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“Un Pueblo Tan Dulce”: Diabetes, Depression, and Obesity Syndemics in Puerto Rico

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“Un Pueblo Tan Dulce”: Diabetes, Depression, and Obesity Syndemics in
Puerto Rico

Shir Lerman

M.A., University of Chicago, 2008

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Submitted in Partial Fulfillment of the

Requirements for the Degree of

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Masters of Public Health Thesis

“Un Pueblo Tan Dulce”: Diabetes, Depression, and Obesity Syndemics in
Puerto Rico

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It is not as it was when I was a boy. We ate healthy food: more vegetables, less fried food. We walked everywhere. The young people now don't care about health, and the older people suffer. It's a very sweet town. (Male, 69)

Chapter One: Introduction and Research Questions

An increasingly strong body of health-related literature demonstrates the interactions of multiple coexisting illnesses (Guarnaccia 1993; Loue 2011; Mendenhall et al. 2012; Vassilev et al. 2011). Researchers are paying increasing attention to Type 2 Diabetes Mellitus (T2DM, thenceforth referred to as diabetes) due to its rising global incidence and prevalence (WHO 2012; Wild et al. 2004), particularly in places that are rapidly experiencing urbanization and economic and nutritional changes, such as China and India (Hu 2011). Risk factors for diabetes include increased weight and inactivity, ethnicity (African Americans, Hispanics, and Native Americans are at elevated risk), age, high blood pressure, and a family history of diabetes (Mayo Clinic 2014b). Diabetes is correlated with other diseases, such as cardiovascular disease (Echouffo-Tcheugui and Kengne 2013; Steinberger and Daniels 2003), obesity (Kaufman 2005; Pi-Sunyer 2002), and polycystic ovarian syndrome (Sharpless 2003). In addition, diabetes is noticeably correlated with depression (McSharry et al. 2013; Mendenhall 2012; Park et al. 2013; Rock 2003). Diabetes and depression influence and worsen one another's side effects. Depression contributes to swifter kidney failure and retinopathy among individuals with diabetes, and to missed medical appointments, medication non-adherence, and inconsistent adherence to a diabetes-friendly diet (Ciechanowski et al. 2006; Egede and Ellis 2010). Individuals with depression are also more likely to abuse alcohol and smoke cigarettes, which can contribute to elevated risk for developing diabetes (Brown et al. 2005). Diabetes may contribute to an inability to heal from depression, particularly if diabetes develops as a consequence of changes in diet that often go hand-in-hand with depression (Golden et al. 2009). Risk factors for depression include alcohol and/or drug abuse, family history

of depression, a history of other mental illnesses, co-existing chronic illnesses, and traumatic events (Mayo Clinic 2014a).

Puerto Ricans are at high risk for diabetes (14%) and depression (11%). Contributing factors include high crime and poverty rates, changing dietary and physical activity patterns, and political instability (Jiménez et al. 2013; Langellier et al. 2012; Parales Quenza 2009; Soltero and Palacios 2011). Previous attempts to address the underpinnings of the pervasiveness of depression among Puerto Ricans with diabetes in Puerto Rico have not thoroughly considered the sociocultural factors that underlie syndemics and structural and symbolic violence as models that promote the etiology and perpetuation of these illnesses as idioms of distress in Puerto Rico.

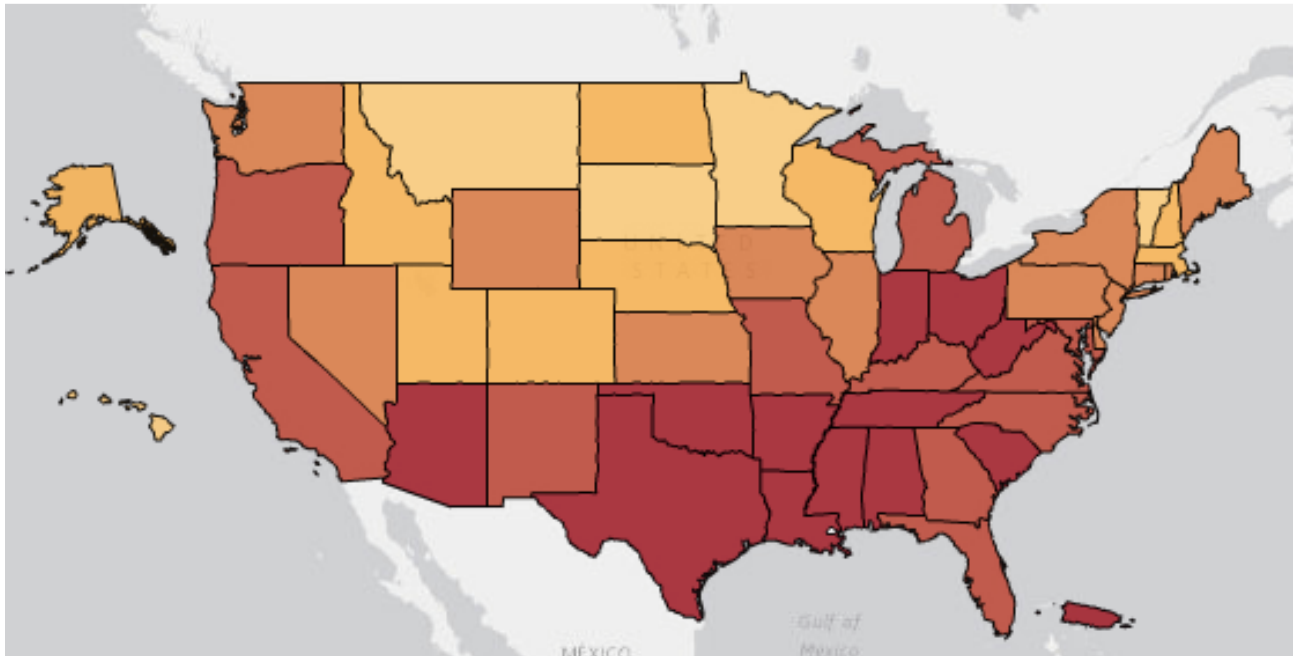
Syndemics theory examines the “...concentration and deleterious interaction of two or more diseases or other health conditions in a population, particularly as a consequence of social inequality and the unjust exercise of power” (Singer 2009:xv). A syndemics approach illuminates the way in which negative health conditions perpetuate and worsen one another’s presence in light of poverty and other social inequalities and is essential to examining the social, political, and economic underpinnings of illness interactions. The relationship between diabetes and depression has developed to the point that it is not sufficient to consider the two illnesses to be comorbid; the two illnesses do not merely coexist, but actively accelerate and worsen one another’s etiology and side effects. Both illnesses are also affected by structural inequalities, which in Puerto Rico translates into high poverty and crime rates in the face of a weak economy, limited access to healthy food, and family problems. Puerto Rico’s status as a U.S. Commonwealth means that the island does not have the full status of a US State and does not receive sufficient funding for federally funded programs, such as Medicaid and SNAP. For example, Puerto Rico ranks forty-eighth out of the fifty states, Puerto Rico, and Washington, DC in terms of annual federal research and development money

received (Elliot et al. 2012).

Social inequality incorporates differential access to healthcare and healthy food, difficulty in obtaining employment or education, and health inequities as a result of poverty and crime. Social inequality, particularly at the political level, contributes to and is evident in various forms of structural violence, defined as the societal, institutional, and structural dimensions of suffering, or what Paul Farmer (2004) calls “...the social machinery of oppression” (Farmer 2004:307; Galtung 1969:171). Furthermore, symbolic violence, or the implicit inequities that impair wellbeing, also contributes to syndemics. It constitutes the way in which sufferers are exposed to and internalize social domination via their social, political, and economic environments, and they, in turn, perpetuate the cycle (von Holdt 2013:115; Mendenhall 2012:16). My analysis of the interactions between diabetes and depression draws on the syndemic framework and uses both structural and symbolic violence to evaluate the manner in which those interactions contribute to the internalization and perpetuation of distress as well as the contributions of social, economic, and political environmental factors to the worsening health of Puerto Ricans.

Diabetes and chronic depression are unevenly distributed in populations (Moffat 2010; Weaver and Hadley 2011). Diabetes was historically considered a “disease of affluence,” as sugar was an expensive commodity and thus limited to the wealthy (Wiedman 2012). However, diabetes currently disproportionately affects the poor within wealthy nations due to the overabundance and over-consumption of inexpensive, nutrient-poor (but high in sugar, fat, and sodium) foods, lack of safe and realistic physical activity opportunities and access to healthy foods, and increased psychological distress due to a lack of reliable access to housing, healthcare, and social support (Guell 2011; Mendenhall et al. 2010; Rock 2003). Changing demographics among those newly diagnosed with diabetes has led to health researchers dubbing it a “disease of poverty” (Mendenhall

et al. 2010; Schoenberg et al. 2005; Rock 2003). The following chart from the CDC shows the prevalence of diabetes among adults ≥ 20 in the United States:



The states with the highest rates of diabetes (Mississippi, Louisiana, West Virginia, Alabama, and Tennessee, as well as Puerto Rico) are also the poorest in the United States (CDC 2012).

Similar to diabetes, chronic depression has become more common among low-income people, including those in countries historically affected by American colonialism (Kaur et al. 2013; Rood 1996). Depression is much more frequent among those who have experienced a form of violence, such as domestic or structural violence (Jackson et al. 2009; Massé 2007; Mendenhall and Jacobs 2012). Forced institutionalizations, over-diagnosing mental illnesses, over-prescribing medications, and failing to incorporate the cultural underpinnings of mental illness etiologies and experiences all

contribute to the misdiagnosis of mental illnesses, particularly among ethnic minorities (Hickling 2012; McGibbon 2012). Mental illness is also caused by, and results in, poverty (Belle and Doucet 2003; Lloyd et al. 2010; Lorant et al. 2003; Saraceno and Barbui 1997).

Eating patterns have been correlated with both type II diabetes and chronic depression (Austin 1999; Hadley and Crooks 2012; Hu 2011). The increased consumption of animal fats, simple carbohydrates, trans fats, and fructose all contribute to insulin resistance (Hu 2011). As of yet, there has not been much research investigating the relationship between eating patterns and both diabetes and depression simultaneously.

As such, I propose to investigate three guiding research hypotheses:

- (1) Major chronic depression, both self-reported and measured by the Beck-II Depression Inventory, is more likely to occur among Puerto Ricans that have T2DM (glucose levels ≥ 126 mg) than among Puerto Ricans without T2DM.
- (2) Non-insulin dependent T2DM is associated with depression, and both illnesses contribute to and mutually reinforce negative lived experiences in a deleterious relationship.
- (3) Eating habits affect the etiology and continuation of the depression and T2DM syndemic among Puerto Ricans.

Chapter Two: Chronic Illness Background

By the end of the twentieth century, chronic illnesses had replaced infectious diseases as primary causes of morbidity and mortality in the United States and worldwide (World Health Organization 2012). Chronic illnesses have also become more prevalent than infectious diseases due to the development of antibiotics and vaccinations, which combat and prevent against infectious diseases, allowing individuals to both live longer and to be vulnerable to chronic illnesses (Aminov 2010; Davies and Davies 2010; Manderson and Smith-Morris 2010; Nugent 2009; Stern and Markel 2005; Whyte 2012). Longer lifespans and the economic implications of paying for medications and regular health checkups impact the experience of adults 65 or older, who are at increased risk for developing multiple chronic illnesses, and as they age, more of the elderly's overall expenses will be dedicated to healthcare (Diefenbach et al. 2009; Rodríguez-Gómez et al. 2006). Seventy percent of deaths in the United States and 63% worldwide are currently due to chronic illness (Centers for Disease Control and Prevention 2012; World Health Organization 2012). The rise in the incidence and prevalence rates of chronic illnesses, at least in the United States, is due to a combination of socioeconomic and lifestyle factors, such as poverty, differential access to healthcare and healthy foods (e.g. fresh fruits and vegetables), increases in the usage of motorized transportation and in sedentary behavior, an increase in the consumption of processed foods, and the cleanliness and overall healthiness and safety of neighborhoods. For example, air pollution, correlated with asthma, allergies, lung cancer, and heart problems, disproportionately affects lower socioeconomic neighborhoods (Chen and Goldberg 2009; Peled 2011; Williams et al. 2009). Based on projections from the National Institute on Aging, by 2030, chronic illnesses will account for over 75% of the disease burden in high-income countries, and over 50% of the disease burden in low- and middle-income countries (National Institute on Aging 2015).

Chronic illnesses are by definition long-term and require on-going monitoring and maintenance. Chronic illnesses change the way that individuals understand and live with illnesses, the ways in which individuals interact with their bodies, and how society interacts with the chronically ill. Diabetes is becoming more prevalent among individuals in their 30s, 40s, and 50s, (Kaufman 2005), leading to individuals living with diabetes for longer periods of their lives. This places an economic burden on both the individual and society, due to disease-adjusted life years¹, greater needs for health care, and social support for an aging population. Chronic illnesses impact how people negotiate the side effects of those illnesses, often affecting the need for more health care and impacting the quality of life. The effect on social support networks can be straining for both the individual and his or her social support network, since chronic illnesses require long-term care (Brown 1998; Druss et al. 2001; Kaufman 1988). Chronic illnesses are simultaneously personal and communal, involving both the sick person, and his or her family members, friends, religious leaders, employers, coworkers, physicians, pharmacists, and other ancillary health professionals.

Many conditions, such as chronic pain, diabetes, heart disease, cancers and mental health problems, are often invisible to the public eye, causing a disconnect between an individual's lived experience and the public's awareness of whether or not the individual is ill or behaving as an ill person is expected to behave (Crowley-Matoka and True 2012; Manderson and Smith-Morris 2010). To have a chronic illness is to house several identities simultaneously: to be both Same and Other, both part of the community and apart from it, and in a permanent state of liminality, neither fully healthy nor acutely ill and quarantined (Jackson 2005; von Peter 2013). The individual partly fulfills the sick role of having 'permission' not to be a fully productive member of society

¹ The number of years that an individual loses to illness, disability, or early death

(Scrimshaw 2006), but since some chronic illnesses allow for partial societal participation, the individual is not seen as being fully “sick” enough to deviate from being productive, but is not well enough to fully participate in society (Manderson and Smith-Morris 2010).

Two chronic illnesses in particular, diabetes mellitus and chronic depression, have attracted attention due to their independent increases in incidence and prevalence (Golden et al. 2009; Weiler and Crist 2009). Although biomedical and anthropological approaches differ, research in both fields has paid attention to the negative effects of each illness and to the relationship between diabetes mellitus and depression, in their treatment of the topic. The epidemiological literature has focused on the chicken-or-the-egg question, asking which illness develops first and thenceforth influences the onset of the other illness (Anderson et al. 2001; Gask et al. 2011; Goldney et al. 2004; Talbot and Nouwen 2000). While it is important to understand the causal relationships, it is also important to address the usefulness of illness narratives and social explanatory models, to explain the development and confluence of diabetes and depression (Broom and Whittaker 2004; Buchbinder 2010; Ferzacca 2000; Mendenhall et al. 2010; Poss and Jezewski 2002; Schoenberg et al. 2005). Both the anthropological and the biomedical literatures have focused on the self-management of each disease, examining compliance with self-management and lifestyle habits that affect the disease course, and cultural and environmental situations that influence the promulgation of both illnesses. Cultural and environmental situations include access to transportation to get to a doctor’s office, economically feasible healthy food options, and safe neighborhoods in which to exercise (Cabassa et al. 2008; Ferzacca 2000; Lin et al. 2004; Weaver and Hadley 2011; Wittink et al. 2008).

Precisely because depression and diabetes are potentially interconnected, a framework is needed that will help researchers appreciate both illnesses as part of a holistic experience.

Syndemics theory, which was founded in the broader paradigm of critical medical anthropology, is an essential tool for understanding the pathways that connect different diseases. In the past three decades, medical anthropologists have increasingly centered their attention on the synergistic interconnections shared among and between certain health conditions within a population, not just within the traditional biomedical co-morbidity model, but also within a broader framework that incorporates the presence of two or more illnesses or biological factors and the ways in which the illnesses influence each other's health effects, combining and producing deleterious interactions and consequences which result in worse outcomes than any one factor would by itself through socio-physiological, biopolitical, biocultural, and psychosocial pathways (Singer 2009). Such pathways include not only the biological relationships between illnesses or factors, such as the host and the pathogen, physical symptoms, and physiological responses to medications, but also the social contexts that influence health outcomes and increase risks for certain illnesses or conditions. These factors include socioeconomic status, gender relationships, ethnicity/race, employment status and history, exposure to violence and trauma, and educational levels. Such synergistic confluences and interactions, and ensuing health outcomes are now recognized in medical anthropology and public health as syndemics. Syndemics expands upon earlier models of illness to address the sociopolitical influences on interconnections and interactions (Singer et al. 2011). An example of a sociopolitical issue would be HIV: the social aspect includes HIV stigma and lack of adherence to medication regimens, and the political aspect includes anti-discrimination laws.

While syndemics originally centered on the substance abuse, violence, and AIDS triad (also known as the SAVA syndemic), it is highly useful as an approach to other synergistic health conditions (Singer 2009). It provides a framework through which to understand how synergistic health conditions do not exist in a vacuum and that in curing and healing individuals, it is not

sufficient merely to treat specific diseases but also to consider the broader social conditions in which diseases and illnesses develop and interact. It is especially valuable to use the syndemic approach in the study and development of interventions for chronic illnesses, since most chronic illnesses have numerous health complications and are strongly correlated with other chronic illnesses as well as acute and infectious illnesses. These diseases are more likely to occur in certain sociopolitical conditions, such as poverty, crime, unemployment, domestic violence, racism, sexism, and political immobility (Belle and Doucet 2003; Hanandita and Tampubolon 2014; LeBron et al. 2014; Weaver and Mendenhall 2014).

It is important to recognize the differences and similarities between disease and illness as etiological categories. Disease refers to a breakdown in the biological pathways of the body with ‘operationally identifiable etiology,’ while illness refers to the cultural construction and psychosocial experience of and meanings surrounding the disease (Kleinman 1980:72). In order to fully appreciate the impact of a health condition on the individual and his or her social network, both the disease and the illness experience need to be taken into consideration. Individuals are bound by cultural models of health and non-health, which in turn dictate the way that they seek (or do not seek) treatment. For the purposes of this research, the term ‘illness’ will be used, as it is the social and cultural implications of the illnesses being examined that are of particular interest. The epidemiology of each illness will be introduced briefly, since it is necessary to understand the disease aspect of chronic illnesses in order to fully understand the lived experience of sufferers. Additionally, since both disease and illness are ‘abnormal’ states of health, exploration of their roots mandates *a priori* understanding of ‘normal’ health and defining how and whether the sufferer can function normally (Keyes 1985; Lutz 1985). Therefore, this research will attempt to describe the

variance of the illnesses of interest from a 'normal' state of health, although due to cultural differences in the perception of 'normal,' various cultural examples of each illness may be needed.

Following similar arguments, the terms 'individual,' 'sufferer,' and 'sick person' will be used interchangeably to describe individuals suffering from chronic illnesses. 'Patient' implies a solely clinical experience of receiving clinical care, while 'sick person,' 'sufferer,' and 'individual' allow for the experience of coping with a chronic illness. Since persons with chronic illnesses often return to work and daily activities in the community and learn to self-manage their illnesses, the terms 'sick person,' 'sufferer,' and 'individual' thus allow for a more active role in one's own life (Kleinman 1988).

Chapter Three: Diabetes

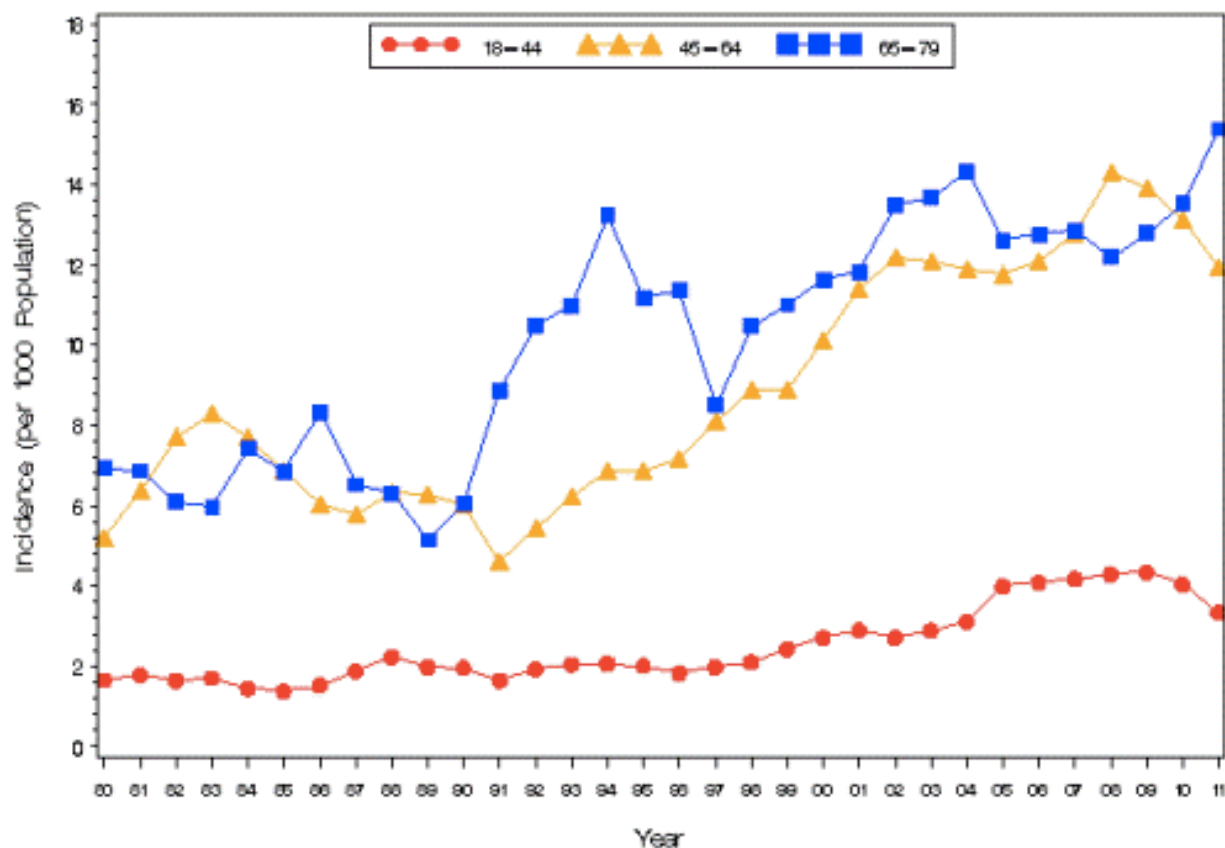
Diabetes mellitus, a chronic illness characterized by high blood sugar (glucose) and the body's inability to produce and/or process insulin (a hormone that helps the body use energy), has reached epidemic proportions (Katon et al. 2010; Mendenhall et al. 2010; Pineda-Olvera et al. 2007). The worldwide number of persons estimated to have any type of diabetes in 2000 was 171 million; by 2014, the number was 387 million people, and it is estimated that by 2030, almost 552 million individuals worldwide will have diabetes (International Diabetes Federation 2014). By 2011, 25.8 million people in the United States alone had developed Type-2 diabetes, constituting 8.3% of the overall United States population (ADA 2011; Hossain 2007). While diabetes mellitus (DM) manifests as one of three types (Type I, Type II, or Gestational), this research will focus specifically on Type II Diabetes mellitus (T2DM), the most common form of diabetes, accounting for nearly 95% of individuals with diabetes, both in the United States and worldwide (ADA 2011; IDF 2013). As such, I will use 'diabetes' to indicate T2M, and will specify all other types accordingly.

During the digestion process, the body breaks down carbohydrates into sugar (glucose) and protein (amino acids) and converts them into glucose, which is then incorporated directly into the bloodstream. β -cells in the pancreas, which produce and synthesize insulin, receive a signal that glucose has spiked, and then the β -cells release insulin, which transports glucose from the blood into the cells to be used as fuel. When the cells do not recognize insulin, glucose builds up in the blood cells and do not receive the fuel they need to function properly; this process damages the β -cells and reduces insulin production, leading to the development of diabetes (ADA 2011; Coronado et al. 2007; Montoya 2011).

Healthcare providers diagnose diabetes after administering an oral glucose tolerance test (OGTT). In this test, a healthcare provider measures an individual's baseline glucose level, the individual then drinks a sweet glucose drink within five minutes after the measurement, and then a second glucose measurement is taken two hours after the individual drinks the glucose beverage (ADA 2011; Rock 2003). Normal glucose levels should be lower than 100 mg/dl, while "at-risk" levels are 101-125 mg/dl, and diabetes is diagnosed at 126 mg/dl and higher (ADA 2011). Symptoms of diabetes include retinopathy (damage to the retina), polyuria (increased urination), polyphagia (increased hunger), polydipsia (increased thirst), blurred vision, unusual weight loss, tingling/numbness in the hands or feet, frequent infections, extreme fatigue and irritability, and slow-healing cuts and bruises (ADA 2013c; Egede 2004; Lin et al. 2004). Diabetes is one of the leading causes of blindness, end-stage renal failure, gangrene, and gangrene-associated non-traumatic limb amputations among adults in the United States (González et al. 2009; Vest et al. 2013). Individuals with diabetes are also at increased risk for stroke, some cancers (bladder, breast, colon and rectal, endometrium, liver, and pancreatic), high blood pressure, and poor dental health. Heart problems are two to four times as likely in individuals with diabetes as in individuals without it (Ferzacca 2000; Giovannucci et al. 2010; Lieberman 2004; Schoenberg et al. 2005).

Type 2 Diabetes is an incredible health burden in the older (65+) population in the United States. Currently, approximately 26% of the elderly population has diabetes, and that prevalence rate is expected to rise in the next three decades (Kaufman 2005; Grossman 2011). However, the prevalence rates of Type 2 Diabetes is also growing in people <65 in the United States (Amed et al. 2010; Dabelea 2009; Grossman 2011); the incidence of people with type 2 diabetes is highest among people in the 45-64 age bracket, at 12.0%, compared to 11.5% among people in the 65+ age set (CDC 2014). As the younger populations age and the birth rates continue to be low, young

people with diabetes will age, which will increase the prevalence rate of diabetes in the elderly population.



Incidence of Type 2 Diabetes by Age Bracket and Year. Centers for Disease Control and Prevention, 2014.

There is research suggesting that overweight individuals overproduce cortisol, which may be a pathway underlying its effect on the development of diabetes (Brindley and Rolland 1989; Ciodini et al. 2007). Living in a prolonged state of stress also contributes to increased risk for developing diabetes via the production of the stress hormone norepinephrine, which inhibits the production of insulin by glycogenolysis (promoting the breakdown of glycogen² in the liver) and gluconeogenesis (production of glucose in the liver), thus contribute to increased levels of glucose (Alonso-

² Glycogen is a form of energy storage produced in the liver; the body converts it into glucose.

Magdalena et al. 2011; Yajima et al. 2001). Other risk factors for diabetes include physical inactivity, gestational diabetes, polycystic ovarian syndrome, ethnicity (specifically African Americans, Hispanics, and Native Americans), older age, abnormal cholesterol and triglyceride levels, high blood pressure, and a family history of diabetes (Mayo Clinic 2014b).

Healthcare providers and health researchers have suggested several contributing factors, such as the thrifty genotype hypothesis (in which humans maintain fat reserves in their body as an adaptation to the feast-or-famine conditions of early hunter-gatherers), lack of transportation or economic access to healthy foods and health care, health illiteracy, linguistic barriers to healthcare, distress from unstable social networks, a rapid lifestyle change (e.g., moving from a rural to an urban setting, immigrating to a new environment), and unsafe neighborhoods (González et al. 2009; Guell 2011; Rock 2003; Smith-Morris 2006; Urdaneta and Krehbiel 1989). Furthermore, cultural models surrounding the etiology and lived experience of diabetes vary by culture, contributing to the complexity of effective diabetes prevention and management.

Diabetes was considered a “disease of affluence” in the early 1980s, as it first became more prevalent in wealthier nations, such as the United States, Canada, and the United Kingdom. Its increasing prevalence was linked to the overabundance and over-consumption of cheap, nutrient-poor foods in those nations (Denaei et al. 2013; Everson et al. 2002; Hu 2011). However, diabetes now disproportionately affects the poor living in wealthy nations, due to a higher consumption of poor-quality foods, lack of physical activity opportunities, and increased psychological distress from lack of access to healthcare and a lack of social support (Eaton et al. 1988; Ferzacca 2012; Mendenhall et al. 2010; Rock 2003). The change in demographics among those with diabetes has led health care researchers and practitioners to consider the disease both a “disease of affluence” and a “disease of poverty” (Candib 2007; Vest et al. 2013). Since the symptoms of diabetes may

not manifest for some time after the onset of the illness or simultaneously, individuals may not know that they have diabetes or are at high risk for it until it is too late to prevent its progression (Lieberman 2005; Urdaneta and Krehbiel 1989). This is particularly common among individuals who are not able to visit a primary care physician on a regular basis (e.g. annual checkups with primary care physicians and/or weekly or monthly follow ups). They may not get screened for diabetes early enough to detect its onset or otherwise may not know to recognize the symptoms of diabetes as they develop.

Carolyn Smith-Morris' (2006) ethnography of diabetes among the Pima Native Americans indicated that the sweltering Arizona heat, unemployment, and unhealthy diet were all factors for the Pima in developing diabetes. She found that the starkly high levels of unemployment and high reliance on government assistance coupled with the ensuing limited resources, reduced physical exercise due to the heat, limited healthy food options on the reservation where the Pima were living, and food as a comfort against daily struggles were all contributing factors to diabetes.

Treatment options for diabetes focus on adopting a healthier lifestyle (particularly a healthy diet and physical activity) and losing weight. If the healthier lifestyle is not sufficient to reduce glucose levels, then a healthcare practitioner will prescribe oral medications, such as Metformin; if the oral medication is insufficient to control glucose levels, then the individual will need to inject insulin (American Diabetes Association 2013c).

Since diabetes is a chronic illness, there is a strong focus in the literature on the lived experience of diabetes, or the way in which an individual's life has changed to accommodate a total shift in the perception of one's health and an ensuing complete shift in health maintenance. A lived experience of diabetes may include taking medications, changes in diet, interactions with health care providers during frequent check-ups (every three months), cultural models surrounding how

and why someone developed diabetes, the long-lasting impact on the individual's social support network and employment, and day-to-day symptomology (Cabassa et al. 2008; Garro 1994; Mendenhall et al. 2012; Mendenhall et al. 2010; Rock 2003).

It should be mentioned that the cost of diabetes treatment can be exorbitantly high, including the price of medications, multiple medical visits, sick days, disability, extra food, and the cost of the side effects associated with treatment, and consequences of diabetes, including heart problems and kidney problems. In 2002, the overall cost of diabetes in the United States was \$132 billion, and as of 2010, individuals with diabetes were spending an average of \$6,000 annually on diabetes management (ADA 2003; Parker-Pope 2010). While \$6,000 is steep, it is especially extortionate for individuals living in poverty, as they cannot always afford the extra money required to live well with diabetes, and they may not always have health insurance plans that can cover the costs. This is ironic, considering that, as mentioned earlier, diabetes is markedly prevalent among individuals living in poverty (Garcia de Alba Garcia et al. 2007; Rosal et al. 2005; Vest et al. 2013; Weaver and Mendenhall 2013).

Chapter Four: Depression

Major chronic depression, a mental illness that often co-occurs with diabetes, defines a collection of symptoms that affect approximately nineteen million Americans and 350 million people worldwide (NIMH 2010; Segal et al. 2002; WHO 2012). Depression has become so common that psychiatrist Dan Blazer and psychologist Anthony Marsella and colleagues have separately suggested that we live in the “Age of Melancholy” (Blazer 2005:3; Marsella et al. 1985:299). It is estimated that by 2020, depression will impose the second-largest burden of ill health worldwide (NIMH 2010; Segal et al. 2002; WHO 2012). Depression currently accounts for 8.3% of U.S. adult years lived with disability (YLDs); \$193.2 billion per year in lost earnings are due to serious mental illnesses of all kinds (Duckworth 2013). The National Institutes of Mental Health (2012) have found that the prevalence of having an episode of major depression in adults in the United States is 6.9%:

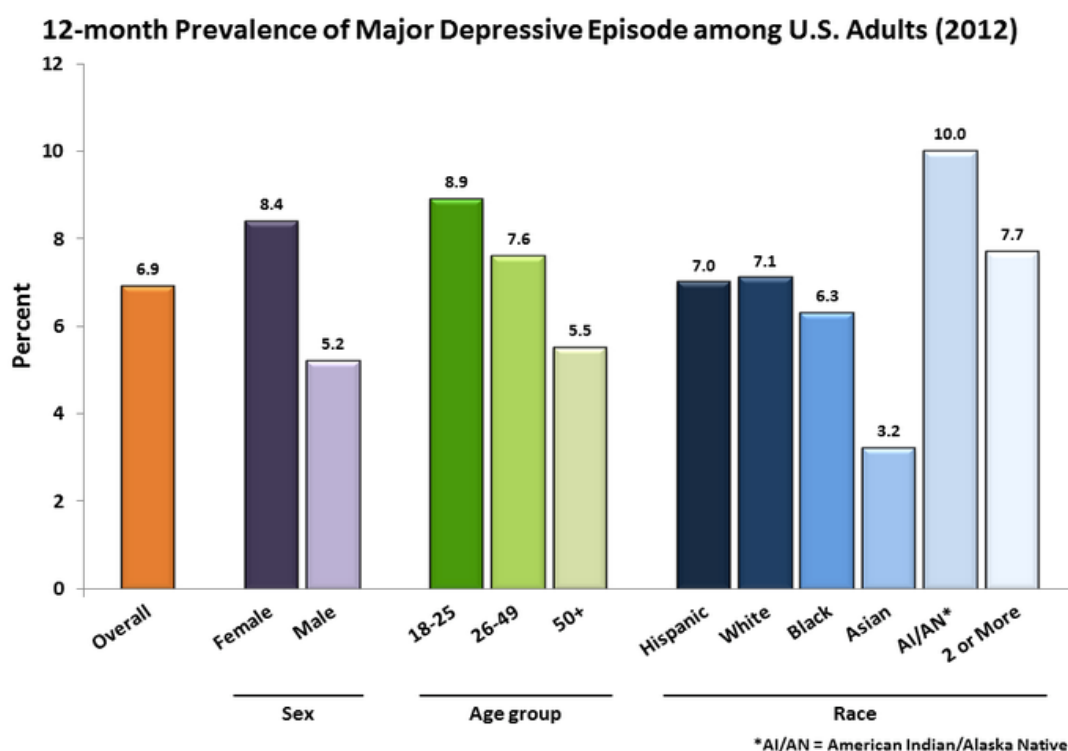
Depression prevalence rates differ by gender and age. Women have higher rates of depression than men in all age brackets: women ages 40-59 have the highest depression prevalence rate at 12.3%, and men ages 60+ have the lowest depression prevalence rates at 3.4% (Mayo Clinic 2015; Pratt and Brody 2014).

In the fifth edition of the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-5; published 2013), the American Psychiatric Association (APA) defines a major depressive episode, as “a period of at least two weeks during which at least five symptoms [out of nine] within a prescribed list are present and represent a change from previous functioning, and at least one of the symptoms is either depressed mood or loss of interest or pleasure.” The symptoms are: depressed mood most of the day; markedly diminished interest or pleasure in all or almost all activities (anhedonia); significant weight loss or gain (a change of more than 5% of body weight in a month)

or decreased or increased appetite; insomnia or hypersomnia; psychomotor agitation; fatigue or loss of energy; feelings of worthlessness or excessive or inappropriate guilt; diminished ability to think or concentrate; and recurrent thoughts of death, recurrent suicidal ideation, or a suicide attempt. All of the symptoms except weight change and suicide ideation need to occur nearly every day. To meet the criteria for diagnosis, the symptoms need to cause distress or impairment in important areas of functioning (e.g. social, occupational) significant enough to cause daily disruptions to daily functioning, and the episode cannot be attributable to the physiological effects of a substance or to another medical condition (American Psychiatric Association 2013). Major depressive disorder (i.e. chronic depression) constitutes more than one episode within the space of two months. There are two forms of major depression: melancholic depression and atypical depression. The diagnosis for melancholic depression requires anhedonia, plus a distinction from grief, severe weight loss, excessive guilt, hyposomnia (reduced amount of sleep), and decreased physical and mental reaction times (Gallagher 1999; Radden 2003). Conversely, atypical depression, while sharing many of the same symptoms as melancholic depression, is not associated with constant anhedonia. Individuals with atypical depression experience improved moods in response to positive events, as well as increased appetite, increased sensitivity to interpersonal sensitivity, and hypersomnia (Chou and Yu 2013; Fournier et al. 2013). Melancholic depression is twice as likely to be diagnosed as atypical depression (Gold and Chrousos 2002; Fournier et al. 2013).

Chronic depression is caused by a combination of socioeconomic, environmental, psychological, cultural, and genetic factors (APA 2000; Diefenbach et al. 2009; NIMH 2011). Depression is semi-heritable; while no single gene has been found that predisposes individuals to this illness, depression is often found among family members (Eghigian 2010; Levinson 2006). While depression often runs in families, it also occurs in individuals without a family history of

depression. The social environment, such as a weak social support network, also plays a strong role in provoking the onset of depression (Hammen 2010; Kleinman 1986). Other risk factors for depression include being a woman, early age onset (in childhood or adolescence), low income, abusing alcohol or illegal drugs, low self-esteem, co-existing health conditions (such as diabetes, heart disease, or cancer), traumatic events (such as abuse), and a history of other mental illnesses (Hirschfeld and Weissman 2002; Mayo Clinic 2014a).



*This graph discusses ‘an episode of major depression’, not chronic major depression, which constitutes more than one episode within two months

Depression may be triggered by stressful life events, such as physical and psychological abuse, loneliness, having another illness, the loss of a loved one, and changes in employment status, environment, and/or finances (Cabassa et al. 2008; Hammen et al. 2010; Jabbi et al. 2008). For example, moving to a new location is often a stressful life event, especially if it requires learning a

new language and navigating a new cultural environment (including social, educational, medical, and dietary).

Furthermore, inequality, particularly manifested in poverty, discrimination, and structural and symbolic violence, is a major contributing factor to the development of depression, especially among ethnic minorities (Belle and Doucet 2003; Fitzgerald 2010; Flores et al. 2008; Galea et al. 2005; Lorant et al. 2003; Williams et al. 2007). Possible pathways to explain this relationship include (but are not limited to) inadequate financial or educational opportunities and a lack of a strong social support network to cope with hardship. Limited financial or educational opportunities are due to a wide range of factors, including xenophobia, sexism, and racism. All of these factors can result in social isolation and stress, since they form the underlying reason for individual and group exclusion (Flores et al. 2008; Hovey 2000; Martínez-Pincay and Guarnaccia 2007). If an individual does not have a social support network his or her stress and social isolation may be exacerbated, contributing to earlier onset depression (Koss-Chioino 1999; Negi 2013; Oquendo et al. 2001). These factors, the –isms and phobias that underlie the political economy and social inequalities of illness, form a foundation of structural violence (Mendenhall 2012:15), which is one of the pillars of syndemics.

Depression can thus be understood as a result of changes in relationships and identities, and a sufferer's identity as a functioning member of society may change, particularly if the sufferer takes extended time off from work (Kleinman and Good 1985; Littlewood 2002). Depression is highly stigmatized: stigma casts societal doubt on the sufferer's mental stability and is a perceived weakness of character and will (Ablon 2002; Estroff et al. 2004; Goffman 1963). Depression stigma is insidious due its negative effects on social interactions, employment opportunities, self-esteem, and feelings of demoralization; the stigma attached to depression often prevents sufferers

from seeking help, and decreases their overall health and quality of life (Couture and Penn 2003; Link et al. 2004; Penn and Wykes 2003; Quinn et al. 2004; Sartorius 2007). Some of the depression stigma also centers on depression being sometimes perceived as “dangerous” to others, because of its association with self-inflicted violence (suicide) and violence against others (Couture and Penn 2003; Link et al. 1999).

Having depression is an isolating experience. Due to the fear of being labeled as mentally ill, individuals may not seek out help or disclose their depression to their friends and family. This causes a dual identity, one that the individual uses in public and one that the individual uses in private. This is especially salient for individuals who perceive their social identity as more important than their personal identity (Dovidio et al. 2001). It can be demoralizing for an individual to emphasize the social over the personal identity and then experience exclusion because of a stigmatized identity, which can promote development of dual identities in order for the individual to protect his or her social identity. Less than one-third (31%) of individuals with depression access treatment (American Psychological Association 2014), due to concerns of stigmatization from healthcare professionals and the general public alike (Shidhaye and Kermode 2013).

Depression has an adverse relationship with eating habits (Brewis 2011; Jacka et al. 2010; Lai et al. 2014). Depression generally causes the sufferer to either lose interest in eating and to lose weight as a result, or to over-consume high-carbohydrate, high-sugar, high-fat foods and to gain weight as a result (Jeffery et al. 2009; Sánchez-Villegas et al. 2012; Westover and Marganell 2002; Wurtman and Wurtman 1995). Sweet, high-carbohydrate, high-fat foods trigger the production of serotonin, a hormone responsible for both increased mood and suppressed appetite, by allowing the production of tryptophan, the building block of serotonin, at the expense of other hormones competing for access to the brain (Gibson 2006; Spring et al. 2008; Wurtman and Wurtman 1995).

Food also holds emotional meaning: people eat comfort foods to feel better, especially if those comfort foods are linked to childhood (Barthes 2013; Canetti et al. 2002; Gibson 2006). While individuals with depression may gain psychopharmacological advantages by consuming food that triggers the production of serotonin, those same foods also contain a lot of fat and cause substantial weight gain if consumed in large quantities, contributing to the development of obesity (Wurtman and Wurtman 1995).

Chapter Five: Depression and Diabetes

Research indicates that individuals with diabetes are at increased risk for depression, and vice versa (Coffman 2008; Gask et al. 2011; Katon et al. 2010; Mendenhall 2012; Menninger 1935). Dr. Thomas Willis observed as early as 1674 that diabetes was associated with “sadness or long sorrow” (Egede and Ellis 2010; Katon 2010; Knol et al. 2006; Leone et al. 2012). Current evidence suggests that the prevalence rate of depression is 2-3 times higher in individuals with diabetes than in the general population (Asamsama et al. 2015; Gask et al. 2011; Nawaz et al. 2015; Zhang et al. 2013), and the risk of diabetes among individuals with depression is 60% higher than among individuals without depression (Asamsama et al. 2015; Chapman et al. 2005; Lloyd et al. 2010; Pan et al. 2011). Individuals with diabetes are twice as likely as individuals without diabetes to develop depression (Chapman et al. 2005; Egede et al. 2005; Gask et al. 2011; McSharry et al. 2013). Mortality rates some medical inpatients with both diabetes and depression has been estimated at 47%, compared with 14% in patients with neither, 23% in patients with diabetes only, and 22% in patients with depression only (Herrera 2013; Park et al. 2013).

However, it has been difficult to establish a clear cause-and-effect relationship between diabetes and depression. While more evidence implicates depression as a precursor and major contributor to diabetes (Coronado et al. 2007, Golden et al. 2009; Mauer et al. 2011, Menninger 1935; Talbot and Nouwen 2000; Weaver and Hadley 2011), diabetes has also been shown to increase the risk for developing depression and to adversely influence depression care (Chan et al. 2010; Katon 2008; Gask et al. 2011; Lustman and Clouse 2007; Shah et al. 2011). Depression, in turn, contributes to decreased diabetes self-care and compliance with healthcare, including decreased glucose monitoring, missed medical appointments, and increased likelihood of diabetes

complications, possibly through inadequate management of the disease (Cabassa et al. 2008; Ciechanowski et al. 2006; Spencer et al. 2006; Weaver and Hadley 2011).

There has also been inconclusive research on the effect of antidepressants on glycemic control in individuals with diabetes. Some studies have found that selective serotonin reuptake inhibitors (SSRIs), the most common class of antidepressants, increase the risk for diabetes (Brown et al. 2005; Khoza et al. 2012; Pouwer et al. 2013; Rubin et al. 2010) particularly by increasing the stress hormone cortisol, which, in turn, contributes to insulin resistance (Khoza et al. 2012; Vrshek-Schallhorn et al. 2013). Poor metabolic control has also been proven to reduce the positive reaction to antidepressants (Katon 2008). Conversely, some research indicates that treating depression with SSRIs has not been shown to increase glycemic levels (Deuschle 2013; Egede and Ellis 2010; Motjabai 2013). This has considerable implications for therapies for individuals with both diabetes and depression. These implications will be discussed later in this thesis.

Some depression symptoms, such as fatigue and appetite decrease, are also diabetes symptoms (Ciechanowski et al. 2000; Held et al. 2010). For example, research suggests that poor or short sleep duration (under seven continuous hours per night) contributes to development of diabetes (Knutson et al. 2006; Olsson et al. 2012; Touma and Pannain 2011). During the slow-wave sleep process, metabolic changes contribute to glycemic homeostasis so that insufficient sleep leads to increased glucose levels and decreased insulin levels (Knutson et al. 2006; Touma and Pannain 2011). Since short and restless sleep is both a symptom and a side effect of chronic depression (Carnethon et al. 2007; Egede 2004; Eghigian 2010; Park et al. 2013), decreased sleep is one mechanism by which depression may foster diabetes (Pouwer et al. 2013). Furthermore, depression causes changes in appetite (APA 2013; Held et al. 2010; Pouwer et al. 2013). Individuals with atypical depression present with increased appetite, especially for high-fat, high-sugar foods and

less nutritionally balanced foods that over time contribute to increased glucose production (Gragoli 2012). A physician might not test for both illnesses if all of the symptoms fit one illness, leading to one of the illnesses being undiagnosed and untreated. Hence, failure to detect coexistence of these illnesses simultaneously might lead to worsening of both (Zhang et al. 2013).

Conversely, diabetes contributes to depression by deteriorating social networks, draining financial resources, evoking a heightened sense of liminality due to having a chronic illness, inducing stress of taking medications, changing diet, and dealing with the side effects of diabetes (Egede 2004; Katon et al. 2010; Solowiejczyk 2010). The severity and ensuing health complications of depression and diabetes, treatment resistance, increased morbidity and mortality, and the cost to both the individual and society are all magnified when the illnesses co-exist (Disdier-Flores 2010; Lloyd et al. 2010). For example, food is a cohesive force: holidays, meetings, family meals, and casual gatherings often include food sharing (de-Graft Aikins 2006; Hopper 1981; Maclean et al. 2009; Mankekar 2005). When an individual cannot partake due to diabetes-related dietary limitations, the ensuing Otherness may provoke reluctance to attend the event in the first place, adding to a sense of social isolation. This is particularly true of women, who tend to be the primary cooks in their families and do not always receive support from their families to prepare healthier meals, especially if they are the only ones eating healthier meals (Garcia de Alba Garcia et al. 2007).

Despite the mounting evidence that suggests a strong positive correlation between diabetes and depression, the exact cultural and genetic pathways are not yet well understood. However, there is an increasing amount of research that suggests specific pathways between the two illnesses. The stress involved in diabetes self-care, such as making changes to one's diet (especially if the dietary changes are not in line with culturally appropriate foods) and changing one's relationship

with one's body to recognize the existence of a chronic illness may both contribute to the co-occurrence of depression and diabetes, particularly if the sick person does not have a social support network adequate to helping with changing one's daily routine. Conversely, depression, whether through the illness itself or through its side effects (particularly sleep loss), has been shown to increase levels of the stress hormone cortisol, which, in turn, decreases insulin sensitivity and stimulates glucose production, both of which contribute to the development of type 2 diabetes (Brown et al. 2004; Gragnoli 2012; Knol et al. 2006).

Much of the literature reviewed for this paper explores socioeconomic factors influencing health problems, such as the lack of access to good quality health care, the influence of ethnicity (Hispanics are disproportionately at risk for diabetes as compared to non-Hispanic whites and Asian Americans), being in a lower socioeconomic bracket, and the lack of culturally sensitive training among physicians in recognizing depression symptoms that do not align with DSM standards (Cabassa et al. 2008; Ferzacca 2000; Martínez-Pincay and Guarnaccia 2007; Mendenhall et al. 2010; Schoenberg et al. 2005). The syndemics approach involves examining the negative, synergistic confluence of diabetes and depression, not just a co-morbid relationship, and underscores the importance of understanding the bidirectional relationship in order to properly address both health problems. While much of the literature on both diabetes (Ferzacca 2012; Himmelgreen et al. 2004) and depression (Belle and Doucet 2003; Harbottle and Schonfelder 2008; Tsai et al. 2012) acknowledges the role of eating habits in each illness's etiology and experience, the literature does not thoroughly examine the depression-diabetes relationship with eating habits as a mediating factor. I intend to contribute to this body of research by both showing that diabetes and depression form a syndemic in the study population and by suggesting that eating habits play a major role in this syndemic.

Chapter Six: Introduction to Puerto Rico³

There has been a marked rise in migration to the United States in the last two decades, reaching a rate comparable to that at the start of the twentieth century (Kónya 2007). As of 2010, there were nearly forty million foreign-born individuals in the United States, the majority of whom (53%) were from Latin America (Griego et al. 2012).⁴ Most noticeably, the Hispanic/Latino immigrant population increased in the past century, surpassing African Americans to become the largest ethnic minority in the United States (Ennis et al. 2011). In 2010, 50.5 million people, or roughly 16% of the US population of 308.7 million people, were of Hispanic/Latino descent, representing an increase from 35.3 million people (13% of the total United States population) in 2000 (Ennis et al. 2011; Takeuchi et al. 2007). The 2010 United States Census defines “Hispanic/Latino” as someone who identifies as being of Cuban, Mexican, Puerto Rican, Central or South American, or Spanish culture or origin, regardless of race (Ennis et al. 2011).⁵

Puerto Ricans inhabit a unique social position and identity among Americans, other Caribbean Islanders, and Central and South American nations. The United States maintains a strong socio-political and economic hold over Puerto Rico that underlines both Puerto Rico’s political, cultural, and economic identity and the relationship that Puerto Rico has with the other Caribbean islands. Due to the relative ease of travel of between Puerto Rico and the US mainland (the same as traveling within the 50 US states), and to the economic factors influencing travel (e.g., searching for

³ Due to the complex situation concerning the extent to which Puerto Rico is part of the United States, and to avoid confusion, I will refer to Puerto Rico as ‘the island’, and to the United States as ‘the mainland’

⁴ According to the US Census Bureau, Puerto Rico is included in the “native-born” category

⁵ ‘Hispanic’ refers to individuals with a Spanish-speaking national origin (includes Spain but excludes Aruba, Brazil, Guadeloupe, Guiana, Haiti, Martinique, the Netherlands Antilles, Saint Pierre and Miquelon, and Suriname). ‘Latino’ refers to those with an origin from Latin America regardless of language use (includes all of Latin America but excludes Spain) (Calderón 1992; Duany 2011b; Marrow 2003). This distinction is important in understanding the geographic and linguistic diversity that exists among Hispanics/Latinos, and acknowledges that they are not a monolithic ethnicity. I will be using solely ‘Hispanic’, due to my focus on the Spanish-speaking Caribbean and Puerto Rico’s origins as a Spanish colony.

better jobs), there is a large number of individuals from all socioeconomic statuses traveling between Puerto Rico and the mainland United States (Aranda 2007; Duany 2002a; Organista 2007; Ramos 2005). However, despite the importance of understanding Puerto Ricans as simultaneous citizens of and immigrants to the United States and the mounting research examining Puerto Rican health in the mainland United States, there remains a paucity of literature addressing Puerto Rican health on the island (Lorant et al. 2003; Pérez-Perdomo et al. 2003; Rodríguez and Vega 2009; Rodríguez-Galan and Falcón 2009). Puerto Ricans on the island have higher rates of morbidity and mortality than Hispanic groups (including Puerto Ricans) on the mainland (Disdier-Flores 2010; Langellier et al. 2012; Thomas 2010; Rodríguez and Vega 2009). Understanding the health status of Puerto Ricans on the island is necessary to understand the background of Puerto Ricans who travel back and forth between the island and the mainland. Furthermore, understanding Puerto Rico's fluid identity as reflecting the relationships between the United States, Puerto Rico, and the larger Caribbean milieu is imperative to understanding why health on the island has changed and what the implications are for further research.

Puerto Rico was a Spanish colony after Christopher Columbus claimed Puerto Rico on behalf of Spain in 1493, in the process ignoring the preexisting claims that the native Taíno inhabitants had on the island (which they called *Borinquen*). On July 25, 1898, the United States invaded Puerto Rico due to growing public anger over Spain's mistreatment of the Cubans during the Cuban War of Independence and to the sinking of the USS Maine off the coast of Cuba (Duany 2002b; Picó 2007). Spain ceded Puerto Rico to the United States on August 13, 1898 after US forces overwhelmed Spain's forces (Aranda 2007; Guerra 1998; Organista 2007; Picó 2007).

Puerto Rico's proximity to the mainland United States and Puerto Rico's current status as a US commonwealth have been strong factors influencing Puerto Rico's relationships with the United

States and in developing a unique Puerto Rican identity as simultaneously *Borinquen*, Caribbean, and American. In 1917, President Woodrow Wilson signed the Jones-Shafroth Act, which “collectively made Puerto Ricans [restricted] United States citizens”: the act created a Senate of Puerto Rico and Puerto Ricans could use US passports and be conscripted for US military service, but they could not vote in presidential elections and the island lacked congressional representation (Duany 2011). In 1950, President Harry S. Truman authorized Puerto Rico to draft its own constitution, although the constitution still needed to adhere to the United States Constitution and relevant federal legislation. On July 3rd, 1952, the US government approved and ratified Puerto Rico’s Constitution, and Puerto Rico changed its official status to US Commonwealth (*Estado Libre Asociado de Puerto Rico* in Spanish) instead of a territory (Dávila 1997; Duany 2002b). In 1952, President Truman also approved federal law 8 U.S.C. §1402, which declared all Puerto Ricans born after January 13, 1941 to be U.S. citizens at birth.

By 2010, 4.6 million Puerto Ricans lived on the mainland, more than the population of the island (four million) (Ennis et al. 2011; Rodriguez 1994). Several factors influenced Puerto Rican migration to the mainland, including an increased economic and political reliance on the mainland, mainland demand for labor at minimum wage, unemployment rates on the island, the Puerto Rican government’s encouragement of migration to the mainland, and Puerto Ricans’ status as US citizens, all enabling easier migration (Rodriguez 1994). These factors may have contributed to the “push and pull” migration theory that appears to be a driving force in Puerto Rican migration. Several factors, such as a population overflow and high rates of poverty and unemployment in the home culture, may ‘push’ people to migrate, and factors such as higher wages and better public services (e.g. schools, electricity, etc.) may ‘pull’ migrants into the new land (Sanjur 1995).

After the 2007-2008 recession, the spike in unemployment and subsequent increased poverty in the population and decrease in socioeconomic opportunities on the mainland shifted the “push and pull” migratory pattern to go in both directions, from Puerto Rico to the mainland and then back to the island (Collado-Schwarz 2012; Duany 2011; Elliot et al. 2012). Puerto Ricans on the mainland live in higher rates of poverty and have lower overall socioeconomic status than do other Hispanic subgroups, contributing to discontentment with desired socioeconomic opportunities (Bureau of Labor Statistics 2014; Greene 2013). However, in 2010 when poverty levels in Puerto Rico reached 45% compared to the US federal poverty rate of 15% (Ennis et al. 2011), there was further incentive for Puerto Ricans to migrate to the mainland in search of work.

Chapter Seven: Puerto Rican Health Issues

As part of the circulatory migration pattern between the mainland and the island, Puerto Ricans bring Americanized/mainland foods (especially highly processed snack foods) back to the island, contributing at least in part to changing dietary patterns and obesity rates on the island (Duany 2002a; Sanjur 1995; Thomas 2010). Mainland-based fast food restaurants have established a permanent foothold on the island in recent decades as well, influencing the types of foods that are economically and geographically available to Puerto Ricans. With corn and soy products heavily subsidized by the federal government and processed foods economically and energetically cheaper than homegrown and home-cooked foods (Gottlieb and Joshi 2010; Nestle 2007), Puerto Ricans on the island are rapidly transitioning into a population that consumes more and more processed foods heavy in non-traditionally prepared soy and corn in lieu of local, fresh, home-cooked foods. This is particularly salient for Puerto Ricans living on the mainland, who are concerned with fully assimilating into the mainstream culture while also maintaining their island identity. In particular, ‘nostalgic gastronomy’ is a means of remaining connected to the home culture in the face of gastronomic changes, while eating mainstream foods is a way to easily, visibly assimilate (Aranda 2007; Mankekar 2005).

With the drastic difference in weather patterns between Puerto Rico and many of the colder places in which Puerto Ricans have settled (especially the tri-state area New York, New Jersey, and Connecticut), there is much less walking and overall physical activity and increased rates of obesity and diabetes in the population of Puerto Ricans on the mainland as compared to back home, which has put a strain on the healthcare systems of both the mainland and the island (Sanjur 1995). Decreased levels of physical activity are correlated with increased insulin resistance and higher risk for diabetes (Hossain et al. 2007; Luchsinger 2001; Urdaneta and Krehbiel 1989), which are

unfortunately also higher among islanders. With Puerto Rico transitioning to a high-fat, high-calorie processed diet while still retaining characteristics of the high-fat, high-calorie characteristics of indigenous diets as a way of holding on to a unique culture, Puerto Ricans are caught between two worlds and partaking of the ‘worst’ of both (Pilcher 2005). Puerto Ricans do not engage in sufficient physical activity to make up for the calories consumed, and yet are not getting the full benefits of consuming a diet high in fiber and nutrients. Additionally, they consume processed foods that are now part and parcel of the globalized food market (potato chips, soda, candy, and fast food), as well as the energy-dense home-cooked foods that dominate traditional Puerto Rican cuisine, such as *plátanos*⁶, *arroz con habichuelas*⁷, and *alcapurrias*⁸. Traditional Puerto Rican cuisine is known in Puerto Rico as *la comida criolla* (literally “Creole food”).

⁶ Plantains, which Puerto Ricans prepare in a variety of ways

⁷ Rice and beans

⁸ Fritters, generally filled with chicken or beef

Chapter Eight: Diabetes and Depression in Puerto Rico

Epidemiological research indicates that Puerto Ricans on the island have higher rates of diabetes and depression than the United States' national averages (Colon et al. 2013; Disdier-Flores 2010; Ortiz et al. 2011). The diabetes prevalence rate for Puerto Ricans living in the United States is 13.8%, higher than for Mexicans (13.3%), Cubans (7.6%), and the overall US prevalence rate of 9.3% (ADA 2014; Henkin et al. 2011). The diabetes prevalence rate in Puerto Rico was 15.5% by 2014, and diabetes accounts for 7.7% of all deaths on the island (Acosta-Pérez et al. 2012; CDC 2012b; International Diabetes Foundation 2014). Fifteen percent of Puerto Ricans on the island have major chronic depression, compared to 6.9% of the overall US population (CDC 2014; Delgado et al. 2006; Diefenbach et al. 2009; Disdier-Flores 2010; Henkin et al. 2011). However, few Puerto Ricans seek out treatment for this disorder, due to a combination of factors, including: stigma, linguistic barriers to care, concerns regarding racism in the medical system, social isolation, and poverty (Alegría et al. 2007; Guarnaccia et al. 2011; Martínez-Pincay and Guarnaccia 2007; Ramos 2005). For example, Puerto Rico's population in 2004 was 3,808,610, and yet only 134,835 people received mental health services (3.5% of the total population) in the same year, even though the estimated lifetime prevalence rate of mental disorders in Puerto Rico was 28% (Jiménez et al. 2013). Puerto Ricans describe depression symptoms as manifesting not only as internal issues (e.g. feelings of sadness or loneliness, guilt) but also physical aches and pains (Cabassa et al. 2008; Fitzgerald 2010; Lewis-Fernández et al. 2010; Ramos 2005) in contrast to the DSM's description of depression as a primarily mental illness.

Despite the mounting information on Puerto Ricans living on the mainland, there is less information on diabetes and depression syndemics among Puerto Ricans living in Puerto Rico. The information that *is* available reflects the same health problems as for Puerto Ricans on the mainland.

The International Diabetes Foundation estimates that in 2014, the prevalence rate of diabetes in adults on the island of Puerto Rico was 15.5%, which was higher than the US Mainland prevalence of 11.4% in adults (IDF 2015). Residents of Puerto Rico are almost two times as likely as non-Hispanic whites in the United States to develop the illness, and diabetes accounts for 7.7% of all deaths in Puerto Rico (Acosta-Pérez et al. 2012; Ortiz et al. 2011).⁹ Puerto Rico also has a high incidence of psychiatric disorders at an estimated 28% of the population as of 2000, and mood disorders are currently the fourth most prevalent psychiatric disorder in Puerto Rico (Disdier-Flores 2010; Koss-Chioino 1999; Rodríguez-Gómez et al. 2006). As noted above, major depression afflicts 15% of the adult population in Puerto Rico.¹⁰ Despite the high need for mental health services in Puerto Rico, mental health care on the island is fragmented and unorganized, and does not fully meet the high need for mental health care services (Colon et al. 2013; Vera et al. 2010). One study of medically indigent Puerto Ricans found that the prevalence of diabetes among study participants with major depression was 14.6%, compared to a diabetes prevalence rate of 9.7% among participants without major depression (Disdier-Flores 2010).

Given that diabetes and depression etiologies are due as much to cultural as to biological factors, there needs to be a greater understanding of the cultural contexts in Puerto Rico in which the illnesses develop. Specifically, a framework is needed to conceptualize both the broader structural factors that support the development of these illnesses and the personal narratives surrounding illness etiology and perpetuation. Because diabetes and depression are both correlated with social inequities, the framework used will need to particularly incorporate political and economic factors.

⁹ Commonwealth of Puerto Rico, Department of Health: “Puerto Rico Chronic Disease Action Plan 2014-2020”

<http://www.salud.gov.pr/Publicaciones/Documents/Chronic%20Disease%20Action%20Plan%20English.pdf>

¹⁰ Centers for Disease Control and Prevention, 2005, <<http://www.cdc.gov/Features/dsDepression/>>.

Chapter Nine: Theoretical Frameworks

The syndemics framework is an essential tool for understanding the social, economic, and political implications of developing and living simultaneously with diabetes and depression (Mendenhall 2012). This concept, developed by medical anthropologist Merrill Singer, examines “the deleterious interaction and health outcomes of two or more health conditions that coexist in a population, particularly (but not only) as a consequence of social inequality and unjust implementation of power” (Singer 2009:xv). Syndemics is based in critical medical anthropology (CMA) as a lens through which to approach a larger spectrum of issues surrounding chronic illnesses (Baer et al. 1986; Singer and Clair 2003). Critical medical anthropology places micro-level individual health concerns within the broader political-economical contexts where they occur and recognizes that the experience of suffering is individual, cultural, and structural (Pfeiffer and Nichter 2008; Singer and Clair 2003). Syndemics goes beyond looking at comorbidity: it examines the ways in which diseases actively interact with one another to worsen each other’s presence more than they would by simply coexisting. It also investigates the social pathways that contribute to and worsen the side effects of health conditions (Mendenhall 2012; Weaver and Mendenhall 2013). Social inequality incorporates, but is not limited to, differential access to healthcare and healthy food, difficulty in obtaining employment or education, illness as a result of crime and poverty, and the accessibility of health care and hospitals in neighborhoods.

Social inequality also includes structural violence (Farmer et al. 2006; Page-Reeves et al. 2013). Social inequality and structural violence influence and perpetuate the synergistic cycle of illnesses (Mendenhall 2012; Singer 2009). Both structural (institutionally sanctioned) and symbolic violence (internalization of implicit inequalities) are also essential factors in the development and perpetuation of syndemics. Violence includes a category of inequalities that “are so destructive to physical and mental health, to social interactions, and to overall wellbeing, that they magnify pain

and suffering to the level of state-sanctioned brutality” (Singer 2009:33, 140). Social inequality and unjust power implementation are inherent contributors to structural violence, which is defined as societal, institutional, and structural dimensions of suffering, or what Paul Farmer defines as “...social arrangements that systematically bring subordinated and disadvantaged groups into harm’s way and put them at risk for various forms of suffering” (Benson 2008:590; Farmer 2004:307-308).

Poverty is a prime example of structural violence, particularly in that it leads to “...disproportionate social suffering for the marginalized” (Sarang et al. 2010:815). Examples of policies resulting from structural violence that widen the poverty gap include unaffordable privatized healthcare that excludes people in lower socioeconomic statuses, policies that prohibit institutions from hiring non-citizens, and the differential delegation of goods and services based on neighborhood (e.g., the quality of schools). Poverty is also intricately interwoven with the concept of identity and draws a stark line between those with sufficient resources and those with insufficient resources, which creates marked social categorization particularly along ethnic lines (Mosse 2010). Structural violence as an actualization of syndemics is a driving force of illness in Puerto Rico. Puerto Rico has a staggeringly high poverty rate and high rates of diabetes and depression, and all three contribute to and reinforce one another’s existence on the island. With Puerto Rico attempting to construct a coherent identity in the face of a complex relationship with the United States that is defined in part by the unequal distribution of financial resources, structural violence is central to the continuing identity struggle and the effect of that struggle on illness perpetuation.

Furthermore, symbolic violence, or the implicit inequities that impair wellbeing, also contributes to syndemics (Mendenhall 2012). It constitutes the way in which sufferers are exposed to and internalize social domination via their social, political, and economic environments, and they,

in turn, perpetuate the cycle (Bourdieu 1989; Mendenhall 2012:16). Examples of symbolic violence include homophobia, sexism, classism, and racism. One pathway in which symbolic violence is actualized is through domestic violence (Hagan et al. 2008): men may abuse women out of pent-up frustration because the men are unable to provide for their families due to unemployment and feel that their identities as men and breadwinners are thus compromised. The men's need to assert their masculinity through domestic violence helps them affirm their own identities at the expense of women's health. The unemployment rate in Puerto Rico was 13.85% in September 2013, which is slightly lower than the overall average of 15.40% unemployment between 1976 and 2013. By comparison, the average unemployment rate in the United States was 5.80% (1948-2013), with a 7.20% unemployment rate in September 2013 (Trading Economics 2013). This is notable, given that men's unemployment rates tend to be higher than women's during recessions, such as the recession that hit both the United States and Puerto Rico during the 2008 financial crisis (Albanesi and Şahin 2013). The high unemployment rate, coupled with unsafe neighborhoods, an inability to consistently afford healthy food, and disparity between unemployment rates in the United States and Puerto Rico has contributed to domestic violence and indirectly to structural violence. In 2011, thirty women were killed in Intimate Partner Violence, a rate six times higher than Los Angeles, which has a comparable population to Puerto Rico (American Civil Liberties Union 2012). As of 2011, approximately 200,000 domestic violence incidents are reported every year in Puerto Rico, along with 3,000 cases of sexual violence, although only 15% of rapes are reported (Mollmann 2011).

Medical anthropologist-psychiatrist Arthur Kleinman's ideas about the usefulness of illness narratives, or the ways in which individuals make sense of their illnesses and their experiences in living with them, provide excellent opportunities to understand individual lives from an emic

perspective. Illness narratives provide an opportunity for individuals "...to give coherence to suffering," and include symptoms, contexts, culturally salient illnesses, personal and interpersonal histories, and relationships (Kleinman 1988:49). Illness narratives (Hunt and Arar 2001; Liburd et al. 2004) consist of:

- Life histories (synopses of individuals' lives, including major life goals and obstacles, personality, illness history, and family history of the illnesses),
- Patient explanatory models (informal descriptions of the occurrence of a particular of knowledge about the body and self),
- Personal and interpersonal significance (external factors that influence how the individuals live with an illness),
- A culturally marked disorder (the classification of an illness as not part of normal life).

Kleinman's Explanatory Models of Illness (EM), a part of an illness narrative that examines the cognitive models of illness centered on the meanings that they attach to their illness (Ferzacca 2000; Kleinman 1980; Weiss et al. 1992), is also a useful method. An explanatory model includes an individual's perceived etiology of and appropriate treatment for an illness, the appropriateness of healthcare providers, all of the emotions attached to experiencing an illness, and attempting to derive meaning from a profound shift in control of one's body (Kleinman 1988). While much has been written on the sufferer's explanatory models, physicians also carry explanatory models of both illnesses and sufferers. Patients and physicians bring these models to their interactions, and any incongruence between the models often negatively influences patient compliance (Hunt and Arar 2001). With diabetes and depression prevalent in Puerto Rico and depression stigma a pervasive force that prevents individuals from seeking healthcare in Puerto Rico (Cabassa et al. 2008; Cohen 2004; Pérez-Perdomo 2003), defining explanatory models will help identify incongruences that

prevent individuals from seeking healthcare, negative provider attitudes toward their patients, and the perpetuation of the illnesses in question.

Chapter Ten: Methodology

Introduction

This study is a qualitatively oriented, descriptive research study. I conducted my study in San Juan, Puerto Rico, during May-August 2012. The study consisted of a survey on depression, demographic information, and open-ended questions about diabetes, depression, and eating habits. I designed my study to answer my research questions, which are:

- Is major chronic depression, both self-reported and as measured by the Beck-II Depression Inventory, more likely to occur among Puerto Ricans that have T2DM (glucose levels ≥ 126 mg) than among Puerto Ricans without T2DM?
- If non-insulin dependent T2DM is associated with depression, do both illnesses contribute to and mutually reinforce negative lived experiences in a deleterious relationship, which I call the ‘the NOD Syndemic’?
- Do eating habits affect the etiology and continuation of the depression and T2DM syndemic among Puerto Ricans?

While I conducted my research at a diabetes clinic, I interviewed 60 people with and without diabetes and asked all study participants about depression in order to compare the depression rates between people with and without diabetes. I administered the Beck-II Depression Inventory (BDI)¹¹, which has been validated in interviewing Puerto Ricans about depression (Kerr and Kerr 2001; Rodríguez-Gómez et al. 2006; Van Voorhis et al. 2007), to assess depression in the study population. After administering the BDI, I asked the participants four sets of questions. The first set focused on the participants’ experiences in living with diabetes, the second on the possible presence of depression (allowing the participant to self-diagnose with depression), the third set

¹¹ See Appendix B for a copy of the BDI.

(contingent on the answers to the second set) asked participants for their experiences in living with both depression and diabetes, and the last set focused on dietary intake.

The University of Connecticut's Institutional Review Board approved this study on March 26, 2012, and the University of Connecticut Health Center approved this study on June 5, 2012.

Study Population

I collected data at the Centro de Diabetes Para Puerto Rico, a diabetes clinic at the University of Puerto Rico's Medical Sciences Campus in San Juan, Puerto Rico. I chose this clinic for several reasons. First, the clinic permits researchers to conduct research on premises (Disdier-Flores 2010; Pérez-Perdomo 2003; Soltero and Palacios 2011). Second, the clinic manages the health care of approximately 80 patients per month, allowing for a large number of potential participants. Additionally, the clinic is centrally located on the campus, making it an accessible location for patients and myself to access. The clinic employs nurses, primary care physicians, dentists, ophthalmologists, and nutritionists. Patients have regular check-ups and diabetes/metabolic management: glucose levels checks, eye drops (to prevent the eye dryness typically associated with diabetes), and nutrition classes on adjusting diets. I presented my project to a research committee meeting at the clinic on June 6, 2012 to discuss my research with the clinic staff and to gain final approval to conduct my study at the clinic. The clinic approved the study during this meeting.

Recruitment

I collected participant observation data from May 26 – August 9, 2012 and conducted interviews between June 11-August 3, 2012. The clinic is open Monday through Friday, 7:30 AM to 4:30 PM. I arrived at the clinic at around 9:30 AM each day and stayed until around 4:00 PM.

Tuesdays and Thursdays were the busiest days in the clinic. On average, I conducted three or four interviews per day.

In all, I screened 66 people and recruited 60 participants between June 11 and August 3, for a 91% response rate. I recruited participants in person by approaching them in the lobby of the diabetes clinic, by randomly approaching persons sitting alone or with 1-2 people in the waiting room, and by referrals from other participants. I conducted all 60 interviews in Spanish after obtaining written informed consent.

Since this research focuses primarily on adults, all participants were at least 18 years of age. I excluded people who were only at the clinic to pay bills or pick up medications, since I found that such individuals were generally not willing to stay at the clinic to participate in the study when they were only intending to be at the clinic very briefly. I also excluded non-Puerto Ricans. As this study focused in part on Puerto Rican identity, I wanted to control for citizenship and limit the responses to Puerto Ricans. Since diabetes and depression affect individuals of both genders and all ages, no individuals were excluded on those accounts. The interview search ended when the interviewer and participant finished the questions or when the participant chose to withdraw from the study, whichever came first. None of the participants chose to withdraw from the study once the interviews had commenced.

Since the interview questions were semi-structured, the time frames of the interview depended on the participant's and the clinic's schedules and lasted approximately 60 to 90 minutes. I recruited participants in the clinic lobby and consented and interviewed the participants on the spot, so participants did not need to miss appointments. The interviews were conducted in a semi-private room next to the lobby where there was enough privacy for the participants to feel comfortable sharing private information but close enough to the lobby that they could hear their

names being called. On several occasions, I paused the interview because the participant was called to an appointment and returned to finish the session after his/her appointment.

There was no cost to the participants for participating in the research other than the 60 to 90 minutes they spent with the researcher. I paid each participant \$5 upon completing the interviews, an amount sufficient to recompense the participants for the personal nature of the questions but small enough to not be coercive. I also told the participants of the remuneration during the consent process rather than during recruitment. Since the interviews were held in the clinics, transportation money was not provided. Individuals were offered the same remuneration regardless of the length of the interview.

The consent forms were the only documents that identified individual names, and the assigned ID numbers were on the consent forms. Each participant received a consecutively assigned alphanumeric code to protect his or her identity. All consent forms and hard copies of interviews have been kept in separate locked files in my office at the University of Connecticut at Storrs. All electronic versions of the interviews are kept on a password-protected computer. A copy of the consent form can be found in Appendix A.

Variables

After obtaining informed consent, I asked the participant several sets of questions. (A copy of the interview instrument is in Appendix B.) The first set of interview questions used the Beck-II Depression Inventory (BDI)¹², which has been validated in interviewing Puerto Ricans about depression (Kerr and Kerr 2001; Rodríguez-Gómez et al. 2006; Van Voorhis et al. 2007). The BDI consists of 21 questions that ask the participant whether he or she has experienced the following feelings or changes in the past two weeks: sadness, pessimism, failure, lack of pleasure, feelings of

¹² See Appendix B for a copy of the BDI.

guilt, feeling punished for something, self-criticism, suicide ideation, crying, changes in appetite and sleep patterns, agitation, indecision, lack of interest, lack of energy, fatigue, irritability, and difficulty concentrating. Each question had answers organized in a Likert Scale to describe increasing intensity of the question: 0 indicated “not at all” and 3 indicated “always”. Scores ranged from 0-63; 13-19 indicates mild depression, 20-28 indicates moderate depression, and 29-63 indicates severe depression. I allowed each participant to take the BDI independently, although I read the BDI out loud to two participants who had impaired vision due to eye drops. I scored the BDI at the very end of the interview, rather than immediately after the participant completed the BDI, in order to not disrupt the flow of the interview.

After administering the BDI, I asked the participants four sets of questions. The first set focused on the participants’ experiences in living with diabetes, the second on the possible presence of depression (allowing the participant to self-diagnose with depression), the third set (contingent on the answers to the second set) asked participants for their experiences in living with both depression and diabetes, and the last set focused on dietary intake. In order to determine whether beliefs about diabetes and depression changed with disease status, I asked participants about diabetes and depression regardless of their disease status, and skipped the questions about personal experiences with the illnesses for participants without diabetes and/or depression. I found that taking the BDI at the beginning did not appear to impact participant responses to the self-reported depression question set, as many of the participants either reported having depression on both the BDI and the self-reported depression question set, or did not report having depression in either interview. Furthermore, many informants without depression informed me why they responded as they did to certain questions that would otherwise raise their scores on the BDI (which would provide a false positive). For example, the BDI has a question on changes in sexual activity, and

some of the older participants informed me that their sex drives had decreased because they were older and did not have the energy for sex, rather than not wanting to have sex due to mood changes.

Analysis

My quantitative data were diabetes status, age, gender, BDI-II scores, and self-reported depression. I analyzed the quantitative results using the computer program software Statistical Package for the Social Sciences® (SPSS®), version 17.0.1. Data are shown as means \pm standard deviation and range. Consistent with standard practice (Beck, Steer, and Brown 1996), BDI scores were recoded into 0 (scores of 0-12) for no evidence of depression and 1 (scores of 13-63) for evidence of depression in order to run statistical tests between participants who scored above and below the threshold for depression. I also recoded the BDI data of informants who scored above the threshold for depression into the different categories of depression: 1 for mild depression, 2 for moderate depression, and 3 for severe depression. Participants were also grouped into three categories for not having diabetes (0), having diabetes (1), and being tested for diabetes (.50). Statistical tests such as independent t-test, two-tailed t-test, Pearson's chi-squared test (chi-squared goodness-of-fit), and ANOVA were used to answer research questions, using a 95% Confidence Interval, power of 0.80, and α of 0.05.

The qualitative data were coded manually using Grounded Theory. Grounded Theory is the social science approach of identifying a theory after the collection and analysis of data (Bernard 2006; Cresswell 2009). The researcher conducts research with a guiding set of questions, and upon analyzing the data, identifies codes in the data. Codes are then grouped into categories. While using Grounded Theory can produce new theories, I used Grounded Theory to determine whether my data are a syndemic, a preexisting theory. I read the first interview and recorded themes in a

Microsoft Word document. While reading subsequent interviews, I either included themes within preexisting theme categories from the first interview, or created new theme categories. I recorded the interview number under each theme. This process yielded 58 codes, many of which were inter-related. Since there were only 60 interviews and I had done all the interviews myself, I was very familiar with the data and was also able to categorize themes into broader categories based not just on the text but also on my knowledge of the participants' body language and intonation during the interviews. I took notes on participants' body language and intonation during the interviews. I then grouped codes into the categories that I present in this thesis.

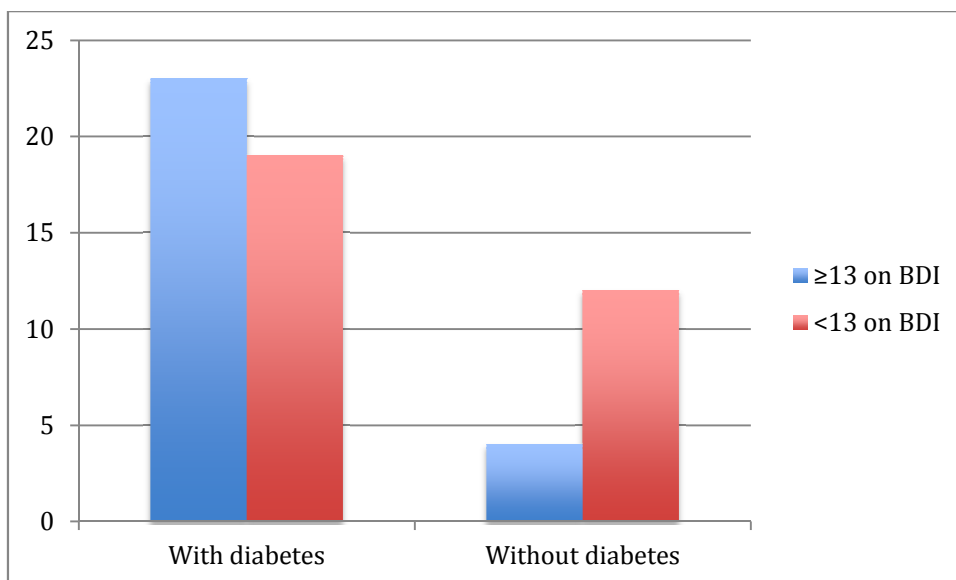
The University of Connecticut's Institutional Review Board (at Storrs) approved the proposed research on March 13, 2012. On June 6, 2012, the University of Connecticut Health Center's IRB confirmed the University of Connecticut at Storrs to be the primary IRB site. I obtained permission from the IRB at the Storrs campus due to my status as a dual-degree student in Anthropology (Storrs) and Community Medicine (Farmington). My advisor and I communicated on a monthly basis while I was in the field regarding clarity and acceptability of questions to the respondents and progress in data collection.

Chapter Eleven: Findings

Quantitative Data

The age range of participants was 24 to 76 years, the mean being 52.15 (SD 6.73). There were 44 females (73% of the participants) and 16 males (27%). All informants were born in Puerto Rico. Forty-two participants (70%) self-reported diabetes, 16 (27%) did not have diabetes, and two (3%) were at the clinic to be tested for diabetes. The informants without diabetes were accompanying family members to the clinic for appointments, and waited at the clinic until the appointment was finished. Data for participants without diabetes was included in order to compare the depression results of the participants with diabetes (n=42) and the participants without diabetes (n=16). The average age among participants with diabetes was 63 years (SD 9.57), and the average age among participants without diabetes was 39 years (SD 9.50). Of the participants with diabetes, all 42 had Type II Diabetes. BDI scores ranged from 2-40; the mean was 13.25 (SD 4.71). The average age of participants with BDI scores above 13 was 55.02 (SD 3.21), and the average age of participants with BDI scores below 13 was 41 (SD 4.03).

Forty-five percent (n=27) of the general participant cohort scored at least 13.0 on the Beck-II, indicating at least mild symptoms of depression. Sixty-four percent (n=38) of participants reported having experienced depression, regardless of their BDI scores. Among participants with diabetes, 23 (55%) scored at least a 13.0 on the BDI, compared to four participants without diabetes (25%) with at least a 13.0 on the BDI.



BDI Scores by Diabetes Status

For all the quantitative analyses, I used the standard statistical significance threshold of $\alpha=0.05$ to determine if there was a statistical difference between diabetes and depression, indicating a relationship between the two factors being analyzed. Seventy percent of the study population had diabetes, which was understandably higher than in the general Puerto Rican population (12.6%), given that recruitment for this study took place in a diabetes clinic. The average age of the cohort with diabetes is 63 years, and the average age of those with depression in the cohort is 55 years.

There is a statistically significant difference between the means of the two groups of participants with diabetes, thus rejecting the null hypothesis. The quantitative data show that diabetes and depression have a significant relationship and are related to one another. Depression, whether self-defined or Beck-II defined, is disproportionately more prevalent among participants with diabetes than among participants without diabetes. The quantitative difference between the BDI-II and self-reported depression prevalence rates in the cohort indicates that the study participants consider the depression symptoms to be meaningful, even if the participants do not

present with enough symptoms to meet criteria for depression on the BDI-II scale. This finding signifies a need for future research on the use of the Beck-II among participants with diabetes, to determine if symptoms of depression are perhaps more painful among people with diabetes than among people without diabetes. The quantitative data support the first hypothesis, that depression is more prevalent among Puerto Ricans with diabetes than among Puerto Ricans without diabetes.

Qualitative Data

Living with Diabetes

I began the qualitative portion of each interview by asking the informant about diabetes: family history of diabetes, diabetes etiology and management, side effects of diabetes, medication accessibility, and diabetes prevalence in Puerto Rico.

Disease Etiology

Two factors were most often mentioned in participants' understandings of diabetes etiologies: genetics (n=31; 52%) and *alimentación* (n=42; 70%), or diet/the consumption of nutrients for the body's health. Regardless of their own diabetes status, almost everyone (all but four participants) mentioned having family members¹³ with type 2 diabetes, leaving those with diabetes themselves to be unsurprised when they, in turn, developed diabetes¹⁴. One participant explained,

I was not surprised to learn that I have diabetes, because I have a lot of family members with it. (Female, 53)

Other participants echoed this statement, saying:

¹³ Parents, siblings, aunts, uncles, grandparents, and cousins

¹⁴ I asked all participants about diabetes etiology, regardless of their own diabetes status

I was not surprised, because everyone in my family has diabetes: my grandmother died from it, and my mother had it for more than forty years, and my dad had it, too. (Male, 53)

Everyone in the world on both sides of my family has it: siblings, aunts, uncles, cousins, parents – everyone has type 2. (Female, 49)

In addition to genetics, diabetes was frequently attributed to dietary factors:

Sugary food affects the sugar levels in the blood, and that's the problem with diabetes. (Male, 61b¹⁵)

When someone eats a lot, that food will influence the development of diabetes. (Female, 47)

I was not surprised [to develop diabetes] – it was as if it was supposed to happen because I didn't lose weight, an "I told you so." Weight caused my diabetes. (Female, 52)

The two etiologies were not seen as conflicting; rather, in many cases, participants considered both genetics and *alimentación* to be coexisting factors in the development of diabetes:

No, it's not an either/or situation. Genetics makes you at risk for diabetes, and *la alimentación* puts you over the edge for developing diabetes. (Male, 49)

It's an eventuality with diabetes – if someone in your family has it, you'll probably develop it, too. You can try to prevent it, but if your diet's bad, then it's a sure thing. (Male, 68)

I blame both [genetics and *la alimentación*]. I wasn't surprised when I developed diabetes, because everyone in my family has it, but I also ate horribly, and that made my diabetes from a possibility into a certainty. (Female 73)

While genetics underscored a sense of fatalism about eventually developing diabetes, *la alimentación* was the catalyst for how soon someone would develop diabetes. There was a sense of resigned acceptance of the diagnosis of diabetes among the participants I talked with since family

¹⁵ I quote two 61-year-old male participants, and distinguish between the two men as 61a and 61b, based on the order of interviews.

members before them had had diabetes as well and the participants expected that they, too, would eventually develop the illness. There was a general awareness of diabetes due to experience interacting with family members with diabetes. There is also a rising public awareness about diabetes from exposure to public announcements, such as on television and in grocery stores and trains (photograph, Appendix B). Public announcements often linked food intake with diabetes, insisting that people watch their food intake so as not to develop diabetes and that individuals with diabetes would need to change their diet in order to be healthy. Oftentimes, participants mentioned both etiologies as being causes of diabetes. However, it was less common for participants to have knowledge about the biological aspects of diabetes before they were diagnosed with the illness:

I knew vaguely about how people develop diabetes, because you see ads on TV or hear things from your family about diet and exercise, but I didn't know the biology of it. I wish I had known about it sooner, it might have helped make sense of what was happening to my body.
(Female, 47)

Another participant corroborated this:

No one teaches us about the physical part of diabetes. I mean, why would they? It used to not be important, because it wasn't that common. Now everyone has it, and it would be useful to know about the physical part so we know more about how lifestyle impacts health. (Female, 71)

Individuals did not commonly discuss the specifics of the illness with their family members, so while individuals were familiar with the general etiology and side effects of the disease and with the stress of taking care of someone with diabetes, they did not know about insulin's role in diabetes or precisely why diet was so influential in diabetes development. Older participants often commented that in their parents' generation, sharing personal information with children was uncommon and that the younger generations did not pay much attention to their own health and were not interested in learning about diabetes. Oftentimes, participants' first in-depth exposure to the biology of diabetes

was from their doctors. This is also significant because individuals often learned the specifics about diabetes after they were diagnosed with it, which has obvious problems for prevention efforts. It is difficult to prevent a disease if people do not understand how or why it develops or the enormous impact it can have on one's life. In addition, taking the proper steps to prevent the disease obviously has less importance after the fact, although in some cases a change in weight and diet can reverse the process.

Diabetes Management

Control of their disease was the most important aspect of diabetes care for the participants. Although developing diabetes was seen as an inevitable outcome of a combination of factors, once diagnosed the locus of control was placed firmly upon the individual to visit the healthcare provider on a regular basis, take his/her medications, change his/her diet, and exercise.

If you don't control [diabetes], you can die of it. My mother has a friend who died from it because she didn't want to change her life; she lost her sight, they amputated her foot. But if you take medications and eat healthier foods, you can live with it. It's a decision. [Female, 24b¹⁶]

Diabetes is a serious illness if you don't control it. I see a lot of people dying of uncontrolled diabetes; they didn't want to take care of themselves. (Female, 76)

Controlling diabetes can be difficult, there are people that can't buy their medicine, and it can be a shock to need to change one's lifestyle, especially if one doesn't have help. (Female, 44)

Side Effects and Loss of Control

Many participants described struggling with the side effects of diabetes. Tiredness was the most commonly mentioned side effect (n=12), followed by frequent urination, nausea, body pain, foot pain (mentioned separately from body pains), and changes in appetite. As a result, many did not feel healthy:

¹⁶ I quote two 24-year-old female participants; I distinguish between the two women as 24a and 24b, based on the order of interviews.

I have a lot of problems I didn't use to have: I don't sleep well, my knees hurt, my body hurts.
(Female, 24a)

I have a lot of health problems as a result of the diabetes: I had pneumonia, I have spine problems, arthritis, I walk with a walker, my blood pressure is a bit high. (Female, 73)

Participants were keenly aware of losing control of their bodies, and as a result, participants noted that their moods often changed for the worse after they were diagnosed.

I dislike not knowing if I'll wake up one day and my eyes will be too dry or my feet will hurt. I worry about my feet getting gangrene. I worry that I'll die soon and leave my children without a mother. My body is falling apart; it's awful. I'm constantly sad and upset. (Female, 44)

I never know what's going to happen with my body. Maybe it'll feel good one day, but maybe it won't. I do what I can to control the diabetes: I take my meds, I try to control my diet, and I try to go for a walk on occasion. It helps prevent the diabetes from getting worse. I still feel frustrated sometimes, though, because I'm tired of needing to constantly monitor my blood sugar and be careful about what I eat. I miss being able to have a beer with friends on occasion and have some *comida criolla*. It bothers me. (Male, 55)

They focused on controlling the illness as a means of maintaining some control over their bodies and improving their moods. However, decreased moods often lingered, leading to the development of depression.

Depression

After diabetes, I asked each participant, regardless of depression status, about depression etiology and management, side effects of depression, medication accessibility, and depression prevalence in Puerto Rico. Participants understood depression to be a contributing factor to feeling unhealthy. They framed depression as both an individual struggle and as an interpersonal conflict.

It was expressed as a choice to not take care of oneself mentally and physically. Factors influencing the development of depression included unemployment, the economy, the stress of caring for family members, divorce, negative relationships with children and partners, stress, and abuse.

Well, stress caused my depression. My mother has Alzheimer's, and it's very difficult for me to take care of her. My daughter has a baby but the baby's father left and doesn't want to help her take care of him, so I need to help her take care of the baby as well. It's very difficult to live in Puerto Rico; there are no jobs, and the economy's bad. Also, my health insurance doesn't pay the full bill to see a psychologist, and psychologists cost a lot of money. [Female, 51]

I was a victim of psychological abuse from my husband – he mistreated me for many years, and finally I had to divorce him because I couldn't continue living with him, he hurt me very much. I still have symptoms: sometimes I'm afraid to leave the house, and I feel bad having fun – it's taking me time to heal. (Female, 52)

I'm always tired and it's difficult to rest, I feel as if my life were a series of catastrophes: I lost my parents and a brother, I sometimes have problems with my children, there's a lot of crime here, I don't have a job at the moment. Sometimes I can't motivate myself to go to the doctor. (Female, 57)

Well, things happen in life, I left my boyfriend because we fought a lot, and that caused a lot of stress. I'm also at university, there were a lot of difficult classes, I have to balance classes and having a life, you see? I have to take care of my mother, because she's old now and she has diabetes, I need to help her do certain things. (Female, 24b)

Depression was an overwhelming experience, due to a series of catastrophes. Many of these catastrophes, such as crime, unemployment, and abuse, were beyond the participants' control, and depression arose when participants tried and failed to control these uncontrollable factors. As these factors were broad in scope and not easily fixed, depression maintained a long-term and worsening presence in participants' lives.

Furthermore, many of these catastrophes involved fundamental changes in relationships that caused loneliness and isolation. Because many of these factors were breakdowns in social relationships, many participants experienced depression alone. They were arguing with their

children and partners, trying to take care of their parents without extra resources, and did not have additional social support networks from employment. Abuse was a particular problem. Due to the structural nature of many of these problems, there was no specific person or organization that people could blame, and in many cases, the government was unable to fix the problems due to insufficient financial resources. Thus, pent-up anger and frustration were directed at people whom individuals knew personally, most commonly partners and children. Being abused made it more difficult to heal, due to the lingering side effects of fear and mistrust.

There were fewer social support networks for individuals with depression in which to build a sympathetic community, since doing so would publicly acknowledge that the individual has depression, and would thus indicate that the individual was either not fully in control of his or her reactions or that his or her character was weak. Because of this, the feelings of loneliness that were already part of depression were exacerbated, intensifying the depression experience and making it more difficult for participants to recover.

No one talks about depression, you know? It's not like diabetes, where you hear about it on the news. No one wants to admit to having depression. You don't talk to other sufferers to see how they're dealing with it. I wouldn't even know where to look for other people with depression. It makes depression worse, being so isolated. If you have support groups for alcoholism, why not for depression as well? (Female, 47)

I still have depression, and I think that being lonely makes it worse. We Puerto Ricans like to talk, but no one talks about depression because it's seen as not being very strong. There are just people floating around, pretending to be alright, but no one supports one another for this kind of thing. (Male, 60).

One of the contributing factors to the perpetuation of depression in Puerto Rico is the lack of open discussion about the illness. There are not many public announcements about depression beyond the occasional television advertisement for antidepressants. Furthermore, participants

thought of depression as a personal process, oftentimes not telling anyone beyond a spouse if they had the illness:

No, I haven't told anyone about having depression. Why should I? I don't need to make a big deal about it, because it's nobody else's business. I take a pill and that's it. Only my wife knows. (Male, 54)

I think maybe my mother had [depression], but we didn't talk about it. I was a kid, you know? Parents don't tell their kids about it, kids don't need to know that kind of stuff about their parents. I don't even know if she told my dad. I'm not sure what caused it for her. We don't hear about depression on the news, no one talks about it. (Female, 48)

The lack of open communication about depression, both in public and between family members, highlighted how depression was seen. Depression etiology and side effects were perceived as more psychosomatic than those for diabetes: changes in appetite were the most commonly cited depression side effect (n=11), followed by tiredness (n=9), not wanting to get out of bed (n=8), and changes in mood (particularly increased irritability, sensitivity, and crying) (n=8). Because depression primarily affects mood, there was no perception of inevitability about developing depression, as there was with diabetes. One is responsible not only for managing one's depression, but also for one's initial vulnerability to it:

One's uncontrolled physical state can affect depression: if one does not control his or her body and does not pay attention to what one is doing. (Female, 58)

Depression is an illness, and my wife had it and had to take pills, and depression can affect one's entire life, with sadness, not eating much. One needs to take care of oneself, not let it turn into an illness – we all have sadness, we can't let it control our lives – it's an imbalance. (Male, 62)

I think that depression is controllable; people can control it by going to a doctor. I get depressed sometimes, but I can control it. (Male, 61a)

It depends on the person [as to whether they'll develop depression]. There are people with stronger characters, or weaker characters – it depends on the person's character, and how they can control their illnesses. (Female, 41)

I think that there are people that lack control over their eating habits, and food is their way of escaping their problems, especially if they have depression. Specifically in Puerto Rico, we eat *la comida criolla*, with meat and rice and beans, we eat a lot of it. We don't have portion control. (Female, 44)

Depression was seen as a result of life's stressors, particularly interpersonal stressors that could not be easily fixed. However, while the stressors were significant, and oftentimes long lasting, many participants emphasized not changing the stressors themselves, but rather how they themselves responded to the stressors. Depression was thus seen as a lapse in someone's control over his or her reactions, and it was each person's responsibility to get the help they needed. Informants reported these results regardless of depression or diabetes status.

In sum, participants understood depression as a separate entity that affects mood and as something that could be fixed with enough effort. They also thought of it as a temporary response to structural problems that could not be easily fixed.

Links between diabetes and depression

Participants identified a link between diabetes and depression. Although there was no firm consensus on which illness developed first, all participants saw both diabetes and depression as major and negatively synergistic problems. A sense of control over and responsibility for one's body was the common theme of diabetes and depression, and the one that unified the two illnesses into a salient relationship for the study cohort:

My pregnancy was stressful, and I developed diabetes from that pregnancy. I developed depression from that, because not only I was dealing with a baby, but I also had this illness I didn't want. (Female, 47a¹⁷)

¹⁷ I quote two 47-year-old female participants; I distinguish between the two women as 47a and 47b, based on the order of interviews.

People sometimes have problems changing their lives, and they feel that it's their fault that they have diabetes because of the way they ate. They get depressed. (Male, 61a)

It's [depression is] due to worrying about life; a person needs to think about things, particularly illness. Someone can lose eyesight and limbs [from diabetes], and the illness develops very slowly, so it can be difficult. If someone used to be active and drank alcohol, and then needs to change all of that, it can be difficult, especially due to losing eyesight. That can be very difficult, especially if the person worked or was active. (Male, 55)

Developing diabetes is a big change, as is learning to live with diabetes. It's easier to die because of it, of not taking care of oneself, of not taking medications because they cost too much, of not wanting to eat better. Yes, it costs more to buy medications, and yes, healthy food costs more. A lot of people here don't make much, and if you live by yourself, you won't have the motivation. These things can influence someone with diabetes to have depression as well. And people with depression can eat more and not want to care of themselves, and not walk. (Female, 47)

Depression has made my diabetes worse. Sometimes I don't want to eat healthy food, I don't want to go to the doctor's office, I don't want to take care of myself, I need to force myself to take my medications. (Female, 50)

The aforementioned interview comments on the diabetes-depression relationship consider depression to be the result of diabetes, particularly due to the stress of maintaining the ensuing lifestyle changes and to loss of full physical functioning resulting from the side effects. Notably, the unwillingness to take one's diabetes medications may lead to decreased medication adherence, therein exacerbating diabetes symptomology and contributing to earlier diabetes complications and a more rapid overall health decline.

People with depression snack a lot, they don't want to pay attention to what they're eating, and food intake goes with diabetes. (Female, 49)

It's frustrating to experience the consequences of high sugar levels, and culture contributes – people don't know what diabetes is: you develop an addiction to food, and there is a connection between food and pleasure, people want to eat to feel better. (Male, 61b)

When someone has depression, s/he person will eat more than s/he used to, which affects weight and obesity, and that affects diabetes. (Female, 54)

Depression was also seen as the cause of diabetes, due to the lack of control over one's diet: food was seen as a source of comfort, a way to temporarily keep one's problems at bay. Depression also indicated an inability to care for one's health and surroundings: individuals were less likely to go to their doctors' appointments on a regular basis and adhere to medication regimens due to a lack of interest in their bodies and in their general surroundings.

Tiredness and changes in appetite were frequently mentioned side effects of both diabetes and depression, making it easier for one or both of the illnesses to be missed during a doctor's appointment if the side effects are misinterpreted and incorrectly attributed to another illness. This is especially pertinent for diabetes, which is a silent illness and develops slowly, and for depression, since its diagnosis is based on a list of symptoms, all of which could be attributed to other illnesses if the healthcare provider does not otherwise suspect it. Furthermore, since diabetes develops gradually, participants did not normally feel unwell enough to go to the doctor's until diabetes had already developed, contributing to a sense of frustration at the inability to prevent the illness.

Participants independently connected both depression and diabetes with unhealthy lifestyles, economic instability, high crime rates, and political inaction. Political and social instability were major stressors that contributed to a sense of helplessness and lack of control. People became depressed as a result of the high unemployment and crime rates, ate large quantities of cheap, high-fat food to cope with their problems, and developed diabetes as a result:

No one has jobs, it's dangerous to be on the streets at night, and it's hard to keep up the façade of normalcy. We eat a lot of that crap food because it's cheap and available and it tastes good, and it makes us feel better temporarily, but we need to

keep eating it to feel good. Ultimately, we don't feel better permanently, but because we're eating crap, we develop diabetes. (Male, 62)

I lost my job a few years ago and became depressed. I could only afford to eat cheap food, and I wasn't in the mood to cook anything healthy. I was afraid to leave the house because there's this gang that hangs out near my building, so I wasn't getting any exercise, either. I would hurry out of the house very rarely to get food, or have my son buy my food. I developed diabetes because of the fear of leaving the house. (Female, 64)

The respondents reported/felt that developing diabetes either caused depression or perpetuated the preexisting depression, due to the difficulty of maintaining a healthy lifestyle necessary to living well with diabetes. However, food was also becoming inaccessible, contributing to growing social discontent:

A lot of people here [in Puerto Rico] are heavy – it has to do with habits and food, and to do with working a lot and being in a hurry, and the eating Fast Food: we work a lot, we don't have time to cook, we can't rest and enjoy life and do exercise. Everyone used to walk, but now we have cars – it's the time we live in. Healthy food is very expensive – we can't always buy food like that. (Male, 62)

A lot of people don't care what they eat. There's a lot of bad food here. Granted, a lot of *comida criolla* is tasty and healthy, but a lot of people don't know how to prepare it. Also, a lot of young people eat in Fast Food restaurants almost every day, because it's quick and you can find them on every corner, and the food's cheap. (Male, 48)

Healthy food is expensive – I can't buy it all the time, and it's hard because I need to take care of my daughter and I want her to eat healthy food. (Female, 55)

Upon my prompting, participants defined healthy foods as fruits, vegetables, salads, chicken, and fish; they considered water to be the healthiest beverage. They also considered home-prepared food to be healthy. However, participants admitted to eating what they considered to be unhealthier food, such as fried food, due to a lack of time, energy, and finances to constantly prepare healthy food, and to an occasional predilection for fast food.

Participants also perceived unhealthy food consumption to be correlated with depression:

A depressed person doesn't care what he or she is doing, what he or she is eating, the person just eats and gains weight. They don't want to leave the house, they don't do anything but cry, they don't move their bodies. Fat people suffer from having fewer friends, from body pain, from being able to do less with their bodies, so they become depressed. (Male, 42).

Fat people have depression, they don't want to leave the house, they don't exercise, they don't like their bodies, they complain. Also, depressed people eat more at home, where they can eat whatever they want. (Female, 52)

Depressed people eat to feel better, to get pleasure, they don't want to think that their lifestyles could cause illnesses. (Male, 61a)

People get depressed and eat a lot, they don't have control over what they eat, they don't want help. They don't want to eat healthy food, they just want to eat junk. (Female, 54)

Food was both the mediating factor between diabetes and depression, and a major contributor to the development of each illness independently. Individuals were thought to be more likely to eat without paying attention to what they were eating:

There's not a lot of education here about how to eat well, and people don't exercise. We have such good food here, but we don't eat it. (Male, 53)

Food here in Puerto Rico is very rich, and people don't do enough exercise. (Female, 41)

Participants frequently discussed food access and food preparation, especially a lack of time to prepare healthier food at home and a plethora of Fast Food restaurants and corner markets with junk food. Not everyone lived close to a supermarket with healthy food options, and even for those that did live close¹⁸ to such supermarkets, healthy food was economically inaccessible. A bad economy

¹⁸ The participants defined "close" as either a ten-minute walk or a twenty-minute drive or bus ride. The time difference between walking and driving/riding the bus is due to the need to carry heavier food items, such as milk and potatoes.

resulted in difficulty purchasing healthy food, and contributed to food deserts. Participants often described how much of the foods that they considered to be healthy were not fully economically accessible to them.

Look, to eat healthy food, we need to be able to buy healthy food. Supermarkets have healthy food, but they're located mostly in the touristy areas, which are expensive. You can buy the fruits off the side of the street [from vendors], but there aren't always quantities to prepare food for your family. The bus system in San Juan is crap, and nonexistent in the rest of Puerto Rico. No one likes carrying heavy food home every day. We need cars, and not everyone can afford one. The healthy food is expensive, too. Canola oil is maybe \$3, and olive oil is maybe \$10. If you have a large family to feed on a small income, which are you going to buy? Sometimes it's cheaper to take your family to McDonald's, where you can buy a meal for \$2. Canola oil, even for \$3, isn't a full meal; it's just oil. I'm a big supporter of *la comida criolla*, but sometimes it's impractical. We're poor and unhealthy. (Male, 55)

I have five children. I would rather buy a big bag of rice that feeds us for four or five days, then buy a bag of apples that would last a day, if the kids even ate the apples. The apples might spoil because the kids wouldn't want apples. I'd pay more money for less food and wasting some food. I work two jobs, and don't always have time to go to the supermarket. The closest supermarket is a twenty-minute drive in rush-hour traffic, and I need to then go home and cook all of it before my night job. It's exhausting. My husband works two jobs and comes home too exhausted to go grocery shopping. We barely make enough to do all of this, much less buy all the healthy food the doctors tell us we need to eat. (Female, 41)

Influence of Puerto Rican identity

In regards to Puerto Rican identity, structural factors were the most frequently cited causes of ill health: a bad economy, abuse, and high rates of unemployment, poverty, and crime in Puerto Rico.

Diabetes is a big problem here: there are a lot of people here who eat a lot, *la comida criolla* has a lot of high-fat food and fried food, and people like it a lot. (Female, 52)

With the economy and crime as they are, there are a lot of problems here, and people can't understand why. They don't want to talk about it: they don't go to the doctor

to talk, and politicians don't want to do anything. Everyone's depressed as a result. (Female, 75)

We all have the same problem here, with the economy and problems with the family, and there's a lot of crime. I don't feel very safe living here, but it's my home, I want it to get better. It hurts me that the country I love, has so many problems. There are a lot of problems here, but nobody does anything to help. The government doesn't do anything, the people don't do anything. (Male, 64)

Depression is a big problem in Puerto Rico. There's a lot of suicide, a lot of problems, child abuse, men abusing their wives, a lot of fighting. (Male, 69)

There are a lot of people here that suffer from depression. The economy's bad, there's no work, everyone wants to leave Puerto Rico for the United States to look for work, but they don't have family in the US. Spouses, parents and children, friends. It's a beautiful island with a lot of problems, an ugly paradise. (Female, 47b)

Many of the issues that participants discussed are reflective of problems that Puerto Rico as a whole has been experiencing since the 2008 economic crisis. In 2006, Puerto Rico's median household income was \$20,095 (Pew Research Center 2014); and then between 2010-2012, Puerto Rico's median household income was \$19,518, which is statistically unchanged from the 2007-2009 recession (United States Census Bureau 2014). In comparison, Puerto Ricans in New York between 2010-2012 had a median household income of \$36,613, while the overall median household income in the United States between 2009-2013 was \$53,046 (United States Census Bureau 2014). The 2008 economic crisis contributed to the 45% poverty level in Puerto Rico in 2010, and has led to high crime and suicide rates, multiple health issues, and a bankrupt government (Collado-Schwarz 2012). Many participants lost their jobs and were unable to afford healthy food, and the unemployment rates and tough economic climate contributed to participants experiencing a loss of control over their lives, which, in turn, led to increased domestic problems as families attempted to make do with fewer resources. The fighting and domestic abuse that participants reported, were a

manifestation of the anger and fear that many felt after the crash, which the government was unable to prevent. The fighting and domestic violence were attempts to regain control over life, particularly over known factors: family members. Since no changes have been immediately forthcoming, and with no changes in the near future, participants reported losing hope that their situations would improve, contributing to the higher depression rates and to high suicide rates. The economic crash and ensuing fewer resources also contributed to the high crime rates, particularly among the younger generations that could not find jobs and did not have any money saved.

Westernized Lifestyle

In addition to being disproportionately affected by the economic crash, the younger generations was also experiencing other marked lifestyle changes. The types of lifestyles that the participants have been describing have been a noticeable shift from how the older participants reported living when they were younger. Participants considered generational differences in lifestyle to be a common theme underlying the development of both diabetes and depression. Consuming healthy food and getting physical activity were both constant parts of life for the older participants, and many of them, regardless of diabetes status, reported that the lifestyle changes that they have observed have been contributors to both illnesses.

My grandmother died of diabetes. She was 87 years old. When she was younger, diabetes wasn't a problem, the way of life was better, with clean air, fewer cars, less stress. (Female, 47a)

There are a lot of fat young people – they eat bad food and don't walk – they drive a lot. When I was younger, I walked everywhere: school, church, the supermarket. (Male, 48)

There are a lot of young people that eat in Fast Food restaurants, and because of that there are a lot of people with diabetes – young people don't want to take care of their health. (Male, 61b)

If the person is relatively young and has bad lifestyle habits, such as unhealthy *la alimentación* and being lazy about using insulin, that person can suffer from depression as an adult. It's harder to adapt to that lifestyle [incorporating diabetes] as an adult. When I was a girl, there weren't so many restaurants as there are today – it was more expensive to eat in restaurants, including Fast Food. Now, young people can eat in Fast Food restaurants because they're less expensive, and diabetes is much more common in young people these days. Diabetes was not a big problem when I was a girl. (Female, 47b)

The young people – they eat in Fast Food restaurants. Those at my age, we eat at home, and we used to have to walk to the supermarket to buy food. Now, everyone drives, we all have cars. Everyone's in a hurry and eats in restaurants. (Male, 53)

The changing lifestyle habits have had a profound effect on the participants' health. Decreased time spent walking and more time spent driving, and increased consumption of unhealthy food at Fast Food restaurants, have become more common in Puerto Rico, leading to an overall decrease in health, particularly among the younger generations who have grown up with this current lifestyle.

Nobody walks anymore! I understand that it's hot – we *do* live in the Caribbean – but you can walk outside in the mornings before it gets too hot. You don't need to walk in the snow like in New York. People complain when it's too hot, but they also complain when it's too cold. People will get in their cars and drive to Burger King, pick up their food in drive-through, and then drive home to eat their extra-large cheeseburgers and fries. It's not like it used to be. Why's it changed? A lot of people live in urban areas now, where they have the opportunity to drive, and the sidewalks and things aren't so good. I'll admit that it's harder to walk when sidewalks are unevenly paved. There's always construction, and nobody wants to breathe in the dust. And the kids these days grew up living like this, with the driving and the bad sidewalks and the Burger King, and they like it like this, they don't know anything else. So they're healthier than their parents and grandparents, but they don't have the money to fix their health. (Female, 69)

I remember walking a lot with my grandparents. It was the way they did things, no one drove all the time. Now, everyone's lazy. I think that the kids have given up. There are no jobs for them, the roads are bad, the economy's bad, the education's bad. Everything's bad. If you grew up in an area where everything's bad, you'd give up, too. We try to support our kids, but it's hard, no one has money. So these kids eat at

McDonald's and hang out on the streets. They drive everywhere because it's faster than walking. They don't know any better. (Male, 64)

Older participants described that they had trouble adapting to Puerto Rico's shift in lifestyle, and that diabetes was a natural consequence of this lifestyle change, particularly the decrease in physical activity and the increase in unhealthy food consumption. However, the older participants would then mention that the younger generations seemed to develop diabetes at an accelerated rate compared to their elders, due to decreased physical activity, changes in diet due to a surfeit of fast food consumption, a lack of exercise in schools that reinforces a lack of exercise post-school, and a general lack of concern for their own health.

Chapter Twelve: Discussion

The objectives of this study were threefold: to determine whether depression was more likely to occur among Puerto Ricans with Type 2 Diabetes than among Puerto Ricans without Type 2 Diabetes; to determine whether Type 2 Diabetes and depression contribute and reinforce one another as a syndemic; and to determine whether eating habits affect the etiology and continuation of the syndemic among Puerto Ricans. I found that the data I collected supported all three of my objectives.

Research Question One: The data showed that depression was disproportionately more prevalent among participants with diabetes than among participants without diabetes. While structural factors were the same for the entire population regardless of diabetes status, the stress of side effects of diabetes, such as reduced eyesight and increased general physical pain, as well as maintaining lifestyle changes, such as diet, contributed to depression. Food was seen as a source of comfort, and people overate to feel better. The connection between depression and diabetes was further perpetuated by unhealthy lifestyles and economic instability. People became depressed as a result of the high unemployment ate large quantities of cheap, high-fat food to cope with their problems, and developed diabetes as a result.

Depression, an invisible illness, is experienced as a dissonance between the sufferer and his or her surroundings (van Dongen 2004): a disconnection between the sufferer's current reality and the reality that is he or she desires. Depression was a loss of control in an uncertain environment, particularly for people who were already trying to deal with diabetes.

Research Question Two: The basic premise of syndemics has been valuable in analyzing the structural factors underscoring the relationship between diabetes and depression in Puerto Rico. Diabetes and depression are noticeable and important illnesses in the patients of a diabetes clinic,

and in order to fully understand their complex relationship with one another, syndemics has provided a context in which to understand the etiology and synergistic perpetuation of the two illnesses. In particular, depression was seen as contributing to and a result of diabetes. The participants viewed depression as contributing to decreased interest in self-care and increased food consumption, with participants attributing depression to the high rates of crime, unemployment, violence, and laziness. The difficulty in maintaining a diabetes-friendly lifestyle, particularly in purchasing healthy food and living a lifestyle different from family and friends, contributed to depression.

In the interviews, participants suggested that structural changes, such as the high rates of poverty, violence, and unemployment, and the associated lifestyle changes have been influential in the prevalence of diabetes and depression, particularly in the younger generations. High rates of poverty and unemployment have ensured that not only are diabetes and depression prevalent in Puerto Rico, but that the illnesses are feeding into one another in a synergistic cycle. Due to the high unemployment rate, many cannot afford healthy food, leading to an over-consumption of cheap, unhealthy food and due to living in unsafe neighborhoods. As a result of these dietary changes, more people have become at higher risk of diabetes. The economic and occupational instability, the ensuing family friction, and the challenges associated with adapting to a life with diabetes, have also contributed to increased risk for developing depression. Having depression has, in turn, contributed to a worsened diet, a lack of a stable and consistent social support network, and missing medical appointments, all of which worsen the risk of and side effects of diabetes.

For these respondents, Puerto Rico is at an untenable crossroads. The island is caught between a negative lifestyle due to structural factors, and trying to escape from a black hole in which the negative lifestyle and its associated health problems form a synergistic syndemic. Puerto

Rico's political status makes it difficult for Puerto Rico to receive sufficient resources to address the structural problems that form the foundation of the syndemic that exists on the island. Having diabetes contributes to and worsens the presence of depression and vice versa. Both illnesses are grounded in the consumption of unhealthy food, which, in turn, is based on limited access to healthy food and a reliance on motorized transportation. Abuse and high crime and unemployment also contribute to earlier onset depression, which, in turn, contributes to earlier onset diabetes.

Research Question Three: Food was one of the most pertinent themes that participants mentioned, particularly the overconsumption of food as being both a product and a cause of depression and diabetes. While preexisting research has identified food intake as a factor in the etiology of both diabetes and depression (Denaei et al. 2013; Hu 2011; Zhang et al. 2013), there has been less research looking at this factor in-depth.

While food overconsumption and obesity are not interchangeable, participants frequently associated food overconsumption with leading to obesity, and discussed obesity as being a key health problem in Puerto Rico. While obesity is indeed correlated with both diabetes and depression independently, research has failed to address the presence of obesity in examining the relationship between depression and diabetes. With obesity being a major risk factor for the development of diabetes, and obesity and depression being highly correlated, obesity may be a key factor in understanding how and why depression and diabetes interact. This thesis did not address obesity due to the exploratory nature of the study and due to my intention to use obesity as a part of my syndemic for my dissertation work.

Due to decreased funding, schools have cut recess, which has left children without the training they need on how often to exercise and how to exercise properly (Acosta-Pérez et al. 2012; Duany 2002b). Coupled with a preference for driving over walking, the younger generations are

not getting sufficient physical activity, and are consuming more energy than they are expending. This is coupled with a high unemployment rate, particularly for the younger generations who have not had the opportunity to work and save money against a potential lost job. It is significant to note that the younger generations are developing diabetes at younger ages. In the past four decades, diabetes has transitioned from being more prevalent in people 65+ to becoming more prevalent in younger people, particularly among people in their teens, 20s, and 30s (Herrera 2013; Hu 2011; Kaufman 2005). This transition is consistent with diabetes trends in the United States (Dabelea et al. 2014; Fazeli Farsani et al. 2013; Walders-Abramson 2014). This transition in Puerto Rico is due to a combination of factors, all of which are common in Puerto Rico and have been discussed repeatedly in this thesis: transitioning to a Western lifestyle of high-fat food consumption and decreased exercise, high unemployment and crime rates, and prolonged levels of high stress. Limited health education combined with Puerto Rico's bad economy has led to young people unable to find jobs and buying food from cheap venues.

Implications: This research has several implications, particularly for interventions. On the micro level, healthcare providers will need to screen early for both diabetes and depression simultaneously so that both illnesses can be detected and patients can receive prevention and treatment before the illnesses advance. Because the effects of SSRIs on glycemic control are still being debated, SSRIs as antidepressant medications should not be fully discounted. Instead, healthcare providers should ascertain a patient's risk for developing diabetes before prescribing antidepressants so that if a patient is at increased risk for developing diabetes, the healthcare provider and the patient can create a lifestyle plan to ensure that the patient does not develop diabetes while he or she is taking antidepressants. Additionally, since prolonged stress contributes

to consistently high levels of cortisol, healthcare providers should also work with their patients to find activities to reduce stress, such as meditation or participation in a religious activity.

It should be noted that the diabetes clinic does not employ a mental health specialist of any kind, although the healthcare practitioners do refer their patients to off-site mental health specialists. Given the high depression rate among individuals with diabetes, it would behoove the clinic to hold free support groups for people with depression, to provide a community in which people can know that they are not alone, share their experiences, and provide support for others. The clinic doctors can run the group sessions, and while there are no mental health specialists at the clinic, the doctors running the sessions can provide some guidance, and provide names of mental health specialists if needed. In order to maintain people's privacy, doctors can tell their patients about the support group during checkups.

The clinic offers nutritional classes for patients already diagnosed with diabetes, to provide information on proper portion sizes, checking insulin correctly, and diabetes-friendly foods that can still be used to prepare traditional Puerto Rican meals. However, the nutritional classes are not held for the family members of people with diabetes. Having the classes be open to family members would help family members to be supportive by explaining the practicalities of what living with diabetes entails, such as checking insulin and changing one's diet.

Patients should be actively involved in the healing process. Creating a patient network will allow patients to befriend others with diabetes and carpool to supermarkets and perhaps pool financial resources to purchase healthier food. Getting to know other individuals with diabetes in the same neighborhood will also offer the opportunity to take walks together so that people do not need to walk outside by themselves. This will also offer people the opportunity to share healthy food recipes. Supermarkets could also be offered tax incentives to open branches in neighborhoods

with limited access to healthy food, so that the neighborhood inhabitants will be able to travel to supermarkets more easily.

These results are in line with preexisting research on diabetes and food intake, and underscore the necessity of using syndemics as a theoretical framework for this research. Unequal access to healthy food was a common theme, particularly since the bad economy and unemployment left many unable to afford such food on a regular basis¹⁹, and the unequal access contributed to the type of *alimentación* that played a part in the development of diabetes.

Limitations and Future Research:

This study does have several limitations, which may affect the results and the interpretation of the findings. The participants to this study were recruited in a diabetes clinic and disproportionately persons with the illness or family members or caregivers of the patients. They were already taking the initiative to be tested for illnesses or managing their diabetes and other health problems.

Since I conducted the interviews in the clinic, the participants may have experienced a reporting bias. They may have felt uncomfortable expressing opinions on their illnesses that they felt did not align with their doctors' opinions. I will address this bias in future research by conducting interviews both in the clinic and in the participants' homes to determine if there is a difference in interview responses.

Due to the small scope of this study, I was not able to look at *ataque de nervios* (attack of nerves), an indigenous idiom of distress in Puerto Rico that presents as an overwhelming and distressing sense of being out of control, and which manifests as crying, uncontrollable shouting, heat rising into the head, and in some cases, seizures and suicidal tendencies (Keough 2009). There

¹⁹ In this context, "regular basis" means weekly grocery store trips.

is some research that suggests a relationship between *ataque de nervios* and depression (Guarnaccia et al. 1990; Keough et al. 2009; López et al. 2011), but virtually none on the relationship between *ataque de nervios* and diabetes. For this reason, I think it is important for me to look at *ataque de nervios* and perhaps other culturally-informed syndromes in my future research on the NOD syndemic.

Based on the participants' interview responses about the importance of neighborhoods and the built environment, in future I will also collect in-depth data about the neighborhoods in which the participants reside in order to better understand neighborhood factors that may affect health. I plan to look at the number of supermarkets with healthy food, the number of bus stations, and the number of light posts in neighborhoods (to determine whether neighborhoods are well-lit enough for people to walk outside at night). This process will be part of the general interview process, since I will be visiting the participants' homes for interviews.

Diabetes and depression are complex illnesses that appear to interact on both the physiological and social levels. The structural factors that contribute to the two illnesses' interactions (e.g. poverty, violence, and lack of education) also lay the foundation for obesity (via eating habits) to be the third factor in the syndemic. In order to prevent and control these health problems, there is an urgent need to address the structural factors that underlie their etiology and perpetuation.

Appendix A: While the BDI has space for the participant's name, I wrote the participant's code instead to maintain confidentiality.


**Beck Depression
Inventory**
Baseline

V 0477

CRTN: _____ CRF number: _____

Page 14

patient initials: _____



Date: _____

Name: _____ Marital Status: _____ Age: _____ Sex: _____

Occupation: _____ Education: _____

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

2. Pessimism

- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

3. Past Failure

- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

4. Loss of Pleasure

- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things I used to enjoy.
- 3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

- 0 I don't feel particularly guilty.
- 1 I feel guilty over many things I have done or should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all of the time.

6. Punishment Feelings

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

7. Self-Dislike

- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

8. Self-Criticalness

- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all of my faults.
- 3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

10. Crying

- 0 I don't cry anymore than I used to.
- 1 I cry more than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying, but I can't.

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Subtotal Page 1

Continued on Back

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0154018392
NR15645



V 0477

Beck Depression Inventory

CRTN: _____ CRF number: _____

Baseline

Page 15 patient initials: _____

11. Agitation

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

13. Indecisiveness

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decisions.

14. Worthlessness

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

15. Loss of Energy

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

- 0 I have not experienced any change in my sleeping pattern.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

18. Changes in Appetite

- 0 I have not experienced any change in my appetite.
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.
- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual.
- 3a I have no appetite at all.
- 3b I crave food all the time.

19. Concentration Difficulty

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

Subtotal Page 2

Subtotal Page 1

Total Score

NR15645

3 4 5 6 7 8 9 10 11 12 A B C D E

Appendix B: Interview Questions (Spanish)

Diabetes:

1. ¿Usted es de Puerto Rico?
2. ¿Usted tiene diabetes?
 - a. ¿Qué tipo de diabetes usted tiene (si lo sabe)?
3. ¿Cuántos años Ud. tenía cuando aprendió que usted tenía diabetes?
 - a. ¿Cuántos años Ud. tiene ahora?
4. ¿Usted sabía qué era la diabetes antes de que le diagnosticaran?
5. ¿Usted siente la diabetes (por ejemplo, usted tiene síntomas)?
6. ¿Qué usted piensa causó su diabetes?
7. ¿Alguna persona en su familia tiene diabetes?
 - a. ¿Quién?
 - b. ¿Usted sabe qué tipo tiene(n)?
8. ¿Cualquier de sus amigos tienen diabetes?
 - a. ¿Usted sabe qué tipo de diabetes tiene?
9. ¿Usted va al doctor sobre una base regular?
 - a. ¿Usted siente que su doctor se ayuda manejar su diabetes?
 - b. ¿Usted tiene que pagar aquí en la clínica para ver el/la doctor(a)?
10. ¿Usted toma medicamentos para su diabetes?
 - a. ¿Si es así, qué tipo?
 - b. ¿Cuántas veces al día o a la semana usted toma sus medicamentos?
 - c. ¿Usted encuentra sus medicamentos ser accesible – puede comprarlos sin problemas?
 - d. ¿Usted piensa que sus medicamentos ayudan a la diabetes?
11. ¿Usted hace algo más para manejar su diabetes (por ejemplo, dieta, rezo, etc.)?
12. ¿Usted se siente saludable?
13. ¿Usted considera la diabetes ser una enfermedad grave?
14. ¿Usted cambió su dieta después de aprender que tiene la diabetes?
15. ¿Usted piensa que la diabetes es un problema aquí en Puerto Rico?
16. ¿Cómo se sintió aprender que usted tenía diabetes?
17. ¿Usted consigue ayuda de su familia en el manejo de su diabetes?
18. ¿Usted consigue ayuda de sus amigos en el manejo de su diabetes?
19. ¿Cómo usted siente sobre despertar por las mañanas?
20. ¿Cómo usted siente cuando usted se va a la cama en la noche?
21. ¿Usted nota cambios en su cuerpo debido a la diabetes?
22. ¿Qué tipo de dieta tenía antes de aprender que tiene la diabetes?

Depresión:

1. Ud. cree que tiene, o ha tenido, la depresión?
 - a. ¿Por qué?
2. ¿Qué Ud. piensa causó su depresión?
3. ¿Ud. considera la depresión ser una enfermedad grave?
4. ¿Ud. piensa que la depresión es un problema en Puerto Rico?

5. ¿Ud. ha hablado con su doctor acerca de la depresión?
6. ¿Cuándo desarrolló Ud. la depresión?
7. ¿Ud. tiene síntomas de la depresión?
8. ¿Alguien en su familia tiene la depresión?
9. ¿Ud. cree que tiene, o ha tenido, un ataque de nervios?
10. ¿Ud. cree que tiene, o ha tenido, susto?
11. ¿Han ocurrido cambios grandes en su vida?
12. ¿Ud. cree que los miembros de su familia lo/la apoyarían si les dijera acerca de su depresión?
13. ¿Ud. cree que sus amigos lo/la apoyarían si los dijera acerca de su depresión?
14. ¿Ud. diría a sus colegas que tiene la depresión? ¿Ud. diría a su jefe que tiene la depresión?
15. ¿Ud. toma medicamentos para la depresión?
 - a. ¿Si es así, qué tipo?
 - b. ¿Cuántas veces al día o a la semana usted toma sus medicamentos?
 - c. ¿Usted encuentra sus medicamentos ser accesible – puede comprarlos sin problemas?
 - a. ¿Usted piensa que sus medicamentos ayudan a la diabetes?
 - b. Si es así, cual es el efecto del medicamento?

Diabetes y la depresión

1. ¿Usted piensa que hay una conexión entre la diabetes y la depresión?
 - a. ¿Por qué?
2. ¿Usted sabe si la diabetes o la depresión se desarrolló primero?
3. ¿La depresión ha afectado a su diabetes?
 - a. ¿Cómo?
4. ¿La diabetes ha afectado a su depresión?
 - a. ¿Cómo?
5. ¿Tener la depresión y la diabetes influye cómo usted entiende ambas?
6. ¿Ud. cree que tener la diabetes y la depresión le hacen a más enfermo que usted sería si usted sólo tuviera una?

Dieta:

1. ¿Ud. puede decirme todo lo que comió y bebió ayer?
2. ¿Fue ayer un día normal para lo que comió y bebió?
 - a. ¿Si no, por qué?
3. ¿Cuánto de lo que comió y bebió, fue normal para lo que Ud. come y bebe en una semana?
4. ¿Con qué frecuencia Ud. sale para comer y beber en restaurantes de “Fast food”, como McDonald’s y Burger King?
5. ¿Ud. piensa que suele come comida puertorriqueña o otras tipas de comida (por ejemplo, comida estadounidense, comida china, etc.)?
 - a. ¿Por qué?
6. ¿Ud. piensa que hay una conexión entre la diabetes y la obesidad?
7. ¿Ud. piensa que hay una conexión entre la depresión y la obesidad?
8. ¿Ud. piensa que la obesidad es un problema aquí en Puerto Rico?

9. ¿Qué Ud. considera ser comida saludable?
10. ¿Ud. piensa que la comida saludable es asequible?
11. ¿Hay supermercados cerca de su casa con comida saludable?
12. ¿Ud. hace algún tipo de ejercicio?

Appendix C: Interview Questions (English):

Diabetes:

1. Do you have diabetes?
 - a. Which type of diabetes do you have (if known)?
2. How old were you when you learned that you had diabetes?
 - a. How old are you now?
3. Did you know what diabetes was before you were diagnosed?
4. Do you feel the diabetes (e.g. do you have any symptoms)?
5. What do you think caused your diabetes?
6. Does anyone in your family have diabetes?
 - a. Do you know what kind of diabetes they have?
7. Do any of your friends have diabetes?
 - a. Do you know what kind of diabetes they have?
8. Do you go to the doctor on a regular basis?
 - a. Do you feel that your doctor is helpful in managing your diabetes?
9. Do you take any medications for your diabetes?
 - a. If so, what kind?
 - b. How often do you take your medications?
 - c. Do you find your medications to be affordable?
 - d. Do you think that your medications are helping the diabetes?
10. Are you doing anything else to manage your diabetes (e.g. diet, prayer, etc.)?
11. How did it make you feel to learn that you have diabetes?
12. Do you get any support from your family in managing your diabetes?
13. Do you get any support from your friends in managing your diabetes?
14. How do you feel upon waking up in the mornings?
15. How do you feel when you go to bed at night?
16. Do you feel healthy?
17. Do you notice any changes in your body due to the diabetes?
18. Do you consider diabetes to be a serious disease?

Depression:

1. Do you think that you have depression?
2. Why so?
3. Have you talked to a doctor about depression?
4. What do you think caused your depression?
5. When did you first develop depression?
6. Do you have any symptoms of depression?
7. Does anyone in your family have depression?
8. Have there been any major changes in your life?

Diabetes and depression

1. Do you think that there is a connection between your diabetes and depression?
2. Do you know if diabetes or depression developed first?
3. Has depression affected your diabetes?
 - a. How so?
4. Has diabetes affected your depression?
 - a. How so?
5. Does having both depression and diabetes influence how you see both?
6. Do you think that having both diabetes and depression make you sicker than you would be if you just had one?

Diet

1. Please tell me **everything** you had to eat and drink yesterday:
2. Were yesterday's meals a regular eating day for you?
 - a. If not, why not?
3. How much of this was what you normally eat in a week?
4. How often do you go eat out at American fast food restaurants, such as McDonald's and Burger King?
5. Do you think that you eat mostly Puerto Rican food or other types of food (for example, American food, Chinese food, etc.)?
 - a. Why so?
6. Do you think that there is a connection between diabetes and obesity?
7. Do you think that there is a connection between depression and obesity?
8. Do you think that obesity is a problem here in Puerto Rico?
9. What do you consider to be healthy food?
10. Do you think that healthy food is accessible?
11. Are there supermarkets close to your home with healthy food?
12. Do you do any kind of exercise?

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