such as, medical status, cultural beliefs, economic status, living situation, and/or mental health, such as depression, anxiety and/or stress. As

an alternative factor, I am suggesting that their perception of health and weight are two separate identities, where weight is influenced by their culture and stating with caution that perception of health status may be possibly influenced by fatalism.

Fatalism was not measured, speculative and only anecdotal evidence by this researcher's health assessments among similar population subgroup. I would like to suggest that a fatalistic attitude prevents people from accepting responsibility for their health status, and that there is a perception of no control over their health. Fatalism may possibly attribute to the thinking of success or failure by luck and a resignation of attitude that regardless of their efforts, whatever will happen will happen. Quatromoni et al. (1994) conducted a focus group exploring nutrition practices and health beliefs of urban Caribbean Latinos with Type 2 diabetes. Fatalism was part of the theme regarding the disease state. However contrary to these data, Caban and Walker (2006) did an analysis of 2655 abstracts and concluded that there are varied health belief models among Hispanic subgroups, an influence of various levels of acculturation and "limited evidence that fatalistic thinking is unique to Hispanic culture" (p 584). In addition, Abraido-Lanza et al. (2007) wrote a commentary exploring fatalism in regards to Latinos however looking at cancer screening but highlighting public health implications to reaching premature conclusions of fatalism on Latinos. The authors went on to report that conceptualizing fatalism as a cultural trait among Latinos may be misguided and masked for other underlying factors, such as, "oppression, racism, and limited healthcare" (p 156).

Overall, this perception of life's course needs to be further studied in order to be able to identify this behavior and to educate people with prediabetes to prevent Type 2 diabetes. In addition, there needs to be a definition of fatalism in regards to diabetes, looking at all ethnic groups, and the need to culturally craft specific health messages as a public health intervention to prevent Type 2 diabetes.

Food Choice Variation over Time

Different foods may reflect different monthly cycles because some foods are more perishable or more expensive (Wilde & Raney, 1998, p. 21). It is not clear whether food choice variation over time is due to perishability because that information was not queried of the participants. However, over the 30-day benefit cycle in week 1 as compared to weeks 2, 3 and 4 more food categories were consumed, such as, sweetened beverages, dairy, meats, deli luncheon meats, fast foods, starchy vegetables and fruits (all types). In addition, there is significance in consumption of foods between the "more" Week 1 to "more" Weeks 2, 3, and 4; between Week 2 to Weeks 3, and 4; and Week 3 to Week 4. Of the sample, 72.2% of the participants do run out of money over the 30-day cycle thus, it can be suggested that the 11 food categories explored are purchased during the first week of the 30-day benefit cycle because of financial access at this time. This researcher does concur with the literature that food expenditures in general are much lower at the end of the month for all food groups (Wilde & Raney, 1998).

I explored artificial sweeteners and the response of, "almost never or never", by 63.9% of the sample is different than that collected from clinical assessments by this researcher at Bronx Lebanon Hospital where this same population reports consuming

artificial sweeteners on a regular basis. It is possible that there was fatigue in filling

out the questionnaires with this question being number 100 or there was a

misunderstanding of the question although there were examples of what artificial

sweetener is in parenthesis, hence, the response was not accurate. However, the type of

artificial sweetener, Splenda that was reported is reflective of the population assessed.

Suez et al. (2014) reported that non-caloric artificial sweeteners, "drives the development

of glucose intolerance through induction of compositional and functional alterations to

the intestinal microbiota" (abstract). The authors reported an increase of insulin

resistance, (a risk factor for Type 2 diabetes) with the intake of artificial sweeteners (Suez

et al, 2014). However, I cannot conclude with confidence there is a link between artificial

sweeteners, such as Splenda, with prediabetes, given the small sample size of this

research study and because there was no pre and post consumption of artificial

sweeteners prior to the prediabetes diagnosis among the participants.

Psychosocial

In food insecure households, adults are more likely to have symptoms of

depression, that may lead to negative health behavior, as well as negative parent-child

interactions (Bronte-Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007, p. 2161).

This research study did not explore depression as a variable however psychological

distress occurs in the Bronx, NY. One in 10 adults in Fordham and Bronx Park suffers

from serious psychological distress and 60% more so in the Bronx than New York City

overall (New York Department of Health and Mental Hygiene, 2006). There are various

strategies used to overcome economic barriers to include enrolling in federal or

emergency food assistance programs, looking for sales/price-matching techniques

by comparing food items and food stores, planning menus, making shopping lists,

relying on household food storage, and bulk buying (Darko, 2013, p. 24). However, in

this study I identified that many resources, such as, emergency food sources, community

feeding programs and meal delivery that would help the stresses of food insecurity are

under-utilized.

Theoretical Framework

The food choice process model was the theoretical framework used to examine

food choice decisions and to explore food security and a monthly food cycle. The

FCPM has three components, (a) *life course* (includes past influences of personal

experiences), (b) *influences* (includes ideals, personal factors, resources, social

framework, and food context), and (c) *personal food system (*includes value

negotiations) (Furst et al., 1996). Specific to influences is my examination of food

security status in relation to food choices and variation over time, which is influenced

by financial and food supplemental resources, hunger and varied coping strategies.

People's life stages include a person's food choice trajectory, which may lead to

habitual food selections that can affect how people adjust to life course transitions. Food

choice trajectory affects food choice decisions as financial resources and status of food

security transitions over time. In this research study, food consumption in the beginning

of the 30-day benefit cycle compared to the later part of the month varied more,

suggesting that at the beginning of the benefit period there were more foods available and

consumed to include: sweetened beverages, dairy foods, meats, luncheon meats, fast

foods, starchy vegetable and fruits. While the food security status of the SNAP participants prior to participating in the study was not available, at the time of the study it was determined to be low to very low food secure based on the USDA module exploring reported coping strategies, however limited.

Food determinants, such as, (a) biological (hunger, appetite and taste), (b) economic (cost, income and availability), (c) physical (access, education, skills (cooking) and time), (d) and psychological (mood, stress attitudes, beliefs, and knowledge about food) all affect food choices. In this research study the participants reported to feelings of hunger, economic distress (very low food secure), and had limited education. Data on cooking skills, mood, physical health status and/or knowledge of nutrition were not collected however would be significant to explore in relation to food choice decisions.

Personal food choice decisions are subject to change in relationship to life transitions that are experienced at different times. For this research study I looked at a point in time, 30 days versus the standard 12 months (USDA, 2014), and did not query prior to 30 days food security status, hence it is challenging to determine specific life transitions and food trajectory for a 30-day time period. Ideals, personal experiences, resources, social factors and food contexts are five factors that influence and shape food choice decisions. Each of these factors fluctuate over a life time when making food choices. In addition, people may develop a self-identity by the foods that they choose to eat, which in turn shapes their specific food selection. A social determinant, such as culture, that includes family, peers and meal patterns play a key role in self-

identity, hence influencing food choices. In my study, with 66.7% of the participants

Hispanic/Latino and 13.9% originally from Puerto Rico and 30.6% from the

Dominican Republic, they consumed specific foods that are specific to the

Hispanic/Latino culture, such as, tostones, kipes, empinadas, and fried plantains.

Resources can be tangible (money, equipment, transportation and space) or

intangible (time, skills, knowledge) assets in making food choice decisions. The

intangible assets were not measured in this research study; however, resources can also

include social capital. Relevant here are food pantries, emergency food, soup kitchens,

meal delivery and/or community programs, albeit reported limited in use. This could be

due to the timing of the food security status over the 30-day benefit cycle, having a

language barrier, not knowledgeable to such resources in the community, and/or not

acknowledging the assistance.

Certain barriers, such as, cost, transportation, cooking skills and/or limited

resources affect food choice decisions, hence influencing food security status. Food

security is transient and strategies to cope facilitate various food choice decisions, which

affect health outcome short and long-term. Although this research study looked at a 30-

day period, food choice variation and certain food categories consumed at certain points

in time were observed. Food choices made in this study were based on financial

resources, available during the 30-day benefit cycle, such as reported by Sobal et al.

(2006) who argued that low income people manage food choices according to their

changing financial situation as they "experience greater or lesser food insecurity" (p. 6).

Social factors include relationships that are influential in food choice decisions. These relationships are family, peers, networks, organizations, communities and other social units that provide opportunities for eating relationships and food choices. An eating relationship with others can affect whether someone gains or loses weight, modifies tastes, or justifies certain food choices and behavior influencing long-term health conditions over the course of someone's lifetime. More than one third (36.1%) of the participants in the research study reported to living alone, 25% reported living with their husband, 5.6% with their wife or 13.9% with a friend. Of the sample, 27.8% were living with their children. Although I did not analyze the social dynamics in relation to food choices, it would be interesting to explore the social dynamics and food choices in relation to food security, health, and weight. For example, most of the participants were very low food secure, either overweight or extremely obese class III, and their social circumstances, more than a third living alone. How these conditions influenced their perception of health as mostly fair or poor and/or whether it affected their food choices are beyond this scope of research study. Also, this SNAP population lived in the city and it is not clear if there existed a sense of community that if and when food becomes limited and/or if there are health/medical needs, there is a social support system available to them.

The personal food systems construct food choice values by classifying foods and situations according to the values (Sobel et al., 2006, p. 7). There are six most noted values when negotiating values "sensory perceptions, monetary considerations, convenience, health/nutrition, managing relationships and quality" (Furst et al., 1996, p.

257); however there are also ethics, tradition and familiarity values (Furst et al., 1996, p. 257). In valuing one's health is to invest into nutrient dense foods, hence investing into positive health outcome. For example, for the SNAP participants who perceived their health as fair to poor, I am suggesting that because almost two-fifths run out of benefits by week 3, they are economically distressed and perception of health altered (See table 36).

Table 36

SNAP Benefit Allotments

	N	%
1st week of the month	14	38.9
2nd week of the month	15	41.7
3rd week of the month	4	11.1
4th week of the month	1	2.8
Missing	2	5.6
Total	36	

SNAP Benefits to Run Out over the 30-day Benefit Cycle

	N	%
1st week of the month	2	5.6
2nd week of the month	9	25
3rd week of the month	14	38.9
4th week of the month	8	22.2
Missing	3	8.3
Total	36	

To support this point, I calculated how many dollars per day a participant may be living on based on SNAP benefits per month (see table 37), and of the sample, 37.14%

are living on $3.33 - $6.4 per day and 22.85% living on $6.66 – $11.66 per day (See

table 37).

Table 37

SNAP Benefits per Month

Dollars per Month household*	N	%	Dollar Average per Day per
<200 per month	13	37.14	3.33 – 6.4 (@ $100-192 per month)
200 - <400 per month	8	22.85	6.66 – 11.66 (@ $200-350 per month)
400 - <500 per month	3	8.57	13.33-16 (@$400-480 per month)
500 700 per month	0	0	0 per month
730 per month	1	2.8	24.33 (@ $730 per month)
Missing	1	2.8	
Total	36		

Note. The number of people in the household is not available to calculate how many dollars per person per day.

The two factors: running out SNAP benefits during the 3rd and 4th week of the 30-

day benefit cycle, and living on $3.00-$6.00 dollars per day may possibly contribute to

non-nutrient dense food choices (saturated fats and sweetened sugary beverages).

Prediabetes SNAP participants who make these food choices are at increased risk for

obesity, insulin resistance, and Type 2 diabetes (Malik, 2011). When combined with

limited financial resources at a specific point in time as seen in this study, participants'

personal perception of health as being fair to poor supports the value constructs of the

FCPM and/or is an indicator for perception of health.

People will negotiate food values based on food patterns (Furst et al., 1996, p. 257). The strength of these values being negotiated during specific food choice decisions may vary according to particular social contexts (Furst et al., 1996, p. 262), such as, when someone is in his or her own home or someone else's house. Furst et al (1996) argued that there are "hierarchy of values' (p. 263), and negotiation of values are significant in the food choice decision process, such as when there are financial constraints. This confirms the pattern in this study where SNAP benefit allotment parallels food choice variation consumption with more food variation seen during the 1st and 2nd week of the month when benefit was received.

Culture is one of the most pervasive foundations for food choices, and SNAP participants in the Bronx, NY are culturally diverse (USDA, 2011). Although many cultures sustain their cultural food identity when coming to a new country, there is also food acculturation as people integrate. Nestle et al (1998) argued that as people from varied societies enter the food system of the West, there is a nutrition transition or dietary shift to consume more energy-dense fats, saturated fats, and sugars, moving away from coarse grains and starchy roots. Over two-thirds of the subjects in this study were of Hispanic/Latino origin. Food acculturation and urbanization from rural living may play a role in nutrition transition of these participants where availability of processed foods increases energy dense type foods (sugar, salt and fat). While participants in this study reported consuming such foods, when asked about specific Hispanic/Latino cultural foods they reported foods with a cultural identity (Bisogni et al., 2002) to their country's origin, and thus, maintained the consumption of customary foods (Appendix M**).** The

authors argued that there are various identities in relation to eating, such as, eating

practices, personal characteristics, to reference groups and social categories (Bisogni et

al., 2002, p. 135). Specific ethnic foods were consumed in my research study, reflecting

a customary approach to self-identity (Appendix M). For example, rice, green bananas,

cassava with onions, dried beans, yogurt, tostones and fried plaintains were consumed a

minimum of twice per week.

My study findings as it relates to the three research questions are relevant to

certain aspects of the food choice process model. In my research study, I examined food

security status, food choice variation, and coping strategies over a 30-day benefit cycle

and whether there is an increase risk for Type 2 diabetes. The FPCM helped me answer

the three research questions as I used it as an overview of the many aspects of the model

however not all of the constructs of the model were addressed the research study, such as

mental health, and transportation. In particular, *financial restraints*, that contributes to

and affects food choice decisions over a certain period was of interest. In the study the

SNAP participants reported benefit allotments to running out by the 3rd week (38.9%) and

4th week (22.2%) of the 30-day benefit cycle and most of the varied food choices were

reported during the first week (54.1%) of the 30-day benefit cycle. Second, *language*

barrier was considered as to how might of affected access to food assistance programs.

In the study, more than 50% of the participants spoke Spanish only; however it is beyond

the scope of this research study to determine if the language was in fact a barrier and

limited food assistance program access. Third, a *perception of health* was assessed that

may or may not be influenced by fatalism; but rather by limited financial resources over

the 30-day benefit cycle, and limited education. With these two factors, I am suggesting that there is a possible inverse relationship with perception of health. As limited financial resources and education decreases, there is an increase of fair to poor perception of health, and thus affecting food choices, non-nutrient dense foods.

In addition, SNAP participants reported benefit allotments allocated as available the first week (38.9%) and second week (41.1%); however, they were limited by the 3rd and 4th week of the 30-day benefit cycle and consequently, a greater variation of foods (11 food categories) were mostly consumed the first week as compared to the 4th week of the month. I am suggesting that possibly toward the end of the 30-day benefit cycle, as benefit allotments to purchase food decreases, the perception of health may be affected by food security status. Fourth, *culture*, is influential in food choices. This was seen, in that the majority of the participants (66.7%) in the study were Hispanic/Latino and reported customary foods, such as kipes, fried plantains, empinadas, and tostones, which drives cultural identity. Fifth, *social dynamics* includes but is not limited to relationships that affect food choice decisions. More than a third of the participants in this research study lived alone, a living situation that may affect their social support system and in effect may influence food choices and consumption. Six, *education* may play a role to food access and its consumption. Limited education affects or influences the ability of a person to access nutrition knowledge, such as understanding food labels, and the consequences of non-nutrient dense food consumption. Seven, urbanization, affects income, food choices, and transportation. Of the sample, approximately a third of Hispanic/Latino participants in the study were from the Dominican Republic. These

participants possibly went from rural living to city living. Authors form the

Brookings Institution and Pew Hispanic Center (2002) reported that there might be a shift

from living in a major metropolitan city to the suburbs, seeking cheaper/affordable

housing, better jobs and quality of life (Suro, & Singer, 2002, p. 11). Hence, it is

foreseeable that the same participants had a change in their food security status due to a

geographical transition or a modification to their living situations change.

The FCPM shaped the constructs underlying the three research questions.

Findings were significant that food security is associated with consumption of fats 1 - 3

times per month and consumption of sweetened beverages to 1 - 2 times per week;

reported food choice variation; limited coping strategies and limited access to food

assistance programs, over a 30-day benefit cycle, potentially increasing the risk for

developing Type 2 diabetes in the population studied.

Limitations of the Findings

This study had several limitations. First, the study was cross-sectional so

causation cannot be inferred. Second, the sample size was small and limited by sample

characteristics, such that study results should not be generalized beyond the group under

study. Third, the completion of questionnaires was problematic for some participants due

to language ability, length, and the time to complete; hence the responses may not be

completely accurate. Fourth, self-reported height and weight were used to determine

respondents' body mass index. Fifth, frequency questionnaires used to determine food

related behaviors and social dynamics might not truly reflect actual events but rather

usual events over the 30-day cycle. Sixth, for the independent *t-test* used to determine

food security transition normally distributed data and homogeneity of variance were assumed for the two groups identified.

Sample size, Participant literacy, language, and fatigue

The sample size was small (*N=36*), which may limit the power of the study to show whether the results are a real effect or by chance in regards to outcome. A small study provides room for a large standard of error, imprecise estimate of the effect, and no firm conclusions (Hackshaw, 2008). The main challenge with my small sample is the interpretation of the results. It was with caution that I interpreted the effect and results of my data as "real" and not by "chance." Hackshaw (2008) argues that there is the chance of over-estimating the magnitude of any association, and "Small studies do not normally yield reliable or precise estimates" (p 1143). In addition, my sample size was limited by the expense of the research, which was a deterrent to the sample size. However, in the current small study I was able to collect the data rather quickly, two and half months; and it was relatively easy to enroll the participants and ask them to complete the three questionnaires in one sitting. Ethically, I was able to receive IRB approval from two institutions, Bronx Lebanon Hospital (IRB: #09-12-1307) and from Walden University (IRB: #04-07-14-0161967) as compared to if I was going to conduct a research study from a multi-center approach.

The questionnaires were in English and Spanish, to accommodate those participants whose primary language was Spanish; the translated questionnaires from English to Spanish were translated back to English to verify that the English to Spanish translation was reliable. However, it is possible the sentence structure of the three

questionnaires in Spanish were confusing or misinterpreted. The readability of the

three questionnaires ranged from 3rd grade level to a 6th grade level (Microsoft Office,

n.d.). With limited secondary and higher education, as seen in this sample, it is possible

that the participants did not understand in full what was being asked even though I

explained the study premise and each questionnaire as to what I was looking for and how

to answer the questions without answering the questions for them. In addition, I was

available for questions, while the participants were filling out the questionnaires. There

is little evidence that there was confusion; however, the questionnaires took up to one and

one half hours to complete and participants could have experienced fatigue when

completing the questionnaires and inadvertently checked the wrong boxes or selected the

incorrect answer. I reviewed each questionnaire prior to participant leaving the clinic and

when I observed incomplete or missing responses, the participant was required to

complete the questionnaire. Other than this visual observation of the responses, I was

unable to determine the reliability of the responses as part of this study.

Other factors contributing to the fatigue and inaccuracy completing the

questionnaire were the wait time and location. The wait time was 70-80 minutes before

being referred for the research study. The wait time to see the health care provider is from

30-60 minutes, then another 10-20 minutes with the health care provider. If referred to

me, there was the screening process as per the inclusion criteria, an additional 5 minutes.

If applicable, I explained the study that took 5-8 minutes; the participant read the consent

form (5-8 minutes) in my office; and then they would go back to the lobby or the

discharge section of the clinic, where they filled the questionnaires out. The two locations

are approximately 20-40 feet, respectively from my office. Some of the participants were disabled and possibly reluctant to get up and walk back to my office to ask any questions. Therefore I am speculating that without being sure of the question, there is the possibility that the participants would just check off the questionnaire to finish, although, I did make a point to go to each participant to see if they had any questions while they were filling out the questionnaires.

Data Collection: Self-report of the Body Mass Index, and Limitations of DHQ 2 Questions (111-121), and CPS: FSS

The body mass index (BMI) was calculated by hand from self-reported heights and weights. Also, only 30 out of the 36 participants provided data from which to calculate the BMI. The use of self-reported heights and weights as well as missing data may have affected the distribution of BMI in terms of food security status.

The DHQ 2's questions, 111-121 were problematic for coding due to multiple responses making the responses unreliable or inaccurate. The instructions as well as the questions might have been confusing for the participants as they were requested to check off more than one response as applicable. The responses were not definite as to whether participants consumed more, less or the same of a food at any given week during the 30-day benefit period. As a result, some participants provided multiple responses to the same questions. Analysis of this data may have been skewed due to the coding of multiple responses to some of the questions. Regardless, of this limitation, the study findings provide an insight into food choice variation over the 30-day benefit cycle.

The CPS: FSS was administered to determine food security status and to identify and measure coping strategies used over a 30-day benefit cycle to avoid hunger. The responses were measured usual versus actual information due to the use of a questionnaire that reflected frequency over time.

Social Dynamics: Food shopping, coping strategies, food choices and skills

Information regarding frequency of shopping over a 30-day benefit cycle to assess whether certain foods or food categories were purchased and/or possibly consumed at a specific point in time was queried as a confusing question, such as, "Do you shop infrequently" (USDA CPS: FSS, 2011), and I do not believe I received reliable answers. For example, 44.4% answered yes and 50% answered no (Appendix N). Thus, it was challenging to assess definitely, whether there was a deficit or an increase in certain foods that would increase a risk for obesity and Type 2 diabetes, nor any macro or micronutrients or lack of that would affect nutritional status. Wilde and Raney (1998) argues that those that shop more frequently, more than one time per month, experience no drop in food intake at the end of the month. For those that shop infrequently, the drop in food intake is usually in food categories of dairy and fruits (Wilde & Raney, 1998, p. 26) and consequently calcium and Vitamin C are significantly lower than the recommended daily allowance (RDA) on average at the end of the month (Wilde & Raney, 1998, p.35). The frequency of food shopping affects food choices and food security status. Wilde and Ranney (2000) also argue that mean food spending among SNAP participants spike during the first three days of the 30-day benefit cycle and those that food shop infrequently, such as once per 30 days the mean food energy levels off by the fourth

week of the 30 days. This was seen in my research study that the frequency of 11

food categories resulted in 8.2% "more" consumed.

Coping strategies were asked in terms of frequency over a 30-day benefit cycle to

determine a transition time when coping strategies were mostly used.   Based on the

responses received, I could not determine an exact point in time, over the 30-day benefit

cycle, if there was a transition of time from marginal to low food security or from low

food security to very low food security status.

Also, it was difficult to correlate the exact point in time over a 30-day benefit

cycle when there was more of a risk for food choices potentially associated with an

increase risk for obesity and Type 2 diabetes. However, I extrapolated from the data

analysis information to suggest that during week one of the month, there was more food

choice variation among the 11 food categories and as month progressed within the 30 day

cycle, financial resources, such as SNAP allotments were depleted and food choice

variation was limited.

Statistics: Validity: Food security, and independent t-test (Levine's test for quality

of variance)

The validity of food security status transition from one point in time to another

was limited because the participants were responding to 30 days and not weekly.

Therefore, it was challenging to asses exactly whether there was a transition and if so, at

what point in time during the 30 days did a transition from high, marginal, low, to very

low food security occurred. In addition, the outcome data on specific coping strategies; a

supplement to the measurement of food security status, were limited to not knowing the

severity of food security status, whether the participant was marginal, low and/or very low food secure. This could be due to the small sample size, potential language barrier, not understanding the questions, and/or fatigue to answering the all of the questions with the same amount of energy.

The independent *t*-test, Levine's test for quality of variance was conducted to look at food choice variation over a 30-day benefit cycle as per research question 2. I was exploring "more" (control group) versus "less" and "same." The independent samples t-test showed either no statistical significant difference between the means or there was a statistical significance between the means. The statistically significant values that were *p < .05* are possibly due to food choices at specific times of the 30-day benefit cycle, however the insignificant values, *p >.05* may be due to "chance" and not food choices at specific time of the 30-day benefit cycle. With the small sample size, the limitation is the assumption that the data has a normal distribution and homogeneity of the variance. Because the sample is small it is more challenging to achieve normality and the t-test results could be misleading.

Recommendations

I suggest the following recommendations for continued or similar research on this topic. Use a larger sample to increase the validity of variables under study, to capture food frequency, and understand food choices. I determined a minimum sample size based on the expense of data collection, and the need to have sufficient statstical power. The sample size while adequate to represent the population, may have not been sufficient to capture the intricacies of food choices as reported by frequency questionnaire.

In addition, there could be a more in-depth approach by conducting a qualitative research study to gain additional insight into the health behaviors or barriers that cannot be addressed by a quantitative study. For example, Haynes-Maslow, Parsons, Wheeler, & Leone, (2013) identified six barriers by conducting a qualitative research study, to accessing fruits and vegetables. The six barriers were "cost, transportation, quality, variety, changing food environment, and changing societal norms on food" (p. 4). It would be of great interest to explore these variables more and possibly gain greater insight into psychosocial and environmental aspect of possible barriers to consuming fruits and vegetables.

Recommendations for research: Recruitment strategy, time, qualitative research, and pilot questionnaire. I would enhance the recruitment strategy by expanding the locations of the flyers initially, to make them more available to a larger pool of subjects, such as, in the waiting areas, bathrooms, elevators, and in every examining room. To note, in my sample, the population was defined and all members had an equal chance of selection. Second, I would examine similar variables over a longer time period, such as, a minimum of 6 – 12 months, similar to the "Household Food Security in the United States in 2013" (USDA, 2014f). Extending the time frame may increase the reliability and validity of the data used to determine food choice variation over time, identify the "transition" period of food security status if there are differences in access of food assistance programs, and whether coping strategies are more, less or the same, and to help pin point in time when the behavior occur. Third, pilot the questionnaires with the SNAP participants prior to the research study in addition to piloting the questionnaires

among professionals as I did prior to conducting this research study. This would help identify confusing questions as well as test for length of the questionnaire and readability, adding to the reliability of the survey tools.

Recommendations for survey tools: Length, modification, location, and compensation. Based on expected results from the piloted questionnaires, I would shorten the DHQ 2 questionnaire to less than 100 questions to avoid respondent fatigue and avoid confusing questions, such as shopping and/or cooking questions if the participant is the not food shopper or the one who prepares the food in the household. Second, I would modify the CPS: FSS questionnaire to add questions, such as, cooking skills, access to a kitchen, and specifically to an oven, microwave, hot-plate, refrigeration, and/or freezer, all which may affect types of foods purchased, preparation and consumption. This information would contribute to types of foods based on facility and/or utilities available. Third, format the questionnaires to make them more readable, such as, using larger font, bold, italicize and highlight or underline certain words to facilitate more reliable responses. This would help the participants to be more engaged and understand what is being asked. Fourth, restrict the respondents filling out the questionnaires to just one area and monitor as questions arise to avoid confusion. This would limit the participants from having to get up and potentially decrease inaccuracies and blank spaces. Finally I would provide food and beverages nearby to survey participants as an expression of gratitude.

Implications

Positive Social Change

Potential social change implications for this study are that food and nutrition policy makers will reconsider the distribution of electronic benefits transfer (EBT) allotments over the course of the month rather than the current policy of once over the 30-day benefit cycle, make nutrition education on a national level mandatory, and recommend a nutrition package specific to SNAP participants to increase fruits and vegetables, whether fresh or frozen over the 30-day benefit cycle. The mandatory nutrition package would allow for the purchase of fresh and/or frozen fruits and vegetables as part of a healthy and balanced diet. As seen in this study food choice variation is affected by SNAP benefit allotments, food security status, and coping strategies. The three suggested changes, frequency of benefit allotments, mandatory nutrition education, and nutrition package, for each individual or household, would help with quality food choice decisions among those with prediabetes who participate in SNAP and possibly decrease obesity and risk for Type 2 diabetes.

In reflecting upon research question one, it can be suggested that behaviors do change over time, hence, food choices change, in order to cope with limited resources. However, since this research study measured a time period of 30 days, it is possible that the participants were already food insecure prior to the research study. It was challenging to determine exactly at what point in time participants went from low to very low food security or if their food security status during the 30-day benefit cycle was consistent throughout this time frame.

The health outcome unfortunately is grim among this population due to being very low food secure, having limited education and limited coping strategies, and being financially strained over a 30-day benefit cycle as the data from this research study indicated. Therefore, as part of this population's survival skills, nutrition education combined with how to budget food dollars are essential in order to cope during the time period when food is limited. There is a need for nutrition education to increase coping strategies, ensure consistent food choices and improve food security status. Creating a mandatory nutrition package as part of SNAP would increase the consumption of produce and decease non-nutrient dense foods. This study's findings have the potential to change SNAP's benefit allotments, make nutrition education mandatory, and a mandatory nutrition package, to lower the risk of type 2 diabetes among SNAP participants with prediabetes.

Conclusions

Coping strategies to minimize food insecurity and hunger were limited. Very low food security associated with limited coping strategies disrupts eating patterns and affects food variation over time with an increase of non-nutrient dense foods, thus, increasing risk of obesity and Type 2 diabetes. The timing of SNAP benefit allotments, food security status, education, language, culture, financial resources, and perception of health all influence food choices and affect health outcome. Authorizing a mandatory SNAP nutrition package that included fresh, frozen or canned (no added salt, no added sugar) fruits and vegetables, whole grain cereals with 8 grams or less total sugar per serving,

and, healthy snacks as well as a nutrition education component would increase quality

nutrition and decrease the risk for developing Type 2 diabetes.

The nutrition education intervention along with the food/nutrition package would

include ideas for coping strategies in order to make food last over the 30-day benefit

cycle; when and how to shop to increase the intake of fresh or frozen fruits and

vegetables, increase nutrient dense foods, that have protein, calcium, Vitamins A, C, and

D, and fiber. Frequent shopping helps low-income households maintain a consistent

supply of perishable food items, such as milk and fresh vegetables and fruits. With the

change of benefit allotments the produce may last throughout the 30-day benefit cycle.

Having an optional food allotment plan per month would benefit SNAP participants and

increase food availability throughout the 30-day benefit cycle. What may offset the

expense of produce throughout the month is for households in SNAP to purchase produce

in season, eliminating the transportation costs built into the produce that is out of season,

and to purchase frozen vegetables as a way to increase the vegetable's longevity. This

optional allotment may decrease the risk of food insecurity, weight gain, skipping meals

toward the end of the month, and intake of high fat and non-nutrient dense foods,

increase intake of produce, and improve quality nutrition; thereby, helping to decrease the

risk for developing Type 2 diabetes.

The ability to be food secure is a fundamental human right and it is to eliminate

the emotional stress among SNAP participants who find themselves using specific coping

strategies to decrease hunger and to make food last until the next benefit allotment.

However it would be a significant public health achievement to be able to distribute the

benefits over the 30-day cycle, create mandatory nutrition education, and a mandatory

food package for those households participating in SNAP. This would greatly decrease

the status of low to very low food security that influences food choices of non-nutrient

density and lower the risk for chronic medical conditions, such as obesity and Type 2

diabetes.

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Appendix A: Invitation to Participate in the Research Study

Invitation to participate in the research study

RESEARCH STUDY

Principal Investigator: DIANA L. MALKIN-WASHEIM

ELECTRONIC BENEFIT TRANSFER: FOOD CHOICES, FOOD INSECURITY

AND TYPE 2 DIABETES

PURPOSE OF THE STUDY: to examine the level of food insecurity of recipients who have prediabetes participating in the Supplemental Nutrition Assistance Program (SNAP) associated with food choice decisions/patterns and coping strategies over a 30-day food cycle or benefit month period that increases the risk of type 2 diabetes.
RECRUITMENT TIME FRAME: 1 month or until requirement has been satisfied

INCLUSION CRITERIA:
- ✓ Has no history with this researcher, such as previous referral
- ✓ Prediabetes (elevated blood sugars – NOT Type 2 diabetes)
- ✓ 21 years or older
- ✓ Participates in the Supplemental Nutrition Assistance Program (formerly called the Food Stamp program)
- ✓ Lives in the South or Central Bronx
- ✓ Able to Read and Write English or Spanish
- ✓ Male or Female

EXCLUSION CRITERIA:
- ➢ Pregnant
- ➢ Under 21 years old
- ➢ Cannot read or write English or Spanish
- ➢ Lives outside South and Central Bronx

COLLECTION of DATA: Using three (3) questionnaires: Demographics and Health questionnaire, Diet History Questionnaire 2 and Current Population Survey: Food Security Supplement

LOCATION: 7th Floor, Rm 7 Wellness Center

TIME: 90 minutes or less to complete the three (3) questionnaires

COMPENSATION: a $5.00 metro card and a $25.00 food gift card

Appendix B: Adult Consent Form

Electronic benefit transfer: Food choices, Food Insecurity and Type 2 diabetes
Dear Participant,

You are invited to participate in a research study being conducted by Diana Malkin-Washeim, Director-Nutritional Services at Bronx Lebanon Hospital. The purpose of the research is to determine: **How does food security status effect food choice decisions and risk for developing Type 2 diabetes.**

The enclosed questionnaires: A) demographics and health, B) food security, and C) food frequency have been designed to collect information on the following:

A) **Demographics and Health Questionnaire:** age, gender, health, country of origin, ethnic background, race, who you live with, weight and height, activity level, and education.

B) **Food Security Questionnaire:** how much you spend for food and non food items; minimum spending to have enough food; other programs you may be participating in to supplement your food intake; how long food lasts, and ways to cope when there is not enough food.

C) **Food Frequency Questionnaire:** how many times you eat certain foods per day, weekly and/or monthly; the types of foods you eat, and the portions (amount you eat).

Approximately, 35 people will participate in this study at Bronx Lebanon Hospital. Your participation in this research study is completely voluntary. You may decline altogether, or leave blank any questions you don't wish to answer. There is a minimum risk for possible psychological distress by filling out the food security questionnaire however there are no other known risks to participation beyond those encountered in everyday life. Your responses will be confidential and data from this research will be reported only as a collective combined total. No one other than research staff will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaires as best you can. It should take approximately **60-90 minutes to complete**. Please put the questionnaire in the sealed box, which is located in room 17, ACN clinic, Bronx Lebanon Hospital. As compensation for your time and effort, a $5.00 Metro card and a $25.00 food gift card will be given to you.

If you have any questions about this project, feel free to contact **Diana Malkin-Washeim, Director – Nutritional Services.** Information on the rights of human subjects in research is available through the Bronx Lebanon Hospital Institutional Review Board, 1650 Selwyn Ave., Bronx, NY 10457;. 718-960-1239. **Thank you for your assistance, time and effort.**

Sincerely,

Diana Malkin-Washeim, MPH,R.D., CDE, CD-N (PRINCIPAL INVESTIGATOR;

IRB_#09 12 13 07)

☐ I understand that by checking off the box, I am consenting to participate in this research study.

Appendix C: Demographics and Health Questionnaire

Demographics and Health Questionnaire

Today's Date: _____ 2014

THANK YOU FOR YOUR TIME!

Please CHECK and CIRCLE ALL your responses

I. AGE:_____   _____**MALE**   _____**FEMALE**

II. Do you participate in the Supplemental Nutrition Assistance Program (SNAP)
[The Food Stamp Program]?   ____Yes   ____No

III. How is your health? ____Excellent ____Good ____Fair ____Poor

IV. Country of Origin: ___United States   ____Puerto Rico ___Dominican Republic
___Haiti ___Mexico Other: _____

V. Ethnicity: ___Hispanic/Latino   ___Non-Hispanic/Non-Latino ___Black
American

VI. Race: ___Black ___White ___American Indian   ___Alaska Native

___Hawaiian ___Asian ___Other Pacific Islander

VII. You live with? ____Alone ___Wife ____Husband ____Children ___Friend

VIII. Weight: ____lbs. or _____kilograms   **Height** ____inches [BMI:]

IX. What was the last grade of schooling you completed?

__1st ___2nd __3rd ___4th ___5th __6th __7th __8th ___9th ___10th ___11th ___12th

X. Did you graduate High School? ___Yes ___No

XI. Did you go to College? ___Yes ____ No

XII. Did you graduate College? ___Yes ___No

Appendix D: Current Population Survey: Food Security Supplement Questionnaire

INSTRUCTIONS

- **Answer each question as best you can. If you are not sure, a guess is better than leaving the answer blank.**
- **Use a black ballpoint pen or pencil.**
- **Circle your answer.**
- **If you make any changes, cross out the incorrect answer and circle the correct answer.**
- **If you mark NO for a question, please follow the instructions that direct you to the next question.**

I am going to ask some questions about food used in your household and the ways you are managing to meet your food needs.

I. FOOD EXPENDITURES

S1A   These first questions are about all the places at which you bought food **LAST WEEK. By LAST WEEK, I mean from Sunday through Saturday.**

First, did (you/anyone in your household) shop for food at a supermarket or grocery store LAST WEEK?

<1>   Yes
<2>   No

S1B   Think about other places where people buy food, such as **meat markets, produce stands, bakeries, warehouse clubs, convenience stores, and bodegas**. Did (you/anyone in your household) buy food from any stores such as this LAST WEEK**?**

<1>   Yes
<2>   No

S1C   **LAST WEEK,** did (you/anyone in your household) buy food at a **restaurant, fast food place, cafeteria, or vending machine?** (Include any children who may have bought food at the school cafeteria).

<1>   Yes
<2>   No

S1D   Did (you/anyone in your household) buy food from any other kind of place **LAST WEEK?**

<1>   Yes

<2>   No

Now I'm going to ask you about the **ACTUAL amount** you **spent on Food LAST WEEK in all the places where you bought food**. Then, since **LAST WEEK** may have been unusual for you, I will ask about the **mount you USUALLY spend.**

S2   How much did (you/anyone in your household) **ACTUALLY spend at supermarkets and grocery stores LAST WEEK (including any purchases made with SNAP or food stamp benefits)?**

           Enter whole dollar amounts.

           $_ _ _.00

S3A   How much of the money spent was for **non-food items, such as pet food, paper products, alcohol, detergents, or cleaning supplies?**

           Enter whole dollar amounts.

           $_ _ _.00

S4   **How much did (you/your household) spend at stores such as meat markets, produce stands, bakeries, warehouse clubs, convenience stores and bodegas LAST WEEK (including any purchases made with SNAP or food stamp benefits)?**

           Enter whole dollar amounts

           $_ _ _.00

S5A   How much of the money ($) was for **non-food items, such as pet food, paper products, alcohol, detergents, or cleaning supplies?**

           Enter whole dollar amounts.

           $_ _ _.00

S6   How much did (you/your household) spend for **food at restaurants, fast food places, cafeterias, and vending machines LAST WEEK,** not including alcohol purchases?

           Please enter whole dollar amounts.

$_ _ _.00

S7   **How much did (you/your household) spend for food at any other kind of place LAST WEEK?**

          Enter whole dollar amounts.

          $_ _ _.00

S8A   Now think about how much (you/anyone in your household) **USUALLY (spend/spends). How much (do you/does your household) USUALLY spend on food at all the different places we've been talking about IN A WEEK? (Please include any purchases made with SNAP or food stamp benefits).** Do not include non-food items such as pet food, paper products, detergent or cleaning supplies.

S8   **Enter whole dollar amount**
          $_ _ _.00

S8ZA   **Do you shop for food infrequently?**

          <1> YES
          <2> NO

          How much would the weekly average be over several weeks?

S8Z   **Enter whole dollar amount**
          $_ _ _.00

II. MINIMUM SPENDING NEED TO HAVE ENOUGH FOOD

S8B   **In order to buy just enough food to meet (your needs/the needs of your household), would you need to spend more than you do now, or could you spend less?**

          <1>   More (GO TO S8C)
          <2>   Less (GO TO S8D)
          <3>   Same (GO TO S9)

S8C   **About how much MORE would you need to spend each week to buy Just enough food to meet the needs of your household?**

Enter whole dollar amount
$_ _ _.00

S8D **About how much LESS could you spend each week and still buy enough food to meet the needs of your household?**

Enter whole dollar amount
$_ _ _.00

III. FOOD PROGRAM PARTICIPATION

Over the last 30 days…

S9 **People do different things when they are running out of money for food in order to make their food or their food money go further.**

In the last 30 days, did you ever run short of money and try to make your food or your food money go further?

<1> Yes (GO TO SP1)
<2 > No (GO TO SS1 – page xxx)

SP1 **In the last 30 days, did (you/anyone in this household) get SNAP or food stamp benefits?**

<1> Yes (GO TO SP2)
<2> No (GO TO SP8, page xxx)

SP2 **In which months of 2013-2014 were SNAP or food stamp benefits received?**

CIRCLE ALL THAT APPLY

<1> January
<2> February
<3> March
<4> April
<5> May
<6> June
<7> July
<8> August
<9> September

<10> October
<11> November
<12> December
<13> All

SP3　　**How much did (you/your household) receive the last time you got SNAP or food stamp benefits?**

Enter whole dollar amounts

$ _ _ _ .00

SP4　　**When do you receive your SNAP or food stamp benefits?**

<1> 1st week of the month
<2> 2nd week of the month
<3> 3rd week of the month
<4> 4th week of the month

SP5　　**When do your benefits run out?**

<1> 1st week of the month
<2> 2nd week of the month
<3> 3rd week of the month
<4> 4th week of the month

SP8　　**During the past 30 days, did any (women/women or children/children) in this household get food through the Women, Infant and Children (WIC) program?**

<1> Yes
<2> No (GO TO SS1)

SP9　　**How many (women/women or children/children) in the household got WIC foods?**

Number _____

IV. FOOD SUFFICIENCY AND FOOD SECURITY

The next questions are about the food eaten in your household in the last 30 days, and whether you were able to afford the food you need.

SS1   **Which of these statements best describes the food eaten in your household-- enough of the kinds of food (I/ we) want to eat, enough but not always the kinds of food (I/ we) want to eat, sometimes not enough to eat, or often not enough to eat? PLEASE CIRCLE**

         <1>   Enough of the kinds of food we want to eat
         <2>   Enough but not always the kinds of food we want to eat
         <3>   Sometimes not enough to eat
         <4>   Often not enough to eat

SS2   **For the following statements, please tell me whether the statement was OFTEN true, SOMETIMES true, or NEVER true for (you/your household) in the last 30 days.**

     The first statement is "(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more." Was that OFTEN true, SOMETIMES true, or NEVER true for (you/your household) in the last 30 days?

         <1> Often true
         <2> Sometimes true
         <3> Never true (GO TO SS3)

SS3   **"The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Was that OFTEN, SOMETIMES or NEVER true for (you/ your household) in the last 30 days?**

         <1> Often true
         <2> Sometimes true
         <3> Never true (GO TO SS4)

SS4   **"(I/we) couldn't afford to eat balanced meals." Was that OFTEN, SOMETIMES or NEVER true for (you/ your household) in the last 30 days?**

         <1> Often true (GO TO SH2)
         <2> Sometimes true (GO TO SH2)
         <3> Never true (GO TO SH2)

SH2   **In the <u>last 30 days</u>, did (you/ you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?**

     <1> Yes
     <2> No (GO TO SH3)

SHF2   **How often did cutting the size of your meals or skipping meals because there wasn't enough money for food? --almost every month, some months but not every month, or in only 1 or 2 months?**

     <1> Almost every month
     <2> Some months but not every month
     <3> Only 1 or 2 months

SHMF2   **How many days did this happen in the last 30 days?**

     _____number of days

SH3   **In the <u>last 30 days</u>, did you ever eat less than you felt you should because there wasn't enough money for food?**

     <1> Yes
     <2> No (GO TO SH4, NEXT PAGE)

SHF3   **How often did this happen-almost every month, some months but not every month, or in only 1 or 2 months?**

     <1> Almost every month
     <2> Some months but not every month
     <3> Only 1 or 2 months

SHMF3   **In the <u>last 30 days</u>, how many days did you eat less than you felt you should because there wasn't enough money for food?**

     _____ number of days

SH4   **In the <u>last 30 days</u>, were you ever hungry but didn't eat because there wasn't enough money for food?**

     <1> Yes
     <2> No (GO TO SH5)

SHF4   **How often did this happen--almost every month, some months but not every month, or in only 1 or 2 months?**

          <1> Almost every month
          <2> Some months but not every month
          <3> Only 1 or 2 months

SHMF4   **In the <u>last 30 days,</u> how many days were you hungry but didn't eat because there wasn't enough money for food?**

          _____ number of days

SH5   **In the <u>last 30 days,</u> did you lose weight because there wasn't enough money for food?**

          <1> Yes
          <2> No

SSH1   **In the <u>last 30 days,</u> did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?**

          <1> Yes
          <2> No (GO TO SC1, GO TO NEXT PAGE)

SSHF1   **How often did you ever not eat for a whole day because there wasn't enough money for food? this happen--almost every month, some months but not every month, or in only 1 or 2 months?**

          <1> Almost every month
          <2> Some months but not every month
          <3> Only 1 or 2 months

SSHM1   **How many times did this happen in the <u>last 30 days</u>?**

          _____ times

V. WAYS OF COPING WITH NOT HAVING ENOUGH FOOD

SC1   **During the <u>past 30 days</u>, did (you/anyone in this household) receive any meals delivered to the home from community programs, "Meals on Wheels," or any other programs?**

                      <1> Yes
                      <2> No

SC2   **During the <u>past 30 days</u>, did (you/anyone in this household) go to a community program or senior center to eat prepared meals?**

                      <1> Yes
                      <2> No

SC3   **In the <u>last 30 days</u>, did (you/you or other adults in your household) ever get emergency food from a church, a food pantry, or food bank?**

                      <1> Yes (GO TO SCF3)
                      <2> No (GO TO SC3A)

SCF3   **How often did this happen?**

                      <1> Almost every day
                      <2> 3 days out of the month
                      <3> 2 days out of the month
                      <4> 1 day out of the month

SC3A   **Is there a church, food pantry or food bank in your community where you could get emergency food if you needed it?**

                      <1> Yes
                      <2> No

SC4   **In the <u>last 30 days</u>, did (you/you or other adults in your household) ever eat any meals at a soup kitchen or shelter?**

                      <1>Yes
                      <2> No (GO TO END)

SCF4   **How often did this happen-almost every day, some days but not every day, 3 days out of the month, 2 days out of the month?; or 1 day out of the month?**
                      <1> Almost every day
                      <2> Some days out of the month
                      <3> 3 days out of the month

<4> 2 days out of the month
<5> 1 day out of the onth

SCM4   **Did this happen in the last 30 days?**

<1> Yes
<2> No

Appendix E: Diet Health Questionnaire 2

NATIONAL INSTITUTES OF HEALTH

Diet History Questionnaire 2

INSTRUCTIONS

- **This 206 questionnaire is about your eating habits in the past 30-days and will take about 35-60 minutes.**

- **Answer each question as best you can. If you are not sure, a guess is better than leaving the answer blank.**

- **Use a black ball-point pen or pencil**

- **Put an X in the box next to your answer.**

- **If you make any changes, cross out the incorrect answer and put an X in the box next to the correct answer. Also draw a circle around the correct answer.**

- **If you mark NEVER, NO, or DON'T KNOW for a question, please follow any arrows or instructions that direct you to the next question.**

---

1. Over the past <u>30-days</u>, how often did you drink **100% fruit juice**, such as apple, orange, cherry, wild berry, cranberry, pear, grapefruit, pineapple, cran-apple, mango, pomegranate, strawberry banana, white grape, mixed fruit?

   ☐ NEVER (GO TO QUESTION 2)

   ☐ 1 time in past month   ☐ 1 time per day
   ☐ 2–3 times in past month   ☐ 2–3 times per day
   ☐ 1–2 times per week   ☐ 4–5 times per day
   ☐ 3–4 times per week   ☐ 6 or more times per day
   ☐ 5–6 times per week

   1a.   Each time you drank **100% fruit juice**, how much did you usually drink?

☐ Less than ½ cup (4 ounces)
☐ ½ to 1¼ cups (4 to 10 ounces)
☐ More than 1¼ cups (10 ounces)

2. Over the <u>30-days</u>, how often did you drink **vegetable juice**, such as tomato, carrot, mixed vegetable, V8, cabbage, broccoli, celery, sweet peppers, spinach, parsley, dandelion greens

☐ NEVER (GO TO QUESTION 3)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

2a. Each time you drank **vegetable juice**, how much did you usually drink?

☐ Less than ¾ cup (6 ounces)
☐ ¾ to 1¼ cups (6 to 10 ounces)
☐ More than 1¼ cups (10 ounces)

3. How often did you drink **fruit drinks** (such as cranberry cocktail, Hi-C, lemonade, or Kool-Aid, diet or regular)?

☐ NEVER (GO TO QUESTION 4)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

3a. Each time you drank **fruit drinks**, how much did you usually drink?

☐ Less than 1 cup (8 ounces)
☐ 1 to 2 cups (8 to 16 ounces)
☐ More than 2 cups (16 ounces)

3b. How often were your fruit drinks **diet** or **sugar-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

4. How often did you drink **milk as a beverage** (NOT in coffee, NOT in cereal)? *(Please do not include chocolate milk and hot chocolate.)*

☐ NEVER (GO TO QUESTION 5)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day

☐ 5–6 times per week

4a.   Each time you drank **milk as a beverage**, how much did you usually drink?

☐ Less than 1 cup (8 ounces)
☐ 1 to 1½ cups (8 to 12 ounces)
☐ More than 1½ cups (12 ounces)

4b.   What kind of **milk** or flavored milk (chocolate milk-hot or cold) did you usually drink?

☐ Whole milk
☐ 2% fat milk
☐ 1 % fat milk
☐ Skim, nonfat, or ½% fat milk
☐ Soy milk
☐ Rice milk
☐ Chocolate
☐ Other

5.   Each time you drank **chocolate milk**, how much did you usually drink?

☐ Less than 1 cup (8 ounces)
☐ 1 to 1½ cups (8 to 12 ounces)
☐ More than 1½ cups (12 ounces)

5b.   How often was the chocolate milk **reduced- fat** or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

6. How often did you drink **regular soda?**

☐ NEVER (GO TO QUESTION 7)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

6a.   Each time you drank **soda ,** how much did you usually drink?

☐ Less than 12 ounces or less than 1 can or bottle
☐ 12 to 16 ounces or 1 can or bottle
☐ More than 16 ounces or more than 1 can or bottle

6b.   How often were these sodas **diet** or **sugar-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

7.   How often did you drink **sports drinks** (such as Propel, PowerAde, or Gatorade)?

☐ NEVER (GO TO QUESTION 8)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

7a.   Each time you drank **sports drinks**, how much did you usually drink?

☐ Less than 12 ounces or less than 1 bottle
☐ 12 to 24 ounces or 1 to 2 bottles
☐ More than 24 ounces or more than 2 bottles

8.   How often did you drink **energy drinks** (such as Red Bull or Jolt)?

☐ NEVER (GO TO QUESTION 9)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

8a.   Each time you drank **energy drinks**, how much did you usually drink?

☐ Less than 8 ounces or less than 1 cup
☐ 8 to 16 ounces or 1 to 2 cups
☐ More than 16 ounces or more than 2 cups

9.   How often did you drink **beer**?

☐ NEVER (GO TO QUESTION 10)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

9a.   Each time you drank **beer**, how much did you usually drink?

☐ Less than a 12-ounce can or bottle
☐ 1 to 3 12-ounce cans or bottles
☐ More than 3 12-ounce cans or bottles

10. How often did you drink **water** (including tap, bottled, and carbonated water)?

☐ NEVER (GO TO QUESTION 11)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

  10a. Each time you drank **water**, how much did you usually drink?

☐ Less than 12 ounces or less than 1 bottle
☐ 12 to 24 ounces or 1 to 2 bottles
☐ More than 24 ounces or more than 2 bottles

11. How often did you drink **wine** or **wine coolers**?

☐ NEVER (GO TO QUESTION 12)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

  11a. Each time you drank **wine** or **wine coolers**, how much did you usually drink?

☐ Less than 5 ounces or less than 1 glass
☐ 5 to 12 ounces or 1 to 2 glasses
☐ More than 12 ounces or more than 2 glasses

12. How often did you drink **liquor** or **mixed drinks**?

☐ NEVER (GO TO QUESTION 13)

☐ 1 time in past month   ☐ 1 time per day
☐ 2–3 times in past month   ☐ 2–3 times per day
☐ 1–2 times per week   ☐ 4–5 times per day
☐ 3–4 times per week   ☐ 6 or more times per day
☐ 5–6 times per week

  12a. Each time you drank **liquor** or **mixed drinks**, how much did you usually drink?

☐ Less than 1 shot of liquor
☐ 1 to 3 shots of liquor
☐ More than 3 shots of liquor

13. How often did you eat **cooked cereal,** such as oatmeal, grits, farina, quinoa flakes, buckwheat, corn grits, creamy rice cereal?

☐ NEVER (GO TO QUESTION 14)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day

☐ 2 times per week   ☐ 2 or more times per day

13a.   How often was **butter** or **margarine** added to your oatmeal, grits or other cooked cereal?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

14.   How often did you eat **cold cereal** with bran or with fiber, such as Cheerios, Shredded Wheat, Raisin Bran, Bran Flakes, Grape-Nuts, Granola, Wheaties?

☐ NEVER (GO TO QUESTION 15)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

14a.   How often was the cold cereal you ate was **cold cereal,** such as, Corn Flakes, Rice Krispies, Frosted Flakes, Special K, Fruit Loops, Cap'n Crunch?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

14b.   Was **milk** added to your cold cereal?

☐ NO (GO TO QUESTION 15)

☐ YES

14c.   What kind of **milk or flavored milk (chocolate, almond)** was usually added?

☐ Whole milk
☐ 2% fat milk
☐ 1% fat milk
☐ Skim, nonfat, or ½% fat milk
☐ Soy milk
☐ Rice milk
☐ Chocolate
☐ Almond

15.   How often did you eat **canned fruits**, such as **applesauce, pears, pineapple, mixed fruit, peaches** in regular syrup**?**

☐ NEVER (GO TO QUESTION 16)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

16. How often did you eat **fresh fruits (Fresh or Frozen),** such as apples, pears, bananas, peaches, nectarines, plums, grapes, cantaloupe,watermelon, honeydew, strawberries, oranages, tangerines,clementines, grapefruit, pineapple, mango, papaya?

☐ NEVER (GO TO QUESTION 17)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

17. How often did you eat **dried fruit, s**uch as prunes, raisins, dried apricots or cranberries*?*

☐ NEVER (GO TO QUESTION 18)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

18. How often did you eat **COOKED or RAW green vegetables,** such as spinach, turnip, collard, mustard, chard, or kale?

☐ NEVER (GO TO QUESTION 19)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

19. How often did you eat **sauerkraut, cabbage or coleslaw**?

☐ NEVER (GO TO QUESTION 20)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

20. How often did you eat **vegetables (fresh, canned, or frozen)**, such carrots, spinach, tomatoes, broccoli, brussel sprouts, asparagus, green, yellow or red peppers, onions, string beans, cauliflower

☐ NEVER (GO TO QUESTION 21)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

21. How often did you eat **starchy vegetables (fresh, frozen or canned),** such as peas, potatoes, sweet potatoes, yams, corn, winter squash (pumpkin, butternut or accord)?

☐ NEVER (GO TO QUESTION 22)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day

☐ 2 times per week   ☐ 2 or more times per day

Now think about all the **cooked vegetables (include potatoes)** you ate in the 30-days and how they were prepared. Go to question 22 – next column

22. How often were your **vegetables (include potatoes) COOKED WITH** some sort of **fat**, including oil spray?

☐ NEVER (GO TO QUESTION 23)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

23. Which fats were usually added to your vegetables **(include potatoes) DURING COOKING**? (***Mark all that apply***)

☐ Margarine   ☐ Corn oil
  (including low-fat)   ☐ Canola or rapeseed oil
☐ Butter (including   ☐ Oil spray, such as Pam
  low-fat)   or others
☐ Lard, fatback, or   ☐ Other kinds of oils
  bacon fat   ☐ Sour Cream
☐ Olive oil   ☐ None of the above

24. Now, thinking again about all the **cooked vegetables (include potatoes)** you ate in the 30-days, how often was some sort of fat, sauce, or dressing added **AFTER COOKING OR AT THE TABLE**?

☐ NEVER (GO TO QUESTION 25)

☐ 1 time in past month   ☐ 5–6 times per week
☐ 2–3 times in past month   ☐ 1 time per day
☐ 1–2 times per week   ☐ 2 times per day
☐ 3–4 times per week   ☐ 3 or more times per day

24a. Which fats, sauces, or dressings were usually added **AFTER COOKING OR AT THE TABLE**? (*include potatoes. **Mark all that apply.***)

☐ Margarine   ☐ Salad dressing
  (including low-fat)   ☐ Cheese sauce
☐ Butter (including   ☐ White sauce
  low-fat)   ☐ Sour Cream
☐ Lard, fatback, or   ☐ Other
  bacon fat

25. How often did you eat **lettuce salads** (with or without other vegetables)?

☐ NEVER (GO TO QUESTION 26)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

26. How often did you eat **salad dressing** (including low-fat) **on salads**?

☐ NEVER (GO TO QUESTION 27)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

27. How often did you eat **FuFu (mashed plantains)**?

☐ NEVER (GO TO QUESTION 28)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

28. How often did you eat **French fries**, **home fries**, **hash browned potatoes**, or **tater tots**?

☐ NEVER (GO TO QUESTION 29)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

29. How often did you eat **potato salad or baked, boiled,** or **mashed potatoes**?

☐ NEVER (GO TO QUESTION 30)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

30. How often was **margarine** (including low-fat) added to your potatoes, **EITHER IN COOKING OR AT THE TABLE**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

31. How often was **cheese** or **cheese sauce** added to your potatoes, **EITHER IN COOKING OR AT THE TABLE**?

☐ Almost never or never (GO TO QUESTION 32)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

32. How often did you eat **salsa or catsup**?

☐ NEVER (GO TO QUESTION 33)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

33. How often did you eat **chili**?

☐ NEVER (GO TO QUESTION 34)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

34. How often did you eat **Mexican type foods** (such as tacos, tostados, burritos, tamales, fajitas, enchiladas, quesadillas, and chimichangas)?

☐ NEVER (GO TO QUESTION 35)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

35. How often did you eat **cooked dried beans,** such as baked beans, pintos, kidney, black-eyed peas, lima, lentils, soybeans, or refried beans? *(Please do not include bean soups or chili.)*

☐ NEVER (GO TO QUESTION 36)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

35a. How often were the beans you ate **refried beans**, **beans prepared with any type of fat**, or **with meat added**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

36. How often did you eat **rice, bulgur, cracked wheat, or millet**?

☐ NEVER (GO TO QUESTION 37)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

36a. How often was **butter**, **margarine**, or **oil** added to your rice or other cooked grains **IN COOKING OR AT THE TABLE**?

- ☐ Almost never or never
- ☐ About ¼ of the time
- ☐ About ½ of the time
- ☐ About ¾ of the time
- ☐ Almost always or always

37. How often did you eat **con-con** (**fried rice**)?

☐ NEVER (GO TO QUESTION 38)

- ☐ 1 time in past month
- ☐ 2–3 times in past month
- ☐ 1 time per week
- ☐ 2 times per week
- ☐ 3–4 times per week
- ☐ 5–6 times per week
- ☐ 1 time per day
- ☐ 2 or more times per day

38. How often did you eat **Green Bananas (used as a vegetable)**?

☐ NEVER (GO TO QUESTION 39)

- ☐ 1 time in past month
- ☐ 2–3 times in past month
- ☐ 1 time per week
- ☐ 2 times per week
- ☐ 3–4 times per week
- ☐ 5–6 times per week
- ☐ 1 time per day
- ☐ 2 or more times per day

39. How often did you eat **sweet fried plantains** (platanos maduro)?

☐ NEVER (GO TO QUESTION 40)

- ☐ 1 time in past month
- ☐ 2–3 times in past month
- ☐ 1 time per week
- ☐ 2 times per week
- ☐ 3–4 times per week
- ☐ 5–6 times per week
- ☐ 1 time per day
- ☐ 2 or more times per day

40. How often did you eat **cassava with onions** (**yucca con cebolla**)?

☐ NEVER (GO TO QUESTION 41)

- ☐ 1 time in past month
- ☐ 2–3 times in past month
- ☐ 1 time per week
- ☐ 2 times per week
- ☐ 3–4 times per week
- ☐ 5–6 times per week
- ☐ 1 time per day
- ☐ 2 or more times per day

41. How often did you eat **sweet cream with beans (habichuelas con dulce)**?

☐ NEVER (GO TO QUESTION 42)

- ☐ 1 time in past month
- ☐ 2–3 times in past month
- ☐ 1 time per week
- ☐ 2 times per week
- ☐ 3–4 times per week
- ☐ 5–6 times per week
- ☐ 1 time per day
- ☐ 2 or more times per day

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42. How often did you eat **pancakes, waffles,** or **French toast**?

☐ NEVER (GO TO QUESTION 44)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

  42a. How often was **margarine or butter** (including low-fat) added to your pancakes, waffles, or French toast **AFTER COOKING OR AT THE TABLE**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

  42b. Each time **margarine** or **butter** was added to your pancakes, waffles, or French toast, how much was usually added?

☐ Never added
☐ Less than 1 teaspoon
☐ 1 to 3 teaspoons
☐ More than 3 teaspoons

  42c. How often was **syrup** added to your pancakes, waffles, or French toast?

Almost never or never (GO TO QUESTION 44)

☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

  42d. Each time **syrup** was added to your pancakes, waffles, or French toast, how much was usually added?

☐ Less than 1 tablespoon
☐ 1 to 4 tablespoons
☐ More than 4 tablespoons

43. How often did you eat **macaroni and cheese, pasta salad or macaroni salad**?

☐ NEVER (GO TO QUESTION 44)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

  43a. Each time you ate **macaroni and cheese**, **pasta salad or macaroni salad**, how much did you usually eat?

☐ Less than ½ cup

☐ ½ to 1 cup
☐ 1 to 1½ cups
☐ More than 1½ cups

44. Other than the pasta salads listed in question 43
how often did you eat **spaghetti**?

☐ NEVER (GO TO QUESTION 45)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

44a. How often did you eat your pasta, spaghetti, or other noodles with **margarine, butter, oil,** or **cream sauce**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

45. How often did you eat **bagels o**r **English muffins**?

☐ NEVER (GO TO IQUESTION 46)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

45a. How often was **margarine** (including low-fat) added to your bagels or English muffins?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

45b. How often was **butter** or **cream cheese** (including low-fat) **added** to your bagels or English muffins?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

45c. Each time **margarine, butter or cream cheese** was added to your bagels or English muffins, how much was usually added?

☐ Never added
☐ Less than 1 teaspoon
☐ 1 to 2 teaspoons
☐ More than 2 teaspoons

46. How often did you eat **breads, rolls, hot dog**

rolls or hamburger rolls AS PART OF SANDWICHES? *(Please do not include fast food sandwiches.)*

☐ NEVER (GO TO QUESTION 47)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

46a. How often were the breads, rolls, hamburger rolls or hot dog buns that you used for your sandwiches were **white bread?**

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

46b. How often were the breads, rolls, hamburger rolls or hot dog buns that you used for your sandwiches were **whole wheat bread?**

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

47. How often was **mayonnaise** or **mayonnaise-type dressing** (including low-fat) added to the breads or rolls used for your sandwiches?

☐ Almost never or never (GO TO QUESTION 48)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

47a. How often was **margarine** (including low-fat) added to the breads or rolls used for your sandwiches?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

47b. How often was **butter** or **cream cheese** (including low-fat) added to the breads or rolls used for your sandwiches?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

48. How often did you eat **jam, jelly,** or **honey** on bagels, muffins, bread, rolls, or crackers?

☐ NEVER (GO TO QUESTION 49)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

49. How often did you eat **peanut butter** or **other nut butter**?

☐ NEVER (GO TO QUESTION 50)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

50. How often did you eat **turkey, chicken or ham COLD CUTS** or **DELI-MEAT,** such as loaf, luncheon meat, turkey ham, turkey salami, or turkey pastrami, bologna?

☐ NEVER (GO TO QUESTION 51)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

50a. How often was the luncheon or deli-style meat you ate **light**, **low-fat**, or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

51. How often did you eat **canned tuna** (including in salads, sandwiches or casseroles)?

☐ NEVER (GO TO QUESTION 52)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

51a. How often was the canned tuna you ate **water-packed**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

51b. How often was the canned tuna you ate **prepared with mayonnaise** or **other dressing** (including low-fat)?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

52. How often did you eat **beef hamburgers** or **cheeseburgers** from a **FAST FOOD** or **OTHER RESTAURANT**?

NEVER (GO TO QUESTION 53)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

52a. Each time you ate **beef hamburgers** or **cheeseburgers** from a **FAST FOOD** or **OTHER RESTAURANT**, what size did you usually eat?

☐ Small hamburger (such as a regular Burger King or McDonald's Hamburger)
☐ Medium (such as McDonald's or Burger King Double Burger or Cheeseburger)
☐ Large (such as Burger King Whopper or Double Whopper or a McDonald's Double Quarter Pounder)

52b. How often did you have **cheeseburgers** rather than **hamburgers**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

53. How often did you eat **ground beef in mixtures** (such as meatballs, casseroles, chili, or meatloaf)?

☐ NEVER (GO TO QUESTION 54)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

54. How often did you eat **hot dogs** or **frankfurters**? *(Please do not include sausages or vegetarian hot dogs.)*

☐ NEVER (GO TO QUESTION 55)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

55. How often did you eat **beef stew, beef pot pie, beef and noodles, or beef and vegetables**?

☐ NEVER (GO TO QUESTION 56)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

56. How often did you eat **pork** or **beef spareribs**?

☐ NEVER (GO TO QUESTION 57)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

56a. How often did you eat **roasted pork** (pemil)?

☐ NEVER (GO TO QUESTION 57)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

57. How often did you eat **roast turkey, turkey cutlets,** or **turkey nuggets?**

☐ NEVER (GO TO QUESTION 58)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

58. How often did you eat **chicken salads, sandwiches, casseroles, stews**?

☐ NEVER (GO TO QUESTION 59)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

59. How often did you eat **baked, broiled, roasted, stewed, fried chicken or chicken nuggets**?

☐ NEVER (GO TO QUESTION 60)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

59a. How often did you eat chicken **WITH skin**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

60.   How often did you eat **baked ham** or **ham steak**?

NEVER (GO TO QUESTION 61)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

61. How often did you eat **pork chops**, **pork roasts, and in mixed dishes**?

NEVER (GO TO QUESTION 62)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

62.   How often did you eat **gravy** on meat, chicken, potatoes, rice, etc.?

☐ NEVER (GO TO QUESTION 63)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

63. How often did you eat **all kinds of liver** or **liverwurst**?

☐ NEVER (GO TO QUESTION 64)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

64.   How often did you eat **regular bacon**?

☐ NEVER (GO TO QUESTION 65)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

64a.   Each time you ate **bacon**, how much did you usually eat?

☐ Fewer than 2 slices
☐ 2 to 3 slices
☐ More than 3 slices

64b.   How often was the bacon you ate **light, low-fat,** or **lean**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

65. How often did you eat **regular and low-fat sausage**?

☐ NEVER (GO TO QUESTION 66)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

65a. Each time you ate **sausage**, how much did you usually eat?

☐ Less than 1 patty or 2 links
☐ 1 to 3 patties or 2 to 5 links
☐ More than 3 patties or 5 links

66. How often did you eat **fish**, such as shrimp, trout, salmon or any kind that was **NOT FRIED**?

☐ NEVER (GO TO QUESTION 67)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

67. How often did you eat **fish**, such as shrimp, trout, salmon or any kind that **WAS FRIED**?

☐ NEVER (GO TO QUESTION 68)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

68. How often did you eat **fish sticks?**

☐ NEVER (GO TO QUESTION 69)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

Now think about all the meat, poultry, and fish you ate in the <u>30-days</u> and how they were prepared.

69. **HOW OFTEN** was **oil, butter, margarine**, **or other fat** used to **FRY, SAUTE, BASTE, OR MARINATE** any meat, poultry, or fish you ate?

☐ NEVER (GO TO QUESTION 70)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

69a. Which of the following **fats** were regularly used to prepare your meat, poultry, or fish? *(Mark all that apply.)*

☐ Margarine (including   ☐ Corn oil
     low-fat)   ☐ Canola or rapeseed oil
☐ Butter (including   ☐ Oil spray (such as Pam
     low-fat)   or others)
☐ Lard, fatback, or   ☐ Other kinds of oils
     baco fat   ☐ None of the above
☐ Olive oil

70. How often did you eat **tofu, soy burgers,** or **soy meat-substitutes**?

☐ NEVER (GO TO QUESTION 71)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

71. How often did you eat **soups**?

☐ NEVER (GO TO QUESTION 72)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

71a. How often were the soups you ate **bean soups**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

71b. How often were the soups you ate **cream soups?**

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

71c. How often were the soups you ate **tomato** or **vegetable soups**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

71d. How often were the soups you ate **broth soups** (including chicken) **with** or **without noodles** or **rice**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

71e. How often were the soups you ate was **Sancocho (large pieces of meat and vegetabes served in broth)**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

72. How often did you eat **pizza**?

☐ NEVER (GO TO QUESTION 73)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

72a. Each time you ate **pizza**, how much did you usually eat?

☐ Less than 1 slice or less than 1 mini pizza
☐ 1 to 3 slices or 1 mini pizza
☐ More than 3 slices or more than 1 mini pizza

72b. How often did you eat pizza with **pepperoni, sausage**, or **other meat**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

73. How often did you eat **crackers**?

☐ NEVER (GO TO QUESTION 74)

☐ 1 time in past month ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week ☐ 1 time per day
☐ 2 times per week ☐ 2 or more times per day

74. How often did you eat **corn bread, corn muffins or biscuits**?

☐ NEVER (GO TO QUESTION 75)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

75. How often did you eat **potato chips, corn chips or tortilla chips** (including low-fat, fat-free, or low-salt)?

☐ NEVER (GO TO QUESTION 76)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

76. How often did you eat **tostones (fried plantain slices)**?

☐ NEVER (GO TO QUESTION 77)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

77. How often did you eat **Kipes (Quipes) (deep fried bulgur roll)**

☐ NEVER (GO TO QUESTION 78)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

78. How often did you eat sweet **fried plantains (platanos maduro)**
☐ NEVER (GO TO QUESTION 79)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

79. How often did you eat **empinadas (stuffed bread or pastry baked or fried)**?

☐ NEVER (GO TO QUESTION 80)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

80. How often did you eat **popcorn** (including low-fat)?

☐ NEVER (GO TO QUESTION 81)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month   ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day

☐ 2 times per week   ☐ 2 or more times per day

81. How often did you eat **pretzels**?

☐ NEVER (GO TO QUESTION 82)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

82. How often did you eat **peanuts, walnuts, seeds, cashews** or **other nuts**?

☐ NEVER (GO TO QUESTION 83)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

83. How often did you eat **yogurt** (NOT including frozen yogurt)?

☐ NEVER (GO TO QUESTION 84)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

   83a.   How often was the **yogurt** you ate **low-fat** or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

84. How often did you eat **cottage cheese** (including low-fat)?

☐ NEVER (GO TO QUESTION 85)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

85. How often did you eat **cheese** (including low-fat; including on cheeseburgers or in sandwiches or subs)?

☐ NEVER (GO TO QUESTION 86)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

   85a.   Each time you ate **cheese**, how much did you usually eat?

☐ Less than ½ ounce or less than 1 slice
☐ ½ to 1½ ounces or 1 slice
☐ More than 1½ ounces or more than 1 slice

85b.   How often was the cheese you ate **low-fat or fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

86.   How often did you eat **frozen yogurt, sorbet,** or **ices** (including low-fat or fat-free)?

☐ NEVER (GO TO QUESTION 87)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

87.   How often did you eat **ice cream, ice cream bars,** or **sherbet** (including low-fat or fat-free)?

☐ NEVER (GO TO QUESTION 88)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

88.   How often did you eat **cake, cookies or brownies** (including low-fat or fat-free)?

☐ NEVER (GO TO QUESTION 89)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

89.   How often did you eat **doughnuts**, **sweet rolls**, **Danish**, or **pop-tarts**?

☐ NEVER (GO TO QUESTION 90)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

90.   How often did you eat **sweet muffins** or **dessert breads** (including low-fat or fat-free)?

☐ NEVER (GO TO QUESTION 91)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

91. How often did you eat **pie**?

☐ NEVER (GO TO QUESTION 92)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

91a.   How often was the pie **flan (made with condensed and evaporated milk and baked in a pie dish)?**

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

92. How often did you eat **chocolate candy**?

☐ NEVER (GO TO QUESTION 93)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

93. How often did you eat **other candy**?

☐ NEVER (GO TO QUESTION 94)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

94. How often did you eat **eggs, egg whites,** or **egg substitutes** (NOT counting eggs in baked goods and desserts)? *(Please include eggs in salads, quiche, and soufflés.)*

☐ NEVER (GO TO QUESTION 95)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

94a.   Each time you ate **eggs**, how many did you usually eat?

☐ 1 egg
☐ 2 eggs
☐ 3 or more eggs

94b.   How often were the eggs you ate **egg substitutes** or **egg whites only**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

94c.   How often were the eggs you ate **regular whole eggs**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

94d.   How often were the eggs you ate **cooked in oil, butter,** or **margarine**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

95.   How many cups of **coffee**, caffeinated or decaffeinated, did you drink over the past 30 days?

☐ NONE (GO TO QUESTION 96)

☐ Less than 1 cup in   ☐ 5–6 cups per week
   past month   ☐ 1 cup per day
☐ 1–3 cups in past month   ☐ 2–3 cups per day
☐ 1 cup per week   ☐ 4–5 cups per day
☐ 2–4 cups per week   ☐ 6 or more cups per day

96.   How many glasses, cans, or bottles of **COLD** or **ICED tea,** caffeinated or decaffeinated, did you drink?

☐ NONE (GO TO QUESTION 97)

☐ Less than 1 glass, can   ☐ 5–6 glasses, cans or
   or bottle in past month   bottles per week
☐ 1–3 glasses, cans or   ☐ 1 glass, can or bottle per
   bottles in past month   day
☐ 1 glass, can or bottle   ☐ 2–3 glasses, cans or
   per week   bottles per day
☐ 2–4 glasses, cans or   ☐ 4–5 glasses, cans or
   bottles per week   bottles per day
                                ☐ 6 or more glasses, cans
                                   or bottles per day

97.   How often was the cold or iced tea you drank **presweetened with either sugar or artificial sweeteners** (such as Splenda, Equal, Sweet'N Low or others)?

☐ Almost never or never (GO TO QUESTION 98)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

97a. What kind of **sweetener** was added to your presweetened cold or iced tea most of the time?

☐ Sugar or honey
☐ Artificial sweeteners (such as Splenda, Equal, Sweet 'N Low or others)

98. How many cups of **HOT tea**, caffeinated or decaffeinated, did you drink?

☐ NONE (GO TO QUESTION 99)

☐ Less than 1 cup in   ☐ 5–6 cups per week
   past month   ☐ 1 cup per day
☐ 1–3 cups in past month   ☐ 2–3 cups per day
☐ 1 cup per week   ☐ 4–5 cups per day
☐ 2–4 cups per week   ☐ 6 or more cups per day

99. Over the 30-days, did you add **sugar or honey** to your tea or coffee (hot or iced)?

☐ NO (GO TO QUESTION 100)

☐ YES

99a. How often did you add **sugar** or **honey** to your coffee or tea (hot or iced)?

☐ Almost never or never (GO TO QUESTION 101)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

100. How often did you add **artificial sweetener** (such as Splenda, Equal, Sweet'N Low or others) to your coffee or tea?

☐ Almost never or never (GO TO QUESTION 105)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

100a. What kind of **artificial sweetener** did you usually use?

☐ Equal or aspartame
☐ Sweet'N Low or saccharin
☐ Splenda or sucralose
☐ Herbal extracts or other kind

100b. Each time **artificial sweetener** was added to your coffee or tea, how much was usually added?

☐ Less than 1 packet or less than 1 teaspoon
☐ 1 packet or 1 teaspoon
☐ More than 1 packet or more than 1 teaspoon

101. How often was **milk** added to your coffee or tea?

☐ Almost never or never (GO TO QUESTION 102)
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

101a. What kind of **milk** or flavored milk was usually added to your coffee or tea?

☐ Whole milk
☐ 2% milk
☐ 1% milk
☐ Skim, nonfat, or ½% milk
☐ Evaporated or condensed (canned) milk
☐ Soy milk
☐ Rice milk
☐ Amond
☐ Other

102. How often was **sugar** or **honey** added to foods you ate? *(Please do not include sugar in coffee, tea, other beverages, or baked goods.)*

☐ NEVER (GO TO QUESTION 103)

☐ 1 time in past month   ☐ 3–4 times per week
☐ 2–3 times in past month ☐ 5–6 times per week
☐ 1 time per week   ☐ 1 time per day
☐ 2 times per week   ☐ 2 or more times per day

102a. Each time **sugar** or **honey** was added to foods you ate, how much was usually added?

☐ Less than 1 teaspoon
☐ 1 to 3 teaspoons
☐ More than 3 teaspoons

The following questions are about the kinds of margarine, mayonnaise, sour cream, cream cheese, and salad dressing that you ate over the last 30-days.

103. Over the 30-days, did you eat **margarine**?

☐ NO (GO TO QUESTION 104)

☐ YES

103a. How often was the margarine you ate **light**, **low-fat**, or **fat-free** (stick or tub)?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

104. Over the 30-days, did you eat **butter**?

☐ NO (GO TO QUESTION 105)

☐ YES

104a. How often was the butter you ate **light** or **low-fat**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

105. Over the 30-days, did you eat **mayonnaise** or **mayonnaise-type dressing**?

☐ NO (GO TO QUESTION 106)

☐ YES

105a. How often was the mayonnaise you ate **light, low-fat or fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

106. Over the 30-days, did you eat **sour cream**?

☐ NO (GO TO QUESTION 107)

☐ YES

106a. How often was the sour cream you ate **light, low-fat,** or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

107. Over the 30-days, did you eat **cream cheese**?

☐ NO (GO TO QUESTION 108)

☐ YES

107a. How often was the cream cheese you ate **light, low-fat,** or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

108. Over the 30-days, did you eat **salad dressing**?

☐ NO (GO TO QUESTION 109)

☐ YES

108a. How often was the salad dressing you ate **light,** low-**fat** or **fat-free**?

☐ Almost never or never
☐ About ¼ of the time
☐ About ½ of the time
☐ About ¾ of the time
☐ Almost always or always

109. Over the <u>30-days</u>, which of the following foods did you eat **AT LEAST THREE TIMES?**
(Mark all that apply.)

☐ Avocado, guacamole
☐ Cheesecake
☐ Chocolate, fudge, or butterscotch toppings or syrups
☐ Chow mein noodles
☐ Croissants
☐ Dried apricots
☐ Egg rolls
☐ Granola bars
☐ Hot peppers
☐ Jell-O, gelatin
☐ Mangoes
☐ Milkshakes or ice-cream sodas

☐ Olives
☐ Oysters
☐ Pickles or pickled vegetables or fruit
☐ Plantains
☐ Pork neck bones, hock, head, feet
☐ Pudding or custard
☐ Veal, venison, lamb
☐ Whipped cream, regular
☐ Whipped cream, Substitute

☐ NONE

110. Which of the following foods did you **TOTALLY EXCLUDE (ELIMINATED)** from your diet?
(Mark all that apply.)

☐ Meat (beef, pork, lamb, etc.)
☐ Poultry (chicken, turkey, duck)
☐ Fish and seafood
☐ Eggs
☐ Dairy products (milk, cheese, etc.)

☺ YOU ARE ALMOST DONE ☺

The next 11 questions will be HOW FREQUENTLY you ate certain foods during the 1st week of the month, the 2nd week of the month, the 3rd week of the month, or the 4th week of the month (end of the month) or every week of the month.

111. If you drink **sweetened beverages,** such as 100% juice, regular Snapple, regular Ice-Tea, regular lemonade, regular Kool-Aid, any kind of regular soda **WHEN** do you drink more or less during the month?
(Check all that applies)

More

☐ 1st week of the month
☐ 2nd week of the month

Less

☐ 1st week of the month
☐ 2nd week of the month

☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

112. When did you eat (most often) **dairy,** such as cheese, milk (all kinds), yogurt, milk-based desserts (puddings, ice-cream, and frozen yogurt)?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

113. When did you eat (most often) **meat,** such as beef, hotdogs, and bacon?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

114. When did you eat (most often) **cold cuts or luncheon meats** like salami, turkey slices, bologna, pastrami, pork roll, roast beef, peperoni, tongue, liverwurst?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

115. When did you eat (most often) **chicken,pork, fish, ground beef**?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

116. When did you eat (most often) at **fast food resturants** like McDonalds, Burger King, Taco Bell, White Castle, etc.?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

117. When did you eat (most often) **starchy vegetables,** such as potatoes, yam or sweet potatoes, peas?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

118. When did you eat (most often) **fruits**?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

119. When did you eat (most often) **breads, rice, rolls, spaghetti, macaroni**?
(Check all that applies)

More   Less

☐ 1st week of the month   ☐ 1st week of the month
☐ 2nd week of the month   ☐ 2nd week of the month
☐ 3rd week of the month   ☐ 3rd week of the month
☐ 4th week of the month   ☐ 4th week of the month

☐ Same every week

120. When did you eat (most often) desserts of any kind?
(Check all that applies)

More	Less
☐ 1st week of the month	☐ 1st week of the month
☐ 2nd week of the month	☐ 2nd week of the month
☐ 3rd week of the month	☐ 3rd week of the month
☐ 4th week of the month	☐ 4th week of the month

☐ Same every week

121. When did you eat (most often) non-starchy vegetables like lettuce, tomatoes, broccoli, brussel sprouts, asparagus, cucumbers, carrots, peppers, onions?
(Check all that applies)

More	Less
☐ 1st week of the month	☐ 1st week of the month
☐ 2nd week of the month	☐ 2nd week of the month
☐ 3rd week of the month	☐ 3rd week of the month
☐ 4th week of the month	☐ 4th week of the month

☐ Same every week

******END******
☺☺☺☺☺☺☺☺☺☺☺☺☺☺☺

Thank you _very much_ for completing this questionnaire!

Because we want to be able to use all the information you have provided, we would greatly appreciate it if you would please take a moment to review each page making sure that you:

- **Did not skip any pages**
- **Crossed out the incorrect answer and circled the correct answer if you made any changes.**

Appendix F: Bronx Lebanon Hospital IRB #09 12 13 07

BRONX-LEBANON
HOSPITAL CENTER

September 26, 2013

Diana Malkin-Washeim
Medicine
Grand Concourse

Dear Ms. Malkin-Washeim:

Your protocol entitled **"Electronic Benefit Transfer: Food Choices, Food Insecurity and Type 2 Diabetes."** **IRB # 09 12 13 07, qualifies as** Exempt according to 45 CFR 46.101 (b) (4) and was **approved on September 26, 2013.**

You are required to notify the Institutional Review Board, in writing, of any protocol changes prior to implementing.

Sincerely,

Jonathan Bella, MD
Chair
Institutional Review Board

JB:ed

Affiliated with Albert Einstein
College of Medicine

1650 Grand Concourse
Bronx, New York 10457
Phone (718) 590-1800

Appendix G: Households With Complete Responses: Food Security Scale Values and
Status Levels Corresponding to Number of Affirmative Responses

Guide to Measuring Household Food Security – 2000

Exhibit 3-3

HOUSEHOLDS WITH COMPLETE RESPONSES:
FOOD SECURITY SCALE VALUES AND STATUS LEVELS
CORRESPONDING TO NUMBER OF AFFIRMATIVE RESPONSES

Number of Affirmative Responses:		1998 Food Security Scale Values [a]	Food Security Status Level	
(Out of 18) Households With Children	(Out of 10) Households Without Children		Code	Category
0	0	0.0	0	Food Secure
1		1.0		
	1	1.2		
2		1.8		
	2	2.2		
3		2.4	1	Food Insecure Without Hunger
4		3.0		
	3	3.0		
5		3.4		
	4	3.7		
6		3.9		
7		4.3		
	5	4.4		
8		4.7	2	Food Insecure With Hunger, Moderate
	6	5.0		
9		5.1		
10		5.5		
	7	5.7		
11		5.9		
12		6.3		
	8	6.4		
13		6.6	3	Food Insecure With Hunger, Severe
14		7.0		
	9	7.2		
15		7.4		
	10	7.9		
16		8.0		
17		8.7		
18		9.3		

[a] See Appendix D, technical note 2, for comparison of 1995 and 1998 scale values.

Source: Calculated by ERS from August 1998 Current Population Survey Food Security Supplement data.

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Appendix H: Household Food Security Scale

Exhibit 3-2

TWO MEASURES OF SEVERITY
OF HOUSEHOLD FOOD INSECURITY AND HUNGER

Conditions/Experiences/Behaviors Indicative of Food Insecurity and Hunger: (sequential set of increasingly severe indicators)				
No such indications: *Presumed food secure*	One or two indications: *At-risk*	Multiple indications: *Few or no hunger indicators*	More, and more severe, indications: *Multiple indicators of adult hunger*	Many indications, including: *Child hunger indicators and more severe adult hunger indicators*

```
|- - - - |- - - - - |- - - - - |- - - - - |- - - - - |- - - - - |- - - - - |- - - - - |- - - - - |- - - - -|
0       1.0       2.0       3.0       4.0       5.0       6.0       7.0       8.0       9.0      10
```
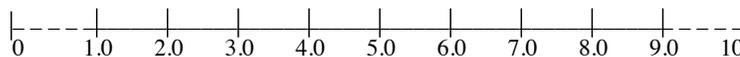
Household Food Security Scale -- *continuous measure*

$(2.32)^{*/}$ $(4.56)^{*/}$ $(6.53)^{*/}$

Food Secure	Food Insecure:		
	Food Insecure Without Hunger	Food Insecure With Hunger:	
		(less severe) "Moderate"	(more severe) "Severe"
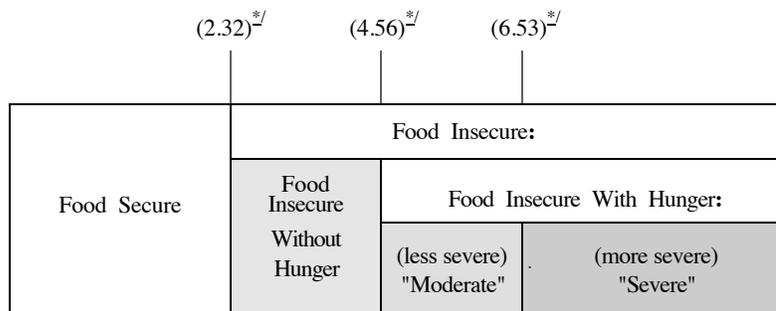
Household Food Security Status -- *categorical measure*

$\underline{*/}$ Located at midpoint between the two adjacent household scale values.

Appendix I: Fats Used While Cooking to Prepare Meat, Poultry, or Fish

	N	%	Not Checked N	%	Skipped N	%	Missing N	%
Margarine	8	22.2	24	66.7	3	8.3	1	2.8
Butter	6	16.7	__	__	3	8.3	1	2.8
Lard, fatback or bacon fat	1	2.8	__	__	3	8.3	1	2.8
Olive oil	9	25.0	9	25.0	3	8.3	1	2.8
Corn oil	14	38.88	19	52.8	3	8.3	1	2.8
Canola oil	12	33.3	20	55.6	3	8.3	1	2.8
Oil spray	1	2.8	31	86.1	3	8.3	1	2.8
Other kinds	1	2.8	31	86.1	3	8.3	1	2.8
None of the above	1	2.8	31	86.1	3	8.3	1	2.8

Appendix J: Fats Added to Vegetables During Cooking

	N	%	Not Checked N	%	Skipped N	%
Margarine	11	30.6	23	63.9	2	5.6
Butter	8	22.2	26	72.2	2	5.6
Lard, fatback or bacon fat			34	94.4	2	5.6
Olive oil	15	41.66	20	55.6	1	2.8
Corn oil	9	25.0	25	69.4	2	5.6
Canola oil or Rapseed oil	6	16.7	28	77.8	2	5.6
Oil spray			34	94.4	2	5.6
Other kinds	3	8.3	32	88.9	1	2.8
Sour Cream	1	2.8	33	91.7	2	5.6
None of the above	1	2.8	33	91.7	2	5.6

Appendix K: Fats Added to Vegetables After Cooking or at the Table

	N	%	Not Checked N	%	Skipped N	%	Missing N	%
Margarine	8	22.2	16	36.4	7	19.4	5	13.9
Butter	7	19.4	17	47.2	7	19.4	5	13.9
Lard, fatback or bacon fat	1	2.8	23	63.9	7	19.4	5	13.9
Salad Dressing	11	30.5	13	36.1	7	19.4	5	13.9
Cheese Sauce	3	8.3	21	58.3	7	19.4	5	13.9
White Sauce	1	2.8	23	63.9	7	19.4	5	13.9
Sour Cream	1	2.8	23	63.9	7	19.4	5	13.9
Other Fats	1	2.8	23	63.9	7	19.4	5	13.9

Appendix L: Butter, Margarine, Cheese, or Cheese Sauce Added to Various Starches

	Butter or Cream cheese added to breads		Butter or Margarine added to cooked cereal		Margarine added to potatoes in cooking or at the table		Cheese or cheese sauce added to cooking or at the table		Mayonnaise or type dressing added to breads		Margarine added to breads	
	N	%	N	%	N	%	N	%	N	%	N	%
Almost never or never	12	33.3	15	41.7	15	41.7	19	52.8	16	44.4	8	22.2
About ¼ of the time	5	13.9	3	8.3	8	22.2	9	25.0	6	16.7	5	13.9
About ½ of the time	1	2.8	1	2.8	3	8.3	4	11.1	7	19.4	4	11.1
About ¾ of the time	1	2.8	1	2.8	2	5.6	__	__	__	__	__	__
Almost always or always	3	8.3	5	13.9	5	13.9	2	5.6	7	19.4	4	11.1
Skipped	11	30.6	9	25.0	1	2.8	1	2.8	__	__	13	36.1
Missing	3	8.3	2	5.6	2	5.6	1	2.8	__	__	2	5.6
Total	36		36		36		36		36		36	

Appendix M: Food Categories

	Never		1 time in past month		2-3 times in past month		1 time per week		2 times per week		3-4 times per week	
	N	%	N	%	N	%	N	%	N	%	N	%
Starchy Vegetables and Grain												
-Potato salad or baked, boiled or mashed	7	19.4	7	19.4	8	22.2	6	16.7			3	8.3
-Rice, bulgur, cracked wheat or millet	6	16.7	5	13.9	5	13.9	3	8.3	7	19.4	5	13.9
-Con con (fried rice)	12	33.3	9	25	2	5.6	7	19.4	3	8.3	2	5.6
-Green bananas	9	25	4	11.1	8	22.2	8	22.2	5	13.9	2	5.6
-Sweet fried plantains	10	27.8	9	25	6	16.7	5	13.9	3	8.3	1	2.8
-Cassava with onions	13	36.1	10	27.8	5	13.9	3	8.3	5	13.9		
-Crackers	6	16.7	9	25	12	33.3	1	2.8	3	8.3	2	5.6
Protein Sources												
-Dried beans, cooked	8	22.2	5	13.9	10	27.8	3	8.3	6	16.7	3	8.3
-Sweet cream with beans	25	69.4	3	8.3	4	11.1	2	5.6	2	5.6		
-Pork or beef spareribs	8	22.2	14	38.9	9	25	2	5.6	2	5.6		
-Pork, roasted	8	22.2	14	38.9	11	30.6	2	5.6				
-Roast turkey, cutlets or nuggets	11	30.6	11	30.6	9	25	2	5.6	2	5.6		
-Chicken salads, sandwiches, casseroles	10	27.8	13	36.1	9	25	3	8.3	1	2.8		
-Ham or ham steak, baked	10	27.8	14	38.9	9	25	1	2.8				
-Fish, not fried	3	8.3	9	25	14	38.9	3	8.3	3	8.3	3	8.3
-Fish, Fried	9	22.2	10	27.8	14	38.9	4	11.1				
-Tofu, soy burgers or soy substitutes	27	75	6	16.7	3	8.3						
Dairy												
-Cheese	6	16.7	8	22.2	7	19.4		13.9	3	8.3	3	8.3
Fast Foods												
-Beef or Cheese Burgers	7	19.4	19	52.8	7	19.4						
-Hotdogs	12	33.3	7	19.4	11	30.6		8.3	1	2.8	1	2.8
-Fish Sticks	20	55.6	8	22.2	6	16.7			1	2.8		
-Pizza	9	25	13	36.1	5	13.9		11.1	1	2.8	1	2.8
Soups												
-in General	2	5.6	8	22.2	14	38.9		2.8	3	8.3	1	2.8
Snacks												
-Corn bread, muffins or biscuits	11	30.6	10	27.8	6	16.7		16.7			2	5.6
-Potato chips, corn chips or tortilla chips	11	30.6	9	25	7	19.4		8.3			1	2.8
-Popcorn	13	36.1	10	27.8	11	30.6		2.8	1	2.8		
-Pretzels	23	63.9	5	13.9	6	16.7		2.8			1	2.8
-Nuts (peanuts, walnuts, cashews, seeds)	11	30.6	7	19.4	6	16.7		11.1	1	2.8	5	13.9
-Yogurt (not frozen)	7	19.4	5	13.9	13	36.1		8.3	5	13.9	2	5.6
Desserts												
-Yogurt (frozen), sorbet or ices	12	33.3	7	19.4	12	33.3	2	5.6	2	5.6	1	2.8
-Ice-Cream: bars, sherbert	11	30.6	11	30.6	8	22.2	4	11.1	1	2.8	1	2.8
-Cakes, cookies or brownies	10	27.8	10	27.8	8	22.2	1	2.8			4	11.1
-Doughnuts, sweet rolls, danish or pop-tarts	11	30.6	8	22.2	8	22.2	5	13.9			3	8.3
-Sweet muffins or dessert breads	14	38.9	7	19.4	8	22.2	4	11.1	2	5.6		
-Pie (in general)	11	30.6	11	30.6	8	22.2	2	5.6			1	2.8
-Flan (pie)	2	5.6	12	33.3	6	16.7	1	2.8	1	2.8	2	5.6
-Chocolate candy	15	41.7	6	16.7	7	19.4	1	2.8	3	8.3	2	5.6
-Other candy	9	25	7	19.4	12	33.3	1	2.8	2	5.6	2	5.6
Miscellaneous												
-Tostones	10	27.8	7	19.4	12	33.3	3	8.3	4	11.1		
-Kipes	22	61.1	12	33.3	1	2.8	1	2.8				
-Fried Plantains	7	19.4	8	22.2	11	30.6	6	16.7	3	8.3		
-Empanadas	18	50	11	30.6	6	16.7	1	2.8				

Food Categories	Almost never or never		About ¼ of the time		Almost ½ of the time		Almost ¾ of the time		Almost always or always	
	N	%	N	%	N	%	N	%	N	%
Protein Source										
-Beans prepared with fat, refried	13	36.1	7	19.4	3	8.3	1	2.8	2	5.6
Soups										
-Bean soups	20	55.6	9	25			1	2.8	1	2.8
-Cream soups	20	55.6	8	22.2	3	8.3				

-Tomato or Veg. soup	14	38.9	7	19.4	5	13.9	1	2.8	4	11.1
-Sancocho (with potatoes and meat)	10	27.8	12	33.3	5	13.9	1	2.8	4	11.1

Fats added to Breads or Rolls

-Mayonnaise	16	44.4	6	16.7	7	19.4			7	19.4
-Margarine	8	22.2	5	13.9	4	11.1	__	__	4	11.1
-Butter or Cream Cheese	12	33.3	5	13.9	1	2.8	1	2.8	3	8.3

Fast Foods

-Cheeseburgers	9	25	9	25	4	11.1	1	2.8	3	8.3
-Pizza with pepperoni or sausage	10	27.8	8	22.2	3	8.3	3	8.3	1	2.8

Snack

-Yogurt, low-fat or fat-free	6	16.7	10	27.8	6	16.7	2	5.6	6	16.7

Appendix N: Food Shopping Infrequently

	N	%
Yes	16	44.4
No	18	50.0
Missing	2	5.6
Total	36	