A Perspective on Diabetes from Indigenous Views

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ABSTRACT:
Six elders, representing six different indigenous cultures, three of whom have academic appointments, were asked to provide their perspectives on diabetes addressing etiology, risk factors, increasing prevalence and co-morbidities. The rapid increase of this chronic disease has impacted the systems of care and financial management within Indian Health Service, the United States healthcare system established for federally-recognized American Indians and Alaska Natives. Indigenous people of North America not only have the highest incidence of diabetes in the world but also are experiencing early disease onset with rates increasing in those < 18 years of age. Giving voice to the very people affected by this disease is critical to develop a culturally relevant solution. Using a storytelling method and qualitative analysis, four themes emerged from the elders' perspectives: a) before contact with Europeans, diabetes was not found among the indigenous peoples; b) outside influence on food choices and activity patterns have been major factors in the rise of diabetes; c) disconnection from cultural roots yielding a state of imbalance or loss of harmony is manifest in negative health outcomes, such as wide-spread diabetes; and d) hope that a solution lies in the core values and knowledge of indigenous cultures. These narratives and themes can be used to guide the practice of non-indigenous health care providers working with indigenous people.

Introduction

Type 2 diabetes, a devastating chronic disease, has reached a crisis level of concern for indigenous families in the United States and their healthcare providers within the Indian Health Service (IHS) healthcare system. O'Connell, Wilson, Manson, and Acton (2012) reported that "approximately 1 of every 3 IHS dollars spent on treatment was for services for adults with diabetes" (p. 304). Diabetes contributes to life-long disabling conditions such as neuropathy followed by amputation, retinopathy, end-stage renal disease, stroke, heart attack, and poor wound healing. The epidemic rates of diabetes and these co-morbidities among the indigenous peoples of North America, known federally as American Indians/Alaska Natives (AI/ANs), yield a substantial financial burden to the IHS, Medicaid, and Medicare (Indian Health Service [IHS], 2010). In addition, co-morbidities among AI/AN elders are also a growing concern due to the need for increased hospitalization, doctor visits, medication and 24-hour care (Goins & Pilkerton, 2010). The director of Indian Health Service, Dr. Yvette Roubideaux (2002) asserts:

> *American Indians and Alaska Natives continue to experience significant dispari-*

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ties in health status compared with the US general population and now are facing the new challenges of rising rates of chronic diseases. The Indian health system continues to try to meet the federal trust responsibility to provide health care for American Indians and Alaska Native despite significant shortfalls in funding, resources, and staff. New approaches to these Indian health challenges, including a greater focus on public health, community-based interventions, and tribal management of health programs, provide hope that the health of Indian communities will improve in the near future. (p. 1401).

The U.S. Department of Health and Human Services, Office of Minority Health (2010) reports AI/ANs are 2 times more likely to have type 2 diabetes and die from diabetic complications than are non-Hispanic whites. See Tables 1, 2, and 3 from the Office of Minority Health (2010 with secondary citations noted (Barnes, Adams, Powell-Griner, 2010; Schiller, Lucas, Ward, & Peregoy, 2012; Kochanek, Xu, Murphy, Miniño, & Kung, 2011).

Table 1. Age-Adjusted percentages of persons 18 years of age and over with diabetes, 2004-2008

	American Indian/Alaska Native	White	American Indian/Alaska Native to White Ratio
Men and Women	17.5	6.6	2.7
Men	18.2	7.2	2.5
Women	16.2	6.2	2.6

Source: Barnes, P.M., Adams, P.F., & Powell-Griner, E. (2005), as cited by the U.S. Department of Health and Human Services, Office of Minority Health. (2010).

Table 2. Age-Adjusted percentages of persons 18 years of age and over with diabetes, 2010 (National Health Interview survey, NHIS)

American Indian/Native American	Non-Hispanic White	American Indian/Native American to Non-Hispanic White Ratio
16.3	7.6	2.1

Source: Schiller, J.S., Lucas, J.W., Ward, B.W., & Peregoy, J.A. (2012), as cited by the U.S. Department of Health and Human Services, Office of Minority Health. (2010).

Education and promotion of healthy choices, such as regular exercise and consumption of whole-grain products, vegetables, fruits, and low-fat milk and meat products are needed to avoid this life-long chronic disease (Tuomilehto, Lindstrom, Eriksson, et al., 2001). In addition, environmental change to support healthy choices in indigenous communities needs to be addressed such as building *walkable* residential areas and walking trails that incorporate level surfaces and lighting to promote regular, safe physical activity. Cultural perceptions and understanding of the onset, progression and impact of a disease should direct the design, implementation, and evaluation of prevention activities within indigenous communities (Teufel-Shone, 2006). In North America, 565 Indian nations are federally recognized (U.S. Department of Interior, 2010a, 2010b). Each of these nations represents more than 500 tribal cultures, languages, traditional customs, and beliefs. To enhance the quality of life for individuals at risk for and diagnosed with diabetes and co-morbidities involves community commitment and resources, culturally relevant health promotion education, and respect for cultural explanations of the disease process within each tribal culture.

Table 3. Age-Adjusted Diabetes Death Rates per 1000,000 (2009)

American Indian/Alaska Native	Non-Hispanic White	American Indian/Alaska Native to Non-Hispanic White Ratio
34.0	18.4	1.8

Source: Kochanek, K.D., Xu, J., Murphy, S.L., Minino, A.M., & Kung, H-C. (2011), as cited by the U.S. Department of Health and Human Services, Office of Minority Health (2010).

Identifying how various Native American cultures explain the onset and course of diabetes is an important first step in developing appropriate strategies to mitigate the disease and its impact on indigenous peoples. To provide the context to culturally grounded explanations of diabetes requires an understanding of the impact of historical contact with Euro-Americans on contemporary adjustment of lifestyles, including food access, food choices, and activity patterns among indigenous people. Clearly, the development and much needed prevention and treatment of diabetes are complex processes that involve individual, family, and community behaviors. Understanding how indigenous people fit the progression and symptoms of diabetes into their worldview of the natural life course of change and balance can inform ethical practices for both clinicians and public health practitioners working with native peoples. Within many cultures, one role of the "elder" is to relate and preserve the traditional ways of thinking.

Methodology

The Applied Indigenous Studies (AIS) with Northern Arizona University utilizes traditional knowledge scholars in classroom oral teaching (Trujillo, 2011). This paper is a documentation of oral traditional knowledge that AIS Department have used throughout the years (Trujillo, 2011). The AIS traditional knowledge scholars (Ms. Maybelle Little,

Mr. Bob Lomadafkie, and Ms. Maria Marina Vasquez) with AIS faculty (Dr. Octaviana V. Trujillo and Dr. Karen Jarratt-Snider) and Dental Hygiene faculty (Ms. Maxine Brings Him Back-Janis) discussed traditional oral concepts of diabetes. The discussions with elders and faculty took place from October 2009 to January 2010. The co-authors chose a phenomenological approach from key informants' lived experiences of diabetes in an oral and written storytelling format. The key informants agreed to provide culturally informed explanation of diabetes and its impact from their perspective. The key informants' perceptions were purposefully informal to facilitate their writing and telling their stories from their perspective (Hodge, Maliski, Codogan, Itty, & Cardoza, 2010). Subsequently, the stories are provided with minimally editing to allow the word choices, relationships and thoughts of the elder to emerge. Some concepts may appear to conflict with Euro-American medical perspectives but this discordance is critical to understanding misunderstandings and unclear communication between non-native providers and native patients.

Procedure

Initial contact was made by the lead co-author with Northern Arizona University's traditional knowledge scholars and Native American faculty with Applied Indigenous Studies and Dental Hygiene. Faculty enrolled in six different indigenous nations: Diné, Hopi, Mayan, Oglala Lakota, Yoeme (Yaqui), and Choctaw, agreed to participate. Next, the lead co-author conducted follow-up meetings, telephone calls, and email messages to lead a dialogue about how diabetes is perceived in their respective cultures. Each of the elders and faculty members were asked to write their perspective about diabetes. An invitation was sent to elders and faculty members about the availability of Wiki to add their writing and to view the progress of co-authors work.

Participants

Participants were recruited as elders and faculty members affiliated with Northern Arizona University in the Applied Indigenous Studies Department and Dental Hygiene Department.

Data Review

Three of the co-authors (Sanderson, Teufel-Shone, and Bounds) reviewed the written stories. Based upon this review, themes were identified by consensus among the co-authors (Teufel-Shone, Irwin, Siyuja, & Watahomigie, 2006).

Results

Demographic characteristics

One male and five females submitted their perspectives in writing. The age range of the 6 participants was 52-79 years of age (mean age was 63 years). Of the six, four were raised in reservation or indigenous communities and two were raised in an urban setting. All reported being raised traditionally; four reported being fluent or semi-fluent speakers of their traditional language, and five reported siblings or parents with diabetes often suffering secondary complications, e.g. renal failure and amputation. One elder reported having "borderline diabetes."

Background: Diabetes on the Navajo Nation

The federally recognized Navajo Nation is the largest American Indian reservation in the U.S., encompassing 27,000 square miles across parts of three states: Arizona, Utah, and New Mexico, with a population of over 250,000 enrolled members (Navajo Nation, 2011). The Diné (Navajo) people are believed to have migrated into the southwestern U.S. approximately 1,000 years ago. In the mid-19th century, the U.S. cavalry forced many of the Diné from their lands on "The Long Walk" to Fort Sumner in New Mexico. Many Diné died en route and during the four-year imprisonment. After the 1868 treaty with the U.S., the Diné returned to their land, and today, they continue agricultural and shepherding practices commensurate with the desert environment of the Southwest (Indian Health Service [IHS], n.d.].

Diabetes is a significant problem on the Navajo reservation. In a comparison of diabetes prevalence among indigenous peoples worldwide, Yu and Zinman (2007) reported a Navajo diabetes mellitus prevalence of 16.5%, higher than that among the Pima of Mexico, but lower than the prevalence of diabetes among tribes in the Dakotas, Oklahoma, or southern Arizona. One study of Navajo adults 45 years of age and older, however, found 40% of participants with diabetes (Will et al., 1997). Navajo youth are also at risk: in 2001, a study of 15- to 19-year-olds identified one in every 359 Navajo youths with diabetes (Dabelea, DeGroat, Sorrelman, et al., 2009).

One of the critical components of reducing diabetes and co-morbid conditions in Diné communities and among other tribes is addressing economic disparity. In her address to the Committee on Senate Affairs, Dr. Melvina McCabe, President of the Association of American Indian Physicians, challenged Congress to consider the influence of the structural environment on diabetes:"Without electricity, how do we store our insulin appropriately, how do we store healthy foods such as fresh vegetables, fruits, eggs, milk. In Indian country, canned goods can be a staple because of the lack of electricity" (McCabe, 2010, para 17).

Bah Ray, Holben, and Holcomb (2012) defined *food security* as "ready availability of nutritionally adequate and safe foods for all people" (p. 93). In their sample, 43.2% of Navajo women were living at some level of food insecurity and this status was associated with increased rates of diabetes. Echoing the message of Dr. McCabe, these authors argue for improved economic conditions, including access to and affordability of healthy foods, as an essential means to reduce the diabetes epidemic (Bah Ray et al., 2012).

Storytelling: Dine' (Navajo) Perspective, Ms. Maybelle Little

There are two sides to Dine' Ways of Knowing -- on a beautiful safe side of the (now) Glittering World and the Dark World of Negativity. Strictness is involved with warnings about wrongdoings; taboos must be followed for prevention of serious life-threatening illnesses and errors due to misbehavior. Individuals must be aware of Powerful Foreboding Forces (from the Dark World) that deal with illnesses and other negative actions and event in the Glittering World. During Creation Times, Four Monsters: Hunger, Poverty, Diseases, and Old Age symbolized by decrepit Females, were allowed to live; each Monster begged the Warrior Twins for their lives because each Female promised to teach generations of learners how to prevent their living ways

from what we know as the sad and sick human condition(s) that afflict populations today. The Four Monsters taught taboos to be heeded: During Creation Times, Four Monsters: Hunger, Poverty, Diseases, and Old Age symbolized by decrepit Females, were allowed to live; each Monster begged the Warrior. Using the example of diabetes –

1. ***Hunger** would result if individuals became lazy and did not take care of their field crops on Earth. This part of the food taboo refers to the behavior of over indulgence in foods and lack of exercise. We are taught that there are healthy foods to be had; but we do not search for these foods and we do not exercise our bodies to prepare for fieldwork like we should.*

2. ***Poverty** would surely follow if no one cared for and respected Ways of Knowing for success in the immediate earthly environment. If ailing diabetics do not follow the teachings of Ways of Knowing dealing with healthy thinking, poverty will issue its affects -- medical costs, food costs and ill feelings that attack the body.*

3. ***Diseases** that affect Perfect Health, the non-visible Sexual Transmitted Disease (STD) types appear as the price to pay for over-indulgence in human misconduct. The obvious illness caused by diabetes seems to flare-up with deep-seated negative eating habits of daily food intake – taking too much of one nutrient and too much of others (some that may have no food value).*

4. ***Old Age** is a part of Life that no one can overcome; however, it can be a Gift of Life if this Power is used in positive ways according to the Dine'. Today's physical ailments most likely are viewed as something that is bothering the human thinking capacity and could be due to negative thoughts and fears of the individual or other sources of negativity. Dine' healers and diagnosticians may be called upon to try to find the cause of physical ailments. Healers and diagnosticians are costly for their assistance with health problems. These Dine' healers try to return to the state of harmonious understanding Life Ways for the patient and his/her state of mind.*

Background: Diabetes on the Hopi Nation

The Hopi Nation is a federally recognized sovereign nation, occupying approximately 2.3 thousand square miles in northeastern Arizona (Hopi Tribe, 2010). The indigenous population of the Hopi Nation is 6,943 (Arizona Department of Health Services, 2012).

The Hopi people are descended from the Puebloan culture of the Southwestern desert. Farming continues to be an essential part of life, both practical and spiritual, especially the cultivation of corn. "The Hopi way of life is the corn -- humility, cooperation, respect, and universal earth stewardship" (Hopi Cultural Preservation Office, 2009b). Although garden plots belong to the Hopi women, the entire family works them, planting vegetables and fruits, including corn, squash, and melons. This provides an opportunity to connect in multiple ways with Hopi children: "as one

Hopi gardener said, 'This is not about growing vegetables; it is about growing kids'" (Hopi Cultural Preservation Office, 2009a). It also sustains family, culture, and community. By educating school children and community groups, the Hopi Office of Range Management/Land Operations strengthens traditional understandings and uses of native plants, as well as protecting the wild plants from mismanagement and loss (Flora, Livingston, Honyestewa, & Koiyaquaptewa, 2009).

Since the appearance of commodity foods and the adoption of more sedentary lifestyles, obesity has become epidemic on the Hopi Nation. In a study of this trend, Eisenmann, Arnall, Kanuho, and McArel (2003) found that 47% of Hopi school children were either overweight or obese. Since traditionalism in Hopi people has been found protective against health risks and chronic disease (Coe et al., 2010), it seems critical that Hopi children learn how to return to the traditions that have kept the Hopi people healthy.

Storytelling: Hopi Perspective, Mr. Bob Lomadafkie

> *A different Indigenous lifestyle was practiced before white man came to this continent. Eating three meals a day (breakfast, lunch, and dinner) with huge food portions on each plate are behaviors of a post-contact environment. However, some traditional cultural lifestyles have continued and some have diminished due to outside influences. Presently, Indigenous Nations are bringing back traditional lifestyles that have not been practiced for many years. These behaviors and beliefs include awareness of physical exercises like running, walking, and addressing poor diet and nutrition. For example, in the old days, the Hopi people would run up the cliffs and this practice is being revitalized in contemporary times. In addition, feasting after harvest continues to be a celebration for villagers. This brings together people for this cultural event, sharing the moment, belief system and social gathering. Contemporary Hopi people are also eating more "greens" like vegetables (brussels sprouts, lettuce) and less prepared foods (microwave frozen meals, McDonald's Restaurants) and red meat (steaks). To be diagnosed with pre-diabetes or diabetes, is challenging but with family and community support, the person diagnosed with diabetes is there for their family to offer strength and foundation for current and future generations. The first convenience store in Hopiland was a trading post. The trading post sold white flour, sugar, and Spam®. Spam is a local favorite. However, no fresh vegetables and fruits were sold to local people. Hopi families had to travel many miles to Winslow or Flagstaff, Arizona to shop for fresh vegetables and fruits.*

Background: Guatemala's Maya Population

Guatemala is a Central American country adjacent to Mexico, Belize, Honduras, and El Salvador, and encompasses approximately 42,000 square miles. Over half of the population is comprised of indigenous descendants of the Maya who live primarily in rural regions of the country, and at least 24 indigenous languages are still spoken, such as K'iché and Mam (U.S. Department of State, 2012).

Our indigenous elder providing the Mayan perspective, Ms. Maria Marina Vasquez, hails from the western highlands near Huehuetena-

go. Knowing something of her land of origin is particularly important in the context of understanding diabetes and other health challenges of the Mayan people. Guatemala's civil war (1960-1996) disrupted and sometimes annihilated entire communities, often in the highland regions. More than 200,000 Guatemalans, mostly indigenous civilians, were massacred or 'disappeared,' and tens of thousands more suffered torture. Reparations for injustices have begun, but remain incomplete (Amnesty International, 2009).

Guatemala's public health system, too, was disrupted during these years, and adequate national health surveillance data for indigenous people are still lacking. For example, in a study of diabetes and other chronic diseases in Guatemala, indigenous people comprised only 2% of the sample population, though most others were of mixed race. Overall, the prevalence of diabetes in this sample was 24.5% of the population over 20 years of age (Pan American Health Organization [PAHO], 2007). In a later sample of residents of metropolitan Guatemala City, however, the prevalence of diabetes among those over 19 years old was 7.3%, but information on indigenous ancestry was not noted (Barcelo et al., 2012). The collection and report of diabetes prevalence among indigenous populations remains a significant omission from surveillance efforts, and yet it is a key to diabetes prevention and care.

Migration as a means of escaping the violence of the war in Guatemala has also indirectly increased the risk for diabetes among Mayan populations. A comparison of rural Mayan and Maya-American children, for example, suggested that the health of these second-generation immigrants to the U.S. improved overall. Health behaviors adopted by Maya-Americans in the U.S., however, has resulted in significant increases in overweight and obesity, putting them at a higher risk for diabetes than their Guatemalan counterparts (Smith, Bogin, Varela-Silva, Orden, & Loucky, 2002).

Storytelling: Mayan Perspective, Ms. Maria Marina Vasquez

The belief is that diabetes came after contact with the Europeans more than 500 years ago. Before contact with Europeans, Indigenous peoples did not have diabetes. There is an interest by this co-author of finding out what type 1 and 2 diabetes are that western medicine has been researching for many years. There is no cure that has been found for diabetes type 1 and 2. After many generations of Mayan people eating refined foods introduced by Europeans, the belief is that many Mayans are diagnosed with diabetes that result from genetic defects, accidents, or psychological trauma. Presently, many Mayan people are diagnosed with type 2 diabetes due to their modern-day lifestyles. This disease contributes to historical trauma that Mayan people experience from forced assimilation to European lifestyles.

In the old days, Mayan people had a very different eating habits and nutrition than what they eat presently. They ate more healthy foods like: wild berries, wild game, cactus and wild greens to supplement their diets. Perhaps the Indigenous peoples of this land used the appropriate technology (using what was available in their area) for their survival and well being. They had to run after wild game for protein and at the same time they were exercising their

body. They had to eat simple meals during season changes from fall to winter, and would eat less portions of food to ensure that food was prolonged in storage. Presently, this is not what is happening. However, food always has been the center of social events and continues in modern kitchens (refrigerator, stove, cupboards, dishes). In the old days, there were no refined sugar to be used for coffee, tea, or preparing desserts to satisfy their sweet tooth. The Mayan people used honey and wild berries to help make their food taste better with natural sweetness. After contact with the Europeans, there was a cultural shift, which introduced white flour, sugar cane, grapes (uvas) and alcohol to Indigenous peoples. This resulted in new sweets and changed their eating habits, from wild game to canned meat and powder potatoes that are eaten today. This includes lack of exercise. Presently, there is high stress related to living in two worlds (white and Indigenous ways) and training to get all of the commodities of today. Globalization has contaminated the remote towns of this co-author's beloved country. The Mayan medical history and tradition will be discussed next.

Before the arrival of the Conquistadors in the beginning of the 16th century there were two general forms and levels of Indigenous medicine: elite healers or popular medicine and Shamanism. Popular medicine was reserved for the practices of studied elites. Once the elites reached the level of highly trained healers they formed part of the social class, which had access to the written word, and the systematized information of the Mayan people. They were then able to train the popular masses. The medicine that they used had a great deal to do with astrology because it was important to the healer to know facts about the patient based on his or her astrological alignment such as the person's date of birth which had a great influence on the rest of his/her life and propensity towards particular patterns of diseases.

The knowledge of astrology, writing, herbology and surgical techniques are a few examples of the kinds of specialize information that the patient could receive from the elite healer. One of the popular levels of knowledge was less specialized and less systematic, though it was inscribed by the same cosmo vision and understanding of health and disease as the elite medicine. The most popular tradition was the herbal and ritual medicines, which confirmed the relationship of personal health to the agricultural cycle and natural and supernatural forces. The popular understanding and practices have remained firmly imbedded in the traditions of Mayan people. They were preserved and assimilated with concepts and practices from the colonial Spanish medicine (new medicinal plants from Europe). Like many cultural systems, traditional medicine has undergone constant changes. As traditional ways of knowing encounter new factors, new ways of knowing replace ancient Maya concepts with concepts and words from European colonization or from modern medicine incorporating them into the Cosmo vision. For example, Mayan illnesses can be classified into four groups: (1) Organic illness, (2) Illness produced by contact with other people, (3) Illness of divine origin brought about by supernatural forces, and (4) Illness related to the individual's astrology [the role of destiny].

In general, Mayan people across Latin America know that traditional and indigenous medicine comes closer to a complete view of illness, integrating social, cultural, and psychological and historical factors; at the same time, developing and understanding the patterns of particular diseases. The Mayan people had wisdom and understanding of health, healing and the appropriate technology to eat healthy until the European contact and eventual colonization of the Indigenous people to the new world. Perhaps if this is taken care of now, this disease will not be an issue for the next generations. The next generations can go back to eating healthy foods like Mayan ancestors. As a Mayan woman from the Highlands of Huehuetenango Guatemala, this co-author has seen in her family the eating habits of today. Since moving to the outskirts of the city, for the past 50 years, the co-author's family has been diagnosed with diabetes. The co-author's four family members believe their diabetes resulted from a specific trauma that has happened to each of them. Western medicine diagnosed them with diabetes within a couple of months after their specific trauma. They believed that their use of refined foods has also contributed to diabetes. As a recommendation to help prevent diabetes is eating pinto beans, nopales or prickly pear cactus pads and tunas or prickly pear cactus fruits. The co-author drinks this beverage a couple times a month to avoid this disease: pineapple, celery, and fruit.

Background: The Oglala Lakota Tribe of the Great Plains

The Sioux or Lakota people is actually composed of multiple bands, such as the Oglala Lakota. Prior to the westward expansion of Euro-Americans, the Lakota inhabited large areas of the Great Plains. Like other indigenous people, the Lakota suffered violence and massacre, possibly the most notorious of these, the Wounded Knee Massacre, a consequence of gross cultural misunderstanding and the U.S. cavalry's attempt to disarm and subjugate the tribe. The Lakota were forced to move north, and most of the 70,000 registered Lakota today inhabit reservations primarily in North and South Dakota, the largest of which is the Oglala Sioux Pine Ridge Reservation (American Indian Heritage Foundation, 2012).

The American Indian participants of the *Strong Heart Study* from North and South Dakota, included the Oglala Lakota of the Pine Ridge Reservation. Among these participants, 36% of men and 47% of women were obese, and the overall prevalence of diabetes in this population was 32.5% (U.S. Department of Health and Human Services, National Institutes of Health [NIH], 2001).

Storytelling: Oglala Lakota Perspective, Ms. Maxine Brings Him Back-Janis

An area that may hold the key in the dialogue of oral health disparities and diabetes is centered on the voices of the tribal people perspectives. Significant in this dialogue are nutritional challenges due to limited access to fruits and vegetables. Because of the remoteness of many tribal communities an ample supply of fruits and vegetables is not available and this creates a challenge when the recommendation is to have these foods as part of one's regular diet. This access issue continually challenges tribal communities to forgo eating healthy diets of nutritional rich foods,

which was very much a part of traditional diet in the past. Among the Lakota, the traditional practices of digging thinpsinla (turnips), picking chunpa (choke cherries), and papa (drying buffalo meat) have lost their appeal to many which has led to less healthy dietary habits that exacerbate the diabetes epidemic among our tribal people. Additionally, tribal people continually express issues with access to prevention services within their communities. It's critical for individuals with diabetes to routinely be seen by a dental hygienist every three months for preventive care and monitoring of oral health status, however accessing these dental hygiene services at tribal and Indian Health Service clinics is limited and poses a challenge for many tribal communities. There are often not enough dental hygiene providers to service the people. In a recent study in a tribal community (Brings Him Back-Janis, 2011), numerous barriers to accessing dental care were expressed by individuals in the community. For example, the study revealed, 'Approximately 90 percent of the participants had at least one decayed tooth. Although most adults have thirty-two teeth (twenty-eight when the wisdom teeth have been removed), approximately 50 percent of the adult participants in the study had twenty-seven or fewer teeth. A full 10 percent of the adults we screened had fewer than sixteen teeth remaining. A number had no teeth at all. We also found high rates of gum disease. Because oral health has implications for total health and is linked to other conditions such as heart disease, premature birth, and infections, these data have many implications for the well-being of my people. (page 3).

Background: The Yoeme (Yaqui) People of Arizona and Mexico

The Yoeme's first contact with Europeans occurred in the 16th century, when Spain invaded what is now Mexico, capturing the Yoeme as slaves, establishing Catholic missions, and mining silver on sacred lands. Many Yoeme were killed or forced to relocate, ultimately into Arizona, to escape violence and massacre. Finally, in 1939, the Mexican government recognized the Yoeme people and their rights to land. It was not until 1978, however, that the Pascua Yaqui Tribe of Arizona became a federally recognized tribe, awarded 202 acres in southern Arizona. Today, there are approximately 10,000 members living in Arizona and more in Sonora, Mexico (Pascua Yaqui Tribe, 2009).

Originally, the Yoeme depended upon hunting and had strong, respectful ceremonial obligations to the natural environment, particularly to the deer and flower world. The deer dances (pahko'olam) and songs continue these traditions and remain an important part of Yaqui life, honoring the survival of the Yaqui people (Delgado Shorter, 2003).

A Euro-American lifestyle, however, has increased the risk for diabetes and other factors contributing to cardiovascular and other chronic diseases among the Yoeme, in both the U.S. and Mexico. The overall prevalence of diabetes among the Pascua Yaqui Tribe in Arizona is 35-39% (men and women, respectively), and there are dramatic differences across older age groups (Aickin et al., 1995). Approximately 42% of women 35 to 44 years of age were diagnosed with diabetes, but prevalence jumped to 92.9% among those 55 to 64 years old. In men, the increased

prevalence was significant, though less dramatic [44% and 61.5%, respectively] (Aickin et al., 1995). In Mexico, Rodríguez-Morán and colleagues (2008) compared the impact of factors of western acculturation on cardiovascular risk factors in a sample population of Yaquis and the more remote Tepehuanos Tribes (20-65 years of age). For diabetes alone, the difference in prevalence was 18.3% among the Yaquis and 0.83% among the Tepehuanos, most significantly associated with the higher intake of saturated fats in Western diets.

Storytelling: Native Language, Traditional Knowledge for Diabetes Prevention: Dr. Octaviana Trujillo

Historically, in our relations with the immigrants groups to North America, indigenous tribes faced the prospect of total extinction as the cost for maintaining the life ways we had known from time immemorial. The only viable alternative to annihilation was establishing some sort of relationship with the government and coexistence with the rapidly encroaching United States national society. This set the framework for the subsequent shaping of both the orientation and the content of "Indian health care" from that point until recent times. Federal policy and national social pressure has had a tumultuous effect on the very existence of our Indian communities. Regardless of the specific nature of any actions on the part of the U.S. toward indigenous communities, the implicit goal was—at its most benevolent—the complete cultural assimilation of Native America. Although this original implicit goal has never been realized, the vitality of our native health has been severely compromised in the ensuing cultural adaptation of indigenous peoples to the rapidly changing social dynamics surrounding them in their native communities. Indigenous Native American tribes are increasingly challenged to meet the demands of an economically driven, technology and research-based decision making world. These demands warrant creative solutions and innovative strategies to ensure that tribal communities maintain balance between the interplay of mainstream and tribal forces.

Tribal leaders readily understand today that no longer can any society function in isolation, as their communities are interdependent with one another, with other cultural minorities, and with the dominant national culture as well. Tribal communities are expanding their role in the competitive arena of a market-driven economy. To address this situation, they are investing millions of dollars in health care. New sources of funding, including gaming and interest-bearing investments, afford tribal communities the purchasing power that historically was not available. Health care is a primary benefactor of the proceeds from this industry as tribal communities increase their investment in their members' health, as well as institutional programs, which serve their communities. Native Americans share many health care needs in common with other groups.

On the individual level, they need to have access to the same institutional benefits as others in order to pursue their own personal health well-being goals. On the community level, education facilitates the development of capable and skilled professionals to occupy decision-making positions within tribal government and indigenous

organizations. Tribal schools and colleges, particularly, attempt to integrate indigenous cultural practices and value systems within the mainstream—that is, national culture—education milieu. Although public institutions in general are becoming more responsive to the needs of minority and indigenous communities in terms of their access to the benefits of quality health care, they have not been so responsive with regard to traditional native health care beliefs and practice. Due to the unique nature of Native American tribal communities vis-à-vis other ethnic communities, this persistent lack has an additional community impact. This is directly related to our relatively small populations and their unique cultural aspects that distinguish them from all other groups, including other minority populations. By nature, indigenous communities lack the much greater degree of migration of new people and resources into the community from other communities that characterizes even the smallest of other minority populations, since most cultural groups spread out in additional interconnected communities often dispersed widely throughout the country.

Although a high percentage of indigenous community members migrate to the urban areas, they maintain a unique connectedness with the home community. In this context, traditional native health care needs of indigenous people suffer because in terms of educational fiscal logistics, addressing those needs simply is not cost-effective. When tribal members leave the reservation to take up residence in metropolitan urban communities, even though they may actually receive a higher quality of health services, they are less likely to have their traditional native health care needs addressed. The European cultural remoteness and the relative isolation of a high number of our Yaqui (Yoeme) members, whether physical isolation in our own communities or in figurative isolation in the urban setting, has meant that a high percentage of our members live a traditional Yaqui lifeway, where the well-being is inseparable and indispensable from our spiritual universe. Among no part of the Yoeme population is this more so than among those of us residing in off-reservation urban settings such as Phoenix (include traditional Yaqui well-being views). It is well known that the majority of indigenous people who live in urban settings maintain strong ties to their respective reservation communities. These ties range from occasional contact with close relations to more involved commitments to extended family, home community, clans, and traditional ceremonial responsibilities. In fact, many of us who migrate to the urban areas seeking educational and economic opportunities consider it a physical move only. Our spiritual, social, and cultural focus remains in our home reservation community. Indeed, many of us who migrate to the urban areas with the intention of returning after accomplishing the specific objectives for which we have left.

It is extremely rare that we Yoeme (Yaqui) think of our migration to the urban area as turning their back on the home community and severing their connection to our cultural roots and homeland. If the Yaqui reservation-based community is the bastion of traditional cultural continuity, then it is the urban-based community that affords them the bridge to the outside world and its

resources that are so critical to maintaining tribal autonomy and cultural continuity in an ever-changing world. The preservation, maintenance, and restoration of native language capability in this context is even more critical due to its implications for our well-being, not only in terms of our cultural continuity, but also in matters regarding how we understand traditional notions of physical and spiritual well-being, and how they relate to health care. The alarmingly high rate of diabetes, particularly among those of us residing in the urban areas, poses a considerable threat to this important continuity that has very real negative consequences for both our urban and the reservation communities alike. Any strategy intended to affect health awareness in the modern context and to improve health outcomes must be comprehensive enough in scope to consider the vitally important link that is the Yoeme language and all that it connotes to the Yaqui people.

Background: Choctaw Nation

Today, diabetes is common among Choctaws—among both the Mississippi Band of Choctaw Indians and the Oklahoma Choctaw Nation. In September 1989, the prevalence of diabetes among the Mississippi Band of Choctaw Indians was 6.5 times the U.S. rate (Johnson & Strauss, 1993). Both the Oklahoma Choctaw Nation and the Mississippi Band of Choctaw Indians now have diabetes prevention and education programs, which emphasize healthy diets and exercise. Both programs also educate members about the risk factors for the disease, and treatment (Choctaw Nation, 2012; Indian Health Service, 2012). Education about the causes of diabetes as well as management of the disease is important. As Dr. Jarratt-Snider learned about the nutritional aspects of diabetes risk as well as the importance of exercise, she has made changes in her own life which she hope will help her avoid the disease that has already impacted members of her own family. With the development of more and more education programs, there is hope of not only reducing the rate of diabetes among Choctaw and other Native American and Indigenous peoples, but also reducing the incidence of severe health problems resulting from the disease, such as renal failure and heart disease.

Storytelling: Traditional Foods and Lifestyles and the Impacts of Colonization and Technology: A Choctaw Perspective, Dr. Karen Jarratt- Snider

Traditional foods and lifestyles of Southeastern American Indians in general may offer important insight on current diabetes risk factors. As with the rest of American society, many Choctaw lives today are more sedentary than in the past. We spend time at desks and computers, watching television, and other activities that result in far less exercise than our ancestors, eat processed food, and consume high fat and high glycemic index foods. In centuries and even decades past, the people worked outdoors gathering, hunting and farming to provide food for our families--gathering, splitting and stacking wood for household heating, hauling clean water, and many more daily activities in which everyone in the community joined. Providing for families and communities, then,--subsistence activities-- involved a good deal of physical activity. A shift from primarily a subsistence, community-based economy to a wage-driven economy, particularly since

the mid twentieth century, has brought a change in the amount of physical activity in the lives of many of the people. In addition to the reduction in physical activity, dietary changes began to occur in the 1800s, due in part to federal Indian policy. Removal forced many to move west to Indian Territory—present day Oklahoma (which is itself a Choctaw term).

Federal policy towards American Indian tribes took many contradictory turns over subsequent decades, but until the 1970's was always predicated on the assumptions that Indians would either assimilate or simply just disappear. Through persistence, resistance, and adaptation, Native American peoples, including the Chahta--like many other Indigenous peoples--, have remained. Yet those many policy changes resulted in loss of land and other natural resources and left many native peoples in a state of poverty and without the ability to continue utilization of traditional foods in their diets. Enter the provision of government surplus foods, or, as many American Indian peoples call them, commodity foods. And why did it matter? High glycemic index foods, combined with foods high in saturated fats and a lack of physical exercise can lead to obesity. Obesity is detrimental to overall health, and is also one of the risk factors for Type II Diabetes. The pattern of changes in lifestyle from subsistence to wage economies resulting in less physical activity and dietary changes from traditional foods rich in fiber and low in high glycemic index foods, to foods high in saturated fats, and processed foods and the rise of the incidence of diabetes in Indigenous communities has been previously noted by several scholars (Joe & Young, et. al., 1993; Lee, 1996; Mihesuah 2005).

Traditional Choctaw foods included a diet comprised of many lower fat foods (compared to those today), such as game (for example, rabbits and deer), and was rich in complex carbohydrates, fiber, fresh fruit and vegetables and nuts. As with so many other American Indian peoples, corn has been an important part of Choctaw foods. Many Choctaw dishes feature corn, such as Banaha (Pvluska Bvnaha), a bread made of a cornmeal mush, which can be combined with peas or beans, wrapped in corn silks and boiled in water or broth. Adding peas or beans to the corn meal makes banaha a complete protein food. Ta-fula, or hominy is a common dish, and still cooked outside over an open fire at many large gatherings. Wild sweet potatoes, peas, pumpkins, beans, hickory nuts and oil, acorns, wild grapes, berries, and greens (turnip, poke, mustard, spinach) wild onions, walnuts, melons, and acorns were among traditional foods found in Chahta diets, as well as crawdads and other fish (Choctaw Nation Cultural Services, 2012).

Corn is a fairly high glycemic index food, but hominy—used in many dishes—has a somewhat lower glycemic index than corn from a can or corn on the cob. Additionally, the pairing of cornmeal with high fiber foods, such as peas, nuts, or beans yields complete protein foods low in saturated fat and rich in fiber. Commodity foods (formerly known as surplus foods), on the other hand, are—for the most part—high glycemic index foods and high in saturated fats. I remember them well—powdered eggs, powdered milk, pinto beans, white rice, flour, white sugar, canned meat (high

in saturated fat and somewhat comparable to Spam), commodity cheese (a processed "cheese food product" similar to Velveeta) and lard. Occasionally, we would also receive a can of grape juice and a can of chicken, but we rarely received those items. I remember the meals my mother would make with those foods. As a child, I thought I just didn't like meat (not caring for the "canned meat"). I can still recall the way that the grease would ooze out of the top of the can as it was opened. My mother would fry it until it was crispy, and then add ketchup, in order to entice me to eat it. I also remembered the traditional foods (cornmeal mush was a staple for many of them) such as mashed sweet potatoes with nuts, banaha, tafula, and I also developed a love of wild greens, fruits and vegetables at a young age. My mother didn't make banaha too often, but many meals included some form of corn meal mush. Today, Indian tacos are a popular dish among many native peoples. But the combination of the high glycemic index (white flour) and saturated fat content (fried bread), make Indian tacos a high calorie food, and one that does not support a healthy lifestyle for those concerned about developing diabetes. Indian tacos are just one example among many of how contemporary diets have shifted from those rich in low glycemic index, low saturated fat diets to high glycemic index, high saturated fat diets.

Discussion

Storytelling provides a cultural context to diabetes and its impact on indigenous people. The perspectives shared yield much needed information from native elders and scholars regarding diabetes. In a collective review of the six stories, four primary themes emerge. One theme embraces the concept that prior to contact with Europeans, diabetes was not known among the indigenous peoples of the western hemisphere. Non-native scholars such as Martin and Goodman (2000) advocate this perspective stating that it was not until the 1940s that certain southwest tribes (Pima and Tohono O'odham) experienced diabetes. Similarly, Roubideaux and Acton (2001) indicate that prior to World War II, diabetes was "not a significant problem for AI/AN communities" (page 206). The relatively recent emergence of diabetes among native people may explain the limited conceptual agreement across the stories suggesting that perhaps insufficient time has lapsed for a collective "cultural understanding" of diabetes to develop.

A second theme identified was the elders and scholars noted that non-native influence on foods and reduction in hunting, gathering and farming have been major factors in the rise of this disease. The narratives explain that the subsistence diet kept the indigenous peoples active and healthy. In contemporary times, indigenous peoples have had to adjust to survive and adopt new foods since traditional staple foods were often not available. These perceptions are echoed in the scientific literature. Wolsey and Cheek (1999) and Teufel (1999) have made strong arguments supporting the impact of non-traditional foods and more sedentary activity patterns on the development of the epidemic proportions of diabetes in indigenous populations.

Another theme is disconnection from cultural roots yielding a state of imbalance or loss of harmony manifest in negative health outcomes, such as diabetes. Cultural detach-

ment is exhibited by a loss of traditional food ways and subsistence activities, loss of traditional language, stories and practices, and even physical separation from land and people. A final theme is hope. All storytellers suggest that the solution lies in the core values and knowledge of the culture. They advocate cultural continuity and revitalization, tribal autonomy and the application of traditional teachings to modern problems. These last two perspectives are common to the various narratives and may apply to all disease processes impacting human health.

The perspectives of these elders and scholars could enhance not only the practice of providers but also tribal diabetes prevention and control programs. In 1997 the US Congress established the Special Diabetes Program for American Indian and Alaska Natives (SDPI) and has awarded health promotion funds directly to tribes. Over the past 15 years, tribal programs have integrated their knowledge of local food and activity behavior patterns and extraordinary creativity to develop locally relevant diabetes prevention and treatment programs. For example, programs have developed and taught healthy ways to prepare favorite foods, e.g. low-fat stew, and promoted physical activity by revitalizing traditional games by hosting community game days and multi-day games (Teufel-Shone et al., 2009). Other creative approaches have involved the use of local health promotion radio programs and public service announcements (often in the indigenous language), youth and community gardens, ropes challenge courses and climbing walls, and even surfing in California and shoeing in Alaska to re-introduce healthy behaviors. Tribal programs have leveraged the strength of community and family cohesion to gain support for behavior change. Programs launched team-weight loss competitions a decade before the method was popularized by the television show *The Biggest Loser* and engaged fathers and grandparents to support breastfeeding before the western medical community advocated the active involvement of family supporters.

Most programmatic strategies are based on the western medical model focusing on changing lifestyle habits and less often on concepts of imbalance and core cultural values. Bullock (2010), a native IHS provider, has said that our model of diabetes has been too small. The western medical approach to diabetes has not considered the health impact of stress created by spiritual imbalance, loss of language and cultural practices and beliefs, and uncertainly of indigenous identities. The perspectives shared by these native elders and scholars could enhance existing tribal programs to yield a more holistic approach to disease prevention and treatment. Diabetes programs might actually support events that address community healing and cultural revitalization as key to halting this condition that directly or indirectly impacts all native families.

Conclusion

These narratives in the form of stories come from a variety of indigenous perspectives. The resulting themes can guide non-native health care providers working with various indigenous people and tribal diabetes prevention and control programs. The concept of imbalance creating by contact with non-indigenous cultures and loss of traditional practices is common but all indigenous people do not all have the same perception of diabetes. Some may hold that changes in food choices and activities patterns can reduce the negative

consequences of the disease; yet, others may feel more strongly that reaffirming traditional beliefs and/or consultation with a traditional healer will be more effective. Health care providers are advised to ask an indigenous patient about perceived causes and even treatments to build a mutual understanding of the condition and treatment strategies. Programs are encouraged to explore and integrate cultural meanings of diabetes and not limit their approach to food and activity change strategies. For an indigenous person, a diagnosis of diabetes has far reaching implications. The diagnosis reaches beyond the individual and impacts the family and reflects the tides of cultural tenacity and loss. Non-native health care providers and even local programs generally know how to treat the person but should partner with traditional healers or elders to treat the spirit.

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