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Secondary Analysis of Diabetes and Psychological Distress in American Indian Women from the California Health Interview Survey (CHIS)

A dissertation
presented to
the faculty of the Department of Nursing
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Doctor of Philosophy in Nursing

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by
Audry M. Greenwell
May 2009

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Keywords: American Indian, Diabetes, Depression, Psychological Distress, Women, CHIS

ABSTRACT

Secondary Analysis of Diabetes and Psychological Distress in American Indian Women from the California Health Interview Survey (CHIS)

by

Audry M. Greenwell

Since European settlers arrived to the United States (U.S.), American Indians (AI) have been separate and unequal members of society. After a long history of discrimination, ethnocide, genocide, and distrust, the AI have become a population with severe disparities, having the highest rates of diabetes, depression, suicide, tuberculosis, and alcoholism than any other minority or majority population in the U.S. The author's purpose for conducting this study was to explore a possible relationship between depression or psychological distress and diabetes in AI women.

AI women are the most under studied group in the country; therefore, a secondary analysis of the large established California Health Interview Survey (CHIS) was done. The sample used 1,110 self-identified AI women's data. Even though the literature shows that the AI have the highest rates of diabetes and depression of any population, this analysis revealed no statistically significant relationship between the two diseases. It did reveal many limitations and implications associated with the use of such large databases for the AI woman.

Among the limitations were the survey itself, its administration to the AI population, guidelines for self-identifying as AI, and the researcher's limited access to the data. The implications of this study are significant. Large databases provide the basis for social and political decisions such as

allocation of federal dollars for health care. Healthcare and health care services are designed according to the health burden of specific populations. If these databases are in error, or not representative of the true population, healthcare decisions will not reflect the true health care needs of the population. The inadequacies of large databases results in less funding, leading to less quality health care, and an increase in AI health disparities. Further research is needed to determine the actual health burden depression and diabetes place on the AI woman.

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DEDICATION

This dissertation is dedicated to two very special people who showed me “the way” the first 20 years of my life. My great-grandmother – Minnie Myers “Mo-Mo” (Choctaw) and my grandfather – Ivy Cowling (Chickasaw). Thank you for loving, accepting, and guiding me regardless of my ‘half-breed’ status.

I also dedicate this work to all of those who are caught between two worlds, not quite accepted and not quite rejected by both. May you find your way and embrace the two worlds to make your own.

ACKNOWLEDGMENTS

There are many people I wish to thank for their help, encouragement, and support during this journey. Through the tears and laughter there have been those who were always there to provide a helping hand and sometimes a shoulder to cry on.

First, I would like to thank my dissertation committee. My deepest appreciation goes to my chair Dr. Joy Wachs, whose expert editing, encouragement, and support never faltered. Thank you is not enough to express the respect and gratitude I have for you. I would also like to thank Dr. Linda Garrett and Dr. Sadie Hutson for their encouragement, support, and multiple edits of my chapters.

A sincere thank you goes to Dr. Susan Grover who was so very encouraging and supportive as I tried to balance on the fence; being both a faculty member and doctoral student at ETSU-CON. It took survival strategies that you provided. I also want to thank Cathy Bennard, FCNU executive aide, for your help and support during my adventures in academia.

An immeasurable thank you goes to Dr. Stacey Williams for her statistical expertise with SUDAAN and her calm manner during my many “crisis”. SUDAAN was like going to a foreign country and your help navigating that country was invaluable.

A very special thank you goes to Dr. Judy McCook, my mentor and friend since my first day at ETSU. You have always been there with encouragement and a positive word, without which I would not have survived this journey. Your continual positive outlook and supportive personality are an inspiration. I look forward to many more years of friendship.

Most importantly, I want to acknowledge the support of my beloved husband Dennis and my dear sister Patricia Snow. Thank you Dennis for always being there, for experiencing my joys and grief and helping me get through it all, I love you. My dearest sister, you have been there since we were children, through good times and bad. I could not have done this without your love and support. Thank you for accompanying me down "memory lane" to remember the teachings of our family. You were the pillar that held me up when we lost our father for the second time in the middle of this dissertation. Both of you were there when I was overwhelmed and wanted to give up, but your love and encouragement saw me through.

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CHAPTER 1

BACKGROUND OF THE PROBLEM

Introduction

In the United States (U.S.), American Indians (AI), also known as Native Americans and the First People, have a long history of discrimination, ethnocide, genocide, and distrust between them and the dominant white-western society. This historical trauma has resulted in severe disparities. Military defeat, cultural pressure, confinement on reservations, forced cultural assimilation, outlawing of native languages and culture, termination policies of the 1950s and 1960s, slavery, and poverty have had devastating effects on AIs' mental and physical health (Jones, 2006). AIs are separate and unequal members of society, which has led them to the highest rates of alcoholism, tuberculosis, diabetes, depression, and suicide, compared to all other minority or majority groups in the U.S. (Jones).

American Indian History

American Indians (AI) were the "first" people to settle the regions of North America, now known as the continental United States, including Alaska, over 10,000 years ago. On this land, they formed intricate and sophisticated societies, including a rich cultural history of traditions, religion, and relationships with each other. These societies thrived until their encounter with European settlers and other immigrants. Approximately 54 million AIs lived in North America when Columbus arrived in the 1400s. From the 15th through the 19th centuries that number decreased drastically to around 4 million remaining currently. The Europeans' arrival to the Americas decimated the AI population, obliterating some tribes and severely decreasing the number in others through war, disease, displacement, enslavement, oppression, genocide, and ethnocide (Paul, 2006).

The first encounter between AIs and Europeans was led by Christopher Columbus in 1492, leading to the extinction of several tribes by 1650. The second major encounter was with Spanish explorers in the mid 1500s, and the introduction of diseases by soldiers under direct orders of their superiors. In 1763, General Amherst stated, “You will do well to inoculate the Indians with smallpox by means of blankets, as well as to try every other method that can serve to extirpate this exorable race. I should be very glad your scheme for hunting them down by dogs could take effect” (Flavin, 2002). The introduction of these diseases from the 1500s through the early 1900s resulted in the deaths of 80% to 100% of many AI tribes.

The immigration pattern called The Great Migration of European white settlers, which started with the arrival of Columbus, continued into the 1630s and 1640s. As more people arrived, the AIs were pressured from their homesteads and lands, being forced westward, during the Western Migration, onto lands of other established tribes, resulting in internal warfare and further decreasing the Indian population. As the Europeans proclaimed the United States their “new found” country, the American Revolutionary War with the British began. This further divided the AIs as they were encouraged to fight for and with both sides during the war, the majority fighting with the British against the colonies in hopes that a British victory would send the settlers back to Europe. The British made peace with the Americans in the Treaty of Paris (1783) and, without consulting the AI, ceded vast tracts of AI territory to the new European white U.S. The U.S. viewed the AIs as a conquered people who lost all right to their land (Washburn, 1975).

As more and more people arrived from Europe, an incessant westward expansion continued, compelling AIs to move west, disrupting their way of life and traditions. President Andrew Jackson passed the Indian Removal Act of 1830, initiating the use of treaties in exchange for AI land east of the Mississippi River and forcing the relocation of as many as 100,000 AIs. The U.S. government took the Indians' land and moved them west to reservations on "undesirable" lands. In many "Trails of Tears" across the nation, Indians were rounded up like cattle and driven to unfamiliar lands in distant regions; many died on the way or in government camps. This forced removal and "relocation" resulted in the death of tens of thousands of AIs during and after the removal. AIs were usually confined to designated reservations, and even though the relocation was termed "voluntary", those who did not comply were sometimes killed. President Jackson instructed whites to kill as many bison as possible thus reducing the main source of food for the Plains Indians, stating, "The only good Indian is a dead Indian" (Flavin, 2002).

In 1876, the U.S. government ordered all remaining AIs to move into reservations. Initially these reservation lands were large; however, as resources were discovered on the lands, the government seized acreage and the land grants shrunk, breaking treaties between the U.S. government and the Indians. To justify the attempted eradication and relocation of Indians, they were portrayed as "savages" and uncivilized by the U.S. government. The original U.S. Constitution addressed this by relegating tribes to a "dependent" status (Dixon & Joseph-Fox, 2001), with a view that these "savages" had to be controlled and cared for by the government, as a child would be "dependent" on parents for survival. European-white society continued to view AIs as "savages" and less than human well into the 1990s (Flavin, 2002).

When relocating, wars, famine, and forced removal failed to eliminate the AI, the U.S. government attempted to "civilize" or assimilate them. In the late 19th century, Christian missionaries started the process of "educating" AI children by removing them from their families and placing them in boarding schools (Shelton, 2001). Here, the children were dressed like white

Europeans, their hair cut, all sacred items removed, and they were forbidden to use their native language, rituals, and religions, resulting in a splitting of the AI family and community. All of this was done in an attempt to force AIs to abandon their native ways. Some children were removed from their families and adopted by white families, creating total assimilation. These methods proved traumatic and detrimental to both AI children and communities (Shelton).

It was not until 1924 with the passage of the Indian Citizenship Act that AIs were recognized as American citizens, even though they had been living in the Americas when the Europeans arrived, having inhabited this land for thousands of years. In part, the Indian Citizenship Act was a way to merge Indians with the American mainstream, thus decreasing governmental responsibilities. As recently as the 1970s the Bureau of Indian Affairs was still actively pursuing a policy of "assimilation" (Bureau of Indian Affairs, 2006), the goal to eliminate reservations. Eliminating reservations would have mainstreamed AIs, providing eradication of the AI societal culture, and terminating the treaty-determined responsibility of the U.S. government toward the AIs.

Although debated and unrecognized by the U.S. government, forced sterilization of female AIs continued into the late 1970s. As late as the 1980s, some areas in the U.S. still had segregated areas, with "white" and "Indian" water fountains in public schools. In July 2000, the Washington State Republican Party unanimously adopted a resolution to terminate tribal governments (Canku Ota, 2006), and in 2004 several claims of theft were filed, where AI land was reclaimed by the U.S. government for its coal and uranium resources. In 2005, Massachusetts finally repealed a 330-year-old law barring AIs from entering Boston, and the National Collegiate Athletic Association banned the use of "hostile and abusive" AI mascots from postseason tournaments, even though AI mascots are still used by amateur and professional sports teams.

Cultural Barriers

The primary reason for conflict between the AI and European-white society from the 1400s to the present time are the significant cultural differences between the two societies. Among these differences several customs and outcomes are universal across many tribes within the U.S., including 1) a primarily matriarchal society; 2) language; 3) communication between tribes and the U.S. government; 4) traditional practices; and 5) poor health.

Indian country is in conflict with white-western society in the way they view themselves and their communities. AIs focus on the community produces conflict between cultures and systems. AI tribes have been largely matriarchal and communal, in direct opposition to western society's dominant patriarchal individualist view. Indian society has a utilitarian belief system, with the group and community being the primary concern and the rights of the individual being secondary (Boss & Brannigan, 2001) AIs focus on what is best for the community, and then consider what is best for the individual, maximizing the group's welfare. Western society is more individualistic, with autonomy and the dignity and rights of each individual being the primary focus. AIs strong connection to their communities and white-Europeans ethnocentric belief in individualism has been the basis for many conflicts between the two societies. From the first encounters between the two, the goal of the U.S. government was to destroy the close connections within and between AI communities, to dominate, and to "divide and conquer".

Language and communication have also created barriers between the two societies. There are as many different languages as there are tribes in the U.S. Yet in the U.S. the government forbid the use of native language and insisted that the AI use English only. The use of native language was a crime carrying severe punishments (Shelton, 2001). Only now AIs are learning their native dialects again. Differences in communication patterns between AIs and whites are also a barrier, with AIs taking a quiet, nonconfrontational, no eye contact, passive approach in direct opposition to white-western societies dominate, confrontational, assertive approach. These differences are often misinterpreted.

American Indian traditional ceremonies, spirituality, and religious practices have also been forbidden for the past 200 years. In the early 19th century as Christians attempted to "civilize" the Indians, anything other than Christian practices were forbidden and deemed evil. This view has continued to the present day. AIs are the only known ethnic group in the United States who are required to have a federal permit to practice their religion (Shelton, 2001). The eagle feather law allows individuals of certifiable AI ancestry, enrolled in a federally recognized tribe, to legally obtain eagle feathers for religious and spiritual use. This law prohibits anyone except those "federally recognized" from possessing eagle feathers (Glenn, 2007), thus prohibiting any AIs not recognized as AIs by the government from practicing their religious beliefs. Control of religious freedom through enforcement of these laws allows continued discrimination against the AI.

Significant disparities among the American Indian are directly linked to the AI's cultural beliefs that are counter to the beliefs of dominant white-European society. A strong connection to community, matriarchal or matrilineal-based society, the use of ceremony and spirituality in religious practices, the use of native languages and communication patterns, (Shelton, 2001) and treatment by whites as an inferior species have contributed to these disparities. The years of oppression and discrimination, leading to historical trauma, have continued to present conflicts between the U.S. government and the "first people" of this Nation.

Political Status

The state of the health and welfare of the “First People”, the American Indian (AI), is extremely poor. This minority group of 4.4 million individuals belongs to 565 federally recognized tribes with 66 % living in urban areas and the rest living on reservation lands (Hendrix, 2002). This group is reported to have the lowest income, least education, highest poverty level, and worst health status of any minority or majority group in the United States (Denny, Holtzman, Goins, & Croft 2005). This situation is the direct result of many years of distrust, the breaking of treaties, and the lack of responsibility and resulting neglect by the U.S. government with the Indian nations.

The relationship between the AI and the U.S. government has been wrought with conflict since white Europeans first arrived in the Americas. The Europeans were eager to colonize and exploit new-found resources. These goals required governing the people who already lived in the “newly discovered” area (Shelton, 2001). The solution was to move the indigenous people, the Indians, to less desirable lands, to lands not providing resources the Europeans deemed important. The rights of the Indians to occupy the land had to be eliminated before a colonizing nation could make full use of the region. This was accomplished through treaties. By the mid 19th century, the U.S. had been at war with all tribes east of the Mississippi River. Most early treaties were designed to take Indian lands and clear the area of Indian inhabitants.

The first treaty exchanging land for protection promised by the U.S. was in 1817 with the removal of the Cherokee Indians east of the Mississippi to “Indian Territory” in Oklahoma. For the next 30 years treaties focused on moving the AI west to new territories. These treaties carried with them the U.S. government’s responsibility to provide food for the increasing number of AIs on reservations. This responsibility proved expensive for the federal government resulting in new policies of assimilation and allotment. The goal of assimilation was to bring Indians into mainstream society and force them to surrender their traditional ways of life, "to kill the Indian and save the man" (Woodhead, 1995). One of the ways to enforce the assimilation policies was through allotment of reservation land. Indian tribal rights to reservation land were abolished and individual plots were assigned and owned by individual Indians. These allotments were assigned to the male head of households, even though most tribes were matriarchal, releasing excess land for settlement by non-Indians. The passage of the General Allotment Act of 1887, known as the Dawes Act, required AIs to register with the federal government to be recognized as an AI and receive an allotment of land. The Supreme Court explained the act "within a generation or two, it was thought, the tribes would dissolve, their reservations would disappear, and individual Indians would be absorbed into the larger community of white settlers" (Shelton, 2001, pg.14) thus eliminating the AI and the problem.

Through a series of treaties, laws, Presidential resolutions, case law, and Supreme Court rulings, the U.S. shaped the scope of tribal sovereignty. Tribes have been considered nations within the larger U.S. and have retained their sovereignty to rule over their own members. If tribes did not have sovereignty, they would be no different from any other racial or ethnic group. Four kinds of sovereign governments exist in U.S. law: the federal government, state government, foreign governments, and tribal governments (Dixon, Mather, Shelton, & Roubideaux, 2001). AIs have a unique relationship with the U.S. government; as a sovereign nation they have the right to self-governance. This right is detailed through three primary principles of federal Indian law: 1) tribes retain their sovereignty until it is taken away by the federal government; 2) the federal government, not individual states, is in charge of Indian affairs; and 3) the federal government deals with tribal organizations that it has recognized (Dixon et al.).

One of the promises made by the U.S. government in exchange for land was the provision of health care. The arrival of the Europeans to the U.S. brought disease. In an attempt to keep the disease from spreading to other white-Europeans via the close proximity of the AI to military encampments, the War Department assumed this responsibility. In 1849, the War Department turned responsibility for Indian health to the Bureau of Indian Affairs (BIA). In 1921, Congress passed the Snyder Act, providing the first formal authority for the federal provision of health services to AIs (Jones, 2006). The Indian Reorganization Act of 1934 initiated the first policy designed to encourage economic development, self-determination, cultural plurality, and the revival of tribalism; however, this approach was short lived and the federal government turned back to its primary goal of eradication of the AI through assimilation, termination of tribes, elimination of reservations, and relocation of Indians away from their homelands (Jones).

After conducting a survey of Indian conditions in 1943, reservations were found to be in horrendous condition with severe poverty and disease. Rather than take responsibility for the condition of AIs, Congress passed several acts terminating federal-tribal trust relationships with tribes across the country, including the sale of tribal lands, imposing state and judicial authority, and ending tribal sovereignty (Shelton, 2001). Thus, the Termination Policies of 1953 to 1968, terminating federal responsibility for AIs, and further dissolution of tribes and Indian communities caused devastation to tribal economies, society, and health. During the termination era, the BIA was relieved of its responsibility for Indian health and the Indian Health Service (IHS) was formed, one of the few actions helpful to the Indian people.

Termination was finally recognized as a failure with the passage of the Indian Civil Rights Act in 1968, promoting tribal self-government and self-determination (Shelton, 2001). In the 1970s, Congress passed several laws designed to renew, strengthen, and restore tribal sovereignty and health. In 1975, the Indian Self-Determination and Education Assistance Act was passed giving tribes the authority to operate programs serving their tribal members. In 1976, the Indian Health Care Improvement Act was signed into law, reaffirming the U.S. government's legal obligation for Indian health. In 1997, President Clinton formed a Blue Ribbon Commission on Race in America but did not recognize the AI. The president increased budgets for six agencies in the Department of Health and Human Services (DHHS) by $1.7 billion, but increased the budget of the IHS by less than 1% (Bureau of Indian Affairs, 2006). In 1999, no new money was appropriated for Indian health care and in 2007 the Bush administration proposed eliminating the entire Urban Indian Health Program from the budget. In 2008, it was again proposed to totally eliminate all urban Indian health care, even though over 60% of the AI population lives in and receives care in such areas. The Indian Health Care Improvement Act has been under consideration for the past 7 years, again indicating the federal government's inability to meet its responsibilities, choosing instead to spend nearly $2,000 more each year for the health care of each federal prisoner than for each AI (Jones, 2006).

Even the "right" to be Indian has fallen under the federal government's control. To self-govern, a tribe must be "recognized" by the U.S. federal government. This right has been superseded by the federal government on many occasions over the past 150 years. The treatment of AIs over the past 400 years has led to an AI poverty rate of 32%, an unemployment rate of 33%, and insurance coverage to only 71% of AIs (Anderson, Belcourt, & Langwell, 2005). The health status of this population is dismal.

Health

AIs have experienced a 400-year history of oppression and prejudice. Past U.S. government policies have led AIs to mistrust government agencies and services. Edicts included forced removal and migration of tribes to reservation land, with the U.S. government sponsoring policies of genocide and ethnocide. The government appointed health care body, the Indian Health Service (IHS), participated in this oppression, genocide, and ethnocide contributing to the extreme health disparities within this minority population. Yet, the AI population is increasing at a rate faster than any other minority with a 44% increase expected by 2030. The AI population is younger than any other group in the U.S. because the elderly die earlier from disease and disability (Indian Health Service [IHS], 2006; Jones, 2006). As this younger population grows, it carries with it a burden of history and a history of poor health.

The combination of years of oppression and multiple health disparities has resulted in AIs being a high-risk group. American Indians have a life expectancy 5 years less than all other groups; they face higher maternal and infant mortality rates, and are many times more likely to die from tuberculosis, diabetes, and alcoholism. The prevalence of chronic illness among AIs is greater than among other groups due to lower socioeconomic status, rural location, and ethnicity or race, making them highly vulnerable (Eschiti, 2005). The isolation and diversity of this group presents an added risk to their health and welfare. AIs have little access to adequate health care, with the care they do receive from tribal health facilities and IHS programs being sporadic and inconsistent.

For the past 2 centuries, the federal government has assumed the responsibility for Indian health care. This did not come without a cost; the Indians paid for their federal health care with more than 400 million acres of land (Dixon & Joseph-Fox, 2001). Tribes also paid for this health care previously by relinquishing land to the U.S. federal government in the past for the promise of health care in the future (Shelton, 2001). However, the federal government has not kept its part of that promise, supplying the only federally (severely under) funded health care for the AI through Indian Health Services (IHS). Through laws and treaties between the two societies, the tribal health system has become more complicated and insufficient. The U.S. government has violated the trust relationship with the Indians resulting in overwhelming distrust. The U.S. government has not met its legal or moral obligations by neglecting the health care of this population. The Indian is not treated equally, and their autonomy, their right to self-determination, independence, and freedom, is continually undermined. The inadequacies of the IHS have contributed to the significant disparities in health status, quality of health care, access to health care services, resources and funding for health care, and available services for the AI.

Disparities Among American Indians

Health disparities among American Indians are significant. Substance abuse, trauma, forced cultural changes, poverty, lack of economic opportunity, and isolation significantly complicate the health of this population. AIs experience a significantly lower health status than other Americans, with diabetes and depression on the increase. Those born today will have a life expectancy 2.4 years less than previous generations, and young AI adults today have a 5-year shorter life span than all other races combined in the U.S. population. A higher percentage of Indians die of influenza, kidney failure from diabetes, heart disease, and cancer than whites. AI patients with cancer have the poorest survival rates of any group (Indian Health Service [IHS], 2006). They have higher maternal and infant mortality rates than all other racial groups due to lack of resources and extreme poverty. Death rates are significantly higher for Indians compared to the U.S. population for the following: tuberculosis (7.5 times higher), alcoholism (7.7 times higher), motor vehicle accidents (2.8 times higher), diabetes (4.2 times higher), unintentional injuries (1.5 times higher), homicide (2.1 times higher), and suicide (1.9 times higher) (Jones, 2006). The health status of the 4.5 million AIs is worse than any other U.S. minority or majority group (U.S. Census Bureau News, 2008).

One of the primary issues affecting the health of AIs is the distrust and conflict between the tribes and the U.S. government. This conflict impedes the improvement of AI health and welfare. Raising the health status of American Indians is a significant challenge based on the conflicting value systems of Western and AI societies. Because of the extreme poverty experienced by AIs, more than half of AIs have moved to urban areas in search of employment. This migration has created even more conflict between the two cultures. Urban Indians keep ties to their tribal communities while adapting to urban life, further removing them from adequate health care. Urban AIs have the additional challenge of proving their AI status to receive healthcare from IHS, something they may not be able to do having moved to urban areas, eliminating an important healthcare resource for over 60% of the AI population (Morbidity and Mortality Weekly Report [MMWR], 2006).

Indian Health Care System

The Indian health care system struggles to meet the needs of the AI population and fails. Over 2 million AIs use health care facilities and services funded through Indian Health Service clinics and hospitals. These facilities are located on or near reservation lands and can only be used by those Indians living on or near the reservation. This health care is free to those who qualify; however, due to limited budgets, the IHS is only able to serve approximately 50% of qualified AIs (IHS, 2006). Urban Indians, 60% of the Indian population, usually do not qualify for IHS care.

Despite the availability of "free health care" for some, the health status of AIs continues to be worse than any other group in the United States. The U.S. Congress does not regard Indian health as an entitlement program. With entitlement programs, the government defines eligibility for a program and the services covered, and then pay for those services to be delivered to the eligible population. If the services cost more than the annual budget, then Congress appropriates supplemental funds to cover the cost. Indian Health Service, by contrast, is prescribed a budget and once the funds are used, no further care is delivered (Dixon, Mather, Roubideaux, & Shelton, 2001). The per capita Congressional appropriations for Indian health have declined yearly with the U.S. government paying less for this care than for federal prisoners: i.e., - $1,914.00 per Indian per year, $3,200.00 per federal prisoner, and $5,065.00 per user in the general population (English et al., 2004), sending a clear message about the value of AI health. A change in the system is needed. Addressing health disparities in a utilitarian, community focused group by an individualistic society results in poor health care and health outcomes.

Diabetes

Diabetes is a chronic, incurable, metabolic disorder resulting in hyperglycemia, high levels of glucose in the blood. Diabetes takes three primary forms, Type 1, Type 2, and Gestational. Type 2 diabetes accounts for 90% of all cases of diabetes in the general population of the U.S. and 98% of all cases in the AI population (National Institute of Diabetes and Digestive and Kidney Diseases, 2006). For this reason, the term "diabetes" in this study, refers to Type 2 diabetes only. In Type 2 diabetes, the pancreatic beta cells are unable to produce sufficient insulin or become resistant to the insulin, both mechanisms resulting in chronic long-term health complications. Type 2 diabetes can be undiagnosed for years, contributing to severe long-term complications (National Diabetes Information Clearinghouse [NDIC], 2006).

For the past 20 years, diabetes rates in the U.S. have increased substantially, reaching epidemic proportions. In 2005, about 20.8 million individuals lived with diabetes, with another 6.2 million undiagnosed and about 41 million prediabetic. The factors that increase an individual's risk of developing type 2 diabetes are: a family history of diabetes, a member of a ethnic group (AIs diabetes rate is 2.2 times the rate of diabetes in non-Hispanic white population), overweight or obese, a history of gestational diabetes, a diagnosis of hypertension, and inactivity (Berry & Melkus, 2006). Diabetes costs an estimated $132 billion every year in the U.S. and with 1 in 3 Americans born after 2000 developing diabetes in their lifetime, the cost will continue to increase (Runge, 2007).

Insulin is the principal hormone that regulates the uptake of glucose from the blood into primarily muscle and fat cells. A deficiency or resistance to insulin prevents glucose from moving into the cell (NDIC, 2006). Most carbohydrates are converted to glucose within a few hours of consumption and released into the bloodstream. In response to these rising levels of blood glucose, insulin is released into the blood by beta cells in the pancreas. Insulin acts as a key so cells can absorb glucose from the blood to use as fuel or to be stored. If the amount of insulin is insufficient, if the cells are resistant or insensitive to the effects of insulin, or if the insulin itself is defective, glucose will not move into the cells. The result is high levels of blood glucose, poor protein synthesis, and metabolic insufficiency (Berry & Melkus, 2006).

Chronic elevated blood glucose levels damage blood vessels. As the lining of the vessels are exposed to high levels of glucose, they absorb more glucose, causing the inner membrane to thicken and weaken, resulting in microvascular and macrovascular disease. Microvascular disease results in friable, poor-quality blood vessels. In the retina, these blood vessels contribute to vision loss or blindness; in the peripheral vessels microvascular disease leads to abnormal, decreased sensation; and in the kidney, microvascular disease results in chronic renal failure. Macrovascular disease leads to cardiovascular disease: coronary artery disease with subsequent myocardial infarction, stroke, or peripheral vascular disease resulting in amputations and diabetic myonecrosis (Cull, Holman, Jensen, & Retnakaran, 2007).

Diabetes is the leading cause of death and disability among adults in the U.S. It is the leading cause of cardiovascular disease, stroke, blindness, end-stage renal disease, peripheral vascular disease, and nontraumatic lower limb amputations. Sixty-five percent of those with diabetes die as a result of heart disease and stroke. Individuals with diabetes have a 2-to 3-fold increased risk of functional disability compared to those without diabetes (Egede, 2004). To decrease incidence and complications from the disease, prevention among prediabetics, early diagnosis, and effective diabetes management to maintain normal blood glucose levels are goals for both healthcare providers and clients.

Depression – Psychological Distress

Depression is a serious health condition that affects thoughts and feelings and negatively impacts an individual's ability to function in everyday life. Depression is common, recurrent, often debilitating, and a potentially lethal disorder (Khouzam, 2007a). Within 1 year, 9.5% of the U.S. population, 20.9 million adults, will suffer from depression, with an annual cost estimated in billions of dollars (National Institute of Mental Health [NIMH], 2007). These costs include missed days at work and decreased productivity and, most importantly, human suffering and diminished quality of life. One half of all Americans will meet the criteria for depression at some time in their lives, and 1 in 4 individuals report a lifetime history of the disorder (Cunningham & Mynatt, 2007). Only one third of those with mental illness receive proper diagnosis and treatment (Cunningham & Mynatt).

A depressive disorder is an illness that involves the body, mood, and thoughts. It affects how individuals feel about themselves and their relationships with others, how they eat and sleep, and the way they think about the world. The most common symptoms of depression are (NIMH, 2007):

- Persistent sad, anxious or “empty” mood
- Feelings of hopelessness, pessimism
- Feelings of guilt, worthlessness, and helplessness
- Loss of interest or pleasure in hobbies and activities that were once enjoyed, including sex
- Decreased energy, fatigue, being “slowed down”
- Difficulty concentrating, remembering, making decisions
- Insomnia, early-morning awakening, or oversleeping
- Appetite and, or weight loss or overeating and weight gain
- Thoughts of death or suicide; suicide attempts
- Restlessness, irritability
- Persistent physical symptoms that do not respond to treatment, such as headaches, digestive disorders, and chronic pain

The causes of depression are multifactorial, very often a combination of genetic, psychological, and environmental factors. Some types of depression run in families suggesting a genetic link and biological vulnerability. Major depression is associated with changes in brain structure or function and alteration in neurotransmitters. Individuals with low self-esteem and a pessimistic outlook, easily overwhelmed by stress, are prone to depression (National Institute of Mental Health [NIMH]). The environment can play a significant part in the development of depression, e.g., socioeconomic stressors, exposure to violence or abuse, limited social support, and a challenging living situation such as encountered with poverty.

Though the development of depression is multifactorial, some factors increase the risk of developing the illness. Gender plays a significant role; women have twice the risk of developing depression with a rate of 4.9% to 8.7% in comparison to men with a 3.2% to 4.4% risk (Shai et al., 2006). Women also face additional stressors, e.g., responsibilities at both work and home, single parenthood, caring for children and aging parents, and hormone imbalances. The presence of another health-related condition, such as diabetes, cardiovascular disease, HIV, or chronic pain, increases the risk of developing a depressive disorder, affecting 11% to 36% of primary care clients (Khouzam, 2007b). The comorbidity of depression and a physical illness leads to less self-care, increasing the severity of both illnesses, decreasing the client's ability to control the diseases, and making the prognosis graver.

Mental illness or brain disorders are often stigmatized; individuals with depression are less likely to seek treatment. Left untreated, depression can negatively impact interpersonal, social, and vocational functioning, resulting in loss of productivity, psychosocial decline, and increased mortality (Khouzam, 2007a). Untreated depression may also lead to tobacco, alcohol, and drug abuse, exacerbating the depression. Depressed individuals frequently contemplate suicide, especially in the presence of a comorbid condition. In 2003, suicide was the 10th leading cause of death in the U.S., i.e., one of every seven patients with recurrent depression committed suicide, making suicide a severe outcome of untreated depression (Mynatt & Cunningham, 2007). Patients with depressive symptoms or a chronic illness should be screened for a depressive disorder so that proper treatment can be initiated to decrease or avoid further complications.

Depression can affect anyone and can be triggered by stress, difficult life events, or other environmental factors. Depression is associated with increased morbidity and mortality, poorer quality of life, and an increased risk of suicide (Ferrans, Penckofer, Savoy, & Velsor-Friedrich, 2007). Depression occurs more frequently in minority women (Egede & Zheng, 2003); American Indian women have the highest rates of poverty, discrimination, exposure to violence, and rate of suicide of any majority or minority population in the U.S.(Napholz, 1995). The suicide rate for AIs is higher than the general population, with the highest rate occurring in female AIs ages 15-44. Because AIs experience significantly higher rates of poverty leading to lack of housing, overcrowding in homes, and other socioeconomic, educational, and significant health problems, the potential for depression and its consequences is evident.

Comorbidity

A strong association between depression and type 2 diabetes has been documented (National Institute of Mental Health [NIMH], 2002). The presence of diabetes doubles the risk of comorbid depression (Anderson, Clouse, Freedeland , & Lustman, 2001). Whether the occurrence of a chronic disease, e.g. diabetes, leads to chronic stress and resulting depression or diabetes and depression are parts of a common or linked set of metabolic disorders, the results are the same: the comorbid conditions of diabetes and depression lead to a poorer prognosis for both diseases. Depression results in poorer physical and mental functioning. Depression in individuals with diabetes is associated with limited adherence to glucose monitoring, diet regulation, and glucose control, and increased complications from both diseases. Glucose control is required to prevent serious diabetes complications (Clouse, Lustman, & Williams, 2007), e.g. cardiovascular disease, stroke, blindness, kidney failure, and limb amputations. The comorbid presence of depression and diabetes can adversely impact blood glucose control.

Diagnosis and treatment of depression can prevent complications, e.g., limited self-care of other health-related conditions, substance abuse, and suicide. Individuals with diabetes and depression have higher morbidity and mortality rates and are 2.5 times more likely to die during a subsequent 8-year period than those diagnosed with either disorder alone (Sacco & Yanover, 2006). Detection and treatment of depression in individuals with diabetes are critical to improve health and decrease complications from both diseases.

Diabetes, Depression- Psychological Distress, and the American Indian Woman

Diabetes is more prevalent in minority populations, with the highest rates in the world occurring in the American Indian (Benavides-Vaello & Garcia, 2006). AI women aged 25-34 years have a higher rate (54 per 1,000) of diabetes when compared to AI men aged 25-34 years (38 per 1,000) (MMWR, 2006). AI women are the most at-risk group for diabetes of any minority or majority group in the world (Acton & Roubideaux, 2001; Morbidity and Mortality Weekly Report [MMWR], 2003; National Diabetes Information Clearinghouse, 2005). Diabetes is epidemic in the AI population, with 60% to70% of adults within the Pima tribe having diabetes (National Diabetes Information Clearinghouse). More than one in three Indians is diabetic and at least another one in three is prediabetic. These numbers continue to rise affecting more AIs at younger ages. The death rate among AIs from diabetes is estimated to be 4.2 times the rate in non-Hispanic Caucasians. AIs in the United States are six times more likely to develop complications directly related to diabetes than non-Hispanic whites (Benavides-Vaello & Garcia; Mutzig & Warnock, 1998).

Although few studies have addressed mental illness in the AI, sparse information has indicated that AI women have the highest risk for mental illness of any group in the U.S. The AI woman is at higher risk for depression, with a prevalence of 18.7% compared to AI men with a prevalence of 12.6% (Bennett et al., 2004). Of all women, aged 25 to 44 years, in the U.S., AI women have the highest suicide rate at 17.3% compared to Caucasian women (10.7%) and African American women (6.4%) (Bender, 2007). AI women have both a high rate of suicide and a high incidence of depression in those with diabetes; the comorbidity of depression and diabetes is a serious health risk. Suicide is a result of untreated, unrecognized depression, and within the general population, the lifetime risk for suicide among individuals with major depression is 2.2% to 15% (Bender). Suicidal risk from depression has not been studied in the AI population. However, the AI woman experiences an impaired quality of life because of social, environmental, health, and economic conditions including poverty, lack of education, and historical trauma that increases her risk for depression.

The recognition and treatment of depression in non-Hispanic white women is poor with less than half of those affected seeking and receiving treatment. Greater than one-third of the demands made on health facilities in Indian country involve concerns related to mental health (U.S. Department of Health & Human Services [USDHHS], 2004). AIs, compared to the general population, underuse mental health services, experience higher therapy dropout rates, and are less likely to respond to treatment (Indian Health Service, 2006b). The recognition and control of diabetes in all populations is inadequate and the coexistence of diabetes and depression significantly affects health outcomes for AI women. Strategies to improve detection and treatment of depression and diabetes are critical to improving the quality of life for AI women, a population that has rarely been studied. When evaluating risk level within this population, AI women rank highest in both diseases, having the highest incidence of diabetes and suicide compared to any other group of Americans. Early recognition and treatment of depression could also improve the outcome of diabetes, decreasing the risk for long-term complications of the disease.

Research Need, Purpose

The long-term consequences of diabetes or depression are significant. Diabetes is associated with serious complications, i.e., organ and tissue damage, cardiovascular disease, kidney failure, blindness, peripheral vascular disease, and premature death. Depression is triggered by stress, difficult life events, or other environmental factors, all for which AI women are at high risk. Unrecognized and untreated depression is associated with increased morbidity and mortality, specifically suicide, and decreased quality of life (Cunningham & Mynatt, 2007). AI women are at significant risk for both diseases and for complications from the comorbidity of depression and diabetes, indicating an emergent need for research with this population of women.

Research concerning diabetes in the U.S. has focused on non-Hispanic white males, and to a lesser degree non-Hispanic white females (Babey, Brown, Diamant, & Hastert, 2007). This is also true of depression research, with fewer research studies on depression than diabetes, especially because depression affects females twice as often as males. Research focused on the relationship between diabetes and depression in the general population of non-Hispanic whites has been conducted, with the majority of studies using white middle class populations. The primary focus of these research studies was cause and effect; with the results showing that depression is more likely in those individuals, usually white males, who have been diagnosed with diabetes (NIMH, 2004; Wierusz-Wysocka & Zozulinska, 2006).

Specific studies of diabetes incidence and prevalence among American Indians have focused on the AI male because the AI population has a much higher level of diabetes than any other group (Burrows, DeBruyn, Gilbert, Pegler, & Thompson, 2003; Dennis et al., 2005; Go et al., 2000). Few research studies have focused on diabetes in the AI female. Less than 30 research studies have focused on the AI male and the high occurrence of depression coupled with alcoholism. Fewer than 10 research studies have been completed on depression in the AI woman. AI women are among the least studied groups in U.S. society even though their risk is the highest. Compared with other women, the physical and mental health status of American Indian women is generally worse (Keita, McGrath, Russo, & Strickland, 1990). No studies examining depression and the risk of diabetes have been undertaken among AI women even though the prevalence and incidence of diabetes and depression is highest in this population. White males have been the dominant focus of research in the U.S., women have been secondary, and AI women have occupied at the lowest strata of importance.

Other issues surrounding the lack of research with AI women are ethical and financial. Past research studies with the AI people were done by agencies outside AI communities (Booton-Hiser et al., 1998; Hood, Kelly, Martinez, Shuman, & Secker-Walker, 1997). Unethical treatment of AI participants and their data by these “outsiders” led to distrust of these agencies. Another important issue is financial. As mentioned earlier, health care dollars are very limited for health care services for the AI, so when funding is not available to meet the most basic health care needs, dollars cannot be diverted for research (Roubideaux & Dixon, 2001), leaving a gap in research with this population. Most significantly, no research establishing a relationship between depression and diabetes in the AI woman has been undertaken. With this population being at highest risk for both of these diseases, research in this area is desperately needed.

Diabetes and depression, independent of each other, occur frequently in the AI woman. This population is at extremely high risk for either of these diseases and their resulting complications. This study will fill an important gap in the literature, as the study will focus on the population most at risk: American Indian women. Because diabetes and depression occur so prominently, the author hypothesizes that a relationship may exist. AI women rarely seek mental health care due to social stigma, cost, and lack of services (Manson, 2001; Napholz, 1995). Screening AI women with diabetes for depression and those with depression for diabetes could result in earlier treatment of both diseases. By establishing a relationship between depression and diabetes, screening can be initiated, a vital aspect of planning care and treatment for both diseases. Research establishing such a relationship is critical in improving the health and survival of the AI woman by providing proper health care after screening. Early treatment of diabetes can decrease the complications of cardiovascular disease, peripheral vascular disease, blindness, and kidney failure. Early treatment of depression decreases complications including poor glycemic control, substance abuse, and suicide. Treatment of either or both diseases decreases the risk of exacerbating the other disease.

Recognition of a disease through early screening not only decreases complications and improves quality of life, but decreases cost through prevention. With the severe shortage of healthcare providers, especially in Indian country, the nurse is a primary health care provider for the AI woman (Dixon, 2001), able to screen women when they present for routine health care. The long-term health problems from diabetes and depression could be altered by recognizing a relationship between the two. This study has the potential to decrease the incidence and prevalence of diabetes and depression and the resulting consequences of either disease. The purpose of this study is to determine if a relationship exists between depression- psychological distress and Type 2 diabetes in American Indian women.

Definitions

American Indian (AI): Indigenous peoples from the regions of North America now encompassed by the continental United States, including parts of Alaska. They comprise a large number of distinct tribes, states, and ethnic groups. Other terms include: Native Americans, Indians, Indigenous Amerindians, and First Nations peoples.

Tribal Affiliation: Group of American Indians whose existence predates European discovery and which has continued to remain separate and distinct. A citizen of an American Indian nation is listed on the membership roll of a specific tribe. The tribe sets its requirements for membership and decides who qualifies as a member; usually an individual who is a descendent of a tribal member qualifies for membership (Dixon, 2001). Some tribes require a certain blood quantum, referring to a degree of American Indian "blood", the federal government requires proof of blood quantum to qualify for federal benefits.

Self-Identified American Indian: Individuals who identifies themselves as American Indians. To be self-identified, a person must have continued association with a tribe or group of American Indians; however, no proof is required.

Diabetes – (Type 2): Insulin disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce it. Type 2 diabetes is associated with race or ethnicity, age, physical inactivity, impaired glucose metabolism, older age, obesity, and family history of diabetes (Department of Health and Human Services [DHHS], 2006). It accounts for 90% to 95% of all diagnosed cases of diabetes.

Depression: An illness that involves the body, mood, and thoughts that affects how a person eats and sleeps, how one feels about oneself, and the way one thinks. A combination of symptoms that interfere with the ability to work, study, sleep, eat, and enjoy once pleasurable activities.

Significance to Nursing

This study will benefit nursing science, education, and practice. The findings from this study will provide nurses with knowledge about the risk of health complications from comorbid diabetes and depression among AI women. Those nurses caring for AI women will be better prepared to detect signs and symptoms of either or both diseases and initiate prevention programs through patient education. Nursing practice will use this knowledge for establishing screening and treatment for those AI women at risk for or having diabetes or depression.

Summary

AI women have the highest rates of both diabetes and depression of all U.S. gender and ethnic groups. They also have the highest morbidity and mortality rates from these diseases of any minority or majority group in the U.S. A long, significant history of oppression and disparity has led to severe health problems. Few studies have looked at the prevalence of these diseases and their relationship to each other. No studies have been found specific to the prevalence of diabetes and depression among AI women. This research will provide evidence for screening programs to detect the diseases earlier, decreasing the complications of diabetes and depression comorbidity, resulting in improved health and quality of life for AI women.

CHAPTER 2

LITERATURE REVIEW

Introduction

Diabetes is a significant health problem in the United States. Diabetes incidence is increasing significantly, reaching epidemic proportions, especially in minority populations. American Indians (AI) have the highest rate of diabetes of any minority or majority population in the world (Burrows et al., 2003). The rates of diabetes and the complications that accompany it are rising. Complications include heart disease, the primary cause of mortality for all Americans, stroke, kidney failure, blindness, and peripheral vascular disease resulting in amputations (De Cora, 2001). These complications affect a disproportionate number of AIs.

Another significant health problem affecting the U.S. population is depression, a side effect of a stressful society (NIMH, 2007). Those at most risk are minorities, those with a lower socioeconomic status, and those in poor living conditions. The population that has the highest rates for all of these factors is the American Indian, specifically AI women. The complications of unrecognized and untreated depression are poor quality of life, exacerbation of other comorbid conditions, and suicide (Cunningham & Mynatt, 2007). AI women have the highest suicide rate of any group in the U.S.(Napholz, 1995)

Comorbidity of depression and diabetes exacerbates both diseases, increasing mortality rates (Egede, 2004; Egede, Simpson, & Zheng, 2002). It has been established that having one of the diseases increases the risk of developing the other disease and it also has been established that having one disease complicates the other (Bailey, 1996; Brantley, Jones, Scarinci, & Thomas, 2003; Chowdhury, 2004; Kuller, Matthews, & Raikkonen, 2007; NIMH, 2004; Sacco & Yanover, 2006). However, a relationship between the two has not been established. Disease management and prevention of complications from the comorbidity of diabetes and depression, is best accomplished through screening leading to early detection (Lee & Weinger, 2006).

This literature review examines the current research on diabetes, depression, the comorbidity of depression and diabetes, and the effect of these diseases among American Indian women. The review also demonstrates a significant lack of research on the relationship between diabetes and depression, especially in the population most affected by these diseases, AI women.

Diabetes Mellitus

Over ten thousand scientific publications concerning diabetes, its causes, and the complications associated with the disease have been published . The primary focus of this literature is the pathology and physiology of diabetes, how it develops, and its severe long-term complications. Most recently, these research studies have demonstrated a significant increase in diabetes throughout the world (Berry & Melkus, 2006; Fowler, 2007; Mayor, 2007; Runge, 2007; Zozulinska & Wierusz-Wysocka, 2006) including the United States (American Diabetes Association [ADA], 2006a; Birnbaum, 2005; National Diabetes Information Clearinghouse [NDIC], 2006). Studies show that the prevalence of diabetes has increased significantly over the last several decades with a total of 18 million to 20 million, or over 8% of the U.S. population, having the disease (Berry & Melkus; Fowler, 2007; Homko & Trout, 2006), with most of the increase being attributed to lifestyle changes, i.e., sedentary lifestyle, increase in high fat diets, and a decrease in physical exercise.

Diabetes is a multifaceted disease that has reached epidemic proportions in American communities, causing adverse effects on both quality of life and health care costs (Babey et al., 2007; Centers for Disease Control and Prevention [CDC], 2006; Runge,2007). Diabetes is a major source of morbidity and mortality, causing significant complications and resulting in over

200,000 deaths annually (National Institute of Diabetes and Digestive and Kidney Diseases, 2006). These statistics demonstrate that diabetes is one of the most significant health concerns today.

Most researchers agree that both internal factors and external factors cause the increased incidence of diabetes. Internal factors are those that cannot be changed such as genetic predisposition due to race, family history of diabetes, and the “thrifty gene” theory (Berry & Melkus, 2006; Hirschhorn & Lindgren, 2001). The “thrifty gene” theory states that a thrifty genotype contributes to the development of type 2 diabetes. This gene evolved during the feast or famine times of hunter-gathers, with survival depending on the ability to store energy as fat (Cox, Permutt, & Wasson, 2005). Accordingly, when famine is not an issue and individuals reduce energy expenditure with more sedentary lifestyles, metabolism is slowed due to the gene, resulting in obesity, a major contributor to diabetes (Berry & Melkus; De Cora, 2001). External factors are those that can be changed such as obesity, increased food consumption with decreased physical activity, and environmental factors such as family roles (Benner et al., 2007; Birnbaum, 2005; Fowler, 2007;; National Diabetes Information Clearinghouse [NDIC], 2006). Many studies theorize that the significant increase in diabetes is a result of the American lifestyle: an increase in convenience and high-fat fast foods, sedentary lifestyle, and socioeconomic status (Brown, Johnson, Majumdar, & Newman, 2005; Dahl, Engum, Holen, Midthjell, & Mykletun, 2005; Everson-Rose, Haan, Kaplan, Maty, & Raghunathan, 2005; Fisher, Goldney, Phillips, & Wilson, 2004).

Diabetes is associated with serious complications and premature death, ranking among the top 10 causes of death in the United States (National Diabetes Information Clearinghouse, 2006). Regardless of whether the cause is external, internal, or a combination of both, the results are the same: an increased risk for cardiovascular disease, stroke, blindness, kidney disease, and depression (Benner et al., 2007; Berry & Melkus, 2006; Coccheri, 2007; Cull, Holman, Jensen, & Retnakaran, 2007; Fowler, 2007; Haffner, Hazuda, Hunt, Stern, & Williams, 2007; Hu et al., 2007) . Studies show that these complications result from microvascular and macrovascular damage to vessels and organs (Benner et al.; Coccheri; Cull et al; Hu et al.) extracting a heavy toll physically, psychologically, and financially from the individual and society.

The primary complications of diabetes account for the severe increase in morbidity and mortality among individuals with the disease. Even though diabetes was listed as the sixth leading cause of death in the United States, this is believed to be a grossly under reported statistic (Anderson & Smith, 2005; Hu, Solomon, & Stampfer, 2001;). With heart disease and stroke accounting for about 65% of deaths in clients with diabetes, and those with the disease having a death rate 2 to 4 times higher from heart disease and stroke than those without diabetes (Center for Disease Control-Diabetes, 2006), the impact is significant. Diabetes is also the leading cause of blindness in adults, the leading cause of kidney failure (with a 44% increase in 2002 alone), a major cause of nervous system damage, and the number one cause of nontraumatic amputations. With the steady increase in diabetes, these complications are on the rise, which costs individuals and society billions of dollars and lowers quality of life (ADA, 2006b; Center for Disease Control-Diabetes; Kulkarni & Stys, 2007; Runge, 2007).

Diabetes disproportionately affects minority populations, minorities having poorer health than majority populations in general (Appel, 2005; Department of Health and Human Services - Centers for Disease Control and Prevention, 2004). Those at highest risk are females from lower socioeconomic strata, with relative lack of personal, social, or political power (Benavides-Vaello & Garcia, 2006; Cape, Cheung, Lee, & Zinman, 2000; Colditz et al., 2006; Homko & Trout, 2006). The AI woman fall in all of these risk categories, experiencing disproportionate poverty and living in marginalized communities with poor health care and health outcomes (Castor et al., 2006; Eschiti, 2005).

It is well documented that the American Indian has the highest rates of diabetes in the world (Burrows et al., 2003; De Cora, 2001; Dennis et al., 2005; Indian Health Service [IHS], 2006a; Morbidity and Mortality Weekly Report , 2006; Reynolds, 2007), with American Indian women having higher rates than AI men. The complications that accompany diabetes are also recognized as occurring most frequently in the AI population (Acton et al., 2002; Acton, Burrows, Engelgau, Geiss, & Narva, 2005; Go et al., 2000; Josline Diabetes Center, 2005). Even with documented findings that diabetes and its complications disproportionately affect AIs, very little research has explored specific causes, prevention strategies, and treatment of diabetes among this minority population. Research specific to the AI woman is almost nonexistent in comparison to over 10,000 studies for non-Hispanic Caucasians.

Depression

Over time, many theories about how depression develops in individuals have been proposed. Two thousand years ago, Aretaeus, a physician, theorized that depression was caused by being frustrated so many times that the person had no hope (National Advisory Mental Health Council, 1993). In 1967, Beck's Cognitive Theory of Depression was introduced and has become the most widely used depression theory. The main component of Beck's theory is that depression results from one's view of oneself, instead of one having a negative view of oneself due to depression (Allen, 2003). Beck's theory states that underlying dysfunctional beliefs can serve as a catalyst for the occurrence of depression and that these thoughts centered on a negative cognitive triad, of thoughts about the self, one's surroundings, and one's future (Abela &

D'Allesandro, 2002; Beck, Brown, & Clark, 1989). A key part of this theory is that not only will the individual have negative underlying beliefs, but that these beliefs fall into certain fields that separates them from other disorders. These fields include polar reasoning, selective abstraction, and overgeneralization (Allen). Polar reasoning is extreme, so even a slight waiver from perfection is considered failure. Abstraction means that successes are ignored and lost to the subject, who is left only with sadness. Overgeneralization implies one will do poorly in one situation and assume failure in all related situations. Therefore, the feelings of depression are failure and loss (Allen, p. 4). Beck's theory postulates that early experiences can lead to dysfunctional beliefs, leading to a negative self-image, leading to depression (Allen; Beck et al.). To identify these negative beliefs and the severity of depressive symptoms, Beck developed the Beck Depression Inventory (BDI) (Abela & D'Allesandro).

Other theories about the causes of depression include Seligman's learned helplessness theory (Seligman, 1991), stating that people in helpless circumstances become depressed. Depressed people become that way because they learn to be helpless; they learn that whatever they do is futile. During the course of their lives depressed individuals learn that they have no control, and that belief leads to depression. Seligman suggested that learned helplessness consists of three interrelated areas of disturbance: (a) motivational-helplessness reduces the motivation to control the outcome, (b) cognitive-helplessness interferes with learning that responding controls the outcome, and (c) emotional–helplessness produces fear as long as the subject is uncertain of the uncontrollability of the outcome, and then produces depression (Miller III & Norman, 1979; Seligman, 1975, p. 56).

Another instrument to detect depression is the Kessler Psychological Distress Scale (K6, K10). This scale was developed for the redesigned US National Health Interview Survey

(NHIS), part of the National Comorbidity Survey (Kessler et al., 2002). This scale is a commonly used measure to assess global psychological distress, especially useful in minority cultures. It has been used in numerous large-scale and nationally representative studies inside and outside of the U.S., which indicates how global psychological distress analysis captures symptoms that may be more commonly experienced by various cultures, as opposed to diagnosable depression and other diagnoses (Williams et al., 2007). This depression screening tool is used in the CHIS to assess anxiety and depressive symptoms that individuals have experienced in the most recent 4-week period (Department of Health, 2002). The six questions in the K6 were asked of all participants in the survey and scored accordingly (California Health Interview Survey, 2006) providing anxiety and psychological distress scores for the AI population in this study.

Most recently, theories combining and testing previous theories have gained attention; some have proposed that depression is caused by: 1) stress and the environment, 2) factors outside individuals 3) factors not directly related to brain function, 4) inherited traits i.e. physical illnesses, or 5) any other occurrence that may take place within individuals. These theories are all or in part similar to Seligman’s and Beck’s theories. Major advances in depression have been made in the past 15 years; however, even with these advances, depression is increasing and occurring at younger ages, with little coordinated action to reduce untreated morbidity (Bland, 1997).

Even with the evolving theories about depression, some basic physiological findings are accepted by practitioners caring for individuals with depression. Depression is a serious health condition that affects thoughts, feelings, and the ability to function in everyday life (Narrow, Regier, & Roe, 1993). Depression results from abnormal functioning of the brain, specifically at the level of neurotransmitters; however, the neurotransmitters involved are unknown. Approximately 10% of American adult males and 20% of American females are affected by depression at some time in their lives; with about 19 million individuals over the age of 18 experiencing some form of depression every year (Chowdhury, 2004). It is estimated that one half of all Americans will have a depressive disorder at some point in their lives and only one third of those individuals will receive proper treatment (Cunningham & Mynatt, 2007; Khouzam, 2007a).

Depression is associated with increased morbidity and mortality and decreased quality of life (Arcury et al., 2005). Depression is common and recurrent, and if left untreated can be lethal, resulting in suicide. Because many depressed individuals refuse to seek treatment, they experience deterioration of interpersonal, social, and vocational functioning (Khouzam, 2007a) and provide rationale for the importance of depression screening by health care practitioners. Recognition of the signs and symptoms of depression can lead to early intervention.

Those at increased risk for depression are: women with a family history of the disease, who have experienced a previous episode of depression, are of lower socioeconomic status, are part of a minority group that has been subjected to discrimination or abuse, and have a comorbid health problem. One in every seven Americans with recurrent depression commits suicide and 70% of those who attempt suicide have been seen in a primary care setting within 6 weeks prior to the suicide attempt (Bender, 2007; Cunningham & Mynatt, 2007), making screening of at-risk patients vitally important.

Women experience depression at least twice as often as men (Blehar & Oren, 1997; National Institute of Mental Health [NIMH], 2007). The most at risk group in the United States is the American Indian, specifically the AI woman. Very little research has been published about this population, the most understudied group in the United States. What is known is that American Indian women have all the significant risk factors for depression. They have a significantly higher poverty rate, 25.3 % of the AI population live in poverty (Indian Health Service [IHS], 2006a;) compared to 12.6 % for non-Hispanic whites (Dixon, 2001; U.S. Census Bureau, 2006; U.S. Department of Health and Human Services: Surgeon General's Report, 2006). The experience of abuse is higher among AIs than any other group (Bohn, 2003; U.S. Department of Health and Human Services, Surgeon General's Report, 2005), and they have a 60% higher suicide rate compared to the national rate (Beals, Manson, Mitchell, Spicer, & Whitesell, 2005; Beals et al., 2005; Duran et al., 2004; Napholz, 1995). Compounding these risk factors, AIs have the highest rate of diabetes in the nation and the effect of co morbid conditions exacerbates complications of both diseases.

Diabetes and Depression

Diabetes and depression are frequently comorbid, and in their combined condition, complications of each disease are exacerbated. At this point in scientific inquiry, the exact causal link between depression and diabetes is unknown. Scientists speculate that depression causes diabetes (Arroyo et al., 2004); that whatever biological trigger causes the imbalance in neurotransmitters in the brain causing depression (Kuller et al., 2007; Ullman, 2007) may also be responsible for the inability of the pancreas to secrete sufficient insulin resulting in type 2 diabetes (Brown et al., 2005). The possibility of depression causing diabetes was first suggested by Willis in 1684, who wrote that diabetes was the result of ‘sadness or long sorrow” (Clouse & Lustman, 2004). The theory that depression may be a risk factor for diabetes has been moderately studied. Depression may contribute to functional impairment, poor diet, medication noncompliance, lack of exercise, and increasing susceptibility to diabetes has been postulated

(Anderson et al., 2001; Bromberger et al., 2004; Brown et al., 2005; Feinglos, Lane, Parekh, Surwit, & van Tilburg, 2005; Fisher, Goldney, Phillips, & Wilson, 2004; Glover, Harmon, Lewin, White, & Wright, 2005; Lin, Simon, & Von Korff, 2005).

Research into the causal link between diabetes and depression, with diabetes causing depression, has been more closely studied than depression causing diabetes. Diabetes has been found to be associated with depression and is recognized as the causative factor for depression in several studies (Anderson, et al., 2001; Arcury et al., 2005; Beckles et al., 2005; Brown & Nichols, 2003; Bush et al., 2004; Dahl et al., 2005; Egede, 2004; Egede, Nietert, & Zheng, 2005; Everson-Rose et al., 2005; Rao, Stewart, & White, 2005; Wilson, 2004). The primary finding of these studies is that the burden of diabetes has a psychological impact on the individual (Arean et al., 2007; Blais et al., 2007; Lee & Weinger, 2006). Researchers indicate that managing troublesome symptoms, adhering to medication regimens, following dietary guidelines, and monitoring blood glucose cause a significant change in lifestyle leading to feelings of depression. Depression impacts quality of life and the patient lacks the desire to monitor glycemic levels (Chowdhury, 2004; Feinglos, Lane, Parekh, Surwit, & Van Tilburg, 2005), thus increasing diabetes morbidity. If depression is relieved, the individual has improved glycemic control. Thus, it is concluded that those diagnosed with either diabetes or depression should also be screened for the other disease.

The causes underlying the association between depression and diabetes are unclear. Depression may develop because of the stress of the diagnosis and the treatment regimen for diabetes or may result from metabolic effects, such as a change in neurotransmitters in the brain. Studies suggest that those with diabetes have a 37% higher rate of depression than those without diabetes (Brantley et al., 2003; Egede et al., 2005; Egede & Zheng, 2003; Sacco & Yanover, 2006), and the presence of depression doubles the risk of developing type 2 diabetes (Rao et al., 2005) indicating that an association does exist between depression and diabetes. These findings support the need for research to establish a relationship between diabetes and depression. If so, more aggressive identification and treatment of depression in those with diabetes, and diabetes in those with depression, could decrease the morbidity and mortality of the co morbid conditions.

Women are at increased risk for complications from the comorbidity of diabetes and depression (Ferrans, Penckofer, Savoy, & Velsor-Friedrich, 2007). Non-Hispanic white women in the U.S. have twice the rate of depression as their male counterparts (Anderson et al., 2001), with the incidence of diabetes being the same in males and females. The majority of research has been conducted on non-Hispanic white males, and then "adapted" for females, leading to erroneous assumptions. In some studies, gender was not specified when addressing the relationship between diabetes and depression. A significant gap in health research exists specifically addressing this issue in women.

Diabetes, Depression, and American Indian Women

Diabetes is a serious, common problem for the American Indian, with over 98% of diabetic AIs having Type 2. AIs have a higher rate of diabetes (Keim, Parker, Sparrer, Taylor, & Van Delinder, 2004) than any other group in the U.S., leading to an epidemic within this population. It is one of the leading causes of death for the AI. When evaluating risk level within this population, AI women rank highest with a rate of diagnosed diabetes cases of 54 per 1,000 compared to 38 per 1,000 in AI men (MMWR, 2006). Among some Indian tribes, 95% of its members have been diagnosed with the disease (Marchland, 2004).

Diabetes contributes to other health problems including hypertension, cardiovascular disease, kidney disease and failure, and peripheral vascular compromise resulting in amputations, blindness, and organ failure. Thirty percent of the AIs in the United States die of complications directly related to diabetes, compared to 10% of non-Indians (De Cora, 2001; Mutzig & Warnock, 1998), more than one in three Indians is diabetic and at least another one in three is prediabetic.

Causes of severe diabetes in the American Indian include economic, social, and hereditary factors. The two categories of risk factors that increase the incidence of diabetes among AIs are genetics and health-related/lifestyle risk factors. The genetic risk is significant in the AI and the higher the percentage of Indian heritage, the higher the risk. Those with Choctaw and Pima heritage are at greatest risk (National Diabetes Information Clearinghouse, 2005; U.S. Department of Health and Human Services, 2004a). As mentioned earlier, the genetic predisposition or "thrifty gene" theory states that the Indian has a thrifty gene from when this population experienced periods of feast and famine thus indicating that the AI developed a gene to store fat during feast in order to survive famine (National Diabetes Information Clearinghouse, 2002), leading to a major contributing factor for diabetes; obesity.

The health-related/lifestyle risk factors include obesity, diet, and physical inactivity. With literature showing that 80% to 95% of American Indians are overweight (Bell, 2004; Bennett, Hanson, Krakoff, Looker, & Singh, 2004), obesity plays a significant part in diabetes risk. Obesity is related to cultural food choices such as fried foods, foods high in animal fat such as red meats, and sweet cakes and breads; this diet is also higher in fat and calories, combined with a decrease in physical activity, leading to a predisposition to obesity. Standard diabetes treatments prescribed for Caucasians have failed for the most part with the American Indian population (De Cora, 2001).

Large-scale studies of American Indians with mental disorders have not been done; however, a few small studies (Anderson et al., 2001) have demonstrated rates of depression ranging from 15% to 30% (National Vital Statistics Reports, 2005). With the prevalence rate of suicide for AIs 1.5 times the national rate, the recognition of depression is vitally important for this vulnerable population. AI women are at even higher risk with a prevalence of depression at 18.7% in comparison to AI men at 12.6% (Bennett et al., 2004). Of all women, AI women ages 25-44 have the highest suicide rate in the United States, often resulting from missed opportunities to treat depression.

Although very few studies about the AI and mental illness have been completed, some factors are believed to play a part in their high depression and suicide rates. Those factors are poverty, low education level, alcoholism, and the highest violence rate of any group in the U.S. (Bohn, 2003). No studies concerning rates of mental illness, depression, and suicide specific to AI women, were found. Neither have large-scale studies been published on the relationship between diabetes and depression in this population. Only a few small scale (3) studies on the relationship were found for this literature review and those three had been done on a few members of the same tribe (Arcury et al., 2005; Bennett et al., 2004; DeCora, 2001).

Type 2 diabetes and depression occur in higher percentages in ethnic minority groups, with the highest rates occurring in AI women (Acrury et al., 2005). The diabetes rate for American Indian women was three times the rate for non-Hispanic white women in 2002, with 30.9% of AI women and 11.1% of white women being affected (Indian Health Service, 2003). The group at greatest risk for complications resulting from the comorbidity of diabetes and depression is the American Indian (AI), especially the American Indian woman. This group at greatest risk is also the group with the least number of research studies published. AIs have the highest diabetes rate for any minority or majority group in America and also have twice the rate of suicide of any other group (Bohn, 2003). Very few studies about the comorbidity of depression and diabetes have been undertaken in the American Indian community (Beals, Jiang, Manson, Roubideaux, & Whitesell, 2007). No studies about diabetes and depression specific to American Indian women were found for this literature review.

Summary

Diabetes and depression are significant health problems in the United States. Minority groups are at greater risk of developing either disease as a result of cultural, social, economic, and health disparities. The minority population at greatest risk for diabetes and depression because of these disparities is the American Indian woman. The literature reviewed provides a knowledge base for the risk of diabetes and depression in the general population with moderate information on these diseases among the American Indian population. Scientific studies establishing a relationship between diabetes and depression in the non-Hispanic white, predominately male, population are increasing. This literature does present conflicting evidence as to which disease occurs first, and if a cause and effect relationship can be documented; however, it does recognize that comorbidity of diabetes and depression increases morbidity and mortality from both diseases. Very little research has been done with the American Indian population and this comorbid relationship, and none has been done studying AI women and comorbidity. The AI woman is at higher risk for the consequences of the comorbidity of these two diseases than any other population in the United States. No studies establishing a relationship between the two exists in publication. It is for this reason that investigating and establishing a relationship between diabetes and depression in the AI woman is vital. A scientific knowledge base that supports this relationship is needed to direct the provision of nursing care.

Screening and treatment for one disease when the other is present could lead to a decrease in the morbidity and mortality of the comorbid condition. Evidence based nursing care cannot be provided until an actual relationship between diabetes and depression is established through research. This study investigated the possible relationship using a scientifically based method.

CHAPTER 3

RESEARCH METHODS

The purpose of this study was to determine if a relationship exists between depression and diabetes in American Indian women via secondary analysis of data obtained from the 2005 California Health Interview Survey (CHIS). By determining if a relationship exists, future research can focus on this population, resulting in evidence-based care for AI women who have either disease or both diseases. Contributing to the existing science will support the need for screening and the early provision of care to enhance patient outcomes.

Study Design

This study used a descriptive correlational design. It was undertaken to determine if a relationship existed between diabetes and depression in AI women. The author did not conduct any primary data collection; this study was a secondary analysis of the CHIS 2005 data using multiple variables related to diabetes and depression among adult female AIs from all counties of California. This secondary analysis used extensive information collected by the CHIS 2005 on AI women and their reported prevalence of diabetes and depression.

The specific research questions were:

1. What socio-demographic variables predict diabetes and-or depression in AI women?
2. Is there a relationship between diabetes and depression in AI women who participated in this study?
3. Do socio-demographic variables influence the occurrence of depression in AI women who have been diagnosed with diabetes, who have not been diagnosed with diabetes, or who are borderline for diabetes?

Sample

The CHIS is the largest population-based state health survey in the United States (Chia et al., 2006). The CHIS is a population-based random-digit dial telephone survey of California's population conducted every other year beginning in 2001. Westat, a private firm specializing in statistical research and large-scale sample surveys, conducted the data collection under the supervision of UCLA's Center for Health Policy Research. CHIS surveyors collected extensive information for all age groups and major racial and ethnic groups in every county in California. Surveyors inquired about health status, health conditions, health-related behaviors, access to health care services, and other health and health related issues.

The CHIS data base was chosen because California has the largest AI population in the U.S.(Ogunwole, 2002; U.S. Department of Commerce, 2008) and a significant number of American Indians were included in the survey. To ensure adequate statistical power (.80) for the analyses in the extracted sample, a priori power analysis was conducted. This analysis was based on a medium effect size and an alpha coefficient of .05 with nine predictors. This number of predictors is the maximum number that could be included in the most complex regression analyses. Specifically, this study tested the demographic factors of educational attainment, marital status (i.e., married as the reference category) and poverty level (i.e., 300% and above of poverty as the reference category), as well as diabetes (i.e., no diabetes as the reference category). Results of this power analysis revealed that a sample size of 114 would be needed to reach adequate statistical power. As the subsample of American Indian women is much larger than that needed sample size, adequate power was presumed. For this secondary analysis, data from 1,110 adult females who self-reported to be American Indians were analyzed from a total of 43,020 adults who responded to the CHIS.

Instrumentation

Data Collection

The CHIS 2005 sample was secured through list-assisted random digit dialing (RDD). A simple random sample of telephone numbers was selected from a published telephone directory, after business and nonworking numbers were purged. Eligible residential households included houses, apartments, and mobile homes occupied by individuals, families, multiple families, extended families, or unrelated persons. All eligible individuals were included for random selection representing all counties in California. Those without a landline were excluded.

The CHIS 2005 surveyors collected extensive information from all age groups on health status, health conditions, health-related behaviors, health insurance coverage, access to health care services, and other health and health related issues (California Health Interview Survey, 2007). The data and results are used extensively by federal and state agencies across the nation, with CHIS being the largest health survey conducted in any state and one of the largest health surveys in the nation.

Surveys were developed by UCLA and its partners to cover a wide variety of health-related research topics. Surveys were patterned after the National Health Interview Survey (NHIS) and analyzed by Westat, the same well-known research company used by state and national agencies including the Centers for Disease Control and Prevention (CDC). In collaboration with Westat, survey items, wording and sequence, and estimated length, not to exceed 30 minutes for the adult questionnaire, were designed and the reliability of the survey was established. The reliability of the survey was further enhanced by its repeated use in 2001, 2003, and 2005. Minor revisions to the questionnaire were made as needed to insure internal consistency with each use. To increase construct validity after revisions were done, a formal pretest and pilot test were conducted before the main survey was begun (California Health Interview Survey, 2006).

Prior to the interview, study staff mailed advance letters to households that were identified from reverse phone directories; approximately 67% of the sampled telephone numbers that received advance letters responded to the survey compared to previous 2001(37.7%) and 2003 (55.9%) response rates. The CHIS was conducted in five languages to incorporate diversity of the population; however, no native languages of American Indians residing in California were used (California Health Interview Survey, 2006).

To increase the CHIS response rate, up to 14 attempts to reach each respondent were made, calling at different times of the day and on different days of the week. If respondents declined to participate, one attempt was made to "convert" them. The overall unweighted response rate was 43.3%, which was the same rate as the Center for Disease Control and Prevention's (CDC) Behavior Risk Factor Surveillance System (BRFSS) survey and similar to other large surveys across the nation. CHIS 2005 was the third data collection cycle conducted between July 2005 and April 2006.

It is important to note that some sampling bias existed. The most prominent issue is that only those persons with landline phones were included, thus excluding those individuals who do not have landlines due to economics, location, or the exclusive use of cell phones. Several additional issues have become problematic random phone surveys in the United States. Barriers to the random-digit telephone survey method include aggressive telemarketing, the busy lifestyle of Americans, language and cultural communication barriers, and a heightened awareness of the need to protect one's privacy and identity.

Secondary Data Analysis

From this large data base, the information from self identified AI women between the ages of 18 and 65 years were extracted for secondary data analysis. SAS-Callable SUDAAN is a statistical package for the analysis of correlated data; this data management system was used to analyze the data. SUDAAN was designed by Research Triangle Institutes (RTI) International in Raleigh, North Carolina specifically to handle large databases such as CHIS, National Health Interview Survey (NHIS), and the CDC. Due to specific weighting of variables, SUDAAN was the only program that would provide accurate and reliable results for secondary analysis.

Initial data analysis was descriptive, providing characteristics of the CHIS sample of AI women. In addition to all participants being female, 18 to 65 years old, and self-identified American Indians, frequency distributions of socio-demographic descriptives relating to marital status, poverty level, and education were included. The researcher also calculated distress means by diabetic categories, i.e., no diabetes, diagnosed with diabetes, or diagnosed as borderline.

The question used by CHIS for diabetes: Have you ever been diagnosed by a doctor with diabetes?

No diabetes
Diagnosed diabetes
Borderline diabetes

Possible socio-demographic predictors of distress and diabetes were also explored to determine if a relationship between diabetes categories and distress existed. This analysis looked at both the relationship with and without including socio-demographic variables.

Research question #1: What socio-demographic variables predict diabetes and-or depression in AI women? Linear regression was used to determine if socio-demographic variables were predictors of psychological distress. Logistic regression was used to analyze the socio-demographic predictors of diabetes.

Research question #2: Is there a relationship between diabetes and depression in American Indian women who participated in this study? This question was examined using linear regression to determine if diabetes predicted psychological distress. Demographic variables were included in a second regression model.

Research question #3: Do socio-demographic variables influence the occurrence of depression in AI women who have been diagnosed with diabetes, who have not been diagnosed with diabetes, or who are borderline for diabetes? Linear regression was used to determine a possible difference in the occurrence of depression in AI women who did not have diabetes, had diabetes, and had been diagnosed with borderline diabetes.

Psychological Distress

In CHIS data psychological distress was determined using the Kessler Psychological Distress Scale (K6). Six questions were used to determine the mean level of psychological distress. This scale yields a summary score that ranges from 0 to 24. The summary score is a sum score, not a mean score, of individual items. The individual items were recoded prior to summing, from 0 to 4, resulting in a possible total sum of 24; in addition, the items were reverse coded so that higher scores indicate higher levels of psychological distress.

The psychological distress measurement was a continuous variable. Six different questions were asked of the participant:

- During the past 30 days, how often did you feel nervous?
- During the past 30 days, how often did you feel hopeless?
- During the past 30 days, how often did you feel restless or fidgety?

- During the past 30 days, how often did you feel so depressed that nothing could cheer you up?
- During the past 30 days, about how often did you feel that everything was an effort?
- During the past 30 days, about how often did you feel worthless?

For each of the questions a score was given according to the Kessler Scale 6 (Department of Health: Government of South Australia, 2003; Kessler et al., 2002; Kessler et al., 2003;; National Co-morbidity Survey, 2005):

- 0=all the time
- 1=most of the time
- 2=some of the time
- 3=a little of the time
- 4=not at all

Once the scores were summed, reverse coding was done, indicating that the higher the score, the higher the distress level based on 0 equals no stress and 24 equals the highest level of psychological distress.

Human Subjects Protection

This study was deemed exempt from the Institutional Review Board Approval (IRB), ETSU/VA IRB decided the study was not human subjects research due to its design. (See Appendix A) These data are available on the internet and all identifiers had been removed. Secondary analysis of this database did not allow any access to participants' identifiable information.

Summary

This study was a secondary analysis of CHIS 2005 survey of American Indian women living in California. Descriptive statistics were used to detail the characteristics of the sample. Both logistic and linear regressions were used for analysis of data to answer the research questions.

CHAPTER 4

RESULTS

For this descriptive correlational study, a sample of 1110 self-identified adult AI women were extracted from the CHIS 2005 survey of 43,020 adult participants and a secondary analysis was undertaken. The previous chapter described the characteristics of this sample. This chapter presents the findings of the study, which investigated a relationship between diabetes and depression-psychological distress in this high-risk population. Socio-demographic variables are presented to describe the sample, followed by socio-demographic predictors of psychological distress and diabetes, and finally the findings regarding the relationship between diabetes and depression or psychological distress in this sample of AI women.

Socio-Demographic Descriptives

Educational levels were assigned values from 0, no formal education, to 10, PhD or equivalent (Table 1). The mean educational attainment of the women was 4.69 (between some college and vocational school), with the largest group of AI women having either a high school diploma or some college (Table 1).

Table 1

EDUCATIONAL ATTAINMENT

	Educational Attainment	Mean = 4.69
Educ. Levels	Percent	Frequency
0=no formal educ.	0.72	8
1=grade 1-8	4.95	55
2=grade 9-11	11.8	131
3=grade12/H.S.diploma	29.64	329
4=some college	21.17	235
5=vocat. School	4.23	47
6=AA/AS degree	11.08	123
7=BA/BS degree	9.55	106
8=some grad school	0.90	10
9=MA/MS degree	4.95	55
10=PhD or equiv	0.99	11

The women were evenly divided with 50% married or cohabitating and 50% widowed, separated, divorced, or never married (Table 2, Figure 1).

Table 2.

MARITAL STATUS

Marital Status	Percent	Frequency
1=married	41.17	457
2=cohabitating	8.65	96
3=wid/sep/div	34.41	382
4=never married	15.77	175

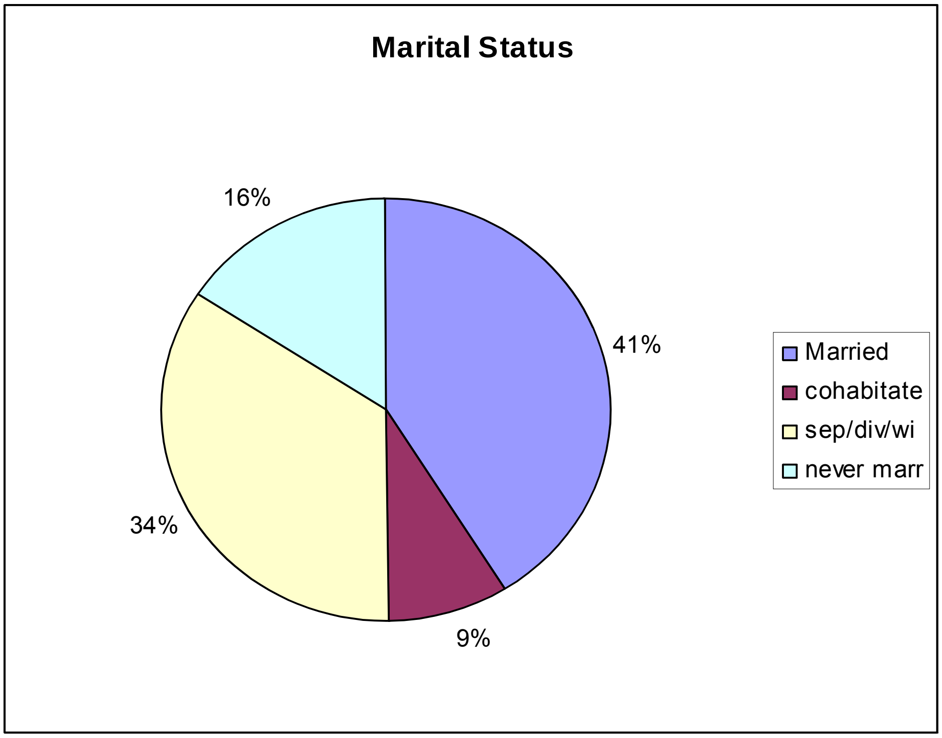

FIGURE 1. Marital Status

Poverty level frequencies showed that 45% of the women reported their incomes below the standards for “adequate” income (199%FPL or below) and 39% reported incomes in the 300% and above category (Table 3, Figure 2).

Table 3.

FEDERAL POVERTY LEVEL (FPL)

Federal Poverty Level	Percent	Frequency
1= 0%-99% FPL	20.81	231
2= 100%-199% FPL	24.59	273
3= 200%-299% FPL	15.23	169
4= 300% and above FPL	39.37	437

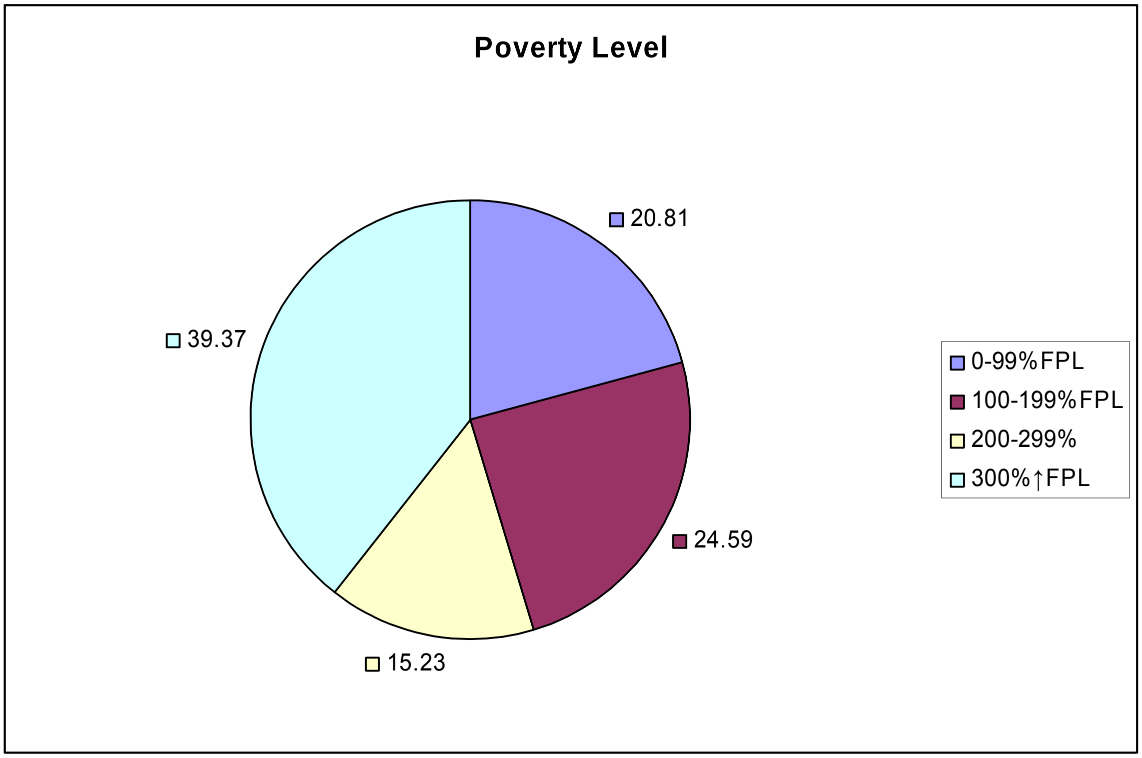

FIGURE 2. Poverty level

Socio-Demographic Predictors of Psychological Distress

Research question #1: What socio-demographic variables predict depression or psychological distress?

All socio-demographic variables were predictors of psychological distress. As education level increased AI women's distress level decreased (see Table 4). Women who were married had significantly lower levels of distress (mean of 3.47) than those widowed, separated, divorced, or never married (4.92-4.77), (Refer to Table 4 and Figure 3).

Table 4.

LINEAR REGRESSION ANALYSIS EXAMINING SOCIO-DEMOGRAPHIC PREDICTORS OF DISTRESS

Variable	β	SE B	P-value
Educational Attainment	-0.21	0.09	0.0228*
Marital Status			
1=married	0.00	0.00	-
2=cohabitating	1.29	0.69	0.0660
3=wid/sep/div	1.08	0.51	0.0360*
4=never married	1.08	0.51	0.0386*
Poverty Level			
1=0%-99% FPL	1.18	0.50	0.0203*
2=100%-199% FPL	1.42	0.52	0.0081*
3=200%-299% FPL	-0.02	0.44	0.9640
4=300%↑ FPL	0.00	0.00	-

Note: married and 300%↑ FPL were used as reference groups. p*<.05

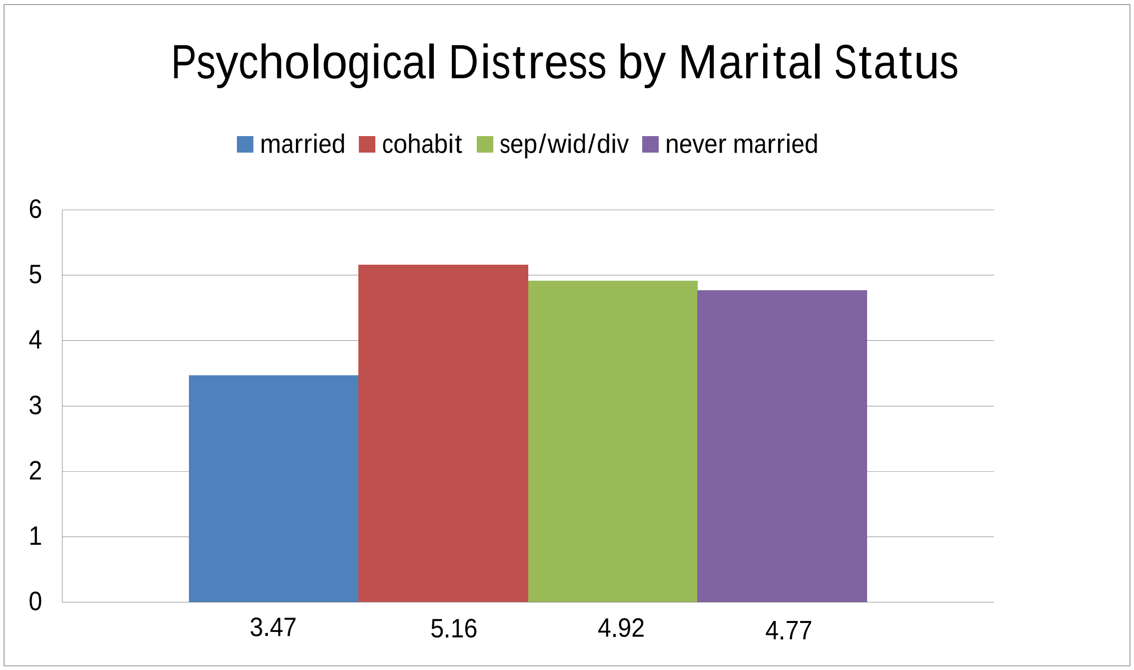

FIGURE 3. Mean Psychological Distress Scores by Marital Status

Another variable that showed significance was income level; women who lived in poverty, both 0%-99% FPL and 100%-199% FPL had significantly higher mean distress levels than the reference group of those at 300% or greater FPL. These results are displayed in Figure 4.

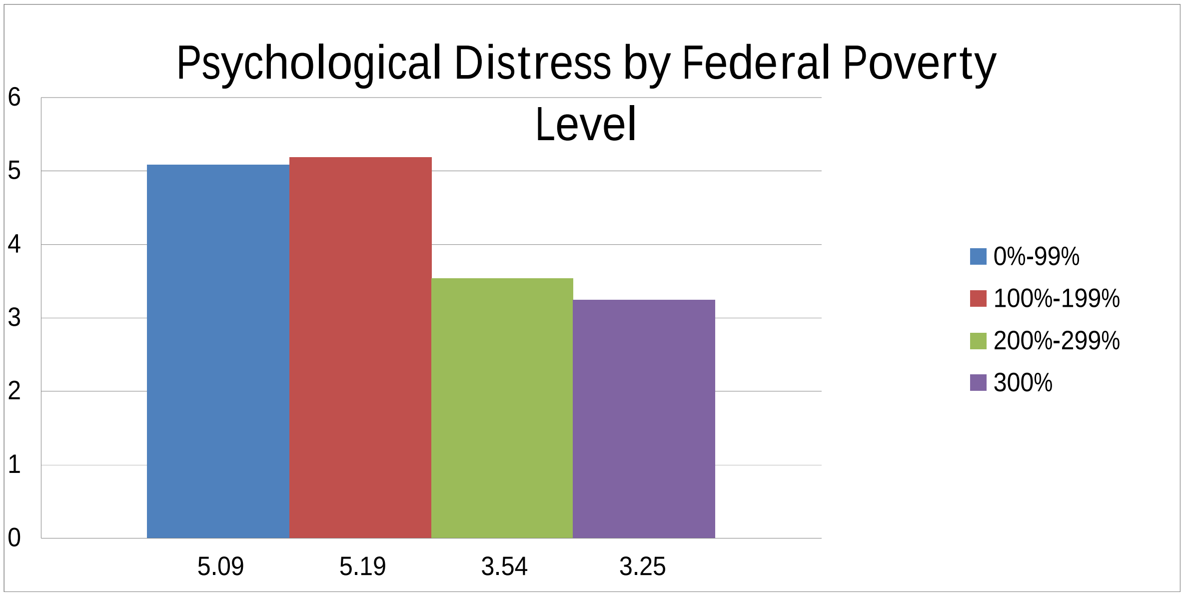

FIGURE 4. Mean Psychological Distress Scores by FPL

Socio-Demographic Predictors of Diabetes

Research question #1: What socio-demographic variables predict diabetes? Using Logistic regression, the socio-demographic variable poverty level, was not found to be a significant predictor of diabetes. The results are displayed in Tables 5-8 and Figure 5-7.

Table 5.

LOGISTIC REGRESSION ANALYSIS EXAMINING SOCIO-DEMOGRAPHIC PREDICTORS OF DIABETES____
DIAGNOSED DIABETES (N=130)

Variable	β	SE B	P-value
Educational Attainment	-0.21	0.11	0.0533
Marital Status			
1=married	0.00	0.00	-
2=cohabitating	-1.14	0.57	0.0508
3=wid/sep/div	0.21	0.35	0.5553
4=never married	-0.81	0.42	0.0602
Poverty Level			
1=0%-99% FPL	0.33	0.40	0.4104
2=100%-199% FPL	0.62	0.36	0.0869
3=200%-299% FPL	0.45	0.47	0.3372
4=300%↑ FPL	0.00	0.00	-

Note. Married and 300%↑ FPL_were used as reference groups. *p<.05

Table 6.

LOGISTIC REGRESSION ANALYSIS EXAMINING SOCIO-DEMOGRAPHIC PREDICTORS
NO DIABETES (N=956)

Variable	β	SE B	P-value
Educational Attainment	0.18	0.10	0.0689
Marital Status			
1=married	0.00	0.00	-
2=cohabitating	1.07	0.54	0.0514
3=wid/sep/div	-0.41	0.34	0.2269
4=never married	0.74	0.41	0.0772
Poverty Level			
1=0%-99% FPL	-0.38	0.39	0.3233
2=100%-199% FPL	-0.56	0.34	0.1052
3=200%-299% FPL	-0.41	0.46	0.3692
4=300%↑ FPL	0.00	0.00	-

Note. Married and 300%↑ FPL were used as reference groups. *p<.05.

Table 7.

LOGISTIC REGRESSION ANALYSIS EXAMINING SOCIO-DEMOGRAPHIC PREDICTORS BORDERLINE DIABETES (N=24)

Variable	β	SE B	P-value
Educational Attainment	0.06	0.13	0.6138
Marital Status			
1=married	0.00	0.00	-
2=cohabitating	-0.07	0.88	0.9393
3=wid/sep/div	1.94	0.60	0.0017*
4=never married	0.34	0.54	0.5309
Poverty Level			
1=0%-99% FPL	0.58	0.70	0.4136
2=100%-199% FPL	-0.19	0.68	0.7749
3=200%-299% FPL	-0.14	1.52	0.9286
4=300%↑ FPL	0.00	0.00	-

Note. Married and 300%↑ FPL were used as reference groups. *p<.05

Table 8.

NUMBER OF AI WOMEN IN EACH POVERTY LEVEL BY DIAGNOSIS

	Poverty Level			
Doctor Diagnosed Diabetes	0%-99% FPL	100%-199%FPL	200%-299%FPL	300%↑FPL
1=diabetes	34	40	18	38
2=no diabetes	190	227	149	390
3=borderline	7	6	2	9
Totals:	231	273	169	437

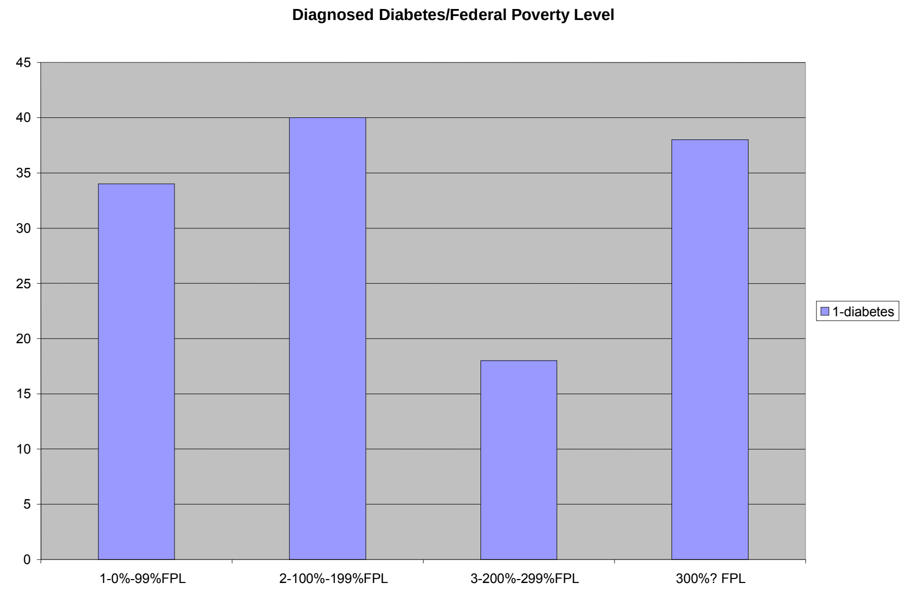

FIGURE 5. Diabetes by FPL

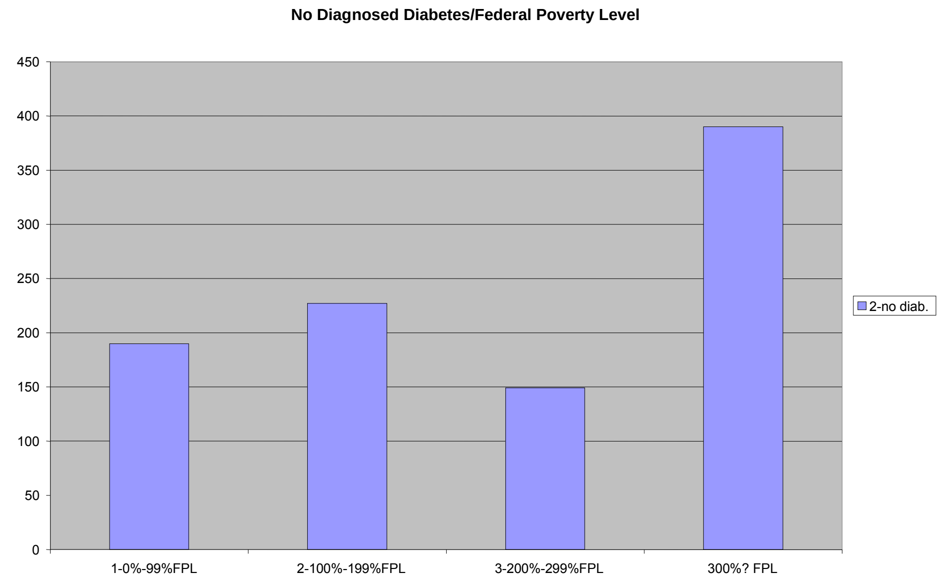

FIGURE 6. No Diabetes by FPL

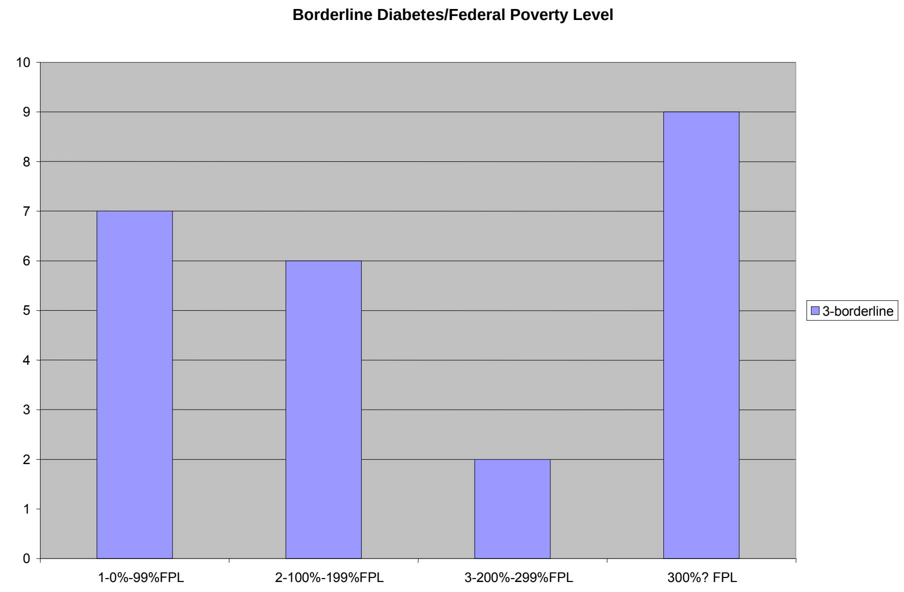

FIGURE 7: Borderline Diabetes by FPL

In regards to marital status, being divorced, widowed, or separated was a significant predictor of borderline diabetes, i.e., an AI woman was more likely to be borderline diabetic if she was divorced, widowed, or separated compared to being married. These results are displayed in Table 9 and Figure 6.

Table 9.

NUMBER OF AI WOMEN IN EACH MARITAL STATUS CATEGORY BY DIAGNOSIS OF DIABETES

	Marital Status			
Doctor Diagnosed Diabetes	Married	Cohabitating	Wid/sep/div	Never Married
1=diabetes	52	6	57	15
2=no diabetes	398	87	312	159
3=borderline	7	3	13	1
Totals:	457	96	382	175

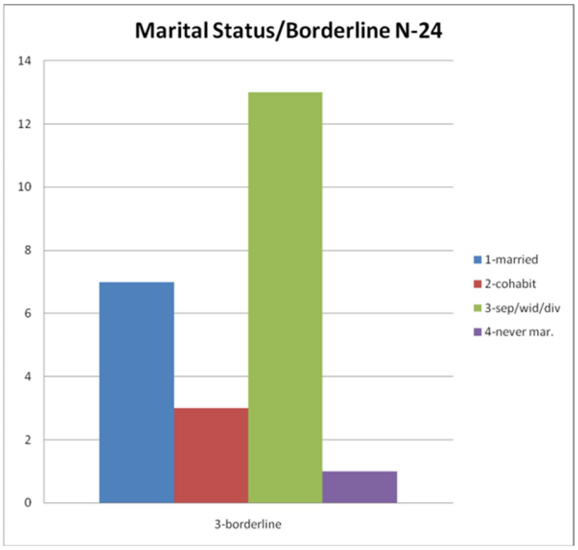

FIGURE 8. Marital Status/Borderline Diabetes

Relationship Between Diabetes and Depression or Psychological Distress

Research question #2: Is there a relationship between diabetes and depression in AI women who participated in this study? After scoring each question (see Chapter 3), the responses were summed to provide a Psychological Distress Score ranging from 0-24 with a lower score indicating a lower Psychological Distress level. Because distress was a continuous variable, linear regression was used to determine if Psychological Distress levels were impacted by whether the women had been diagnosed with diabetes (1), had no diagnosis of diabetes (2), or had been diagnosed with borderline diabetes (3). This regression equation resulted in no significant difference in distress scores among the three diabetic categories, diabetics, borderline diabetes, and no diabetes. (See Table 10).

Table 10.

LINEAR REGRESSION OF DIABETES CATEGORIES RELATIONSHIP WITH PSYCHOLOGICAL DISTRESS
PRIOR TO USING SOCIO-DEMOGRAPHIC VARIABLES

	Serious Psychological Distress		
Variable	β	SE B	P-value
Diabetes Diagnosis			
1=diabetes	-0.15	0.55	0.7896
2=no diabetes	0.00	0.00	-
3=borderline	-0.03	0.95	0.9773

Note. No diabetes used as reference group. *p<.05.

The mean distress score for each of the diabetic categories was low, 4.11 for women with diabetes on a scale from 0 (no distress) to 24 (high distress). The mean distress scores for no diagnoses of diabetes (4.26) and diagnosed borderline diabetes (4.24) scores were slightly higher. Refer to Figure 9.

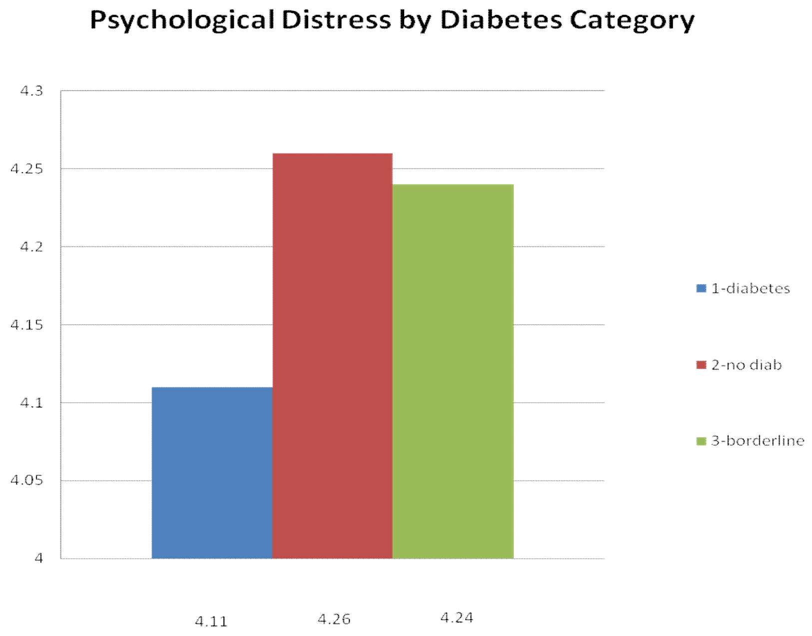

FIGURE 9. Mean Psychological Distress Scores by Diabetes Category

Relationship Between Diabetes and Depression or Psychological Distress Controlling for Socio-Demographic Variables

Research question #3: Do socio-demographic variables influence the occurrence of depression in AI women who have been diagnosed with diabetes, no diabetes, or borderline diabetes? Socio-demographic variables were added to the regression equation to determine their effect on the hypothesized relationship between diabetes categories and psychological distress among this group of AI women. All 3 categories of the diabetes variable were used, with no diabetes as the reference group, to predict distress. None of the socio-demographic variables, educational attainment, marital status, or poverty, influenced the relationship between diabetes and depression or psychological distress. No significant relationship between diabetes and depression was established, even when socio-demographic variables were controlled. These results are depicted in Table 11.

Table 11.

LINEAR REGRESSION OF DIABETES CATEGORIES RELATIONSHIP TO PSYCHOLOGICAL DISTRESS CONTROLLING FOR SOCIO-DEMOGRAPHIC VARIABLES

Variable	β	SE B	P-value
Educational Attainment	-0.22	0.09	0.0160
Marital Status			
1=married	0.00	0.00	-
2=cohabitating	1.25	0.69	0.0744
3=wid/sep/div	1.12	0.51	0.0309
4=never married	1.05	0.51	0.0438
Poverty Level			
1=0%-99% FPL	1.20	0.50	0.0194
2=100%-199% FPL	1.45	0.52	0.0068
3=200%-299% FPL	-0.00	0.45	0.9937
4=300%↑ FPL	0.00	0.00	-
Diagnosed Diabetes			
1=diabetes	-0.45	0.54	0.4089
2=no diabetes	0.00	0.00	-
3=borderline	-0.51	1.12	0.6512

Note. Married, 300%↑ FPL and no diabetes were used as reference groups. *$p<0.05$.

Summary of Results

In summary, after examining this sample of AI women's descriptive statistics, regression analyses were conducted to determine if a relationship between depression or distress and diabetes exists. Both before and after the addition of socio-demographic variables of educational attainment, marital status, and poverty level, results showed no statistically significant relationship between depression and diabetes in this sample.

CHAPTER 5

DISCUSSION

Introduction

A long history of discrimination, ethnocide, and genocide has led to significant health problems among the AI people. This history has resulted in severe disparities for this population, with the AI population having the lowest income, least education, highest poverty levels, and worst health of any minority group in the U.S. They also experience the highest diabetes and suicide rates in the U.S., while having the lowest per capita financial support for health care. Health promotion and prevention services, screenings, health care, and nursing care are provided to the AI population based on research and evidence of specific health problems among AIs. This study was designed to explore a relationship between diabetes and depression, thus providing evidence for needed healthcare programs and further research.

The purpose of this study was to determine if a relationship exists between diabetes and depression in AI women through a secondary analysis of a large health database. The researcher analyzed data from the California Health Interview Survey (CHIS) and this analysis demonstrated no relationship between diabetes and depression.

Socio-Demographic findings included:

- This sample had an average educational level of high school diploma or some vocational school
- Half of the women were in a supportive relationship, married 41% or cohabitating 9%, and half of the women were widowed, separated, or divorced 34% or never married 16%

- Half of the women were in the lower two federal poverty levels, 21% in the poorest and 25% in the slightly less poor category, and 40% ranked in the highest FPL of 300% and above.

Socio-Demographic predictors of psychological distress were statistically significant.

- As educational attainment increased, the woman's psychological distress level decreased
- American Indian women with lower incomes reported higher psychological distress.
- Married women had lower levels of psychological distress than those who were cohabiting, widowed, separated, divorced, or never married.

Socio-Demographic predictors of diabetes indicated that:

- Educational attainment and poverty level were not significant predictors of diabetes.
- Widowed, separated, or divorced women were more likely to have borderline diabetes.

After controlling for all of these socio-demographic variables, the results of this analysis indicated no relationship between diabetes and psychological distress in this group of AI women.

Discussion of Findings

According to current research literature the group at highest risk for diabetes is the American Indian. Research also indicates that the AI woman has the highest incidence of suicide (Bohn, 2003; Grandbois, 2005). Based on this scientific data, it is logical to assume that the AI woman would have high levels of both diabetes and psychological distress, and that there may be a relationship between the two. However, this study did not support this hypothesis. Research on AIs indicates that more Indians live in poverty and have lower educational attainment than either the majority or other minority populations (IHS, 2006; Department of Health and Human

Services-Centers for Disease Control and Prevention, 2004); however, this study did not support those facts. It is clear that AIs have severe health disparities and the results of this study may indicate why these disparities are on the increase. If the data used to determine the health care needs for a population is not representative of that population then serious repercussions can occur. This study shows how significant misrepresentation of a population's needs can occur. The primary reasons for this misrepresentation are: the data collection methods (i.e., length, communication, telephone survey), sampling of AI women (tribal affiliation vs self-identified AI), and the limitations of CHIS secondary analysis (researcher access to data methods).

Research question 1: What socio-demographic variables predict diabetes and, or depression in AI women? In this study some socio-demographic variables were significant predictors of distress, specifically as educational attainment increased distress levels decreased, as income levels decreased, distress levels increased, and those women in less supportive relationships i.e., never married, widowed, separated, or divorced, had higher levels of distress than those who were married or cohabitating. These relationships are expected in all populations including the dominant white-European population so are not specific to the AI female population.

Research question 2: Is there a relationship between diabetes and depression in AI women who participated in this study? No relationship between diabetes and depression in AI women was identified. The lack of a representative sample could account for this finding. However, further research is needed to determine if in fact a relationship does exist.

Research question 3: Do socio-demographic variables influence the occurrence of depression in AI women who have been diagnosed with diabetes, who have not been diagnosed with diabetes, or who are borderline for diabetes? Again, the occurrence of depression in women diagnosed as diabetic, no diabetes, or borderline was not influenced by socio-demographic variables, indicating that neither socio-demographic variables nor the diagnosis of diabetes increased the occurrence of depression\psychological distress in this sample population.

The literature review showed a significant burden of disease for both diabetes and depression among the AI population (Acton & Roubideaux, 2001; Beals et al, 2005), however, this study did not support that burden. The reasons for this inconsistency are many; limitations in the survey instrument itself, the representativeness of the sample, and cultural barriers.

Secondary Analysis of CHIS

Research involving AI participants is limited, primarily due to the long-term distrustful relationship between the AI and the U.S. government. Unauthorized and unethical research practices have created a barrier to AI access by researchers. This lack of research has resulted in little healthcare data about this population, leading to a need to analyze established databases. Secondary analysis of data from an established federal health survey database is a cost effective and scientific method for generating data to support population health, provided the data are reliable and valid. Secondary analysis of large data sets is a reasonable approach as data collection is prohibitive due to cost and accessibility. Population health data provides descriptive information to plan, design, implement, and evaluate the health of a community or population. Use of large databases allows researchers to identify the health care needs of minority groups, and how health services are provided, who uses them and if they are effective (Bierman & Bubolz, 2003, pp. 2-3). The purpose of this study was to determine if a relationship between depression or distress and diabetes exists in AI women. The CHIS database was chosen for two reasons 1.) California has the highest AI population of any state in the U.S. (U.S. Census Bureau News, 2008) and 2.) CHIS has a large number of AI respondents. Because data on AIs are limited and restricted, having access to a large database with a large number of AI respondents is vital to establishing the health issues of this high risk population. Analysis of large databases also generates the knowledge necessary to decrease disparities, improve the health of populations, and meet the increasing health care needs of the underserved, provided these databases are representative of the population.

Limitations

Secondary analysis of large databases does have limitations. A first limitation is finding relevant data for analysis. This is especially true with minority populations and specifically the AI population. These data are only as beneficial as their validity. Continued reference to the "inadequate" availability of AI population's health disparities data (American Diabetes Association [ADA], 2006a) by significant sources such as the Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (DHHS), and Indian Health Service (IHS) calls to question the adequacy of available data. The history of trauma and mistrust between the AI and majority populations makes this limitation even more significant. Few databases are available with AI data, and those that do exist have limited availability to nontribal member researchers.

Another limitation is that researchers using large databases do not participate in deciding which data will be collected, when, and how. Many databases may not represent the population at risk due to collection techniques. Locating existing data that adequately represent the population of interest can be problematic. The CHIS database is well established and data have been collected four different times, using every county in California. Therefore, relatively large data sets have been collected from the AI population in that state, although the data may not adequately represent the needs of the population.

The CHIS used a random-digit telephone survey: only those with a landline telephone were included in the sample. Persons who did not have a landline, either because they used a cell phone for their primary phone, did not have access to a landline, or could not afford one, were automatically excluded from the survey. Because AIs have a significantly higher poverty rate than other groups in the survey, the likelihood that they do not have a landline due to cost is also higher. AIs living on or near reservation lands are more isolated, again increasing the chance that they do not have landlines due to cost or lack of landline access.

Administration of the survey also resulted in several additional study limitations. The survey was long, taking 30 to 45 minutes to complete (California Health Interview Survey, 2006). Although the interviewers were trained to administer the survey, they were not expected to adapt the interview in a culturally appropriate way for the AI population. Due to the history of distrust and differing cultural beliefs, data obtained may not have been accurate; AIs may have answered questions the way they thought they were expected to respond out of respect and a feeling of intimidation from years of domination by the majority population. Interpreters were provided for respondents who spoke Asian dialects or Spanish; however, no interpretation in any Native languages was provided even though the population at highest risk for diabetes is the older AI population, the same population that is most likely to speak a Native dialect. Even if a oral language barrier did not exist during the interview, nonverbal and concept misunderstanding may have existed. Questions using “depressed”, “hemoglobin A1C” , and “mental illness” could be misinterpreted due to cultural beliefs specific to the term, i.e. some tribes do not recognize the term “depressed” when referring to a “feeling”.

Another major limitation was the AI sample. Though this study had a large AI sample size (1,110 AI women), the sample may not have represented the population. Should both tribal members and self-identified AIs be considered “American Indian”? First, who decides whether a person is a specific race or ethnicity? Second, how are guidelines for ethnic identity determined? Once guidelines are determined, what rights and benefits accompany the definition? The AI is in a unique situation in regard to the definition of race or ethnicity. An Indian is a person who has inherited Indian blood and is recognized as an Indian by a tribe or community (Reynolds, 1996). Another definition is a person with a certain “quantum” of Indian blood who still has ties and relationships with an associated tribe. Depending on the reason for tribal affiliation, several other federal guidelines define who is Indian and who is not, and are a source of conflict between the federal government and the tribes and tribal members. To be federally recognized as a tribe, the federal government must recognize an ongoing relationship and a responsibility to the designated group of Indians. Because the federal government tried to terminate its responsibility to AIs with the Termination Act of 1953 much debate about what determines the AIs ethnic identity has arisen. Federal recognition can lead to federal benefits; however, these benefits are extremely scarce and dependent on the federal budget for that year.

Prior to the turn of the century, individuals hesitated to acknowledge being AI. Being AI had a negative social stigma and those who admitted their affiliation with a specific tribe often experienced discrimination and isolation. However, now being a member of a minority, specifically AI, could be beneficial. An entitlement attitude proved to be financially advantageous for some with the development of gaming and federal healthcare benefits through the Indian Health Service. Although, most of these “benefits” were extremely limited, the dominate population erroneous assumed that AIs receive “free” healthcare and large sums of money from casinos leading to an increasing number of individuals identifying themselves as AI.

As a result, the question arises as to whether the 1,110 self-identified AI female sample from CHIS is representative. When reviewing the numbers of AI *only* females and AI *plus some other race* females in the U.S., California, and the CHIS survey, it became apparent that a significant difference exits in the CHIS survey. In the U.S. female population, 0.9% of the population reports being “AI race alone with tribal affiliation” and 1.5% report being “AI in combination with some other race”(Centers for Disease Control [CDC], 2008). In California, the state with the highest AI population in the U.S., 1.0% of the female population reported being AI only, and 1.9% reported being AI in combination with some other race (Ogunwole, 2002); however, the CHIS survey had a female AI only sample of 0.6% and a female AI plus sample of 4.34% . This is depicted in Figure 10.

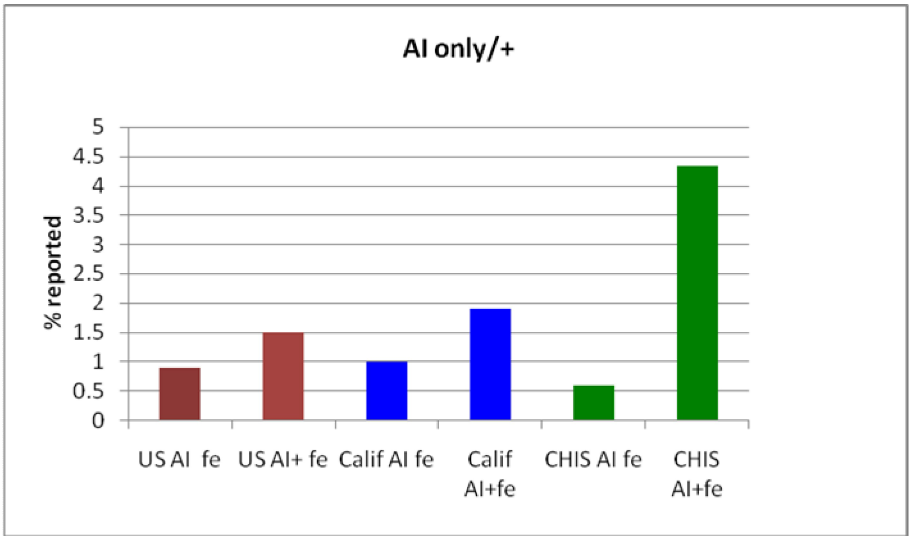

FIGURE 10. American Indian Identification

US AI fe = percent of females in the U.S. that identify as AI only

US AI+ fe = percent of females in the U.S. that identify as AI plus some other race

Calif AI fe = percent of females in California that identify as AI only

Calif AI+ fe = percent of females in California that identify as AI plus some other race

CHIS AI fe = percent of females in the CHIS survey that identify as AI only

CHIS AI+ fe = percent of females in the CHIS survey that identify as AI plus some other race

The self-reported AI plus rate is over 7 times the AI only rate compared to the state and U.S. ratio of approximately 1:2. The CHIS sample may not be an accurate representation of the AI population in California or across the nation.

Political Implications

Large databases such as California Health Interview Survey (CHIS), National Health Interview Survey (NHIS), and Center for Disease Control and Prevention's (CDC) Behavior Risk Factor Surveillance System (BRFSS) provide data that reflect the health of the U.S. and its many groups. These data provide a basis for social and political decisions, specifically where federal healthcare dollars will be spent. If the data are incorrect, the impact of these decisions can be devastating. According to this secondary analysis, no significant relationship between diabetes and depression in AI women exists; however, previous research and literature are clear that AIs have a two to six times greater rate of diabetes (U.S. Census Bureau, 2006) and a higher suicide rate than any other population. Research literature, as indicated in Chapter 2, also show a relationship between diabetes and depression in the white male. This study may indicate that use of a large database such as CHIS can negatively impact the health of the AI population by minimizing the actual burden of disease, therefore decreasing funds to care for and reduce this burden.

Research shows that per capita and per year more health care dollars are spent on federal prisoners than the AI (English et al., 2004). This indicates that inadequate or erroneous data is being used to decide funding allocated to the healthcare of the AI. If the decision to provide funds for preventive care, acute and chronic healthcare, and further research are based on these databases, disparities will increase, AIs will experience poorer health, and the percent of federal dollars allocated to specific health problems of minority populations will decrease.

Health Care Implications

Identifying the specific rate of diabetes both in the general population and AI populations has been challenging because research estimates vary significantly depending on the database used. Depending on which source is used, the occurrence of diabetes in the general population varies significantly, and the occurrence in higher risk populations, specifically the AI, varies even more. See Figure 11.

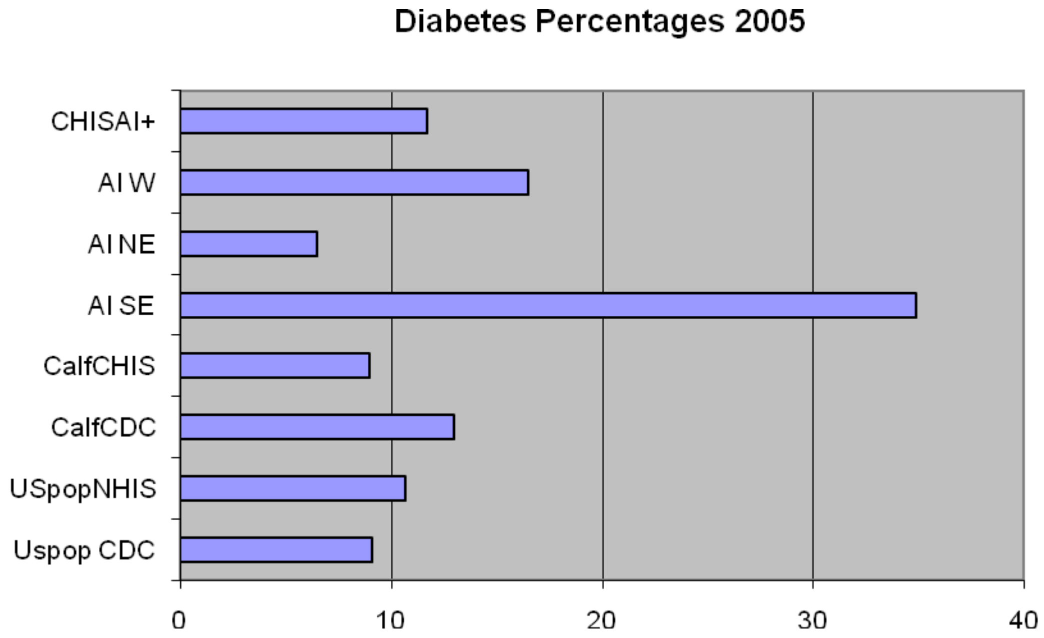

FIGURE 11. Diabetes Percentages

CHISAI+ = percentage of those with diabetes who identify as AI plus some other race in the CHIS

AI W = percentage of those with diabetes who identify as AI only in the Western U.S.

AI NE = percentage of those with diabetes who identify as AI only in the North Eastern U.S.

AI SE = percentage of those with diabetes who identify as AI only in the South Eastern U.S.

CalfCHIS = percentage of adults with diabetes in the California Health Interview Survey

CalfCDC = percentage of adults with diabetes in California according to the Centers for Disease Control and Prevention

USpopNHIS = percentage of adults with diabetes in the U.S. according to the National Health Interview Survey

USpop CDC = percentage of adults with diabetes in the U.S. according to the Centers for Disease Control and Prevention

These variances can result in individual interpretation and manipulation. Evidence-based care should be developed from a strong knowledge base because discrepancies can lead to care based on error. Provision of nursing care should result from scientific evidence; this evidence must be accurate or poor healthcare and an increase in disparities can result. Because over 90% of diabetes in AIs is type 2, modifying risk factors through behavior change is the key to decreasing the occurrence of the disease. The incidence of diabetes is continuing to rise, resulting in a need to design education and healthcare programs based on accurate data, especially for the AI population.

Another area that needs to be addressed is tribal affiliation versus self-identified AI. Guidelines for determining if the participant is AI need to be established in partnership with the AI community, both those living on reserve lands and those in urban settings. Once these guidelines are established, a clearer picture of health care problems and concerns could be identified based on scientific inquiry. These guidelines will also help identify ‘at-risk’ individuals and determine who qualifies for specific healthcare benefits.

Implications for Research

This study elucidates many concerns and issues for research with the AI population. Accurate data based on research provide the knowledge for designing, implementing, and evaluating health care programs for at-risk minority populations. To gather these data reliably must start with the population being studied. Establishing a trusting relationship between participants and researchers is vital. When working with the AI population, it is recommended that the survey be designed specifically for and in partnership with the community, including the recruitment of community members to administer face-to-face surveys by going to participants instead of relying on a telephone based instrument. This survey would be culturally appropriate, using understandable terms and appropriate verbal and nonverbal communication and respecting cultural differences.

Further research with this population is imperative. Without this needed research, a knowledge base for quality care is lacking. To start, research defining the population is vital. This research could be done by:

- Working within specific AI communities
- Using community-based research methods, as the AI population is community focused
- Working with AI members both in determining need and in gathering data
- Designing research materials that are specific to the population (tribe), using appropriate terms and nonverbal and verbal communication, and administering the tools in appropriate settings depending on the situation
- Establishing a trusting relationship, including guidelines for appropriate and inappropriate behavior
- Safeguarding the use of study results by giving data to the AI people FIRST and encouraging them to make the final decision about use

Next, researchers must identify the true burden of disease within this population, based on research within the population, not ‘about’ the population. It is well known how significant the health problems of the AI are; however, how much of this estimate is based on actual information from the AI and how much is based on the larger non-Hispanic white population?

Once true measures of the levels of disease are established, significant numbers of research studies must be funded. For example, research about diabetes and depression or distress in AI groups is desperately needed. With both of these diseases negatively impacting the AI population, research is vital to AI survival. Estimates based on other populations are not good enough; these diseases and their consequences are increasing the burden on an already over-burdened population of AIs.

The implications of not funding needed research with this population are momentous:

- Increase in diabetes among AI resulting in an increase in heart disease, stroke, organ failure, kidney disease, blindness, and amputations.
- Increase in distress\depression resulting in poorer quality of life, lost work time, increased family stressors, and an increase in an already elevated suicide rate.
- Increase in dollars spent on long-term chronic illness care.
- Loss of prevention opportunities. Type 2 diabetes accounts for the majority of diabetes in the AI population. Lifestyle modification can prevent the occurrence of diabetes in many individuals, preventing all of the above problems.
- Prevention and intervention programs must be designed specifically in collaboration with this population, and with the support of health care providers within the AI community.
- Accurate databases must be created to support political and social influence for increases in health care funding.

Implications for Education:

Many of the barriers to securing representative data and then providing care based on these data with the AI population are cultural. First, education about the history and culture of the AI people should be taught, starting at the earliest levels of education. This information should be based on fact, not on the interpretation of information provided through the white-European lens. This education should continue from elementary levels through graduate schools. Secondly, appropriate cultural education should be required for anyone working with the AI population. Specifically, nurses and other healthcare providers must have this education to deliver culturally competent care.

Very few AIs have become nurses and healthcare providers. As discussed above, research and care is most accurate and beneficial when it is provided in collaboration with the AI. Nurses who are AIs and know the culture would be the greatest asset to decreasing the health disparities within this group. The key to increasing their numbers is taking nursing education to their communities. Also mentioned previously, is the community culture that predominates within the AIs, making it more difficult for AI students to leave this community structure and to attend college. Taking college courses to these communities would increase attendance by AIs and therefore increase the number of AI nurses to provide healthcare.

Conclusions

Throughout the tumultuous history between the AI people and the U.S. government and dominant white-European culture, goals have differed. The U.S. government has attempted to eliminate the AI population, first through war, disease, relocation, and reservations, then through termination policies and an attempt to totally assimilate the AI into mainstream society. AIs have had an opposite goal of personal, community, and cultural survival. With opposing goals the result has been devastating to the health and wellbeing of AI communities; AIs experience the highest rates of disease, poverty, and social problems of any minority population in the U.S. Lack of quality research and health care interventions have actually contributed to the U.S. government goal of elimination.

The AI has an extremely high burden of disease, especially diabetes and depression or distress. The literature review for this study supports this; however, the data to support the actual burden of disease in this population vary widely. This discrepancy is largely due to estimates based on the dominant white population and partly due to the scarcity of information about the AI population itself. Disease burden of the AI female is even less studied, with some disease information, such as the incidence and prevalence of depression, being nonexistent. As a result, a large established database was chosen for a secondary analysis to determine if a relationship between depression and diabetes in this population existed. This study showed no statistically significant relationship between diabetes and depression in this sample of AI women. The analysis also highlighted the severe limitations of using a large database to study the AI population. The results of this study show the inadequacies of large databases for minority populations resulting in less funding, less quality health care, and an increase in health disparities which could ultimately result in the elimination of the AI people. The limitations are many and lead to a conclusion that AI population research is severely lacking and studies must be undertaken to improve the quality of evidence-based health care for the AI female population.

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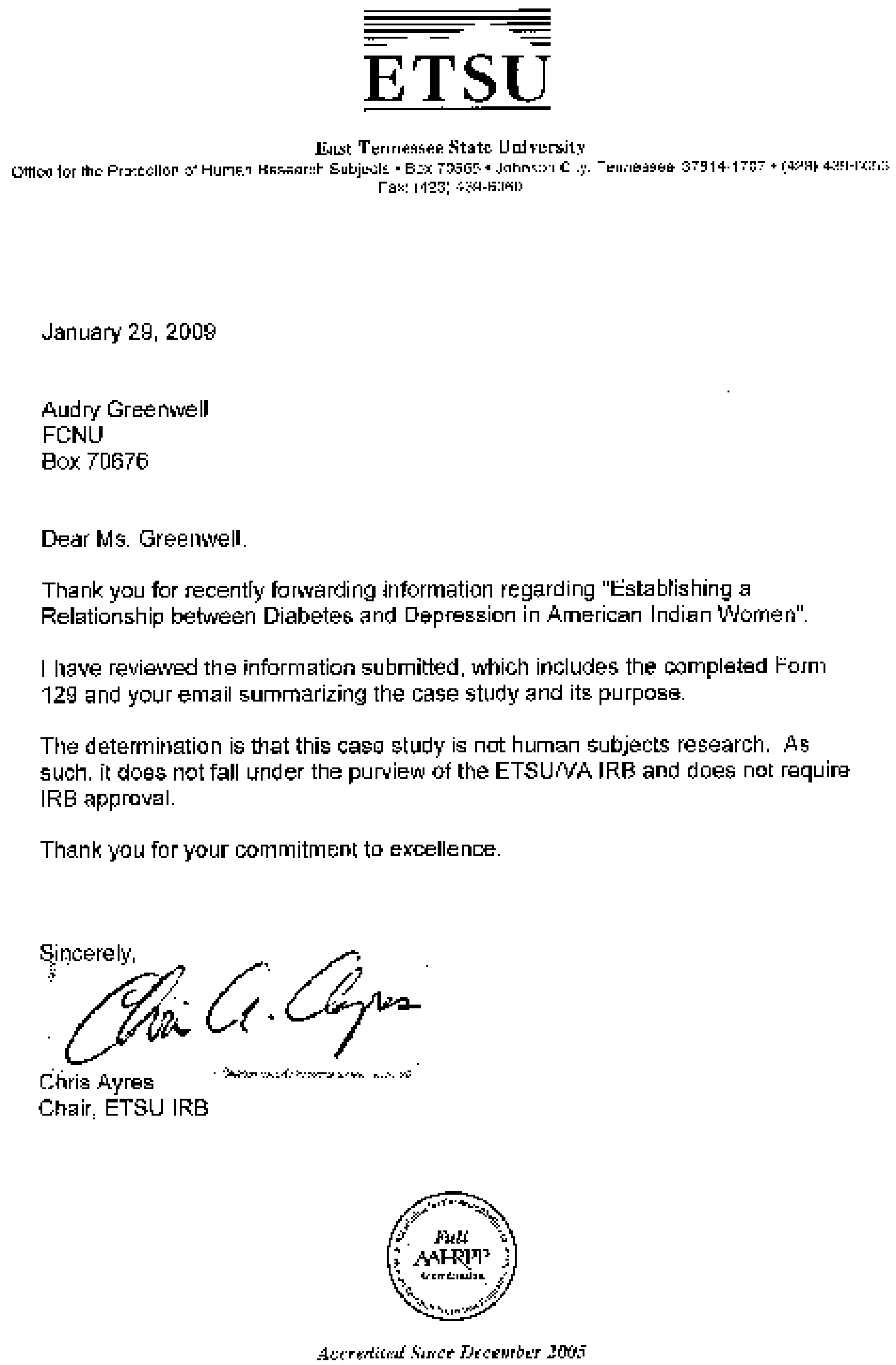
APPENDIX

Appendix A: Protection of Human Subjects



ETSU

East Tennessee State University
Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707 • (423) 439-6053
Fax: (423) 439-6060

January 29, 2009

Audry Greenwell
FCNU
Box 70676

Dear Ms. Greenwell.

Thank you for recently forwarding information regarding "Establishing a Relationship between Diabetes and Depression in American Indian Women".

I have reviewed the information submitted, which includes the completed Form 129 and your email summarizing the case study and its purpose.

The determination is that this case study is not human subjects research. As such, it does not fall under the purview of the ETSU/VA IRB and does not require IRB approval.

Thank you for your commitment to excellence.

Sincerely,

Chris Ayres
Chair, ETSU IRB

Full AAHRPP Accreditation

Accredited Since December 2005

VITA

AUDRY M. GREENWELL

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	1985-1990 – Registered Nurse – Humana Hospital, Lexington, Ky.: PACU, Labor and Delivery, Mother and Baby, ICU, Outpatient Surgery
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	1981-1985 – Registered Nurse – Norton's Children Hospital, Louisville, Ky. : Burn Unit
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	Phi Kappa Phi – ETSU 2007-present