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Recognizing the Impact of Personal and Environmental Influences on Type 2 Diabetes Management

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RECOGNIZING THE IMPACT OF PERSONAL AND ENVIRONMENTAL INFLUENCES
ON TYPE 2 DIABETES MANAGEMENT

by

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A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
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RESEARCH PAPER APPROVAL

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A Research Paper Submitted in Partial
Fulfillment of the Requirements
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Approved by:

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TITLE: REGOGNIZING THE IMPACT OF PERSONAL AND ENVIRONMENTAL INFLUENCES ON TYPE 2 DIABETES MANAGEMENT

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Globalization has drastically altered the way humans function. Modern ways of life have induced obesity and type 2 diabetes upsurges on a global level. Type 2 diabetes is a complex chronic illness that can be extremely difficult to prevent and manage. It requires strict consistency in terms of energy consumption, self-assessment, and physical activity. A wide array of variables impact human behavior and one's ability to abide by such strict regimens. These variables can often be categorized as environmental or personal influences. Comprehensive understanding of these variables can provide insight to diabetics and health professions regarding barriers to diabetes management as well as useful strategies that could be applied. This research paper investigates some of the personal and environmental variables of diabetes management and discusses specific strategies diabetics may use to control blood sugar levels.

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CHAPTER 1

INTRODUCTION

As the world population continues to grow at a steady rate, the challenge of meeting humanity's nutritional needs becomes increasingly complex. Poverty remains to be a real issue in many countries across the globe; the inhabitants of these countries struggle to meet their personal basic care and nutritional needs on a day to day basis. According to the Food and Agriculture Organization of the United Nations (2013), from 2010 to 2012 an estimated 868 million people worldwide were undernourished or suffering from hunger.

However, a contradictory phenomenon is simultaneously occurring. As famine and starvation remain to be a prominent issue, obesity and diabetes are becoming increasingly common on a cosmopolitan scale (Boero, 2012). A free trade world economy has resulted in an unequal distribution of resources, including wealth and food. This imbalance of resources has led to a bipolar extreme of poverty and exorbitance. Public health professionals have recently observed that obesity rates appear to be increasing more rapidly in higher income countries, verifying a positive correlation between wealth and obesity (Harvard School of Public Health [HSPH], 2013a). But ironically, both industrialized and developing countries alike are experiencing similar upsurges in obesity and type 2 diabetes (Meetoo, 2013). In fact, both obesity and type 2 diabetes have been deemed pandemics due to world prevalence increasing at an unmanageable rate. As a result, there is an increasing need for diabetes care services across the globe. Generating an equilibrium of nutritional resources on a global level

may be an insurmountable task for a single person. However, a single person is capable of fostering balanced dietary practices among other individuals and groups.

Background

There are a multitude of factors which influence one's ability to maintain a healthy lifestyle. Access to healthy or fresh foods, personal preferences, mental status, social influences, etcetera, all contribute to the way one manages his or her health. These factors which influence one's ability to manage diabetes can often be categorized as personal or environmental stimuli. For instance, social stigmatizations, access to food, social support, and disability accommodations may be considered external influences which affect one's ability to control diabetes or diabetes symptoms. Similarly, internal factors such as values, preferences, levels of motivation, and time perspectives may also contribute to one's ability to control diabetes symptoms.

Overall, the type 2 diabetes pandemic should be handled like any other biological pandemic and with the same urgency. In order to gain control over this pandemic, there must be improved efforts to increase awareness about the type 2 diabetes mellitus medical disaster, including how to harness control and prevention. Weight control is widely accepted as an effective treatment option for type 2 diabetes. Yet, the amount of resources designed to assist diabetics and overweight persons with maintaining a healthy lifestyle are limited. There is also little guidance on how diabetics can use personalized strategies to affectively promote and achieve weight management and blood glucose control. As the prevalence of diabetes continues to increase, it will be necessary to expand diabetes support services for people across the globe.

Differentiating Diabetes and Obesity

Type 2 diabetes mellitus and obesity together have been termed "twin epidemics" (Teixeira & Budd, 2010, p. 527), so it is necessary to emphasize that obesity and diabetes are two separate conditions which have some underlying commonalities and some major differences. Each of these conditions have resulted in separate but interrelated pandemics. A plethora of scientific studies have identified a strong correlation between obesity and type 2 diabetes, and roughly 80 percent of type 2 diabetics are overweight or obese (Hilaire & Woods, 2013). Obesity, along with several other medical conditions such as hypertension, high triglyceride levels, and low HDL cholesterol, have consequently been categorized into a group of risk factors for type 2 diabetes (Smyth and Heron, 2005).

A key difference between obesity and diabetes mellitus is the prognosis if poorly managed or left untreated. According to Teixeira and Budd (2010), the correlation between obesity and type 2 diabetes requires high priority because obesity can actually accelerate diabetic processes that can cause death. According to the U.S. Department of Health and Human Services (2009, p. 41), obesity is defined as a "condition in which a greater than normal amount of fat is in the body; having a body mass index of 30 or greater". Obesity has been linked with many chronic medical conditions such as high blood pressure, high cholesterol, stroke, heart disease, and type 2 diabetes (Bagchi & Preuss, 2013). Yet, according to Eckel et al. (2011), a majority of the individuals considered to be obese do not develop type 2 diabetes. In fact, an estimated 20 to 30 percent of obese individuals are metabolically healthy (Hwang, Bai, Sun, & Chen, 2012),

so as a solitary diagnosis, excessive weight is not necessarily a detriment to one's overall health (Eckel et al., 2011).

On the contrary, diabetes mellitus undeniably leads to physiologic dysfunction if poorly managed or left untreated. Diabetes mellitus is a chronic illness characterized by reduced ability to maintain homeostatic glucose levels within the blood due to beta cell dysfunction or pancreatic deficiencies in terms of insulin production (Fain, 2009). Diabetes is the leading cause of nephropathy, end stage renal disease, neuropathy, and vasculopathy, which is attributed to over 60 percent of non-traumatic lower limb amputations (Bagchi & Sreejayan, 2012). In addition, diabetes mellitus can create macrovascular complications that often leads to cardiovascular disease (Hilaire & Woods, 2013). Because of the multitude of perilous functional and physiological implications associated with diabetes mellitus, the focus of this study will be on managing diabetes rather than obesity.

While in recent years scientists have gained a wealth of knowledge regarding diabetes and obesity, further research is still necessary to increase understanding of the relationship between obesity and diabetes. Obesity will not be the focus of this research, but recognizing and comprehending the relationship that exists between obesity and diabetes is vital to understanding treatment and management strategies.

Significance of the Study

Currently, the prevalence of obesity and type 2 diabetes is continuing to rise at a disturbing rate. During the 21st century, the worldwide prevalence of diabetes mellitus as a chronic condition notably reached pandemic proportions for the first time in history (Ginter & Simko, 2010). With any type of epidemic or pandemic, there are foreseeable

consequences. The public health and fiscal concern of allowing these trends to continue is immense. There are numerous complexities associated with sustaining a sick populace, but among the most obvious concerns are those of pecuniary nature. Diabetics alone will not be forced to bear the burden of chronic illness, but those not directly given diagnoses will also be left to face indirect consequences of such a medical epidemic. Already, high medical expenditures and unemployment rates associated with type 2 diabetes have undeniably strained federal U.S. health care budgets and social support systems. Recent research published by the American Diabetes Association (2013) estimates that the total cost of diagnosed cases of diabetes rose from 174 billion in 2007 to 245 billion in 2012.

The economic cost of providing basic health care to millions of diabetics is already excessive, but more importantly the money being spent on these health care expenditures could be used to fund indispensable government programs such as Social Security and Medicare. It is crucial for Americans to address the diabetes epidemic or pandemic sooner rather than later because if prevalence rates continue to soar, then the medical expenses alone will become exponential and, more than likely, unsupportable for many federally funded programs and uninsured families.

Essentially, the comprehensive impact of allowing type 2 diabetes remain rampant will result in an insurmountable medical catastrophe, and the future welfare of people across the globe will be jeopardized. It would be irresponsible to dismiss the inevitable consequences without attempting to prepare for the ramifications of this medical calamity. One thing is certain, modern society will not be able to avoid a surge

of diabetes-related medical problems unless more people are willing to adopt healthier standards and embrace lifestyle modifications.

Many of the negative repercussions from the diabetes and obesity pandemics are foreseeable and possibly preventable. Fortunately, epidemics can generally be controlled if their causes can be acknowledged, especially when a cure can be identified (Pinkney, 2002). Evidently, the cure for obesity is weight management via exercise and prescribed dieting. Yet when referring to diabetes as a general condition, there is not merely one identified cause, and there currently is no absolute cure (Fain, 2009). Medical professionals have identified risk factors for diabetes as well as multiple diabetes management and prevention strategies. Yet, diabetes remains to be on the rise in countries around the globe (World Health Organization, 2013). Unless there is immediate, universal application of diabetes prevention and management strategies, this health concern will only exacerbate and become unbridled. Therefore, the diabetes pandemic will continue to require immediate attention and intervention.

Further research is necessary to improve understanding of effective diabetes control and management. Future research should be aimed at finding explicit strategies can be used to actively contend this health crisis. Several environmental, psychosocial, and personal factors impact health behaviors, so it is important to incorporate these concepts into diabetes management interventions and strategies.

Purpose

The objective of this research is to analyze personal and environmental variables that influence type 2 diabetes mellitus management in order to identify as well as promote practical diabetes management strategies. The first step to controlling the

diabetes pandemic is to recognize barriers and appropriate interventions for specific demographics. This information can then be used to formulate unambiguous strategies aimed at prevention and successful diabetes management (resulting in controlled blood glucose readings).

Several factors may influence one's ability to maintain a healthy lifestyle or manage a diagnosis of diabetes mellitus. This paper considers some common variables of diabetes management and categorizes them into two classifications: personal and environmental variables. Personal variables are internally controlled, subjective influences, while environmental variables include external, objective influences on diabetes management. Selected variables from each classification were researched using established peer reviewed resources. Noteworthy inferences from the peer reviewed articles are described and discussed within this paper. Databases such as Academic Search Premier, PsychINFO, MEDLINE, and PubMed were used to gain access to the peer reviewed resources.

Because weight management has already been widely accepted as a probable means of diabetes management, one aspect of this research will be to investigate personal and environmental variables relevant to personal weight management. In addition, internal and external variables not relative to weight management are also discussed for the purpose of validating other practical approaches to controlling the diabetes pandemic.

Definition of Terms

There are four well defined forms of diabetes which include: Type 1 diabetes (insulin dependent diabetes mellitus), Type 2 diabetes (non-insulin dependent diabetes

mellitus NIDDM), gestational diabetes mellitus, and diabetes insipidus. Each form of diabetes has its own specific etiology, effects on the body, and appropriate treatments. In order to distinguish each form of diabetes and the associated features, it is necessary to introduce some key terminology which will expound the various forms of diabetes. Other pertinent vocabulary relevant to this research is also defined.

Blood Glucose: Main sugar found in the blood and is body's main source of energy. (Also known as Blood Sugar)

Blood Glucose Level: Amount of glucose in a specific amount of blood. Measured in milligrams per deciliter (mg/dL) in the United States and millimoles per liter (mmol/L) in medical journals and other countries around the world.

Diabetes: A chronic illness that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces (WHO 2012). Modern advances in biomedical and physiological research have provided a thorough understanding of each specific form of diabetes.

Diabetes Insipidus: Condition generally caused by a defect of the pituitary gland or kidney and characterized by normal blood glucose level but frequent and heavy urination, excessive thirst, and an overall feeling of weakness.

Dialysis: Medical process of cleansing the blood artificially with special equipment when the kidneys are no longer able to filter the blood adequately

End Stage Renal Disease (ESRD): Total permanent kidney failure causing the body to retain water and build up harmful wastes. A person with ESRD needs dialysis to perform the work of the failed kidneys.

Fasting Blood Glucose Test: Measures blood glucose levels after a person has not eaten for 8 to 12 hours (usually overnight) and may be used to diagnose pre-diabetes or diabetes or to evaluate whether a person with diabetes is keeping blood glucose levels on target.

Gestational Diabetes Mellitus: A type of diabetes that develops only during pregnancy and usually disappears upon delivery but increases the mother's risk of developing diabetes later in life.

Hyperglycemia: Higher than normal blood glucose

Impaired fasting glucose: See Pre-diabetes.

Impaired glucose tolerance: See Pre-diabetes.

Insulin: Hormone produced by the Beta cells of the pancreas which help the body use glucose for energy.

Insulin resistance: the body's inability to effectively respond to and use the insulin it produces.

Metabolic syndrome: Group of health conditions associated with an increased risk for heart disease and type 2 diabetes. Hypertension, high triglyceride levels, low HDL cholesterol

Microvascular disease: Condition where the walls of the smallest blood vessels become abnormally thick but weak, which slows the flow of blood to the cells. The smallest blood vessels, such as those found in the eyes, nerves, and kidneys, are most often affected.

Obesity: A condition of having a body mass index of 30 or greater.

Pre-diabetes: Condition of having higher than average blood glucose levels but not high enough for a diagnosis of diabetes. People with pre-diabetes are at greater risk of developing type 2 diabetes, stroke, and heart disease. Other terms for pre-diabetes include impaired glucose tolerance and impaired fasting glucose.

Type 1 diabetes mellitus: Also known as insulin dependent diabetes mellitus or juvenile diabetes. Occurs when the body's immune system attacks insulin producing beta cells of the pancreas, consequently creating high glucose levels caused by a total lack of insulin

Type 2 diabetes mellitus: The most common form of diabetes which is characterized by chronic high blood glucose levels caused by either lack of insulin or the body's inability to use insulin efficiently.

Source: (U.S. Department of Health and Human Services, 2009)

Chapter 2

REVIEW OF THE LITERATURE

Etiology and Prevalence:

Type 2 diabetes mellitus is a progressive disorder in which the development can be prompted and affected by multiple components (Sheehan & Ulchaker, 2012). However, an undeniable cause of diabetes mellitus is insulin resistance (O'Connell, 2011). The inability of the pancreas to produce or secrete appropriate amounts of insulin is also common in type 2 diabetics (Fain, 2009). As previously mentioned, there is a strong positive correlation between obesity and the risk of diabetes. The exact relationship between these two conditions continues to be enigmatic and not completely explicable (Strock et al., 2012). Yet, a greatly accepted link between the two conditions is that elevated weight often causes insulin resistance within the body, which leads to beta cell dysfunction and the inability to maintain homeostatic blood sugar levels (Eckel et al., 2011).

Conditions that often accompany obesity such as hypertension, dyslipidemia, low HDL cholesterol, and elevated plasma glucose have all been classified into a cluster of major risk factors for diabetes mellitus (Smyth & Heron, 2006). The controversial notion of grouping these risk factors into a single concept termed "metabolic syndrome" has recently been recognized by the American Heart Association and U.S. National Heart, Lung, and Blood Institute (Pickney, 2002). In the United States, it is common for many of these metabolic conditions to take onset in the later years on life. An estimated twenty-three percent of everyone 65 years and older has diabetes, though diabetes is not assumed to be an inevitable consequence of aging (Petit & Adamec, 2011).

Modern lifestyle trends have attributed to weight gain and obesity trends in many populations, and within these societies, an epidemic of diabetes has followed (Barnett & Kumar, 2004). This is verified in the prevalence statistics of obesity and diabetes in several populaces. Globalization has led to revolutionary changes in the way people function and interact with one another. Essentially, globalization has impacted the food environment, the engineered environment, and technological advancement, which has resulted in monumental reform of cultural norms across the globe (HSPH, 2013a). Over time, global free trade has driven down the cost of food; the fast food and convenience food industries have made high calorie instant meals very popular and readily available across the globe (Hurley, 2010). Additionally, the developments of labor saving devices such as cars, remotes, and computers have eliminated the need for certain physical activities (Sheehan & Ulchaker, 2012). The intentions behind such products may have been geared toward convenience and increasing quality of life, but the long term effects of these products have been detrimental to the world's health status.

In Western culture, it is now more socially acceptable than ever to get dinner from a drive through window. This prime example demonstrates how the new age changes in the engineered environment (drive-through windows as a commonly engineered element of restaurants), technology (personal motor vehicles used as a main source of transportation), and food sources (abundances of fast food chains and processed convenience foods) all cooperatively impact the lives of many Americans on a daily basis. Since high calorie food sources are so readily available and physical exertion is no longer requisite for procurement of food sources, it has become increasingly common for caloric intake to surpass calories depleted for energy on any

given day (Haws & Winterich, 2013). As a result, the prevalence of obesity and type 2 diabetes has been spiraling out of control since the 1960s (O'Connell, 2010).

The term "diabesity" has been used to describe the obesity and diabetes epidemics as a single entity due to the coinciding emergence of the two conditions (Fain, 2009). Although in the past, overweight and obesity trends have been difficult to track due to inconsistent diagnostic standards throughout the world (Seidell, 2010), an established standard for obesity was eventually determined as having a body mass index of 30 or greater (U.S. Department of Health and Human Services, 2009). This criterion has been adopted by several societies in recent years, including the United States. When using this criterion for obesity, the estimated prevalence of obesity among U.S. adults age 20-74 more than doubled from 1980 to 2008 (Ogden & Carroll, 2010).

To illustrate the rapidity of the obesity trend, one can examine the obesity trends among each U.S. state over time. The haste of the growing rate of obesity is illustrated by the Harvard School of Public Health (2013b) website which reports, "In 1990, no state had an obesity rate higher than 15 percent. By 2010, no state had an obesity rate lower than 20 percent, and 12 states had obesity rates greater than 30 percent". Thus, within the relatively short time period of 20 years, all fifty U.S. states experienced a substantial amount of weight gain within each population. Overall, an estimated 78 million or approximately 35 percent of Americans were obese in 2009-2010 and an additional 16.9 percent of U.S. children met the criteria of obesity (Ogden, Carroll, Kit, & Flegal, 2012).

Likewise, the number of Americans diagnosed with diabetes has been steadily spiking since the 1980s; this number almost quadrupled over a span of 30 years from 5.6 million cases diagnosed in 1980 to 20.9 million cases diagnosed in 2010 (Centers for Disease Control and Prevention, 2011). Data from the National Diabetes Fact Sheet in 2011 was used to determine a diabetes prevalence of 25.8 million children and adults in the United States, or a total of 8.3% of the total U.S. population (American Diabetes Association, 2011). This alarming number is expected to double by the year 2030 due to the aging population, population growth, urbanization, and increasing prevalence of obesity and physical inactivity (Wild, Roglic, Green, Sicree, & King, 2004).

With the arrival of the 21st century, obesity has often been considered an American issue (Fields, 2011), and the United States has been attributed to being the source of an obesity pandemic (Prentice, 2006). Indeed, obesity was largely isolated to Western culture in past decades (HSPH, 2013a). However, industrialized and developing countries alike are experiencing similar obesity and diabetes upsurges, with the United States being just one of several industrialized nations where type 2 diabetes and obesity has been declared an epidemic (Leeds & Richards, 2008). In 2000, India and China were actually ranked above the United States in the top ten countries globally with highest estimated number of adults with diabetes (Mantzoros, 2006). However, upon closer examination, Italy, the United States, and Pakistan had highest proportions of diabetic adults in terms of population size when compared to India and China.

Regardless of where this trend began, complications spurring from domestic and international diabetes and obesity trends are now evident and disconcerting. Diabetes,

as a generalized diagnosis, currently affects an estimated 347 million people world-wide (World Health Organization [WHO], 2013). Startlingly, noncommunicable diseases such as obesity and diabetes are even beginning to invade countries already struggling to control infectious diseases such as AIDS, TB, and malaria, which adds a dual health risk currently being termed "Double Burden of Disease" (Prentice, 2006). The worldwide prevalence of diabetes as a chronic condition has notably reached pandemic proportions for the first time in history (Ginter & Simko, 2010).

Besides having a body mass index of 30 or greater, other major common risk factors for developing type 2 diabetes include: poor nutrition or diet, genetics, high levels of cholesterol in the blood, a history of heart problems, and physical inactivity (Sheehan & Ulchaker, 2012), (Hanas & Fox, 2008). Clearly, nutrition and cholesterol consumption are highly relative to weight control and the issue of obesity. Since evidence suggests that the issue of obesity is interrelated to diabetes mellitus, some variables may play a dual role in procuring new interventions for type 2 diabetes mellitus as well as obesity.

Nutritional etiology of diabetes. Family history and genetics are not factors that can be easily controlled, but nutrition and cholesterol consumption are pliable variables that may potentially be regulated or modified. Nutrition can essentially be affected by both environmental and personal factors, and it is important to discuss and differentiate the role of each type of influence in order to improve understanding of barriers to diabetes control at both the individual and social level.

Often times the unhealthy behaviors related to having a poor diet are influenced by environmental issues such as access to food. Socioeconomic status and the food

prices are also barriers that can impact access to nutritional, low calorie foods (HSPH, 2013a). According to the study by Agborsandgaya et al. (2013), socioeconomic status can actually be a predictor of diabetes management since type 2 diabetics who reported a lower income were less likely to make necessary changes to their diet or physical activity levels.

There are many explanations as to why socioeconomic status has such a profound impact on health behaviors. For instance, lower calorie "healthy" foods generally cost more per serving (Drewnowski, 2010). Also, studies show that chain grocery stores and supermarkets are more sparse in poor neighborhoods, while liquor stores are often highly concentrated in the same low income neighborhoods (Shimotsu, et al., 2012). This unequal distribution of competitively priced, fresh food sources undoubtedly creates a major barrier to attaining healthy, nutritional meals for anyone living in these less affluent neighborhoods.

Also, the marketing technique known as "supersizing" which is used by many fast food chains, offers price reductions per unit when consumers purchase larger quantities. Supersizing has been shown to facilitate the purchasing of larger food sizes of unhealthy foods and increase overconsumption (Haws & Winterich, 2013). It often creates a financial justification for low income families to order the larger quantities of unhealthy foods. However, according to Haws and Winterich (2013), this nonlinear pricing is also a successful marketing strategy when dealing with low calorie foods, but it is simply not as common as it is with fast or processed foods.

Furthermore, Tsui, Deutsch, Patinella, and Freudenberg (2013) point out that the public institutional food sector, which often serves low income populations at risk for

obesity and diabetes, often rely on processed foods in order to meet nutrient based standards. Yet, cooked and processed foods tend to have a higher glycemic index than raw food or minimally processed whole food (Petit & Adamec, 2011). Also, high amounts of sugar, sodium, and chemical additives increase the palatability of these highly processed foods, making overconsumption a common occurrence (Moodie et al., 2013).

Other examples of environmental factors that influence the nutrition of the general public are described by Tsui et al. (2013) who emphasizes that food service workers can greatly influence the nutritional value of meals through menu planning, food purchasing, techniques of food preparation, and portion sizes. Accordingly, Tsui et al., (2013) recommends that public food services workers are retrained with nutritional skills needed to prepare balanced meals from minimally processed foods. Foods such as greens, bananas, oranges, chickpeas, cauliflower, eggplant, and tomatoes have been shown to have a lower glycemic index and reduce the risk of developing type 2 diabetes (O'Connell, 2011). In addition, these foods often require less preparation on behalf of the food worker when compared to highly processed foods. If high calorie, processed foods were not readily available and only healthier alternatives were offered, then the consumption of raw foods such as fruits or vegetables would likely increase.

Personal variables affecting diet and nutrition. Then again, population growth and globalization has resulted in the high demand for tasty and convenient food, and production companies have responded to high demands by developing a massive variety of innovative food products. This has put the responsibility of decision making onto the consumer. Clearly, several variables play a role in how an individual makes a

selection in such a vast market. Personal, internal factors that can affect food selection and nutrition include: personality traits, preferences, and values. Factors like taste, method of preparation, nutritional value, texture, and visual aesthetics are all are to be considered when any individual makes a food selection. Yet, attitudes and values are two main driving forces behind the acceptance or preference of these food aspects.

The level of importance of food in a person's life, or food involvement, is a potential predictor of food consumption and willingness to try new foods (Eertmans, Bergh, Vansant, & Victoir, 2005). Conversely, the establishment of the term neophobia was established circa 1992 to describe a state of unwillingness to try new or unfamiliar foods (Pliner & Hobden, 1992). Neophobia has been referred to as both a state and a personality trait (Barrena & Sanchez, 2012). High food involvement and complete unwillingness to try new foods are both examples personal of personal traits can affect the food choices one makes. Clearly, having food related perceptions that sway a person's decisions or behaviors is an internal variable which ultimately affects a person's overall nutrition. Evidence does suggest that food attitudes can be altered, though not without effort or dedication. Increased or frequent exposure to exotic and unfamiliar foods has been a recommended interventional strategy to null extreme attitudes with neophobics (Eertmans, et al., 2005). Unfortunately, adjustment of food attitudes may be a time consuming task.

Personal preferences in terms of taste, instigates many of the diet choices individuals make. According to Hale (2011) food preferences are instinctual and also developmentally learned. Pleasure is one of the main motivators to ingest food, but

many of the foods that the human body naturally interprets as delectable includes foods high in sugar, fat, and salt (Prescott, 2012).

Values also play a meaningful role in food selection. As previously discussed, larger quantities of food can often be purchased at discounted rates per unit. This discount for larger size is appealing to individuals who value saving money but simultaneously causes negation of health values (Haws & Winterich, 2013). Sun (2008) acknowledges that a relationship between health concerns and attitudes toward healthy eating exist. Yet, values such as convenience and price value can lead to nullification of health values (Haws & Winterich, 2013).

Assessment

By definition, diabetes is the body's inability to naturally regulate glucose levels, so the monitoring of blood glucose levels is critical to both pre-diagnosis diabetes prevention and post-diagnosis diabetes management. There are multiple types of blood tests that can be performed to determine overall glucose homeostasis, but the preferred diagnostic assessment for diabetes is the fasting blood glucose test (Fain, 2009). A individual taking a fasting blood glucose test should not eat or drink for at least eight hours prior to the time of testing (Mazze et al., 2012). A fasting plasma glucose reading greater than 126mg/dl qualifies for a diagnosis of type 2 diabetes (Hilaire & Woods, 2013). An impaired fasting glucose, also referred to as Prediabetes, requires a fasting plasma glucose reading between 100 to 125 mg/dl (Mazze et al., 2012). Prediabetes indicates a high risk of the development of type 2 diabetes mellitus.

The Postprandial Plasma Glucose Test is another method of assessing plasma glucose levels. The Postprandial Plasma Glucose test is taken two hours after

consuming a meal, and a glucose reading equal to or greater than 200 mg/dl is indicative of further testing for type 2 diabetes (Sheehan and Ulchaker, 2012).

Blood glucose levels can also be tested randomly with hand held glucose meters. The development of hand held blood glucose meters have been revolutionary in terms of assisting individuals with managing diabetes because it allows diabetics to regularly monitor their own blood glucose levels (Petit, 2011). Tracking of one's blood sugar levels using hand-held blood glucose meters has also been referred to as home blood glucose monitoring, and technological advancement of these devices have made blood testing much more convenient and less painful (Sheehan and Ulchaker, 2012). Certain types of devices can be set to provide prompts for testing or announce comparative data regarding past blood glucose readings (Petit, 2011). Consistent blood glucose monitoring allows diabetics to be more informed about their current state of homeostasis, which can guide them with decision making regarding diet, exercise and medication consumption (Judd, 2011).

A common assessment physicians use to analyze how well a diabetic has managed their blood glucose levels over the past three months is an A1c blood test, where an A1c score greater than 7 indicates that an individual needs to take action to better control blood sugar levels so diabetic complications can be avoided (Judd, 2011). A strict adherence to the 3 month schedule allows medical professionals to determine if lifestyle or pharmaceutical adjustments are necessary (Ellis, 2013).

Treatment and Interventions

The beta cells of the pancreas produce the hormone insulin, which regulates blood sugar levels by stimulating the liver and muscles to produce glycogen; however,

individuals with type 2 diabetes have an inhibited ability to produce or use insulin (Fain, 2009). Impaired insulin production is not currently curable, but it is manageable (Hicks, 2010). Synthetic insulin has proven to be evolutionary to the treatment of both type 1 and type 2 diabetes mellitus. Essentially, administered insulin in type 2 diabetics prevents hyperglycemia by allowing ingested glucose to bind to insulin receptors that instruct glucose to be absorbed into muscles cells throughout the body (Meetoo, 2013). Still, it is important that insulin users are well informed on how to recognize and manage hypoglycemic episodes, since hypoglycemia is a common side effect of insulin therapy (Ellis, 2013). Insulin is generally injected into the subcutaneous tissue using a 4 or 5 millimeter needle (Meetoo, 2013). Insulin pump therapy can also be used to regulate insulin levels slowly and continuously, but the higher cost makes them less common (Meetoo, 2013).

Oral hypoglycemic agents are another treatment option (Chan, Bishop, Chronister, Lee, & Chiu, 2012). Among the most common of the oral agents are sulfonylureas and meglitinides, which promote insulin secretion in pancreatic beta cells (O'Connell, 2011). Biguanides, also known as metformin or Glucophage was developed in 1995 and is still frequently prescribed today; it controls glucose levels by limiting the amount of glucose that is secreted from the liver (Petit & Adamec, 2011). There are numerous pharmaceutical products designed to assist diabetics with the control of blood glucose levels. Because various pharmaceutical agents are designed to affect different areas of metabolic production, some individuals may be prescribed both insulin and oral hypoglycemic agents (Ellis, 2013).

Unfortunately, dependence of diabetes drugs has major disadvantages including high cost, unwanted side-effects, and limited success when used alone (O'Connell, 2011). Pharmaceutical and insulin therapy will subdue threatening symptoms of diabetes, but these interventions require consistent usage and do not provide long term effects (Fain, 2009). In addition, diabetics are frequently prescribed multiple medications to assist with comorbid medical conditions such as high blood pressure, and the addition of diabetes medication can be demanding (Petit & Adamec, 2011). Consequently, interventions that involve oral pharmaceuticals often complicate medical management.

Clearly, pharmaceuticals can prevent acute diabetic catastrophes, but it is necessary to express the importance of maintaining a healthy lifestyle in order to prevent diabetes complications or insulin dependency. The American Diabetes Association (2013) emphasizes the significance of lifestyle modification as a key strategy to managing and controlling type 2 diabetes. In general, insulin and oral medications are most effective when combined with lifestyle modification involving self-monitoring of blood glucose levels, meal planning, and regular physical activity (Ellis, 2013).

Weight management using diet and exercise has been shown to significantly reduce the risk of developing type 2 diabetes mellitus (Mazze et al., 2012). Weight management has also been found to significantly impact the health of individuals already diagnosed with type 2 diabetes mellitus. With proper diet and exercise regimens, diabetes related symptoms can be avoided or managed (Petit & Adamec, 2011). Diabetics who follow diet and exercise programs often experience improved

blood glucose readings (Teixeira & Budd, 2010). Therefore, weight control is widely recommended as a preventative strategy to avoid the diagnosis of type 2 diabetes mellitus and also as an interventional strategy subsequent to diagnosis.

Medical Nutrition Therapy can play a vital role in weight management, thus preventing diabetes as a chronic illness as well as diabetes related complications (Bantle et al, 2008). For instance, there have been documented cases of remission of diabetes symptoms when obese individuals limit caloric consumption to improve glycemic control (Pinkney, Sjostrom, & Gale, 2001). According to Mazze et al. (2012), three of the most noteworthy goals of Medical Nutrition Therapy include achieving and maintaining: blood glucose levels within the normal range, a lipid and lipoprotein profiles that reduces the risk for vascular disease, and blood pressure levels in the normal range or as close to normal as safely possible.

Medical Nutritional Therapy is more than simply adopting a diet for a specific time period; it requires long term lifestyle modification in regard to food choices and eating patterns (Sheehan & Ulchaker, 2012). Low carbohydrate, high protein diets have been prescribed as an effective way for type 2 diabetics to lose weight, yet it is also recommended that diabetics eat small amounts of processed meat by consuming meat substitutes such as fresh eggs, peanut butter, tofu, and cottage cheese, which contain high amounts of essential proteins and vitamins (Petit & Adamec, 2011). The paleolithic diet is an example of a high protein diet that has been associated with high satiety, and it has been shown to reduce weight and A1c blood sugar levels in diabetics (Jönsson, Granfeldt, Lindeberg, & Hallberg, 2013).

The glycemic index is a useful dieting tool that can allow diabetics to make informed decisions in terms of nutrition by allowing them to predict how particular foods will affect blood sugar levels. Foods are numerically rated on a scale of 1 to 100 with 100 representing a glucose tablet or a piece of white bread, and foods with a higher rating will increase the blood sugar more rapidly than foods with lower glycemic indexes. (Judd, 2011). Abiding by the glycemic index requires meal planning capabilities to ensure that the meals will result in an overall balanced amount of glucose consumption (Petit & Adamec, 2011). Dieticians can provide assistance and guidance with the development of individualized meal plans (Teixeira & Budd, 2010).

Physical activity is the other complimentary component to diabetes management and weight control success. Progressive aerobic physical training offers a multitude of health benefits and can expedite homeostatic control (Mazze et al., 2012). Sheehan and Ulchaker (2012) recommend walking 10,000 steps per day and offer strategies such as walking in the workplace, using home gym equipment, obtaining a gym membership, utilizing personal trainers, or becoming involved in physical group activities. The American Diabetes Association (2013) recommends adhering to a workout schedule that includes a minimum of 150 minutes of physical activity per week. Again, there are many factors that may inhibit one's ability to exercise including but not limited to motivation and time management. Studies suggest that social support can be a major driving force to exercise and thus better diabetes management in general.

The goal of any diabetes treatment intervention is maintenance of blood glucose levels within the normal range and avoidance of hypoglycemia or hyperglycemia (Smyth & Heron, 2005). The American Diabetes Association (2013) also recommends that

people diagnosed with type 2 diabetes receive ongoing diabetes self-management education and support. Several studies suggest that interactions with health professional often influence health related activities in diagnosed diabetics (Petit & Adamec, 2011). Informative consultations with health professionals have been positively correlated to healthy lifestyle modification, so diabetes interventions may need to incorporate training or convincing medical professionals to spend additional time counseling diabetic patients (Agborsangaya et al., 2013). Each component of lifestyle modification (self-monitoring, regulated energy consumption, and physical activity) requires understanding on behalf of the patient, as well as time-management skills. Diabetes management strategies should cater to the client's capabilities, values, and preferences, and utilization of a multidisciplinary team is recommended to assist diabetics with treatment plan development and compliance (Hilaire & Woods, 2013). Ideally, a care team approach makes it possible to provide meaningful interactions between diabetics and diabetes experts and essential services like ongoing support by means of diabetes management counseling.

Because any accommodation, or lack thereof, would be an external variable contributing to diabetes management, it is necessary to discuss how the Americans with Disabilities Act (ADA) addresses accommodation of type 2 diabetes a chronic medical condition. The Americans with Disabilities Act provides specific guidelines concerning environmental barriers in the workplace, but many policymakers argue that it does not adequately address matters associated with chronic illnesses such as diabetes since it does not explicitly describe appropriate accommodations (Leeds, & Richards, 2008). Amending the ADA regulations to include necessary accommodations for

diabetes is one way society can attempt to reduce vocational issues associated with the diabetes epidemic and improve diabetes management on a large scale. Regardless, it is important to promote application of successful diabetes management techniques in the educational and vocational settings; this may require reasonable accommodations in the workplace. For instance, diabetics should have access to healthy foods including between designated meal periods and schedule modifications to monitor blood glucose testing or administer insulin (Burda et al., 2012).

Psychosocial Implications

A number of psychosocial factors influence human behavior, including health related activities. Several variables may impact one's ability to make informed decisions regarding health and health related activities. As mentioned, informative interactions with diabetes experts and medical professionals appears to be an environmental variable that improves diabetes management in type 2 diabetics (Hilaire & Woods, 2013). Furthermore, social stereotypes (also known as stigmas) and social support are two other examples of environmental, psychosocial variables that are believed to greatly influence diabetes management.

A high comorbidity of type 2 diabetes and obesity means that many diabetics are forced to face obesity stigmatization, which according to Teixeira and Budd (2010) can affect people with diabetes in a variety of ways including psychological health, employment, housing, and overall quality of life. Obesity stigmatization is also problematic in the healthcare industry, and this can be a major barrier to receiving essential health services. According to Teixeira and Budd (2010, p. 530), studies suggest that only around one-third of diagnosed diabetic get prescribed essential

services such as dieting consultations, and “fear of discrimination” is a potential reason why some obese diabetics delay medical appointments. Perceptions of stigmatization have also been linked to psychological conditions such as depression and low self-esteem (Petit & Adamec, 2011). Incidentally, depression has been correlated with higher A1c levels in samples of both African Americans and Caucasians (Wagner, Abbott, Heapy, & Yong, 2009).

On the contrary, Wu, Liang, Wang, Chen, Jian, & Cheng, (2011) contend that diabetes support groups offer multiple advantages for members, including medical referral information, increased goal setting, and reports of increased self-efficacy among group members. Khan, Stephens, Franks, Rook, and Salem (2013) point out that spousal praise of healthy activities have also been attributed with increased levels of exercise. In addition, Willoughby, Kee, and Demi (2000) demonstrated that women with support from an adult within the same household are more likely to cope with type 2 diabetes more effectively. These are all clear examples of how social interaction can actually be conducive to diabetes self-management.

Decisions to engage in healthy or unhealthy behaviors are often driven by personal beliefs or values. Yet, values and beliefs are often shaped by the culture in which a person is immersed. Consequently, personal values may be influenced by environmental variables such as cultural inducements. Cultural truisms, or beliefs that are rarely questioned by the people of the same culture, have been linked with certain habitual routines such as dining practices and food consumption patterns (Hauser, Nussbeck, & Jonas, 2013). Accordingly, patterns of behavior culturally defined as normal have a great impact on food choices and the way one eats.

For instance, the mass production of canned food in the 1930s elicited revolutionary changes in the way Americans purchased and prepared food. Attitudes toward cooking began to change when Americans began to highly value the convenience factor of no-hassle canned goods; this eventually resulted in an overall reduction in culinary skill and expertise among United States citizens (Lyon & Kinney, 2013). Then, in 2012, "lack of personal culinary skill" was identified as an environmental component contributing to overconsumption of energy due to fast or convenience foods dependence (Sheehan & Ulchaker, 2012, p.14).

The same cultural regard toward convenience is demonstrated by the popularity of the fast food industry. More than a few cultures have developed habitual eating routines which involved high calorie processed foods (Feeney, 2012). According to Mattsson and Helmersson (2007), in countries where schedules are heavily dependent upon time, the purchase and consumption of fast food multiple times per week has become a standard dining practice. A dependence upon fast food among Swedish high school students was noted as being "embedded in a culturally defined eating context in which time has taken preference over other concerns" (Mattsson & Helmersson, 2007, p. 121).

According to a study conducted by Dave, An, Jeffery, & Ahluwalia (2009), convenience was the most highly valued feature influencing food choices among a representative sample of 1033 Americans, and a strong, positive correlation between fast food consumption and attitudinal preferences toward convenience was observed. All things considered, this study suggests that the value of health often times does not take precedence over the value of convenience for many Americans. Cultural influences

can be considered environmental in nature, and some cultural rituals can hinder diabetes treatment efforts. However, the values held by an individual are personal variables that are not completely dependent on culture.

Personal psychosocial factors contributing to diabetes management. As previously discussed, psychological conditions such as depression can also have a negative impact on mental and physical performance as well as overall outlook of life. Type 2 diabetics with a diagnosis of severe depression are more likely to have a body mass index greater than 30 and less likely to adhere to dietary and prescription recommendations (Petit & Adamec, 2011). This suggests that psychological status is another personal variable that affects diabetes management.

Wellness perceptions have also been found to have a direct effect on diabetes care. Hicks (2010) points out that reactions toward chronic illness varies from person to person, and things like stress, guilt, and shock can be personal barriers to diabetes management. This is supported by Lawson, Bundy, Beicher, & Harvey, (2010) who used the COPE inventory to establish a connection between illness perceptions and effective coping strategies in recently diagnosed diabetics.

Sheehan and Ulchaker (2012, p. 21) argue that “ongoing motivation” is essential to consistent adherence to diet and exercise regimens. For some, symptom management can be an effective motivator (Hall, Fong & Cheng, 2012). Lawson, Bundy, Beicher, & Harvey, (2010) have also identified personal traits such as intellect, agreeableness, and openness as having a significant impact on coping with diabetes in terms of planning, seeking emotional guidance, and self-control. Ironically, personal variables such as depression, openness, and motivation are often affected by

environmental, psychosocial factors like social stereotypes. Hence, Hicks (2010) contends that self-management encompasses the control of psychological and social factors that affect diabetes management.

Chapter 3

DISCUSSION

Diabetes as a chronic illness has a numerous implications on several facets of life. Essentially, type 2 diabetes has the potential to significantly impact physical, psychosocial, and vocational functioning. Fortunately, with proper diabetes management, one can keep physiological symptoms to a minimum and continue living life with few physical limitations. However, diabetes management requires long term lifestyle modification, which can be more or less difficult depending on the environmental and personal variables in one's life. Weight control has been identified as an effective intervention, but this is a vague recommendation. Effective management of diabetes and weight encroaches into many aspects of life including occupational tasks, diet, socialization, time management, and psychological status; Likewise, these same variables often difficult for diabetes patients to abide by their specific health regimens. Therefore, it is necessary to recognize personal impediments to diabetes management goals, and develop customized strategies that promote success.

There are numerous personal and environmental variables that influence diabetes management, yet health professional may under-estimate these influences. Comparing personal and environmental influences of diabetes management can provide researchers and diabetes professionals with greater appreciation of the barriers diabetics face, as well as successful diabetes management strategies. Under certain circumstances, these variables can be controlled and applied in ways which promote successful diabetes management.

Personal factors that inevitably affect diabetes management may include attitudes or values regarding food, mental status, personal perceptions, and time management or planning skills. These personal factors are innate characteristics that are often difficult to influence or change. For example, attitudes, values, or feelings such as depression can be addressed, but these notions can take years to transmute. Regardless, the recognition of these factors will play a critical role in implementing critical diabetes interventions. Health care workers and diabetes management professionals may need to dedicate a significant amount of time to counsel and motivate clients to adjust certain personal variables such as self-esteem and time management. Counselors should emphasize that these personal variables are many times internally or personally controlled. Accordingly, diabetes consultants are also encouraged to use solution focused therapies and motivational counseling strategies to get clients to recognize that they are capable of overcoming personal barriers.

Utilizing strategies that do not require the alteration of personal traits may be more time efficient than attempting to alter personal variables. Convenience has been identified as highly valued in the United States and other countries that highly value time, so the promotion and distribution of healthy convenience foods could play an invaluable role in diabetes management and prevention. Currently, Americans consume more processed foods per person than any other nation on the planet (Feeney, 2012). However, highly processed foods such as fast food and canned goods are becoming a controversial topic (O'Connell, 2010). Feeney (2012) points out, processed foods are a risk factor for diabetes, and these foods are especially bad for people with diabetes since they mainly contribute to the intake of calories with salts, sugars, and

preservatives. In terms of diabetes prevention and management, it is imperative to communicate the risks associated with the consuming highly processed foods. Education about high risk nutritional choices should begin with childhood, and health education programs should incorporate information on diabetes prevalence rates as well as associated complications.

Environmental factors which contribute to diabetes management may include access to food or socioeconomic status, cultural customs, social stereotypes, social support, and diabetes education and accommodation programs. Due to the fact that diabetes mellitus has become immensely widespread, it is important to continue researching diabetes management strategies aimed at specific populations while considering cultural values. A focus on identifying cultural rituals that can impede or aid diabetes management could help generate awareness that leads to specific groups making more informed decisions regarding their health. The positive correlation between social support and improved diabetes management suggests that increasing diabetes counseling and self-help groups could assist many people with achieving better glucose control.

It is also notably important to acknowledge the risks associated with American cultural dining standards. Increasing healthy fast food options may be an opportunity to improve diet choices among large quantities of people. In addition, diabetics and high risk populations should be exposed to culinary and nutrition training. Trainings should demonstrate healthy approaches to home cooking and provide suggestions regarding convenient health foods, appropriate serving sizes, and ways to avoid diabetic complications. It should also direct consumers to how to use glycemic index of various

foods to control blood sugar levels. Sponsored support groups, incentive programs, and accommodations may prove to be effective environmental interventions that can foster wide-scale control over the diabetes epidemic. In essence, appropriate accommodations are key to controlling diabetes in the vocational setting. Since more and more young people are being diagnosed with diabetes, work accommodations may become more frequently required. Because the ADA sets the standard for federally required accommodations in the workplace, this specific policy is extremely significant to any organized effort to control diabetes through work accommodations.

Implications for professionals

There is already an enormous demand for diabetes related health care in the United States, and this need is only expected to increase in the near future. A team approach to diabetes management is becoming more common (Hilaire & Woods, 2013), so rehabilitation counselors are beginning to play a vital role in the coordination of health care for diabetics.

Clearly, using education as an interventional means of controlling the diabetes epidemic is a germane method to gaining increased awareness and responsiveness. Educational interventions should encompass diabetes prevention and diabetes management programs including advocating for reasonable accommodations for people with type 2 diabetes. Promoting behaviors aimed at the reducing diabetes and obesity will prove to be key in diabetes and obesity resistance. However, the information conveyed must be specifically tailored to the appropriate target audience. Apposite strategies geared toward individual needs are necessary to promote healthy routines across diverse groups.

Consequently, counselors and medical professionals should designate time to educate their clients regarding the risks of consuming highly processed, fast foods on a regular basis. Medical Nutritional Therapy and referral to physical fitness programs should be consistently prescribe among diabetics. Diabetes Experts and Nutritional Therapists are urged to promote healthy convenience foods by emphasizing the practicality of preparing minimally processed foods that can easily be consumed while “on the go”.

Nurses and physicians should also consider these findings when prescribing diabetes management interventions to their clients. The rehabilitation counselor may need to emphasize the observed importance of medical consultation with type 2 diabetics. Counselors should encourage medical professionals to spend additional time educating type 2 diabetes clients about the repercussions of poor symptom management; it is also imperative that type 2 diabetics are provided comprehensive information that discusses diabetes management strategies such as monitoring glycemic index and how to control environmental and personal variables. Rehabilitation counselors are urged to promote awareness among health professionals regarding the existence and implications of social stereotypes and stress the need to prescribe therapeutic medical services such as exercise regimens and nutritional therapy.

Rehabilitation counselors and other health professionals are encouraged to consider these inferences when developing individualized treatment plans for clients with diabetes. Additionally, rehabilitation counselors will have the responsibility of cultivating increased awareness among clients regarding advances in diabetes treatment and prevention. Because these strategies will need to be applied in various

environments, it is also important for other professionals within the community to approve newly recognized diabetes management techniques and provide supportive options to people with type 2 diabetes. Therefore, rehabilitation counselors and public health professionals may need to advocate for the needs of people with type 2 diabetes in the form of gaining acquiescence among community members regarding the implementation of newly recognized diabetes management strategies.

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