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DISSERTATION

**THE ESSENCE OF EATING:
A PHENOMENOLOGICAL STUDY OF TYPE 2 DIABETES**

Submitted by

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School of Education

In partial fulfillment of the requirements

for the degree of Doctor of Philosophy

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Fort Collins, Colorado

Spring 2002

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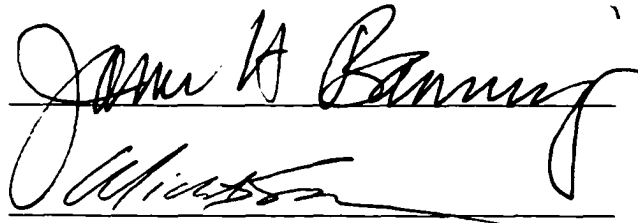
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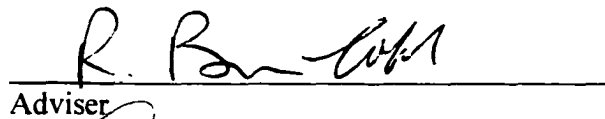
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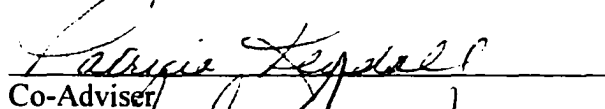
WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED
UNDER OUR SUPERVISION BY LYNNE M. OLDHAM ENTITLED THE ESSENCE
OF EATING: A PHENOMENOLOGICAL STUDY OF TYPE 2 DIABETES BE
ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY.

Committee on Graduate Work

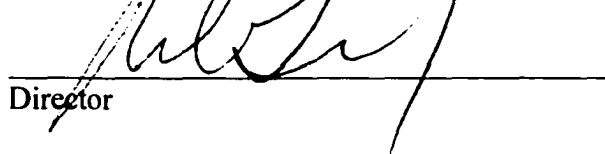




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ABSTRACT OF DISSERTATION
THE ESSENCE OF EATING: A PHENOMENOLOGICAL STUDY OF
TYPE 2 DIABETES

Diabetes is a chronic illness affecting over 16 million Americans. Type 2 diabetes accounts for approximately 90-95% of cases in the United States and its prevalence increases with age. As the percent of the population over age 60 increases, we can expect diabetes to present even greater challenges to the health care system.

Medical nutrition therapy is an integral component of diabetes care and management. However, both patients and primary care providers identify following diet regimens as one of the most challenging components of diabetes care. The manner in which people acquire, select, prepare and consume foods reflects a complex personal interaction.

The purpose of this study was to gain an in-depth understanding of how individuals with type 2 diabetes living in rural northwest Colorado personally experience the meaning of food and eating and the underlying themes that account for these meanings. This qualitative study used a phenomenological framework to guide the research. Individual semi-structured interviews were conducted with nine women between the ages of 65 and 88.

Verbatim transcript analysis revealed eight underlying themes used to develop the textural descriptions of their experiences with eating. These themes included: memories associated with food, food as a source of social interaction, should/shouldn't syndrome, changing dietary behavior, use of dietary supplements, relationships with medical personnel, adjusting to diabetes and co-morbidities, and rural values of independence.

The essence of eating varied among individuals; it also evolved within an individual over time. Factors in addition to health motivated food choice. Each participant presented herself as a distinct entity and expressed a diverse set of opinions and thoughts across each theme. This variance limited correlations and inter-relationships. Nonetheless, all participants exhibited a strong sense of independence, self-sufficiency, and desire for control.

These results may help health care providers better understand how rural older women with diabetes approach eating, thus improving their ability to help patients develop approaches to diet management that work.

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CHAPTER I: INTRODUCTION

The first words from many people after being diagnosed with diabetes are “what can I eat?” This uncertainty of food choice stems from a long history of dietary restrictions, lengthy lists of good versus bad foods and complex dietary exchanges. Prior to the availability of insulin in 1921, people with diabetes followed a dietary regime ranging from boiled onions, cabbage, lettuce and radishes to a state of semi-starvation, with the exception of caffeine and an occasional shot of whiskey (Wylie-Rosett & Rifkin, 1985). Since the first use of oral sulfonylureas in 1950, dietary recommendations for individuals with diabetes have been amended a number of times. The most recent modification occurred in 1994 when the American Diabetes Association released its position statement on Nutrition Recommendations and Principles for People with Diabetes (American Diabetes Association, 2001b). These recommendations significantly changed how health care providers counsel people with diabetes with regard to the carbohydrate content in their diet. In light of these guidelines, many questions arise. What do the patients themselves understand about what they eat? What meaning does food have to the individual with diabetes?

Background

Diabetes Mellitus is a serious chronic disease, characterized by abnormalities in the metabolism of carbohydrate, protein and fat. Type 2 diabetes, previously referred to

as adult-onset diabetes or non-insulin-dependent diabetes. is the most common form of the disease.

Both physiologic and socioenvironmental factors are involved in type 2 diabetes. Aging increases the risk of developing diabetes, and approximately one-half of all diabetes cases occur in people over the age of 50 (American Diabetes Association, 2001d). The primary socioenvironmental factors associated with diabetes are improper nutrition, obesity, and inactivity. The majority of patients with type 2 diabetes (80%) are overweight (National Institutes of Health, 1998). Sedentary lifestyle and a high fat diet have also been identified as environmental risk factors for the development of type 2 diabetes (National Institutes of Health, 1995).

Complications that result from type 2 diabetes include retinopathy, neuropathy, nephropathy, and peripheral vascular disease. In addition, type 2 diabetes is a major risk factor for cardiovascular disease.

Presently, over 16 million Americans are affected by diabetes. Type 2 diabetes accounts for approximately 90-95% of diabetes cases in the United States. The prevalence of diagnosed occurrences of type 2 diabetes has increased by more than a third (from 4.9 to 7.3 percent) between 1990 and 1999 (Centers for Disease Control and Prevention [CDC], 1999). The CDC estimate that approximately 800,000 new cases are diagnosed each year, or 2,200 new cases each day. Diabetes remains the seventh leading cause of death in the United States, primarily from cardiovascular disease. In Colorado, diabetes is the eighth leading underlying cause of death (Colorado Department of Public Health and Environment [CDPHE], 2001). In 1996, the most recent year for which

national diabetes-related death rates were available. Colorado's rate was 52 per 100,000 population, an increase over the past decade's rate of 46.6 per 100,000. The Healthy People 2010 goal, however, is to have an age adjusted mortality rate related to diabetes of no more than 45 deaths per 100,000 population (US Department of Health and Human Services, 2000).

Diabetes rates vary by region. In Colorado, the highest diabetes related mortality rates occur in the rural eastern plains (CDPHE, 2001). However, the rate of type 2 diabetes in Routt and Moffat Counties in northwest Colorado has been increasing steadily over the last ten years.

The counties of Routt and Moffat are larger in square miles than the state of Connecticut. Moffat County, bordering both Wyoming and Utah, is the second largest county in the state. With the exception of Steamboat Springs, all of the towns in Routt and Moffat Counties are considered rural. In addition, Routt and Moffat Counties have experienced a steady increase in the 60+ population since the 1990 census (CDPHE, 2001). This growth trend in the 60+ population, combined with the increase in prevalence of type 2 diabetes, presents new challenges to health care systems.

Though there is no cure for diabetes, two recent landmark studies, the Diabetes Control and Complications Trial completed in 1993 (DCCT, 1993) and the United Kingdom Prospective Diabetes Study completed in 1998 (UKPDS, 1998), demonstrate that a regimen of blood glucose control can decrease the risk of developing complications associated with diabetes. Recent studies have also shown that a patient's improved blood glucose associates directly with improvement in several quality-of-life measures (Testa, 2000).

The management of blood glucose includes medical nutrition therapy, exercise, lifestyle modification, pharmacological intervention, self-management education, and combinations of the above (American Diabetes Association, 2001c). Adherence to treatment regimens is crucial for successful management. Nonetheless complying with recommendations can be complex and demanding. Unfortunately, an individual with diabetes spends less than 0.5% of their time with health professionals and therefore must make a number of critical decisions about diabetes on their own (Glasgow & Osteen, 1992).

Medical nutrition therapy is an integral component of diabetes care and management. The primary goals of medical nutrition therapy for people with diabetes are to improve metabolic control (glucose and lipids), provide appropriate calories, and improve overall health through optimal nutrition (American Diabetes Association, 2001b). However both patients and primary care providers identify following diet regimens as one of the most challenging components of diabetes care (Glasgow, McCaul, & Schafer, 1986; Jacques & Jones, 1993).

In addition to food choices, the use of dietary supplements can influence blood glucose levels (Mozersky, 1999). Estimated sales of dietary supplements in the United States have increased from \$8.6 billion in 1994 to \$47 billion in 1999 (Global Nutrition Industry, 2000). According to Guthrie, over seventy herbal remedies make some type of claim with reference to the treatment of diabetes or lowering blood glucose levels (Guthrie, 2000). Although research in the field of dietary supplements for persons with

diabetes is still young, interest in alternative therapies continues to grow (Gori & Campbell, 1998).

A few studies have looked at patterns of diet and type 1 diabetes (Maclean, 1991). However, little research exists on the meaning of food in the lives of the individual with type 2 diabetes, and no studies exist to the researcher's knowledge that explore the role of dietary supplements from the perspective of the individual with type 2 diabetes.

According to Wilson (1971):

Food beliefs are... of critical importance to the food and nutrient status of the people studied. Equally important is the fact that these beliefs themselves are important to the people holding them. They will not be easily given up since they are part of everyone from their earliest days, intimately and reciprocally binding them to their environment, as they perceive it.

Rozin (1980) advocates that there is still much to learn about the food choice process, which he describes as multidetermined, context-dependent and shaped by cultural factors and individual experiences. He suggests that researchers should seek out descriptions of factors and describe the way these factors might interact.

Recently, Savoca and Miller (2001) investigated the food selection and eating patterns of adults with type 2 diabetes. They recommended that nutrition educators assess long standing eating practices of individuals with diabetes. They further indicated that additional research was needed to refine and validate a nutritional management model of diabetes to help educators tailor interventions and improve outcomes for people with diabetes.

The manner in which people acquire, select, prepare and consume foods reflects a complex, personal interaction of socio-cultural beliefs and biological environment. Levi Strauss (1969) suggests that a person's taste in food is culturally shaped and socially

controlled. Shifflett and Nyberg (1978) stress that food use is a dynamic and subjective process. An individual food may have complex and personal layers of meaning associated with it. An example cited is how one thinks of a carrot. Carrots are not only food, but may be viewed as nutritious, inexpensive, easy to prepare, and “good for the eyes”. Other cultures perceive different ways of knowing food. For example, the traditional Chinese view food as important in preventing and treating disease. Health is believed to be maintained and balanced according to foods Yin (cold) and Yang (hot) properties. Illnesses caused by Yin excesses are treated by “hot” foods; those caused by Yang excesses are treated by “cold” foods (Chang, 1974).

Lewin (1947) developed a theory of channels and gatekeepers to explain how changes such as modifying eating habits could be initiated. He described two channels through which food travels before reaching the table, the grocery channel and the garden channel. According to Lewin, a gatekeeper (shopper) decides whether to allow or deny a food item from the channel into the home. Lewin asserted that forces in front and behind each gate helped or hindered passage through the gate. For example in the grocery store channel, the force of pleasing family or friends with donuts may encourage a shopper or gatekeeper to purchase a dozen. However, the force of trying to control blood glucose by limiting sugar may discourage the gatekeeper from purchasing the donuts.

Theoretical Framework

A number of studies have used theoretical and methodological approaches to understand determinants of diabetes related behaviors. Several lines of research suggest that diet change is the area in which improvements can potentially lead to the greatest

health benefits. Despite this, few studies have examined the significance of foods and food and dietary supplement choices of older adults with type 2 diabetes. In addition, much of the research about diabetes and chronic disease in the United States has been conducted in urban areas; little research has focused on the needs and decisions made by adults living in rural areas.

To develop a comprehensive understanding of the meaning of food in the lives of individuals with type 2 diabetes, qualitative research based on a phenomenological perspective was used. Qualitative research methods are appropriate for describing a phenomenon from the individual perspective (Morse, 1994). Qualitative research has the potential to explain why a phenomenon exists, to preserve the natural variation in human behavior, and to explore unobservables, such as emotions and meanings (Achterberg, 1988). Qualitative research can also enable the researcher to identify trends and underlying concerns that explain why people behave the way they do. Therefore, qualitative research was ideally suited to explore the food choices and dietary supplement use of people with type 2 diabetes. (Morse, 1994).

Meade (1934) suggested that to understand food use patterns of individuals and groups, researchers must learn to "take the role of the other" (as cited in Shifflett & Nyberg, 1978, p.48). They must gain an understanding of the food user's point of view of social reality, his or her symbols, attitudes, food meanings and values. A phenomenological approach allows the researcher to enter into the world of the individual with type 2 diabetes and view his or her personal mythology concerning food and dietary supplements. Ultimately persons with diabetes make the final decisions on what they eat. However, success with diabetes education and medical nutrition therapy may be

enhanced if health care providers more fully understand the person with diabetes, especially the meaning behind his or her choices of food and use of dietary supplements.

Results from this research may help health care providers better understand how older women with diabetes approach eating, thus improving their ability to help patients develop workable approaches to diet management. Therefore, the purpose of this study was to describe how participants choose their food and dietary supplements based on a personal mythology of food and supplement meanings.

Problem Statement

The purpose of this phenomenological study was to gain an in-depth understanding of how a small group of individuals with Type 2 diabetes, living in rural northwest Colorado, personally experience the meaning of eating.

Individuals were defined as women over the age of 60, living independently, who purchased and prepared their own food. The study sought to answer two basic questions:

1. From the perspective of the individual, what meaning does food and eating play in type 2 diabetes?
2. What are the underlying themes and contexts that account for these meanings?

Limitations and Delimitations

The results of this study will need to be interpreted carefully given the relatively small size of the study population. In addition, it must be noted that the study population (women over the age of 60 with type 2 diabetes, living in rural areas) is not representative of the population as a whole. However, the intent of qualitative research is not to generalize findings, but to form a unique interpretation of events (Morse, 1994).

Additionally, because qualitative research relies on an individual's self-reporting of their behavior and lifestyle issues, it is not subject to verification.

Definition of Terms

Body Mass Index (BMI). Based on an individual's height and weight and is a helpful indicator of obesity and underweight in adults. BMI can be calculated by the following formula. $BMI = \text{weight in kilograms} \div \text{height in meters squared (kg/m}^2\text{)}$. A person with a BMI of 25-29.9 is considered overweight where as a person with a BMI of 30 or higher is considered obese.

Diabetes mellitus. Consists of a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

Dietary Supplements. A product intended to supplement the diet that bears or contains one or more of the following ingredients: a) a vitamin; b) a mineral; c) an herb or other botanical; d) an amino acid; e) a supplement used by man to supplement the diet by increasing the total dietary intake; or f) a concentrate, metabolite, a constitute, extract, or combination of any ingredient described in the above (Dietary Supplement Health and Education Act of 1994).

Eating. The act of consuming food and/or dietary supplements for nourishment.

Insulin resistance. An impaired ability of skeletal muscle cells and other types of cells to remove glucose from the blood under the action of insulin.

Plasma lipids. A collection of measures that assess the amount of lipid and/or fat in the bloodstream. Arteriosclerosis is a common problem for a person with diabetes, therefore measuring the high-density lipoprotein (HDL); low-density lipoprotein (LDL), triglycerides and total cholesterol may give insight to how well diet is being controlled.

Glycosylated hemoglobin (HbA1c). A blood test that measures an individual's weighted mean blood glucose levels for the preceding 3 to 4 months. It is expressed as a percentage of total hemoglobin that has glucose attached.

Self Care. The actions people perform to improve their health and well being within the context of everyday life (Kickbush, 1989).

Summary

This chapter presented a broad overview of the background of the study. Although much research has been done in diabetes, and nutrition is an integral component of diabetes management, few studies have explored the meaning of food for older adults with type 2 diabetes. The problem statement, theoretical framework, limitations and definition of terms were discussed.

The remainder of this dissertation is organized into four chapters. Chapter II reviews existing literature addressing diabetes, medical nutrition therapy, food choices of older adults, chronic disease in rural areas, adherence issues, health belief models, and qualitative research associated with diabetes. Chapter III includes the methodology that guided the research and the study participants. Chapter IV presents the results of the study. The overall conclusions of the research, discussion, and recommendations for future research are provided in chapter V.

CHAPTER II: LITERATURE REVIEW

In order to gain a greater understanding of why older adults with type 2 diabetes select the foods they do, and the role dietary supplements have in their lives, an extensive review of literature was conducted. The available research was limited, fragmented and encompassed numerous disciplines including medicine, nutrition, education and psychology.

The following overview of related literature consists of nine topic areas: (1) medical aspects of diabetes; (2) the emergence of type 2 diabetes and benefit of control; (3) medical nutrition therapy and dietary supplements in diabetes management; (4) food choices of older adults; (5) chronic disease in rural areas; (6) adherence issues; (7) health belief models and theories; (8) qualitative research in diabetes and (9) implications for using phenomenology to understand the meaning of food and dietary supplements.

Medical Aspects of Diabetes

Diabetes mellitus is a group of metabolic diseases affecting almost every organ of the body. It is a disease of insufficient insulin action stemming from either a decrease in the amount of insulin in the body or by the body's inability to utilize the insulin that exists.

Insulin is necessary for the metabolism of carbohydrate, protein and fat, and the transport of glucose into muscle, adipose and liver cells. If the body's supply of insulin is inadequate, glucose accumulates in the blood stream, resulting in hyperglycemia (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2001).

There are two primary types of diabetes, type 1 and type 2. Type 1 diabetes, previously referred to as juvenile diabetes or insulin-dependent diabetes, generally begins in childhood or young adulthood. Type 1 diabetes has a rapid onset marked by polyuria, polydipsia, polyphagia and severe hyperglycemia. Patients with type 1 diabetes have insulin deficiency secondary to autoimmune damage to the β -cells of the pancreas (Thai & Eisenbarth, 1993). Individuals with type 1 diabetes require exogenous insulin to prevent ketoacidosis and eventual death.

In contrast, type 2 diabetes is a disease of gradual onset with few symptoms. Type 2 diabetes, previously referred to as non-insulin-dependent-diabetes or adult onset diabetes, is a term that describes individuals who have insulin resistance and usually relative (rather than absolute) insulin deficiency. The risk of developing type 2 diabetes increases with age, obesity and lack of physical activity (Haffner, 1998). Type 2 diabetes may be present for roughly 6.5 years prior to its diagnosis and treatment (Harris, Klein, Welborn, & Knuiman, 1992). Genetics plays a major role in the development of type 2 diabetes. The offspring of individuals with type 2 diabetes have a 15% chance of developing diabetes and a 30% risk of developing impaired glucose tolerance (Raffel & Rotter, 1985).

The pathophysiology of type 2 diabetes involves several processes. Three basic metabolic defects characterize type 2 diabetes: insulin resistance, an increase in glucose production by the liver, and β -cell dysfunction that is not autoimmune-mediated (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2001).

Insulin resistance is characterized by an impaired ability of cells to remove glucose from the blood under the action of insulin. This impairment may be the result of either a

cellular receptor or post receptor defect. As insulin resistance increases, the liver begins to release glucose inappropriately, and fasting blood glucose rises. Higher levels of insulin correspond to higher degrees of insulin resistance (Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2001).

A substantial amount of research has so far failed to identify the cause of pancreatic β -cell dysfunction in individuals with type 2 diabetes. The changes in β -cells occur early but their exact cause is unclear. Some researchers speculate that the changes are genetically mediated; others suggest the damage results from chronic exposure to hyperglycemia or the adverse effects of free fatty acids (Ramlo-Halsted & Edelman, 2000).

Debate continues as to the true underlying cause of type 2 diabetes. Leahy (1990) suggests that the limitation in beta cell response to hyperglycemia is the cornerstone of the pathophysiology of type 2 diabetes. On the other hand, Ramol-Halsted & Edelman (2000) believe that insulin resistance is the initiating event underlying type 2 diabetes but that changes in β -cell function determine the onset and progression of diabetes. There is consensus however, that insulin resistance and insulin deficiency together cause the common form of type 2 diabetes and that hyperglycemia plays a role in initiating and sustaining both defects.

Complications

Complications associated with diabetes are commonly divided into acute and chronic categories. For individuals with type 2 diabetes, the primary acute complication is hyperglycemic hyperosmolar nonketotic syndrome (HHNS). HHNS is a life threatening condition characterized by severe hyperglycemia, absence of ketosis, profound dehydration and impaired consciousness. Glucose levels generally range from

600-2000 mg/dL with an average of 1,000 mg/dL. HHNS is more likely to occur in elderly patients and is often precipitated by illness or other stresses (Fishbein & Palumbo, 1995).

A secondary complication is hypoglycemia. Hypoglycemia is a common side effect of insulin therapy and may occur with the use of sulfonylurea medications. Inadequate food intake, increased exercise, stress and alcohol may also precipitate hypoglycemia. Mild to moderate hypoglycemia (40-70 mg/dL) may have few, if any, symptoms and is easily treated with the ingestion of a fast acting carbohydrate. Severe hypoglycemia (< 40 mg/dL) may result in neurological impairment and may require intravenous glucose or glucagon.

The chronic complications associated with type 2 diabetes can be further classified into macrovascular and microvascular categories. Macrovascular and microvascular complications account for considerably more morbidity and mortality than acute complications. The major risk factors for the macrovascular and microvascular complications of diabetes are hypertension, hyperlipidemia, hyperglycemia and lack of exercise (American Diabetes Association, 1989).

Persons with diabetes are two to four times more likely to have macrovascular disease, a disease present in 75% of diabetes related deaths (American Diabetes Association, 2001d).

The three major types of macrovascular disease are coronary artery disease, cerebral vascular and peripheral vascular disease.

Persons with type 2 diabetes appear to be at particular risk for coronary artery disease. Evidence of coronary artery disease is present in up to 20% of people with diabetes over the age of 45 and the prevalence increases with age (American Diabetes Association, 2001d).

Adults with diabetes have a two to fourfold increase in the prevalence of dyslipidemia, compared to age-matched nondiabetics (Harris, 1991). Elevated triglycerides levels and low concentrations of high-density lipoprotein (HDL) cholesterol are the two most common lipid abnormalities in patients with type 2 diabetes. Hypertriglyceridemia is defined as levels greater than 150-mg/dL and high-density lipoprotein levels less than 45 mg/dL. Although controversial, some studies suggest that elevated triglycerides are an independent risk factor for coronary artery disease (Stewart & Laker, 1994).

Microvascular complications result from damage to the small blood vessels. The consequence of this damage is the thickening of the capillary membranes causing inadequate blood flow. These microvascular changes manifest as retinopathy, nephropathy and neuropathy.

Diabetes, particularly diabetic retinopathy, is the leading cause of new cases of blindness in the United States for persons between the ages of 20 and 74. Each year 12,000 to 24,000 people lose their sight because of diabetes, and up to 21% of people with type 2 diabetes have retinopathy when they are first diagnosed with diabetes (Klein & Klein, 1995).

Diabetic retinopathy occurs when micro aneurysms form and weaken the capillaries of the eye. If weakened capillaries rupture and release blood, retinal hemorrhages result. Hard exudates form as a result of the hemorrhage. If they extend into the macular area, the exudates reduce vision. In both type 1 and type 2 diabetes the development and progression of retinopathy correlates to both glycemic control and duration of diabetes (DCCT, 1993).

Diabetic nephropathy involves the progressive destruction of renal tissue, a process that eventually results in renal failure. In diabetic nephropathy, damaged capillaries cannot remove waste and toxins from the blood. Capillaries can also become permeable, resulting in protein, which should remain in the blood, excreted into the urine (proteinuria). When the entire kidney fails to function, one is diagnosed with end stage renal disease (ESRD). Diabetes has become the most common single cause of ESRD in the United States. ESRD requires long-term dialysis or a kidney transplant in order for the patient to live. Half of the patients needing long-term dialysis require it because of diabetes. Diabetes induced renal failure occurs in about 30 to 40 percent of patients with type 1 diabetes and 20-30 percent of patients with type 2 diabetes. Because of its higher prevalence, patients with type 2 diabetes comprise approximately 60% of ESRD diagnosis (Nathan, 1993).

Neuropathy is a common complication in both type 1 and type 2 diabetes. Diabetic neuropathy is characterized by loss of myelination and atrophy of nerve axons. In population-based studies, 30-70% of persons with diabetes were affected depending on neuropathy criteria (Harris, Eastman & Cowie, 1993).

Peripheral neuropathy affects the nerves controlling the feet and hands, and severe forms of nerve damage can lead to amputation. Autonomic neuropathy may cause gastrointestinal, genitourinary and cardiovascular disease symptoms and sexual dysfunction. Prevalence of neuropathy increases with age, duration of diabetes, hypertension, and worsening of glucose control (Harris et al., 1993).

Treatment Approaches

Diabetes is a chronic disease that requires an individual to make lifestyle changes. The goal for treatment of individuals with type 2 diabetes is to help prevent the long-term problems of uncontrolled diabetes and promote self-management of diabetes. Treatment effectiveness is generally measured by blood glucose and lipid responses to therapy. The American Diabetes Association (2001c) recommends the following goals for individuals with type 2 diabetes. See Tables 1 and 2.

Table 1. Recommended Glycemic Goals

Biochemical index	Normal	Goal
Fasting/preprandial glucose	< 100 mg/dl whole blood < 110 mg/dl plasma	80-120 mg/dl whole blood 90-130 mg/dl plasma
Bedtime glucose	< 110 mg/dl whole blood < 120 mg/dl plasma	100-140 mg/dl whole blood 110-150 mg/dl plasma
Hemoglobin A1c	< 6%	< 7%

Source: American Diabetes Association, 2001c.

Table 2. Recommended Lipid Levels for Adults

Risk	Low	Borderline	High
Cholesterol	<200mg/dL	200-239 mg/dL	≥ 240 mg/dL
LDL-cholesterol	<100 mg/dL *	100-129 mg/dL	≥ 130 mg/dL
HDL-Cholesterol	> 35 mg/dL - men > 45 mg/dL - wome	35-45 mg/dL – men 45-55 mg/dL – wome	< 35 mg/dL
Triglycerides	<200 mg/dL **	200-399 mg/dL	≥ 400 mg/dL

* With known history of coronary heart disease (CHD) < 100 mg/dL

** With known history of CHD < 150 mg/dL

Source: American Diabetes Association. 2001c.

The principal treatment tools used to manage diabetes include medical nutrition therapy, exercise, monitoring of blood glucose, pharmacology, self-management education and combinations of above (American Diabetes Association, 2001).

Medical nutrition therapy. The role of medical nutrition therapy is considered the first-line therapy of choice in the management of type 2 diabetes (Lipkin, 1999). There is no longer a single most appropriate diabetic diet, and both the American Diabetes Association and the American Dietetic Association have embraced the concept that diet needs to be individualized for patients with type 2 diabetes. McCord and Brandenburg (1995), in their study on the beliefs and attitudes of persons with type 2 diabetes, found that 66% felt that diet was the most important factor in managing their disease, with another 25% stating that exercise was the most important factor. Medical nutrition therapy will be discussed in greater detail later.

Exercise. The basic goals of exercise for individuals with type 2 diabetes are to improve glucose tolerance, optimize cardiovascular health and maintain a desirable body weight. Studies in patients with type 2 diabetes have demonstrated a benefit of exercise by increasing insulin sensitivity and glucose tolerance, as well as inducing favorable changes in blood lipids. This exercise induced enhanced sensitivity to insulin occurs regardless of weight loss (Schneider & Ruderman, 1990). To improve glycemic control, exercise needs to be done at least every other day on at least 3 nonconsecutive days, since enhanced insulin sensitivity is lost within 48 hours after exercise (Schneider & Ruderman, 1990).

Self-monitoring of blood glucose. Self-monitoring of blood glucose (SMBG) allows the person with diabetes to test his or her individual blood glucose response whenever necessary to medication, diet, stress, or exercise. Providing technique is correct, results are highly accurate and closely approximate plasma blood glucose values measured in clinical laboratories (Tate, Clements & Walters, 1992). On the basis of test results, action can be taken to bring blood glucose levels into the desired range. There has been a significant increase in the number of persons with type 2 diabetes who monitor their blood glucose. In 1991, 82% of persons using insulin and 31 % not using insulin were reported to monitor blood glucose levels compared to 6% and 2% respectively in 1981 (American Diabetes Association, 1994).

Long term monitoring – glycosylated hemoglobin (HbA1c). Glycosylated Hemoglobin is a blood test that measures an individual's average blood glucose for the preceding 2-3 months. Glycosylation occurs as glucose in the plasma attaches to the hemoglobin component of the red blood cell. The more glycosylation, the higher the

value. The Standards of Medical Care for Patients with Diabetes (American Diabetes Association, 2001c) recommend glycosylated hemoglobin testing at least one or two times a year in patients with a history of stable glycemic control, and at least quarterly in patients who are in poor control or have had a change in treatment. In a nondiabetic person, a normal HbA1c is 4.0 – 6.0%, which corresponds to mean blood glucose of approximately 90 mg/dL.

Pharmacologic therapy. The immediate objective of pharmacologic treatment of type 2 diabetes is the achievement of normal or near normal glucose levels. Currently there are five chemical classes of oral agents available in the United States for the management of diabetes. These include sulfonylureas, meglitinides, biguanides, alpha glucose inhibitors and thiazolidinediones. A growing body of evidence suggests that a majority of patients with type 2 diabetes are not able to achieve optimal glucose control on a single agent. Over time, combinations of two and sometimes three drugs may be needed (UKPDS, 1998).

Sulfonylureas are oral hypoglycemic agents that act by stimulating the beta cells of the pancreas to produce more insulin. The possible side effect from use is hypoglycemia related to an increase in insulin production. The second generation, and more commonly prescribed, sulfonylureas are: glyburide, glipizide and glimepiride.

Glyburide is marketed as Diabeta[®], Micronase[®], and Glynase[®]. Glipizide is marketed as Glucotrol[®] and glimepiride is marketed as Amaryl[®].

Meglitinides also function by increasing the release of insulin from the pancreas.

but work more quickly than sulfonylureas and are also designed to treat postprandial hyperglycemia. The effect is glucose dependent and diminishes at low blood glucose concentrations. Meglitinides are available as repaglinide, marketed as Prandin[®]. Nateglinide, marketed as Starlix[®] is the newest oral medication for use with type 2 diabetes.

The biguanide metformin, marketed as Glucophage[®], is not a hypoglycemic agent; rather, it works primarily by decreasing hepatic glucose output and secondarily by decreasing peripheral insulin resistance. Studies indicate that metformin also helps to normalize lipid levels by reducing triglycerides, LDL and total cholesterol (DeFronzo, Goodman and the Multicenter Metformin Study Group, 1995). Metformin is the only prescription oral hypoglycemic agent to have roots of botanical origin. Metformin originated from *galega officinalis* (Goats rue or French lilac) extract, which was used in medieval times to treat diabetes (Oubre, Carlson, King, & Reaven, 1997).

Alpha-glucosidase inhibitors work by inhibiting specific enzymes in the gut, by delaying carbohydrate absorption and reducing postprandial glucose. The decrease in postprandial glucose levels means a reduction in the overall glucose load. The two alpha-glucose inhibitors available in the United States are acarbose marketed as Precose[®] and miglitol marketed as Glyset[®].

Thiazolidinediones are a new class of antidiabetic agents that are described as insulin sensitizers. They act by enhancing insulin action at the receptor and post receptor level in the liver and peripheral tissues. Currently, rosiglitazone, marketed as Avandia[®] and pioglitazone, marketed as Actos[™] are available in the United States.

The role of insulin in treating type 2 diabetes has changed as a result of new oral antidiabetic agents. Although persons with type 2 diabetes do not require exogenous insulin for survival, approximately 40% will require insulin for adequate blood glucose control (National Institutes of Health, 1995). However, several barriers have limited the use of insulin for type 2 diabetes. The main theoretical concern is the development of a state of hyperinsulinemia, which Lipkin (1999) points out is an independent risk factor for cardiovascular disease. In addition, insulin may cause weight gain and increases the risk of hypoglycemia. However, other studies show that lipid patterns improve with the use of insulin (Henry, et al., 1993) and weight gain can be reduced or prevented with the concurrent use of metformin (Bergenstal, Johnson, & Whipple, 1999).

Self-management education. Self-care behavior is critical to maintaining the physical and emotional health of people with diabetes. One component of diabetes self-care is diabetes education. The goals of diabetes education are to optimize metabolic control, prevent acute and chronic complications and optimize quality of life (De Weerd, Visser, Kok & Van der Veen, 1990). Diabetes education, whether in a class setting or provided on an individual basis, consists of providing knowledge, skills and motivation to incorporate diet, exercise, medication and SMBG into daily lifestyles. According to the most comprehensive study to date (Norris, Engelgau & Narayan, 2001), no clear-cut statements can be made as to the most effective method of providing diabetes education. Results of their review of 72 published studies indicate that in the short term, knowledge levels, SMBG skills and self reported dietary habits improved with training. Glycemic control and diet improved more than weight and physical activity levels. However

glycemic control did not correspond to measured changes in knowledge or SMBG skills. Recommendations resulting from this study indicate that educational interventions should be individualized and based on readiness to change. Additionally, evaluations from interventions should encompass variables such as self-efficacy, problem solving, coping skills and quality of life, as well as HbA1c and knowledge.

A study conducted by Hunt, Pugh and Valenzuela (1998) explored the self-care actions of patients with type 2 diabetes and the reasons behind these actions. Researchers concluded that self-care behaviors are part of an ongoing process of making small decisions and that these decisions are made within the context of the "broader situation". The key factors identified which influence treatment choices included: (1) the belief in the power of modern medicine; (2) the desire to act and feel "normal"; (3) the desire to avoid physical symptoms; and (4) limited economic resources.

In summary, type 2 diabetes is a complex chronic disease affecting many aspects of the health and life of individuals who have this disease. Strategies to control type 2 diabetes can help manage symptoms and minimize long-term complications. These strategies include both medically related behaviors such as self-monitoring of blood glucose and the use of medications, as well as lifestyle related behaviors including weight control and exercise.

The Emergence of Type 2 Diabetes and Benefits of Control

Emergence of Type 2 Diabetes

The incidence of diabetes in the United States increased by 33% between 1990 and 1998, to a total of more than 16 million cases (CDC, 1999). Much of this increase can be attributed to a rise in obesity, which increased 61% between 1991 and 2000 (CDC, 2000). Obesity results from interactions between physiologic and psychological demands that lead to excess caloric intake. In 1998, the National Heart, Lung, and Blood Institute (NHLBI) in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases issued the first federal guidelines on identifying, evaluating and treating obesity in adults. Diagnosis is based on three factors: Body Mass Index (BMI), waist circumference, and a person's risk factors for conditions and diseases associated with obesity.

A number of studies indicate that BMI is one of the strongest predictors of diabetes, and previous studies have shown that an increase in BMI prevalence forecasts an increase in diabetes (Chan, Rimm, Colditz, Stampfer & Willett, 1994; Colditz, Willett, Rotnitzky, & Manson, 1995). Further studies have found that for every kilogram increase in weight, the risk of diabetes increases anywhere from 4.5% (Ford, Williamson & Liu, 1997) to 9 % (Mokdad et al., 1999).

BMI is a mathematical formula that is highly correlated with body fat. BMI is weight in kilograms divided by height in meters squared (kg/m^2). In the United States, individuals with a BMI between 25 and 29.9 are categorized as overweight, and those with a BMI above 30 are categorized as obese (National Institutes of Health, 1998).

According to these criteria, 35% of Americans are overweight and 26%, or approximately one in four, are obese (CDC, 2000).

Changes in the American diet are thought to have a significant impact on the increasing prevalence of obesity, insulin resistance, diabetes, dyslipidemia and heart disease. Total caloric intake has declined over the past 80 years, though fat consumption has increased. The average American diet in 1919 was comprised of 28% to 31% fat. In 1976 fat consumption peaked at 42% of total caloric intake, and since then has leveled off at 38% of total calories from fat in 1996 (Pi-Sunyer, 1996). High fat diets cause an increase in circulation of free fatty acid (FFA) levels, facilitating insulin resistance as well as allowing the body to store fat more efficiently. Computer-centered lifestyles, easy fast food and disappearing space for outdoor exercise are also contributors to obesity.

The prevalence of type 2 diabetes increases with age. Among the elderly, approximately 10% of all Americans age 65 and over and 20% of those age 80 and over have been diagnosed with diabetes. This compares to approximately 3% of all Americans under the age of 65 (CDC, 1999). However, type 2 diabetes is no longer exclusively an adult disease. It is occurring with greater frequency in children and adolescents. Youth with type 2 diabetes typically have a BMI greater than 25. The total number of individuals with diabetes will grow larger in the future as the proportion of older people in the population increases.

To conclude, the increase in type 2 diabetes is evident both in the young and the aging. Type 2 diabetes is one of the major epidemics of the late 20th century and it does not seem that it will disappear any time soon. The rise in obesity combined with the

increase in the lifespan of Americans, will likely lead to greater and greater numbers of Americans being afflicted with the disease.

Benefits of Glucose Control

Two landmark diabetes control studies, completed during the 1990's demonstrated that blood glucose control helps prevent diabetes-related complications.

Diabetes control and complications trial (DCCT). The Diabetes Control and Complications Trial (DCCT) was a randomized trial that examined whether intensive treatment to control blood glucose levels in people with type 1 diabetes could decrease the frequency and severity of diabetes related complications. In the trial, 1,441 persons with type 1 diabetes from multiple centers across the United States participated in the study and were followed for an average of seven years. Participants were randomized to either the intensive therapy group or the conventional group. The baseline average HbA1c was 9.0%. The intensive therapy group lowered HbA1c to 7.2% while the conventional therapy group maintained HbA1c at 9.0%. The intensive therapy group delayed the onset and slowed the progression of microvascular complications such as retinopathy, neuropathy, and nephropathy. The results were so significant that the study ended one year earlier than scheduled. However, the intensive therapy group did have a two-fold increase in hypoglycemia (DCCT, 1993).

United Kingdom prospective diabetes study (UKPDS). The United Kingdom Prospective Diabetes Study (UKPDS), completed in 1998, was a multicenter, prospective and randomized intervention trial that evaluated various therapies for type 2

diabetes. The purposes of the study were to determine whether improved glucose control would delay or prevent diabetes related complications and which therapies - diet, sulphonylurea drugs, insulin or metformin, had advantages or disadvantages. Over 5,000 patients with newly diagnosed type 2 diabetes were recruited and followed for an average of ten years. In addition, patients with type 2 diabetes who were also hypertensive were randomized to an intensive or less intensive blood pressure control group.

Results indicated that those who were intensely managed had an average HbA1c of 7.0% compared to the conventional group, who achieved an average HbA1c of 7.9%. Microvascular complications were reduced significantly (25%), but reduction of macrovascular complications did not reach a significant level. Aggressive treatment of hypertension was also beneficial and lowered blood pressure by 10 mm systolic and 5 mm diastolic resulting in a 24% reduction in any diabetes complications (UKPDS, 1998). Participants in the intensive group had more hypoglycemic episodes and gained more weight than those receiving conventional treatment.

In 1990, an initial report was published on the response of fasting plasma glucose (FPG) to diet therapy (UKPDS, 1990). Participants who received intensive nutrition therapy for three months decreased FPG by 46 mg/dL and HbA1c by 1.9%. Body weight decreased by approximately 5 kilograms (11 pounds). However, diet and exercise appeared to have a time limited response with the greatest benefits coming soon after diagnosis. The UKPDS indicates that as type 2 diabetes progresses, combination therapies are likely to be needed.

To conclude, glucose control has been shown to reduce the complications associated with type 2 diabetes. However, as diabetes progresses, additional therapies may be needed to maintain adequate control.

Medical Nutrition Therapy and Dietary Supplements in Diabetes Management

Medical Nutrition Therapy

Medical nutrition therapy (MNT) is a principal component of diabetes care and management. The primary goal of medical nutrition therapy is to assist people with diabetes to make changes in their nutrition and exercise habits that will lead to improved metabolic control. Additional specific goals include:

1. Maintaining as near-normal blood glucose levels as possible by balancing food intake with insulin or oral hypoglycemic agents and activity levels;
2. Achieving optimal serum lipid levels;
3. Providing adequate calories to maintain or attain a reasonable weight as determined by both an individual and health care provider;
4. Preventing and treating acute complications of insulin treated diabetes such as hypoglycemia, short term illness, and exercise related problems as well as long term complications of diabetes including renal disease, neuropathy, hypertension and cardiovascular disease;
5. Improving overall health through optimal nutrition (American Diabetes Association, 2001b).

To better meet these goals, the American Diabetes Association revised its dietary guidelines for the management of diabetes. The 1994 dietary recommendations

encouraged an individualized, patient-centered approach that takes into account personal lifestyles, specific goals, ethnicity and culture. The revised guidelines also liberalized eating plans for people with diabetes. There is no longer a standardized calorie-level “ADA diet” because the American Diabetes Association does not endorse any single meal planning system. The new “consistent carbohydrate diabetes meal plan” recommends meal plans that incorporate consistent amounts of carbohydrate from day to day at breakfast, lunch, dinner and snacks (American Diabetes Association, 2001b).

For overweight individuals with type 2 diabetes, moderate caloric restriction (250-500 calories less than average) is recommended. Moderate weight loss of 10-20 pounds (4.5 – 9.0 kg), regardless of starting weight, has been shown to improve diabetes control, reduce hyperlipidemia and reduce hypertension (Watts et al., 1990; Wing et al., 1987).

The ratio of protein, fat and carbohydrate in a diet depends upon an individual’s needs. The primary function of protein in the diet of persons with or without diabetes is to provide amino acids required for tissue growth and maintenance. The current Recommended Dietary Allowance (RDA) for protein in the diet of persons with diabetes are the same as for the general population, 0.8-g/ kg/ day (American Diabetes Association, 2001). This translates into approximately 10-20% of daily calorie intake from protein or 64 grams/day for a 175-pound man and 47 grams/day for 130-pound women. Proteins generally do not have much influence on overall blood glucose levels.

The recommendations of percentages of calories from fat are based on lipid, glucose and weight goals. The National Cholesterol Education Program (NCEP) recommends that all individuals over 2 years of age limit fat intake to less than 30% of total calories (Expert Panel on Detection, Evaluation, and Treatment of High Blood

Cholesterol in Adults, 2001). Saturated fat, which has the greatest effect on increasing blood cholesterol, should be limited to less than 10% of calories. Polyunsaturated fats have been shown to lower total cholesterol, but have also been shown to lower high-density lipoprotein (HDL) cholesterol, an unwanted effect. Polyunsaturated fat intake should consist of less than 10% of calories. Monounsaturated fats lower total cholesterol, but do not lower HDL. For individuals with dyslipidemia and elevated triglycerides, some researchers suggest increasing the monounsaturated fat intake while decreasing the saturated fat (American Diabetes Association, 2001a).

Carbohydrate needs are also dependent upon glucose, lipid and weight management goals and should be individualized based on individual eating habits. The belief that people with diabetes must avoid simple sugars was based on the assumption that simple sugars were digested and absorbed more quickly than starches, and thus were contributing to hyperglycemia. The 1994 recommendations noted that there was relatively little scientific evidence to support this theory. Thus, our current understanding suggests that sucrose as part of the total carbohydrate content of the diet does not impair blood glucose, and sucrose containing foods may be substituted for other carbohydrates gram for gram (American Diabetes Association, 2001b).

Fiber, a form of carbohydrate, has recently received considerable attention as a therapeutic treatment for type 2 diabetes. Soluble fibers are capable of inhibiting the absorption of glucose from the small intestine. In addition, whole grain products that tend to be absorbed more slowly than refined carbohydrates, elicit smaller postprandial glucose responses.

Chandalia et al. (2000) studied the effect of increasing the intake of dietary fiber on glycemic control in patients with type 2 diabetes. A randomized, crossover group of 13 patients were assigned to follow one of two diets for six weeks. The moderate fiber diet consisted of 24 grams of fiber (8g soluble and 16g insoluble). The high fiber diet consisted of 50 grams of fiber (25g soluble, 25g insoluble). Results indicated that the high soluble fiber diet improved glycemic control, decreased hyperinsulemia and lowered plasma lipid concentrations. However, the feasibility of consuming 50 grams of fiber outside a clinical setting remains questionable.

Dietary Supplements

Public interest in the use of nutritional supplements and herbal products to control diabetes is on the rise (Mozersky, 1999). Health food stores, magazines, television ads and the Internet bombard individuals with messages claiming to treat disease from a “natural” stance. A dietary supplement is defined by the Dietary Supplement Health and Education Act of 1994 (DSHEA, 1994) as a product intended to supplement the diet that bears or contains one or more of the following ingredients: a) a vitamin; b) a mineral; c) an herb or other botanical; d) an amino acid; e) a supplement used by man to supplement the diet by increasing the total dietary intake; or f) a concentrate, metabolite, a constitute, extract, or combination of any ingredient described in the above. In the United States, dietary supplements are differentiated from drugs and food additives and are not subject to the same regulations. The U.S. Food and Drug Administration (FDA) does not authorize or test dietary supplements for safety or effectiveness in relation to the manufacturers’ claims (Commission on Dietary Supplement Labels, 1997).

Estimated sales of dietary supplements have increased from \$8.6 billion in 1994 to \$47 billion in 1999 (Global Nutrition Industry, 2000). Approximately 41% of supplement sales are in the form of vitamins and minerals, 37% are herbs and botanicals and 21% are sports products or meal replacement products. The rise in the use of supplements is due to a number of factors including the increase of chronic disease, consumer interest in natural foods, increased cost of conventional medicine, and the fear of adverse reactions to conventional drugs (Tenney, 2000). People with diabetes use dietary supplements with the hope of lowering their blood glucose level, relieving neuropathic pain, improving co-existing chronic diseases and improving their well being (Mozersky, 1999).

Davis and Magilvy (2000) found that Hispanic and non-Hispanic older adults with chronic disease used a comparative process in deciding whether to use medical or alternative forms of care. Their study population viewed total dependence on medical care as unhealthy. The families in their study routinely used herbs and other alternative practices as a manifestation of personal knowledge of their illness and individual experiences.

Although the number of claims for supplements is vast, clinical trials are limited. Not all supplements are safe or beneficial and much of the alleged effectiveness of herbs and supplements has been promoted through anecdotal accounts. Following is a brief review of current literature as it relates to some of the most popular dietary supplements used by individuals with diabetes.

Chromium. Considerable interest has been shown recently in the role of chromium supplementation for individuals with type 2 diabetes. It is hypothesized that poor

chromium status is a factor contributing to impaired glucose tolerance and type 2 diabetes. Chromium, a trace mineral, may improve the efficiency of insulin-mediated glucose uptake in skeletal muscles (Anderson et al., 1997). Chromium has also been suggested to have a therapeutic role in obesity, is sold as a “fat burner” and is claimed to enhance muscle tissue.

Two forms of chromium exist: chromium picolinate, found in nutrition supplements, and chromium dinicotinic acid glutathione, found in foods. Natural sources of chromium include brewer's yeast, bran, grains, liver, oysters, peanuts, and certain fruits and vegetables. Concern exists that as these foods are processed, chromium is depleted from them and thus supplementation with chromium may be beneficial.

A number of studies have demonstrated the beneficial effects of chromium on circulating insulin, glucose and lipids. However, results from supplements are mixed. Anderson et al. (1997) studied 180 individuals with type 2 diabetes living in China. They found that after two months of supplementation with 1,000 µg/day, glycosylated hemoglobin as well as fasting and 2-hour glucose concentrations decreased significantly (Anderson et al., 1997).

Corticosteroid induced diabetes has also been shown to react favorably to chromium supplementation. Ravina, Slezak, Mirsky, Bryden and Anderson (1999), demonstrated that corticosteroid treatment could increase chromium excretion, a process that can lead to chromium deficiency and/or corticosteroid-induced hyperglycemia. In their study of thirteen patients with steroid induced diabetes, Ravina et. al., found that supplementation with 600 micrograms of chromium per day reversed steroid induced diabetes.

A few studies suggest that the elderly are more susceptible to chromium depletion. (Mertz, 1993). Preliminary research conducted by the USDA in 1985 found low chromium intakes in a small group of people studied. However, in the United States chromium deficiency has only been reported in patients receiving long-term chromium-deficient total parenteral nutrition (Freund, Atamian, & Fischer, 1979). Currently the American Diabetes Association does not recommend chromium supplementation unless chromium deficiency is present (American Diabetes Association, 2001b).

In January 2001, the Food and Nutrition Board (FNB) released the new Dietary Reference Intakes (DRI) for chromium and other micronutrients (Institutes of Medicine, 2001). The Adequate Intake (AI) of chromium for men over the age of 51 is 30 ug/day. For women over the age of 51, the AI is set at 20 ug/day. This amount was set based on estimated mean intakes. Due to insufficient evidence, an Estimated Average Requirement (EAR) and Tolerable Upper Limit (UL) have not been established (Institutes of Medicine, 2001).

Fish oil. A number of studies have been conducted in people with type 2 diabetes to determine the effects of fish oil on cholesterol, LDL, triglycerides and glucose. Fish oil is high in the essential fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). EPA and DHA have been shown to increase the flexibility of cell membranes. Flexible cell membranes have more efficient insulin receptors, allowing for efficient glucose metabolism. In a double blind placebo controlled study, McVeigh et al. (1994), found that fish oil strengthened arterial walls and may be cardio protective for individuals

with type 2 diabetes. In addition, EPA and DHA have been shown to reduce heart disease risk factors such as elevated triglycerides and hypertension (Kris-Etherton et al., 2000).

A meta-analysis reviewing 18 randomized placebo-controlled clinical trials in over 800 subjects reported that fish oil supplementation had a statistically significant triglycerides lowering effect and no significant effect on fasting glucose or HbA1c (Montori, Farmer, Wollan, & Dinneen, 2000). The studies included doses of fish oil from 3 to 18 grams/day.

Herbs. Numerous herbs have been reported to have glucose lowering effects. Guthrie (2000) lists over seventy herbs that lower blood glucose levels and nine herbs that raise blood glucose levels. However, at this time, few herbs have been well researched and accepted as beneficial. In the United States the quality and quantity of herbal supplements are not regulated by any organization, and the safety of some herbs remains questionable (Mozersky, 1999).

The third National Health and Nutrition Examination Survey (NHANES III) conducted between 1988 and 1994 looked at nonvitamin, nonmineral (NVNM) dietary supplement usage prevalence and trends. Results from this report indicated that age was one of the most significant factors in herbal and other botanical and nutrient supplement usage. The highest usage of herbs and botanicals occurred in later middle and earlier older ages, identified as those between 55 and 74 (Slesinski, Subar, & Kahle, 1995).

Of the numerous herbs thought to decrease blood glucose, the following have demonstrated beneficial effects in human studies. The studies cited in the subsequent paragraphs were identified via the Natural Medicines Comprehensive Database. This list

is not inclusive, but represents the more popular herbs used to treat diabetes (Natural Medicines Comprehensive Database, 2001).

Ginseng has been used for medicinal purposes for over two thousand years (Guthrie, 2000). Of the numerous types of ginseng grown, American and Asian ginseng have been shown to have blood glucose lowering properties. The administration of up to 3 grams of American ginseng 2 hours before meals has been shown to reduce post-prandial blood glucose levels (Vuksan, et al., 2000). Studies using Asian ginseng, otherwise known as panax ginseng, have shown a reduction in fasting blood glucose and HbA1c in people with type 2 diabetes (Sotaniemi, Haapakoski, & Rautio, 1995).

The effect of fenugreek on blood glucose has also been studied. The active component of fenugreek is the seed. Fenugreek seeds are high in fiber, which affect the gastrointestinal tract, slowing glucose absorption in individuals with type 2 diabetes (Guthrie, 2000). Studies in India have found fenugreek seeds to be beneficial on blood glucose and serum lipids for individuals with diabetes. In individuals with type 1 diabetes, the ingestion of defatted fenugreek seed powder has been shown to reduce plasma glucose and daily insulin requirement (Sharma, 1990). Serum total cholesterol, LDL, VLDL cholesterol and triglycerides were also significantly reduced (Sharma, 1990).

Gymnema has been used extensively in India to treat type 2 diabetes. Gymnema is known as gurmar, a Hindu name meaning, “sugar destroyer”. The leaves of the plant contain gymnemic acid, which blocks the taste of bitter or sweet flavors without affecting the ability to taste sour or pungent flavors (Guthrie, 2000). Gymnemic acid appears to

reduce intestinal absorption of glucose and may stimulate pancreatic cell growth (Baskaran, Kizar-Ahamath, Shanmugasundaram, & Shanmugasundaram, 1990).

Ginkgo is generally associated with treating Alzheimer's disease and enhancing memory. This is due in part to ginkgo's ability to improve blood flow throughout the body and act as an antioxidant (Guthrie, 2000). There is some evidence that treatment with ginkgo leaf extract may prevent diabetic retinopathy and can improve color vision in patients with early diabetic retinopathy (Lanthony & Cosson, 1988). Ginkgo has also been reported to increase pancreatic beta cell function in response to glucose loading, leading some researchers to speculate that it might decrease the development of hyperinsulemia, which often precedes the development of type 2 diabetes (Kudolo, 2000).

In summary, medical nutrition therapy remains the cornerstone of diabetes management for individuals with type 2 diabetes. Effective nutrition therapy requires an individualized approach taking into consideration personal goals and lifestyle. Dietary supplements in the form of vitamins, minerals, herbs and supplements are gaining in popularity as treatment options for diabetes. As interest in dietary supplements increases, research in this field is certain to expand.

Food Choices of Older Adults

Despite the high rate of type 2 diabetes, there is an absence of studies examining the significance of foods and food and dietary supplement choices of older adults with type 2 diabetes. Considerable information is available on the demographic characteristics and lifestyles associated with what people eat, but little is known about why people eat what they do. Even less information exists regarding specific subgroups within the population.

The United States Department of Health and Human Services reported in 1999 that 26% of persons aged 65 and older characterized their health as fair or poor, while only 9% of persons under the age of 65 considered themselves in poor health. This same report suggested that older persons have at least one chronic condition and many experience multiple health problems (Administration on Aging, 2001). Many of the chronic health conditions seen in the elderly, including diabetes, have nutritional causes as well as nutritional consequences. These include restricted diet and/or activity, or nutritional deficiencies due to food-drug interactions. Although an overall decline of calorie needs occurs as people age, nutrient needs remain consistent or may increase due to diseases or nutrient-drug interactions.

The study of food choice has been approached from the nutritional, sociological, economic, biological, anthropological and cultural perspective, underlying the importance and intricacy of food selection. Falk, Bisogni, and Sobal (1996) described food choice as a “fundamental yet elusive action”. Rappoport, Peters, Huff-Corzine and Downey (1992) suggested food consumption is “an expression of mind as well as palate; a consequence of intentional thought and information processing”. Levi-Strauss (1969) proposed that we select foods primarily because of what they mean to us and to a lesser extent because they meet our physiological needs. He epitomized this point by stating “what is good to eat is good to think” (as cited in Mennell, Murcott & van Otterloo, 1992). Shifflett and Nyberg (1978) conceptualized food choice as a complex decision-making process resulting from the interrelationships among numerous sociocultural variables. They stressed that food use is a dynamic and subjective process and an individual food may have complex layers

associated with its meaning. An example cited is how one thinks of a carrot. Carrots are not only a food, but may be viewed as nutritious, inexpensive, easy to prepare, and “good for the eyes”.

Rappoport et al. (1992) advocated that food meanings directly influence reasons people give for eating what they eat. Employing unstructured exploratory interviews with 248 people aged 17-72, four general categories of reasons for eating emerged. These were eating for pleasure, health, tradition and convenience. Using discriminant analysis, researchers found that age, gender and nutrition knowledge were significant predictors of the pleasure and health rating of specific foods.

Falk et al. (1996) used a constructivist paradigm and qualitative approach to explain how factors that affect food choice in the elderly function as food choice processes. Based on the conceptual model of food choice processes developed by Furst, Connors, Bisogni, Sobal and Falk (1996), Falk and coworkers then focused on food choices of the elderly (age 65 and older). The model views food choice as both a reflective and automatic process with three distinct components: (1) life course, (2) influences, and (3) personal system. Life course includes personal roles and the social, cultural and physical environments to which a person has been previously exposed. Influences consist of ideals, personal factors, resources, social framework, and food context. Personal system involves negotiations between values and determining the trade off each value has. Their conclusions indicated that life course events and food choice ideals formed early in childhood were a significant influence on food choices made as an older adult.

Taste ranks as the primary reason adults without diabetes choose the foods they do. Glanz, Basil, Maibach, Goldberg, & Snyder (1998), used two self-administered cross

sectional surveys to examine the self-reported importance of taste, nutrition, cost, convenience and weight control on personal dietary choices. They found that in general, taste was the most important reason for selecting food. Older adults indicated that nutrition and weight control were important, while cost and convenience were more important to younger persons. Of particular interest was the importance of perceived nutrition by the respondents. Glanz et al., (1998) speculated that a person's perception of the importance of nutrition is likely an attitude that is strongly held and unlikely to change.

Kronl, Lau, Yurkiw, & Coleman (1982), looked at gender and the perceived meanings of food by 194 men and women between the ages of 65 and 77 living in Toronto. The researchers used 14 marker foods to determine frequency of use and perceived meaning of foods. They found that perceived taste and health belief were strong motives in food selection while price, convenience and prestige were less important. Kronl et al. found differences in the eating patterns between men and women. Women consumed a greater variety of foods and consumed a greater number of fruits and vegetables than men. Kronl and coworkers were one of the few research teams to also investigate nutrient supplementation. Thirty-seven percent of the men and 46% of the women in their study used some form of nutrient supplementation.

Most recently, Savoca and Miller (2001) examined the beliefs and perspectives about food selection and eating patterns among people aged 40-65 with type 2 diabetes. Their research was designed to substantiate diabetes nutrition education and was part of a larger study exploring diabetes self-management behaviors. Their results found that eating patterns were influenced by participants' knowledge of diabetes management, and current

challenges of applying nutrition recommendations were linked to their prior eating practices. Savoca and Miller concluded that further qualitative research is needed to identify the role that partners play in dietary management and understand the meal planning practices of those who live alone.

To conclude, food choice and food beliefs are not necessarily related to the nutritional value of the food. Determinants of food selection and consumption such as beliefs and practices are numerous and present an opportunity for further exploration.

Chronic Disease in Rural Areas

Much of the research about diabetes and chronic disease in the United States has been conducted in urban areas; little research has focused on the needs and decisions made by adults living in rural areas. Coward, Vogel, Duncan and Uttaro (1995) found that older persons residing outside of a metropolitan area had higher incidences of hospital admissions, functional limitations, and chronic health conditions, as well as increases in confusion and forgetfulness.

In 1989, a diabetes questionnaire was given to adults with diabetes as part of the National Health Interview Survey (Coonrod, Betschart, & Harris, 1994). The National Health Interview Survey is an annual personal interview survey administered nationwide to over 85,000 adults. The diabetes questionnaire asked individuals with diabetes if they had ever attended a diabetes education class or program. Sociographic and clinical factors were also gathered to determine if they had an influence on participation in diabetes education. The survey indicated that people who lived in a metro area were 43% more likely to have received diabetes education than those who lived outside a metro area. The same survey also indicated that 23% of those with type 2 diabetes had received diabetes

education as compared to 58% of people with type 1 diabetes. Results from this survey suggested that the greatest need for patient education was in rural communities, especially in the northeast. The proportion of adults who had received diabetes patient education decreased with age, but was similar for men and women.

The elderly have fewer resources and less access to transportation and information, which limits their access to food (Morley, 1987). Similarly, the elderly may experience problems with dentition, mental health, compromised economic situations, polypharmacy, and changes in functional status. All of these situations may contribute to an increase in nutritional decline as well as a decreased quality of life.

Marshall et al. (1999) conducted the San Luis Valley Health and Aging Study to describe the prevalence of nutrition risk factors between elderly Hispanic and non-Hispanics white residents in rural southern Colorado. This is one of the few studies that focus on the nutritional health of elderly living in a rural area. Their two-year study identified nutrition risk factors as inadequate intake of vegetables, problems with dentures or teeth limiting the kinds of food consumed, difficulty preparing meals and lack of money to buy food. They concluded that Hispanic and non-Hispanic whites had similar macronutrient diet intakes, but Hispanics were lower in micronutrients. In addition, Hispanics reported less vigorous activity, and less variety of foods than non-Hispanic whites. Hispanic women had the highest prevalence of overweight with an average BMI >30, a substantial risk factor for many diseases, including diabetes.

Davis and Magilvy (2000), explored how chronic illness is experienced and managed by Hispanic and non-Hispanic white older adults living in rural Colorado. Using

descriptive ethnography, five interrelated themes emerged that described their experience: managing illness on a daily basis, support from faith and family, balance through negation, self-care and belonging to a community. Davis and Magilvy found that rural values of independence and personal decision-making were often in conflict with the expectations of following instructions from health care providers. They also found that both ethnic groups were reluctant to regularly visit physicians and wanted to remain independent, especially for medical care.

Diabetes can be a debilitating disease for anyone, but may be particularly distressing for elderly living in rural areas. Lack of medical services, transportation, educational opportunities and resources can hinder the management and care they receive. Finally, the craving for self care and pride in rural independence may reduce their desire to seek medical care.

Adherence Issues

Strategies of diabetes control are often complex and frequently require individuals to change and adhere to different lifestyles, eating habits and patterns (Glasgow & Toobert, 1988; Lytle, 1992). The term compliance has traditionally been used to define the degree to which a person's behavior coincides with medical or health advice (Lutfey & Wishner, 1999). However, because compliance suggests that patients are passive recipients of advice, the term adherence has recently been substituted to emphasize the patient's active role in decision-making. Several lines of research suggest that diet change is the area in which improvements can potentially lead to the greatest health benefits. Despite this, diet is also the area in which individuals with diabetes have the greatest difficulty (Sullivan & Joseph, 1998). According to the 1989 National Health

Interview Surveys, only 64% of patients with type 2 diabetes adhere to nutritional recommendations (CDC, 1990).

Schlundt, Rea, Kline, and Pichert (1994) identified twelve types of situations that make dietary adherence difficult for adults with diabetes. These included negative emotions, resisting temptation, eating out, feeling deprived, time pressure, temptation to relapse, planning, competing priorities, social events, family support, food refusal and support of friends. They suggest asking patients to rate the difficulty of the twelve descriptions to help individualize educational and intervention strategies.

One measure of adherence frequently used by physicians is the extent to which an individual's disease is well controlled. HbA1c is frequently used as an indicator of metabolic control since it reflects blood glucose levels over the preceding three to four months. The assumption is that good adherence, or good self-care, will lead to improved metabolic control which will in turn lead to a reduction of long term diabetes related complications. However using the level of disease control as a measure of adherence is problematic. Blood glucose control may be affected by a number of factors including other illnesses, effects of physical activity, and physiological variables. In addition, the meaning of adherence may differ for the health professional and the patient.

Roberson (1992) examined the patient's view of compliance among 23 rural African-Americans with chronic health conditions living in the southeastern United States. The author found different definitions of compliance between patients and health care professionals. Patients viewed compliance in terms of apparent "good health" and sought treatment approaches that were manageable, livable, and from their point of view,

effective. Roberson's report recommends that health professionals spend less time identifying noncompliance rates and place more emphasis on ways to alter strategies to enhance the client's efforts towards "good health".

McCord and Brandenburg (1995) assessed the beliefs and attitudes of physician-determined compliant and noncompliant patients with type 2 diabetes. Both compliant and noncompliant patients were knowledgeable about diabetes, although this knowledge did not necessarily transform into compliance. The researchers suggested that the perception of compliance by the physician may have little to do with the patient's perceptions of diabetes and the patient's perception of important factors for disease control.

Adherence is further complicated due to the lack of predictability from one area of diabetes care to another. Glasgow et al. (1986), found adherence varied across areas of diabetes regimen, with greater adherence in areas involving medications and glucose testing than in areas requiring lifestyle change such as diet and exercise. Other researchers have substantiated these results (Connell, Storandt, & Lichty, 1990; Polly, 1992). Furthermore, the relationship between adherence to medication, glucose self-monitoring, diet and exercise, with metabolic control is inconsistent. Both positive (Schmidt, Rost, McGill & Santiago, 1994) and negative (Glasgow et al., 1986) relationships have been reported.

In summary, self-reported dietary adherence varies across specific components of diabetes care. Lifestyle factors, especially diet, may possess a particular difficulty for the individual. Diabetes goals established by health care professionals frequently focus on metabolic control as an indicator of diabetes control. However, research suggests that

clinicians and the individual with diabetes should determine goals and work together towards metabolic control.

Health Belief Models and Theories

Self-care behavior is essential to attaining and maintaining the health of individuals who have diabetes. One means of helping patients with diabetes achieve good self-care is understanding the factors that determine diabetes related behavior. Health beliefs are considered important predictors of compliance behavior because they may influence patients' motivation for a particular health action (Harris, Skyler, Linn, Pollack & Tewksbury, 1982).

Several models and theories have been developed to explain health behavior. A theory is defined as a set of principles aimed at understanding how concepts are related to each other, why some things work in a particular way and how a program or intervention could be changed if it is not successful. A model on the other hand, gives order to events and concepts (Achterberg & Clark, 1992).

Nutrition and education researchers have stressed that nutrition education and nutrition programs should be based in theory to optimize education efforts and impact behavior. Between 1980 and 1990, less than 25% of nutrition education research was theory driven (Achterberg & Clark, 1992). Since then, however, 58 theories/models have been used with nutrition education. The models and theories most often used in nutrition education consist of a student (or learner); teacher (or instructor); curriculum (or subject matter); and governance (or context) (Gowin, 1981). The underpinning of this is the focus on knowledge leading to attitude change and ultimately behavior change.

Many diabetes education programs are just beginning to use theory-based education. Most diabetes programs focus on motivational behavior change and adherence. These models are based on the assumption that people will change their behavior if it will be of benefit to them. The frameworks most often cited to investigate health beliefs in those with diabetes include the Health Belief Model (Becker & Janz, 1985), Social Learning Theory (Bandura, 1977), Theory of Reasoned Action (Fishbein & Ajzen, 1975), and the Transtheoretical Model of Change (Prochaska, DiClemente & Norcross, 1992).

The Health Belief Model (HBM)

The Health Belief Model (HBM) was originally developed to explain why individuals would or would not take part in preventive health actions. The model was later expanded to apply to people's behavior in response to a diagnosed illness and compliance with medical regimens. The HBM states that the likelihood of undertaking a health action depends on an individual's beliefs along four dimensions;

1. Perceived susceptibility, or belief that one is vulnerable to the disease or its consequences;
2. Perceived severity, including both medical and social consequences;
3. Perceived benefit that following a particular health recommendation will be effective in decreasing the severity of the disease;
4. Perceived barriers or potential negative aspects associated with undertaking the new behavior.

The model also proposes that a relevant stimulus or "cue to action" must occur to motivate the individual to make the appropriate health behavior change. The stimulus can be internal (hypoglycemia) or external (recommendations from a physician). According to

the model, individuals with diabetes who perceive fewer barriers to and/or greater benefits of treatment, more vulnerability to complications, and complications that are more serious are more likely to perform the recommended behaviors.

The HMB has been supported by several studies on health beliefs, self-care and glycemic control. However, the predictive power of the four beliefs varies. In a study of elderly men with diabetes, perceived barriers had the greatest predictive power of self-care. Participants using insulin therapy perceived more barriers than those on other treatment therapies (Chapman, Ham, Liesen & Winter, 1995). Surprisingly though, participants with the greatest susceptibility (greatest fluctuation of blood glucose) perceived the fewest barriers to treatment.

In another study of adult men with diabetes, perceived severity of illness was related to greater compliance as measured by fasting blood glucose. However, perceived susceptibility and non-compliance as measured by HbA1c suggested that perceived susceptibility did not result in an increase in compliance. In addition, the health beliefs and behaviors of family members (external cues to action) influenced compliance (Harris, Skyler, Linn, Pollack & Tewksbury, 1982).

In Cerkoney and Hart's (1980) study, 30 subjects with insulin-dependent-diabetes were interviewed six to 12 months after attending a diabetes education class. Self-report and direct observations were used to measure patient's compliance to insulin administration, urine testing, diet, hypoglycemia management and foot care. Their findings suggested that those individuals who perceived their illness as serious and responded to cues to action were the most compliant with their diabetes regimen. Cue

motivators were the feature of the health belief model corresponding most closely with compliance behavior.

Peyrot and Rubin (1994) suggest that perceived susceptibility and perceived severity may have a curvilinear relationship. They postulated that those individuals experiencing the highest and lowest levels of perceived susceptibility may have the lowest levels of self-care and treatment compliance. Those who feel extremely susceptible may be unable to change their behavior due to feeling overwhelmed or having a fatalistic attitude towards their disease.

Social Learning Theory

Bandura's (1977) Social Learning Theory (SLT) is based on the concept that a person's self efficacy and outcome expectations determine how much effort they will invest in an activity and what level of achievement they will attain. Self-efficacy is defined as the confidence a person feels about performing a particular activity. Some researchers suggest that individuals with diabetes who have a high degree of self efficacy are more active in their diabetes-self care and achieve better glucose and emotional control than those with a low sense of self-efficacy (Rubin & Peyrot, 1992). SLT maintains that self-efficacy can be increased through four methods: (1) performance accomplishment, (2) observational learning (modeling), (3) positive reinforcement, and (4) emotional arousal. Accomplishments are considered the most influential in raising self-efficacy. Training and repetition of a task increases accomplishment, which subsequently increases persistence, initiation and endurance, resulting in behavior change (AbuSabha & Achterberg, 1997). For example the training of people to self-inject insulin should be broken into many small steps beginning with filling the syringe, checking for air bubbles, making sure insulin is at

the appropriate marker on the syringe, and finally injecting the insulin. However, self-efficacy in one area of diabetes care is not generalizable to all areas of diabetes care.

People who feel confident they can accurately inject insulin may not be confident in their capacity to eat a healthier diet.

Glasgow, Toothbert, Mitchell, Donnelly and Calder (1989) used SLT to compare two diabetes education programs against a control intervention. Seventy-eight participants with type 2 diabetes were randomly assigned to a nutrition education (NE), nutrition education plus social learning intervention (NE + SL) or a control group (CG). The NE + SL group received the same nutritional information as the NE group, as well as information on goal setting, modeling and problem solving. Both intervention groups achieved better dietary outcomes as measured by reduced calorie and fat intake than the control group. However, there was no significant difference between the nutrition education and the nutrition education and social learning group in either dietary or glycemic control.

In 1992 Glasgow et al. used a self-management training program designed for persons over 60 years of age with type 2 diabetes. The "Sixty Something..." study targeted social learning variables including problem solving and self-efficacy. Their ten-session intervention program led them to conclude that improvement in self-management skills was attainable by older adults with diabetes as evidenced by a reduction in weight and calorie consumption as well as an increase in the frequency of self-monitoring of glucose.

Aljaseem, Wissow and Rubin (2001) examined the relationship of both health beliefs, specifically barriers to treatment and self-efficacy, with self-care behaviors in individuals with type 2 diabetes. Their cross-sectional correlation study identified eight self-care behaviors related to diet, exercise, blood glucose monitoring, and medication. Their findings indicated that both beliefs and self-efficacy contribute to self-care behavior. The researchers recommend expanding the health belief model to incorporate self-efficacy.

Theory of Reasoned Action

The Theory of Reasoned Action (TRA) states that the best predictor of a patient's behavior is the patient's intention to behave in a certain way (Fishbein & Ajzen, 1975). Behavioral intentions have two primary determinants. The first is the subjective norm. Subjective norm is determined by a person's belief about what other people whom the patient views as important think he or she should do. The second determinant is the individual's attitude toward the behavior. This is determined by the patient's specific beliefs about the behavior such as how realistic it is to achieve glucose control or whether the patient believes that tight glycemic control will prevent complications.

Peyrot and Rubin (1995) applied the TRA to diabetes self care behavior and found that intentions strongly predicted behavior changes 6-12 months later. Consistent with other findings, Peyrot and Rubin found a stronger relationship between intention and self-regulated behaviors such as self-monitoring of blood glucose and insulin adjustment than for lifestyle behaviors such as diet and exercise.

Chapman et al. (1995) looked at the attitude, intention, subjective norm and perceived control over problem foods (cake, donuts, and pie) for elderly men with diabetes. The researchers found that subjective norm was the strongest predictor of dietary

adherence, and those with the highest levels of self-reported adherence had more positive attitudes towards diabetes than those with lower levels of adherence.

Anderson, Donnelly and Dedrick (1990) used the TRA to revise the Diabetes Attitudes Scale. The original Diabetes Attitude Scale (1987) was developed to understand the attitudes of health care providers toward diabetes and its treatment. The revised version is intended to measure a variety of independent attitudes of both health care providers and patients. Findings indicate that in general, older patients believed that their physician should be the primary decision maker in daily treatment, whereas younger patients preferred more autonomy in their self-care.

Transtheoretical Model of Change

The Transtheoretical Model of Change (Prochaska, Diclemente, & Norcross, 1992) has proven to be a useful model for understanding and predicting readiness to change across a variety of behaviors including smoking, alcohol use, and exposure to ultraviolet radiation. The model has also been used to understand dietary changes such as reducing fat, increasing fiber, increasing fruit and vegetable consumption and losing weight (Curry, Kristal & Bowen, 1991; Glanz et al., 1994; Nitzke et al., 1999). Most recently, a number of studies have used the Transtheoretical Model of Change (TTM) to understand and describe behaviors of adults with type 2 diabetes (Byrd-Bredbenner & Finckenor, 2000; Sullivan & Joseph, 1998).

The principle behind the TTM is that behavior change is a dynamic process. As people change a behavior they move along a series of stages or a continuum from not being aware to adoption of a desirable behavior. Researchers recommend that interventions be

targeted to the stage the individual is in to help guide the individual to the next stage.

However, the stages are not linear (Greene et al., 1999). The progression through the stages can be conceptualized as the game of Chutes and Ladders; individuals may enter at any point and may move up and down until permanent change is made (Bryd-Bredbenner & Finckenor, 2000). The five stages are as follows:

1. *Precontemplation*, the individual is not planning to change his/her behavior in the near future;
2. *Contemplation*, the individual is willing to consider the problem and the possibility of change. The usual time frame associated with considering the behavior change is six months;
3. *Preparation*, the individual is making a serious commitment and effort to change;
4. *Action*, the person is in the process of making the necessary behavior modifications; and
5. *Maintenance*, the individual continues the change for a period of time, usually six months. However, for dietary behaviors researchers suggest maintaining the changed behavior for two years (Bowen, Meischke & Tomoyasu, 1994).

Concern has arisen that while most people (up to 80%) with a given health behavior problem are in either the precontemplation, contemplation or preparation stage, most programs are designed for those who are in the action stage (Sandoval, Heller, Weise & Childs, 1994). In a worksite weight control intervention program, Prochaska, Norcross, Fowler, Follick and Abrams (1992) found that individuals who entered the program at the contemplation or action stage were more successful in moving from one stage to the next than those who began the program in the precontemplation stage. Knowledge of a

patient's stage of change can indicate the type of change process and intervention that can best assist them in moving to the next level.

When trying to change multiple nutrition behaviors, individuals are likely to be in different stages of change for different behaviors. Ledermann (1997) found this to be true in her dissertation on dietary change in individuals with non-insulin dependent diabetes. Her findings suggested that the majority of participants were categorized in the action or maintenance stages, but participants were at different stages for different dietary related behaviors. She concluded that staging was both difficult and controversial.

Sullivan and Joseph (1998) used the framework of TTM to understand lifestyle changes of people with diabetes. Rather than using the terms "precontemplation", "contemplation", and so on, they used the terms "easy", "difficult" and "impossible" to identify the level of difficulty patients had when making lifestyle changes relating to their diabetes. Results indicate that none of the behaviors were easy to attain, and diet and exercise were difficult despite understanding the importance of them in relationship to glucose control.

Byrd-Bredbenner and Finckenor (2000), used the TTM and guidelines developed by Kristal, Glanz, Curry and Patterson (1999) for health professionals to use with patients to improve diabetes management. They developed questions to identify the stage of behavior an individual is in for various diabetes self-care practices. These stages were then matched with experiential and behavior processes to assist with stage progression.

In summary, the relationships between health beliefs and compliance behaviors have received considerable attention and are confirmed by many studies. While several

theoretical models have been developed to explain health behavior, no single theory or model appears to be able to predict dietary behaviors or ensure effectiveness and success with behavior change.

Qualitative Research in Diabetes

Much of the research on the self-management of diabetes focuses on correlating behaviors and beliefs with measurable outcomes such as glucose control. However, little is known about the day-to-day experience of making decisions about food and supplement use and about how people with type 2 diabetes process this experience. Because of the 1) changes in medical nutrition therapy for people with diabetes, 2) conclusions reached from the UKPDS promoting early dietary intervention, and 3) rise in prevalence of type 2 diabetes, there is considerable need to explore the nutrition choices made by those with diabetes.

Qualitative methods provide information about personal experiences and help in understanding the processes, circumstances, beliefs and values associated with food and dietary supplement choices. Qualitative research, which focuses on the human experience, is ideally suited to study what it is like for individuals with type 2 diabetes to make nutrition decisions. The focus from the qualitative perspective becomes how the person responds to food, not how the body responds. In qualitative research, the researcher develops a relationship with the participant and becomes the primary channel of data collection.

Creswell (1998) identified five research approaches or traditions of inquiry associated with qualitative research including biographies, phenomenology, grounded theory, ethnography and case studies. Each tradition is based in a theoretical and

philosophical framework. Of the qualitative studies associated with diabetes, grounded theory and phenomenology are the approaches most frequently cited.

Grounded theory is intended to create or uncover a theory that relates to a particular situation. In grounded theory, individuals interact in response to a particular situation or phenomenon. Hernandez (1995) used grounded theory to investigate the experience of four young adults living with type 1 diabetes. She found that her values of education and glycemic control were based on her perspective as a researcher and certified diabetes educator. However, these values were not necessarily congruent with the values of her participants. Participants indicated that becoming a diabetic is a process that begins with trying to live a life of normalcy after diagnosis. This continues until some event disrupts the status quo, forcing the individual to learn more about diabetes and its management. The third phase involves becoming accustomed to living with diabetes and incorporating diabetes into life, resulting in the theory of “the science of one”. Hernandez’s final thoughts concur with results from other researchers. The traditional paradigm of adherence/compliance and glycemic control via education may not be appropriate. She suggests that the concept of adherence be replaced by collaboration with the individual with diabetes and empathy on the part of the educator.

Using a variation of grounded theory, McCord and Brandenburg (1995) assessed the beliefs and attitudes of 14 non-insulin dependent adult patients with diabetes. Their goal was to discover participant’s experiences with diabetes and its effect on their lives. The common premise was that diabetes had a persistent influence on daily life and activity.

The primary drawback of diabetes was the need for structure and planning, resulting in a reduction of spontaneity.

Price (1993) studied adults with insulin-managed diabetes to describe the processes by which they learned diabetes self-management. Using grounded theory, she identified factors and processes that formed the basis of self-management. The individualized regimens developed from personal experience resulted in the self-management theory of “what works for me”.

Nyhlin (1991) also used grounded theory to explore self-care from the perspective of people with type 1 diabetes in Sweden. Her research suggested that diabetes management is a juggling act between food, insulin, and exercise with each person having a unique set of circumstances that change over time. Her theory evolved into “walking a fine line”, a synopsis of the balancing skills needed to manage diabetes.

Miller, Warland, and Achterberg (1997) used qualitative methods to explore factors that influence decision making for food selection by women with type 2 diabetes. The researchers used individual interviews at point-of-purchase and in-store observations to generate four decision-making typologies: (1) the Overloaded Shopper, (2) the Nutrition Savvy Shopper, (3) the Budget Shopper, and (4) the Out-of-Touch Shopper. They concluded that knowing an individual’s decision-making typology would allow educators to better tailor diabetes nutrition messages to their needs.

In another study by Miller, Probart and Achterberg (1997), focus groups and in-depth interviews were used to explore consumer comprehension of nutrient information on food labels among rural women with type 2 diabetes. Participants indicated they referred to the food label when shopping, but comprehension was poor and misconceptions

abounded. Consumers indicated that fat, not carbohydrate or sugar was the nutrient of greatest concern. In addition, shoppers paid little attention to serving size. The researchers concluded that many women with type 2 diabetes would benefit from additional education and practice in reading food labels.

In summary, qualitative research focuses on human behavior. The investigator takes an active role in the research process by becoming an instrument of data collection. The meanings conveyed by participants are analyzed inductively to ascertain the process, circumstances and beliefs associated with them.

Phenomenology

Phenomenology is the study of the experiences of individuals, focusing on the meanings given by participants to phenomena they have experienced. Phenomenology is a philosophy that addresses the “phenomenal” question, what does it mean to be human? What is meaning? Why should we seek out meaning?

The goal of phenomenology is to gain a deeper understanding of an experience. This is accomplished by reducing the textural and structural meanings of experiences to a brief description that typifies the experiences of all participants in a study (Moustakas, 1994).

Phenomenology is rooted in sociology and psychology and has been used with nursing and health research. Patterson and Sloan (1994) used a phenomenological theory (paradigm case analysis and interviews) to study how individuals with long standing type 1 diabetes make decisions about their self-care. Their investigation was the first phase of research designed to develop materials to empower individuals to make self-care

decisions and assist health care providers in facilitating this process.

As these individuals became experts in their diabetes self-care, they made conscious decisions to assume control of their diabetes and maintain control of their diabetes. As their sense of self-control developed, they encountered risks and confrontations with their health care providers. However, through their previous familiarity, knowledge of their bodies and knowledge of diabetes management, they developed self-care experience and were able to manage their diabetes.

Dickinson (2000) used Van Manen's (1990) phenomenological framework to conduct her dissertation, which explored what it means for adolescent females to live with type 1 diabetes. Through ten in-depth interviews, five themes emerged which she presented using a music analogy:

1. Chorus – blending in with the adolescent culture;
2. Solo – standing out and being watched;
3. Trills – weighing the options and choosing a tune;
4. Chords –being tethered to the system and to diabetes, and;
5. Dissonance – struggling with conflict

Her findings suggested that although diabetes is a lifelong disease and the girls had difficult choices to make on a daily basis, they managed to adjust their routine to accommodate their disease and fit in with their peers.

Phenomenology is concerned with the meaning, perception and interpretation of living, in this case with diabetes. The few phenomenological studies identified to date that address the phenomena of diabetes focus on individuals with type 1 diabetes. However,

phenomenology is an ideal approach to use to study the meaning food and dietary supplements have for individuals with type 2 diabetes.

Summary

This literature review represents the framework for this study. Diabetes is a complex disease requiring many lifestyle and behavioral changes. Existing studies have identified the physiology, course, and treatment options for individuals with type 2 diabetes. We know that type 2 diabetes is on the rise, and that as people increase in age, they are more likely to develop type 2 diabetes. We also know that dietary adherence is a critical component of diabetes management but remains difficult to attain. The rise in popularity and use of dietary supplements continues. The number of supplements targeted towards individuals with diabetes is also on the increase. What we do not know is what it is like for older people with type 2 diabetes to make nutrition choices on a daily basis and what role dietary supplements play in their lives.

Qualitative research using a phenomenological approach will allow the researcher to enter into the world of the individual with type 2 diabetes and provide greater insight to the essence of eating.

CHAPTER III: METHODOLOGY

The purpose of this chapter is to outline the methodology that guided this research project. First the researcher's experience and point of view are discussed. This is followed by a discussion of phenomenology and a comparison of methodologies. Third, the study population and protection of human subjects is described. Fourth, the method of data collection and analysis is outlined. Finally, strategies for ensuring trustworthiness are discussed.

Researchers Experience and Point of View

The inspiration for this study stemmed from fifteen years experience as a registered dietitian and health educator. My education and training primarily consisted of the traditional medical model of health and illness. In this model, the health professional becomes predominantly responsible for the treatment of the patient. As times changed and my day-to-day experience in health education grew, my perception of health care evolved to include a more holistic, patient centered approach to care.

A number of years ago I had the opportunity to work as a chronic disease dietitian in Guam. Working with individuals from various ethnic backgrounds (Chamorro's, Filipinos, Micronesians, Koreans and Chinese) I learned about the unique beliefs and behaviors of individuals from a variety of cultures. Because I was frequently unfamiliar with local dishes such as Kelafuen (minced Spam with lemon, onion, and coconut), or their nutritional value, I often asked clients to provide food samples. During these

sessions, the clients would describe how particular foods were grown, caught, prepared and consumed. I found that as interesting as the particular varieties of food were, of more interest to me were the way in which the foods fit into the client's culture and the significance foods held for them.

My personal philosophy of wellness today consists of a more holistic approach to health care. For me, holistic health combines all aspects of how one balances life, including complementary therapies such as dietary supplements. My goal in educating patients with diabetes is to try to understand their beliefs and behaviors towards their own care, including the foods they eat. In so doing, I hope to empower them to make personal, informed decisions about their diabetes care. Though the number of carbohydrates a client consumes is important to me, of equal importance are the lifestyle changes clients make because of their diabetes. What is it like for them to make nutrition choices that can affect their disease process?

Phenomenology as a Philosophical Perspective

From examining the literature surrounding nutrition and diabetes and from listening to patients describe their perceptions of food and diabetes I became aware of the variety of influences affecting nutrition choices. Phenomenology provides the opportunity to explore these influences and discover the essences of eating. By definition, an essence is "a universal that is grasped intuitively through the study of the internal structure of instances of the phenomenon under study" (Boyd, 1993 p.126).

Phenomenology has been described as a philosophy as well as a practice. Phenomenology as a qualitative method provides an opportunity to describe and clarify

phenomena important to practice, education and research. Merleau-Ponty (1962) describes phenomenology in the following way. "Phenomenology is the study of essences and according to it, all problems amount to finding definitions of essences; the essence of perception or the essence of consciousness" (p.vii).

Phenomenology is not a static philosophy. There is no single methodology to guide research based upon it. Rather phenomenology is a movement towards understanding the meaning of the lived experience (Cohen & Omery, 1994). The underlying theme among the various phenomenologies is to describe the lived experience and interpret the meanings from those experiences. It is this lived experience, composed of external and internal influences that give meaning to an individual's perception of the phenomena.

Two distinct philosophical approaches exist within phenomenology (Cohen & Omery, 1994). The Husserlian tradition, or eidetic phenomenology, focuses on epistemology, or the nature of knowledge. Edmund Husserl (1859-1938) is considered the father of phenomenology (Cohen & Omery, 1994). Husserl believed that phenomenology should be the basis for philosophy, and for that matter, all science. For Husserl, essences are the essential structures present in everyone's consciousness, and these essences form the basis of our experiences. The goal of phenomenology is to describe the meaning of an experience from the perception of those who have had the experience. The question to be answered from Husserl's standpoint is *how do we know?*

Phenomenology according to Husserl is presuppositionless. He advocated that one must return to a "reflective intuition" and remain free from perceived ideas or notions regarding the phenomena of interest. Husserl promoted phenomenological reduction, or

bracketing, as a way to set aside or suspend previous knowledge or personal beliefs about the phenomena under investigation to provide a pure description of the phenomena.

In contrast, Martin Heidegger (1889-1976) viewed the primary focus of phenomenology as ontological. Heidegger proposed that understanding was the basic form of human existence. Heidegger believed that human behavior occurs in relation to things, people, events and situations. Therefore, people are tied to their worlds, a situation he refers to as “being-in-the- world” and people can only be understood within their own context.

Heidegger believed that all human knowledge is ultimately based on interpretation. He maintained “ To be human is to be interpretive, for the very nature of the human realm is interpretive. Interpretation then is not a tool for knowledge; it is the way human beings are” (as cited in Polkinghorne, 1983, p. 224).

Heidegger was interested in uncovering and understanding presuppositions, not eliminating or suspending them. Heidegger did not believe it possible to bracket because people are self-interpreting and cannot step out of context. Therefore, for Heidegger there is no “pure truth”.

Phenomenology does not produce factual statements or generalizations from experiences. Rather it produces descriptions of what is essential or important to a particular experience. Husserl’s phenomenological framework was used to guide the present study because of the need for descriptions of the experience surrounding food and dietary supplements for individuals with type 2 diabetes. Sharing the lived experience through in-depth individual interviews provided the best data source for this

phenomenon. The researcher's professional background in science, holistic perspective of health, and personal style of research fit well with the Husserlian tradition.

Sampling and Consent

Study Participants

The study sample consisted of women over the age of 60, living in rural northwest Colorado diagnosed with type 2 diabetes. The study participants had been rural dwellers for the majority of their lives. The population in northwest Colorado is 93% Caucasian, and the participants reflected this racial composition.

Participant Eligibility

Eligible participants were women over the age of 60 who have been diagnosed with type 2 diabetes for at least one year. Participants were the primary food/nutrient purchasers and preparers of food in their households. Participants were treated with diet, exercise, oral medications, insulin or a combination.

Recruitment of Participants

Study participants for individual interviews were recruited through the Northwest Colorado Visiting Nurse Association in Steamboat Springs and Craig, CO. Nurse educators conducting senior wellness clinics nominated eligible participants.

Informed Consent and Ethics

Prior to conducting interviews, the study was reviewed and approved by the Human Research Committee (HRC) at Colorado State University and by the Northwest Colorado Visiting Nurse Association. Participants were contacted once they agreed to participate to prepare them for the interview and answer preliminary questions. Each participant was given a brief description of the purpose and procedure of the study and a

guarantee of confidentiality. In addition, participants were made aware that participation was voluntary and could be terminated at any time.

This study was unlikely to present any risks to the participants. However, it was recognized that some individuals may have been uncomfortable with audio taping or discussing personal issues such as problems with diabetes management.

To maintain confidentiality, participants were identified by their first name only on the audiotape and by pseudonyms in the transcript and subsequent study materials. The audiotapes were available only to the researcher involved in the study and her advisors. Tapes and transcripts were managed according to the guidelines of the HRC.

Study Design

Data Collection

This qualitative descriptive study was guided by the following research questions.

1. From the perspective of the individual, what meaning does food and eating play in type 2 diabetes?
2. What are the underlying themes and contexts that account for this meaning?

A semi-structured interview format consisting of open-ended questions was used to collect data. Individual interviews allow the participant to respond without the influence of peers and can add a dimension to the gathering of information by having face-to-face contact. A semi-structured approach allowed for personalized responses from the participants as well as allowing the researcher to change the order of questions, add questions and probe for deeper meaning. In addition, semi-structured interviews provide the greatest amount of reliable information with the most efficient use of time

(Achterberg, 1988). The design of the study was meant to be flexible, and questions were added, deleted, or expanded upon as the interviews took place and data emerged.

Where the accumulation of qualitative data involves interviews, the researcher becomes the primary instrument for gathering and analyzing the data. The researcher must acknowledge his or her biases, since they are all brought into the interview process. Individual interviews were conducted at either the individual's home or at a mutually agreed upon location. The goal was to create an atmosphere that was friendly, respectful and confident.

An interview guideline had been developed to assist with questions and provide a place for taking notes. Each interview began with a scripted introductory question intended to help the individual relax and immerse herself in the topic of diabetes.

Three Certified Diabetes Educators (CDE's) working with a population similar to the researchers' study population evaluated all questions. The investigator pilot tested the questions listed in the interview guide with 5 volunteers in the fall of 2000. This pilot testing served to provide the researcher with experience in interviewing, transcribing the interviews and coding the data. Initial questions were then revised to increase clarity.

Each interview was audio taped with the participant's permission. Interviews took place between November 2001 and January 2002. A total of nine interviews were conducted.

Data Analysis

Husserl's phenomenological method and Moustakas (1994) process of phenomenological data provided a guide for analyzing the data in this study. The purpose of analyzing the data was to describe the phenomena or essences as they

presented themselves. This was not a linear process, but consisted of simultaneous data collection and data analysis. Analysis began as soon as the initial data were collected.

The following strategies were employed in collecting and analyzing data:

1. In keeping with the Husserlian tradition, the researcher bracketed or put aside preconceived notions and ideas before beginning interviewing and analysis. Bracketing enables the researcher to remain neutral with respect to personal belief or disbelief in the phenomenon (Streubert & Carpenter, 1999).
2. The researcher followed an interview guideline to make sure the basic set of questions was asked of everyone, but the conversations were allowed to flow in unanticipated directions if relevant to the research questions.
3. The researcher audiotaped each interview. Interviews were initially replayed in their entirety to gain a sense of wholeness, or full description. Following this, interviews were transcribed verbatim.
4. Each interview transcript was read and reread to identify core ideas and concepts. Horizontalization, or meaningful statements regarding how individuals experience diabetes and their nutrition choices, was highlighted. The development of a list of independent statements revealing significant meanings was then generated.
5. The meanings were grouped into non-overlapping meaning units or themes. New statements were compared with existing statements. Verbatim examples were also incorporated.
6. The researcher then reflected on data within and across categories to discover connections between themes.

7. The researcher utilized triangulation methods to provide support for the data analysis. The findings of the data were confirmed by a peer review (PhD, RN, CDE). These findings combined with the interviews and member checks allowed data to be combined and compared to reach agreement on data analysis.

8. Finally, the researcher developed a composite description of the meaning and the essence of the experience.

Strategies for Ensuring Trustworthiness

While quantitative studies rely on validity and reliability as measures of rigor, qualitative studies rely on the concept of trustworthiness as an indicator of quality. The trustworthiness of qualitative research is assessed in terms of whether it is credible, transferable, dependable, and confirmable (Denzin & Lincoln, 1994). The steps taken to ensure credibility are as follows:

Credibility

Credibility is the qualitative term linked with internal validity of quantitative research. Credibility refers to whether the researcher accurately represents the participant's perceptions regarding food, supplements and eating habits. A number of techniques were used to enhance credibility. In this study, the researcher's prolonged and varied field experience in nutrition and diabetes enhanced the credibility of the study. In addition, reflexivity by a journal was employed. A reflexive journal allowed the researcher to record and reflect on ideas, thoughts and beliefs while protecting herself from over involvement. Reflexivity provided an opportunity for the researcher to "come clean" in an acceptable manner. Member checks, or letting participants review the researchers summary took place at the end of each interview.

Finally, peer examination by another Certified Diabetes Educator, PhD, RN, and the research advisory committee occurred throughout the data collection and analysis process, enhancing the integrity of the study.

Transferability

Transferability is used in qualitative research as opposed to generalizability or external validity in quantitative research. Transferability refers to whether the findings of the study can be applied to other settings or are generalizable. The goal of qualitative research is not to generalize as one would in a quantitative study, but to gain a sense of in-depth understanding. In this study, the understanding related to the meaning food and dietary supplements had for women with type 2 diabetes, living in rural northwest Colorado. Transferability was improved by using nominated samples and dense description of the findings. Nominated samples were generated from health care professionals working with seniors within the geographic area. Dense or thick description can also validate the transferability of the research. Thick description means that the researcher records the complete literal description of the event being investigated to ensure the categories and themes generated are grounded in the actual data. Thick description is used throughout chapter four to describe the findings from the participants.

Dependability

The dependability of a qualitative study refers to the accuracy of the data and the degree to which the results of the study can be replicated. Using a reflexive journal to account for changing conditions in the study and changes in the understanding of the phenomenon enhanced dependability. Dense description and peer examination also

strengthened the soundness of the study. Finally, the use of an interview guideline combined with the flexibility to follow up on questions added to the dependability of the study.

Confirmability

Confirmability is analogous to objectivity in quantitative studies. Confirmability is concerned with the degree to which the findings represent the information observed or obtained from the participants. Confirmability includes gathering information from participants, which is then interpreted by the researcher. Several techniques were used to improve confirmability. Researcher biases were acknowledged and stated at the beginning of chapter three. Restating ideas conveyed by the participant at the conclusion of each interview also enhanced confirmability. An audit trail demonstrated how theories emerged and enhanced confirmability.

Trustworthiness issues in qualitative research need to be addressed by detailing the methodology utilized. Through reflexivity, member checking, peer examination, thick description, an audit trail and prolonged field experience, trustworthiness was achieved to the best of the investigators ability.

Summary

This chapter presented the researcher's point of view and experience related to diabetes. Phenomenology as a philosophical perspective and method of inquiry was discussed. Protection and recruitment of study participants, as well as the study design were presented. Data analysis and strategies for ensuring trustworthiness were also explained.

CHAPTER IV: RESULTS

The intent of this chapter is to present and discuss the findings of the research. The chapter is presented in three sections: portrayal of the participants, participant demographics, and the descriptive findings.

Portrayal of the Participants

The research study was conducted in two towns in Northwest Colorado. Nine women ranging in age from 65-88 years participated in the study. Nurse educators working in these towns recruited participants. Selection was restricted to females living independently. A brief description of the participants follows.

EB

EB packs more activities into one day than most people do in a week. If she is not out skiing, snowshoeing or walking, this 68 year old can be found volunteering or helping with a church activity. A farmer's wife and retired nurse, she is accustomed to strenuous physical activity and healthy eating. Her training in the health field has given her a unique perspective of her own diagnosis of diabetes.

RW

RW used to wonder, "what is sugar diabetes?" as she would listen to her mother and grandmother talk on the front porch. Eight years ago she found out she had diabetes. Disenchanted with the way her physician told her she had diabetes, she "stuck her head in the sand", and went into self-professed denial of her disease. Retired after working all

her life, she enjoys her freedom, and does not plan to change her lifestyle because of her diabetes.

VS

VS would be happy if she could just continue going out to "club" with the ladies once a week because "they're all so nice". As the oldest participant in this study (88) and a lifetime local, she keeps busy caring for herself and her home. Her ranching background instilled a strong sense of self-reliance and independence. Although she never had children of her own, her extended family makes sure she is never in need. In good weather, she manages to walk to and from her weekly hair appointment and attends church each Sunday.

BO

For more than 75 years, BO has lived in Colorado. She is a matter of fact woman who approached her diabetes diagnosis 18 years ago the same way she approached her smoking cessation, cold turkey. "When the doctor said no more sugar, that was it". Although she listens to her doctor's advice, she is active on the Internet and is proficient in using recipe software programs to determine her food composition. She also reads and receives a number of diabetes magazines. Her year round physical activities are aided by a membership to a local gym, a home treadmill, rowing machine and light weights.

MP

A nine-month-old grandchild provided the incentive MP needed to care for her recent diagnosis of diabetes. MP is still going through what she describes as "an emotionally difficult time". This is the first significant illness she has been faced with since the death of her husband from heart disease three years ago. Although dietary

changes for MP are not at the forefront of her mind, she is determined to lose weight and has begun to exercise.

GK

The family of GK convinced her to move to northwest Colorado approximately 10 years ago. Originally, from the south, GK has fond memories of raising her 6 children in rural Tennessee in a large house with a wrap around porch, "serving Kool-Aid and cookies". She has a number of other health conditions limiting her mobility, but remains optimistic and appreciative of her friends and family. She identifies diabetes as her most important health concern.

TY

Long time local and former owner of a grain elevator, TY is an independent octogenarian. She preferred to meet the researcher at her office because she "likes to get out whenever I can". She enjoys her daily ritual of meeting "the girls" for coffee every morning at McDonalds. Her "anything in moderation" attitude applies to all aspects of her life. She's always willing to try new things, and visits the health food store so they can grind her flax seed.

PM

PM is an optimistic yet realistic woman. Her diabetes diagnosis combined with her multiple sclerosis has given her the conviction to live life to the fullest and "get rid of stress". She continues to work part time and attributes her friends and co-workers as a source of inner strength. Her motto is to "control your disease before it controls you".

Her sense of spiritual belonging has provided her with peace and an acceptance of her diseases.

JD

JD, a quiet widow, describes herself as finding independence and self-sufficiency later in life. She currently keeps busy playing cards, traveling and volunteering. Her latest interest is vegetarian cooking, something new to her.

Participants Demographics

All women had been diagnosed with type 2 diabetes from one year to 18 years. Seven out of the nine participants were taking oral hypoglycemic agents as part of their diabetes management. One was on insulin and an oral hypoglycemic agent, one was being treated with insulin alone, and one was controlled solely by diet and exercise. The majority of the participants were Caucasian. Six of the nine participants lived alone. All participants were primarily responsible for their own shopping and cooking. Four of the nine spent their entire life in rural Northwest Colorado. Most (seven of the nine) participants were interviewed in their own home. Interviews were semi-structured, open-ended, and lasted from 45-90 minutes each. See Table 3 (see appendix A for demographic percentages).

Table 3. Participant Demographics

Participant	Length of time diagnosed with diabetes	Age	Living Arrangements	Medications for diabetes	Number of co- morbid Conditions	Ethnicity	Supplements taken
EB	1 ½ yrs	68	Spouse	Oral	<3	Caucasian	Calcium
JD	2 yrs	76	Alone	Oral	<3	Caucasian	MVI*
BO	18 yrs	75	Split level house with family	Oral & insulin	>3	Caucasian	MVI
TY	3yrs	87	Alone	Oral	<3	Caucasian	Ca, K, Mg Vitamin E B12 Garlic Flax
MP	1 yr	61	Split level house with family	Diet & Exercise	>3	Caucasian	Glucosamine & chondroitin, Vitamin E, Vitamin C MVI
PM	3 yrs	69	Signifi-cant other	Oral	<3	Caucasian	MVI Vitamin C Calcium
RW	8 yrs	75	Alone	Oral	<3	Hispanic	None
GK	12 years	87	Alone	Oral & insulin	>3	Caucasian	Vitamin E Vitamin C MVI
VS	15 years	88	Alone	Oral	>3	Caucasian	Bilberry Lueitin MVI Vitamin E Occulvite Calcium

*MVI: Multivitamin

Descriptive Findings

In keeping with phenomenological analysis, data analysis occurred throughout the data collection process. Field notes were taken during and immediately following each interview to capture insights and impressions. All interviews were audio taped and verbatim transcript analysis was conducted following each interview. Post data collection included 94 transcribed pages. Upon transcription, the data were horizontalized; that is, all aspects of the data were considered equal. Data were then grouped into meaningful clusters from which themes were created. These clustered themes and meanings were used to develop the textural descriptions of the experience (Moustakas, 1994).

Initially thirteen general themes describing the meaning of food and factors that shape food choices were identified. These themes were continuously reviewed and revised. To ensure trustworthiness, the researcher collaborated with two other diabetes educators to ensure the themes were reflective of the meaning portrayed by the participants. Themes were then merged into similar categories. For example, participant interpretations of food labels and of food recommendations were combined in the category of changes in dietary behavior. Relationship with medical personnel was combined with the manner in which individuals were initially made aware of their diagnosis of diabetes. Eight themes resulted from the original 13. Five of these themes related directly to food choice and food meaning. Three themes related to circumstances contributing to the development of the meaning of food choice.

Themes related to food choice are as follows: memories associated with food; food as a source of social interaction; should/shouldn't syndrome; changing dietary behaviors; and dietary supplements.

The three themes that contributed to the meaning of food are: relationship with medical personnel; difficulties adjusting to diabetes with co-morbidities, and rural values of independence. These themes will be further elucidated in the findings that follow.

Memories Associated with Food

Each of the participants recalled fond memories of food. Most of the participants in this study had similar social, cultural and physical backgrounds. The most prominent food memories were associated with childhood and young adulthood. These early experiences established principles that remained important throughout their life and carried over into their later years. Many indicated that family traditions and customs had considerable impact on their food choices. The following anecdote is typical of those who lived and worked on farms and ranches in their younger years:

I married a farmer and moved to the farm and there I did a lot of cooking for men...I cooked meat, potatoes, I'd have a salad, I'd have a hot vegetable, a dessert and bread. I'd give them milk and I really thought of it as a nutritious thing. We fed them in harvest and I would take dinner out to the field (EB).

Another rancher remembers:

Lamb, we were raised on lamb. And oh, we just cooked everything in the book. But anyone could tell you my maiden name was M... and everybody stopped, they wanted to stop at M.'s to eat because we always had such good food. My dad had a big sheep ranch and there were hired men and all...so we just had like regular rancher's cook, good food (VS).

The notion of meat and potatoes constituting a good meal was evident by the number of participants that described this as part of their upbringing. Ideals about what

constitutes a healthy meal changed for participants as they became more informed about nutrition. As one participant stated, "My husband was from Texas, he couldn't understand a meal without meat" (MP).

Another participant echoed this remark by stating:

We would have meat and potatoes and gravy, you know a good meal because he [my husband] worked hard (TY).

I was always cooking, for me and my husband and six kids...that's a lot of kids...we had a big freezer and had beef brought in. We kept the refrigerator full of meat, so I had plenty of meat and stuff like that. We would eat good. See my son (pointing to a photo on the wall), he's a big man, a big man (GK).

Home made breads, pies and pasta were evident in their past and were recollected fondly.

I used to bake, bake pies and everything. I used to sell them to the drug store and make around six a day. Now I don't think I could bake pies like I did (TY).

Another participant offered:

You know the food was so inexpensive. All the pasta we ate was home made and all the bread was home made (RW).

I enjoyed it [cooking]. I think of it now so much. The kids used to come home from school.... I always cooked up a big batch of cookies and Kool-Aid. I always kept paper cups so they could come in and get cookies and Kool-Aid. I used to cook like that all the time, bake pies, cookies; I don't do it any more. I can't stand at the stove long enough to cook my breakfast (GK).

My mother did bake a lot, pies, cakes, and all that stuff (VS).

The admiration for homemade foods was evident in the participant's preparation for family members as well.

See if I buy a processed something, like if I were to buy a TV dinner or something to give to him, he'd eat it but he wouldn't like it. He doesn't like anything that's ready made. This same participant explained: I think it [cooking] has carried over from my childhood to my whole life and the way we eat now (EB).

The availability of fresh foods and gardens was recalled warmly.

My mother did a lot of canning so we did have a lot of home grown things and we raised our own poultry. I know my mother made her own ketchup and pickles and stuff like that. Not just vegetables, other things (MP).

You had all these fresh vegetables and you had fresh fruits from the garden, you preserved them, you froze them, so you had them all winter long (EB).

We had a beautiful garden. In fact, we had two. It was this place up in the hills where we could raise squash... My mother canned but I hated it. That's one part of my life I said I wasn't going to do (VS).

Even now, some participants remain avid gardeners.

In fact, this summer I froze a lot of fresh vegetables from gardens. I was able to do a lot of that so we'll be eating all the stuff I froze this winter... I've made jelly this year, jellies and jams. I just have a freezer full of frozen food (PM).

One participant summed up the importance of food in her life by stating:

Food has always meant a lot to me. I think it's because of my heritage, growing up in the Italian Spanish family. I mean whatever they cooked they ate and whatever they cooked, I ate. And enjoyed. I lived with my mother, and my aunt and grandmother and uncles. We lived on a street where my grandmother had one house, we had another house, my aunt had another house, and we were all in that one area. My whole family, they were always cooking. It was wonderful I loved it. Good food. And I miss a lot of it today, I tell you. I can't cook like they used to. But I manage all right (RW).

Food as a Source of Social Interaction

Eating was frequently a significant part of the participant's social life. The findings from this study revealed three factors associated with the social aspect of eating. The first being the importance of friends, the second the importance of pleasing others and the third the difficulties faced when going out to eat.

Socialization and companionship were reasons for wanting to stay healthy.

Friends were identified as becoming increasingly important and influential as the

participants aged. For one participant the thought of becoming ill and missing out on her social club was a primary reason to keep her diabetes in control.

I belong to the ladies recreation club out here. I had to give up my card club on account of my eyes. So I didn't want to give this one up. I want to stay far enough away from those things [cookies] because I do want to go to club. cause they're all nice ladies and I just enjoy getting out (VS).

Another participant described the benefit of sharing experiences and the influence of social support as follows:

Well I go to McDonalds every morning and I have a biscuit and coffee. You visit with the other ladies. It helps a lot. Sometimes we have 2 or 3; sometimes there are 10 of us (TY).

We go out every Sunday to the Village Inn. I have a salad and they serve a vegetable, which is usually beans, or corn and I have a little steak...several of us ladies go from here every Sunday. They know us so well; they know just what we want (JD).

One participant equated her card games with the pleasure of food and companionship.

I've played bridge for so many years and we always had candy, nuts and stuff on the table so you naturally eat that (MP).

Eating at congregate meal sites was also identified as a pleasant social interaction.

A lot of times for lunch I eat at Sunset Meadows [congregate meal site]. That's a good square meal and the people are nice (GK).

However, a few participants did not attend congregate meals sites stating the food served was too high in starch for their diabetes.

Participants took pleasure in preparing meals for family and friends and put more effort into the meal than when eating alone.

He's [significant other] eating more, but his weight has dropped... So, it makes him feel good too. It makes me feel good that I must be doing something right (PM).

I'm very lucky. The way I cook for him [husband] I just about never fry anything and I have never been hard on fat. The other thing is he [husband] doesn't particularly care for pastries and donuts, so it's never been around (EB).

Another participant who rarely ate vegetables of any kind on her own indicated that she made healthier meals when she had some one to cook for.

Every once in awhile, if I'm having dinner, like tonight I'm having dinner with Laura, I'll have some green beans and mashed potatoes...If we go out to a place with a salad bar I'll have some, but I never make it at home (RW).

Most participants found that going out to eat wasn't difficult, but occasionally felt embarrassed when at someone else's home. As one participant described:

The most frustration for me is when I'm out of the home...In a restaurant you just choose, but when you're at someone's home and they're feeding you and you're passing things on and they're wondering why you don't eat it, it's different (EB).

Another participant who lived alone indicated that food no longer had the same interest to her that it did in the past.

I think when I was younger food was a big part of enjoyment, but I really don't think that much about it now (JD).

Should/Shouldn't Syndrome

Participant statements indicated that they were aware that their diet could influence their health and diabetes. Most of the participants had received some prior nutrition information regarding their diabetes. Some participants received warnings from health providers, primarily their physicians. Each participant interviewed identified foods they believed to be good for diabetes as those low in sugar and/or carbohydrates, fruits and vegetables. However, despite the allowance of moderate amounts of sugar in

an overall meal plan. many participants labeled cakes, cookies, pies and candy as “bad” foods.

Although participants were hearing the nutrition messages, they were not always following them. Participants frequently used the words “should” and “shouldn’t” in describing foods choices and preparation methods.

When I think of eating, I think to myself whatever I’m eating I’m not supposed to be doing this. This is the wrong kind of food... I cook for myself, a lot of fried foods, which I know, is a no-no. I know better (RW).

I’m more aware of what I eat but I’m still not eating real properly. The chips, cookies, ice cream, that’s the hardest to give up, I know I should but I still haven’t totally given that up (MP).

They say it’s better to eat small meals and eat more often [than to] eat a large meal. Sometimes I wonder if I’m eating too many small things (JD).

I shouldn’t eat pastas, breads and chocolates or anything sweet. I know I shouldn’t be doing all that, but I can’t help myself (GK).

I haven’t eaten vegetables like I should all my life. I just haven’t cared that much for them (TY).

One participants’ remark reflected her awareness that her dietary and lifestyle choices could predispose her to future diabetes complications but ignored this knowledge.

I never will [get my diabetes under control] until they put me in the hospital. I know I’m so bad at it, I really am. And I know better. I’m not an idiot (RW).

Another participant expressed her frustration with her disease, uncertain of what she could or should be doing differently:

I haven’t varied more than five pounds since I was a young girl. Because I just never over eat or eat way too much. If I would have a dish of ice cream, I don’t eat a large one and not a great big piece of pie. I just can’t think anything that I did wrong (VS).

Changing Dietary Behaviors

The study findings suggest that participants have continued to make changes in their eating patterns and behaviors since their diagnosis of diabetes. The degree to which these changes were made varied from those making no changes to others who aggressively confronted their disease by changing their lifestyle on a number of levels. Most participants were between these extremes: they modified their existing eating habits but did not abandon them.

Changes in the food choice process. The majority of participants indicated that making changes in their diet was not as difficult as they imagined. Some made changes gradually, others preferred the “cold turkey” approach. The changes most frequently cited were to reduce the amount of food they ate, limit the sweets, watch carbohydrates and eat more fresh fruit and vegetables.

For people who had always eaten healthy, changing eating patterns to meet their diabetes needs was done easily.

When I really started doing it [making changes in eating] it was so long ago, it's just like second nature to me now. I did it like I did smoking. When the doctor said no more sugar that was it (BO).

For some participants the diagnosis of diabetes was a turning point, making life better and having a positive effect on them. One example of this is shown by a participant who stated:

I really made some changes at that time [of diagnosis]. I felt like if I wanted to live a better life, a healthier life, I needed to do these changes. I thought it would be hard for me to do, but it's been easy. Once you set your mind to a goal of living longer, healthier, then your diet falls into place. Your mind changes and you know you have to do this and you accept it. Because of diet I know that I'm eating right and exercising like I should and it's just made my life better and more

productive. I'm enjoying life a lot more now in my later years than I did when I was younger (PM).

Others acknowledged changes in eating, but took them in stride.

My life has changed as far as eating and my freedom in eating, yet it hasn't bothered me in the least... I'm a very bland eater and I eat the same thing a lot, but it isn't a problem. I'm perfectly happy. It's been easy for me because that's the way I [have always] cooked (EB).

Another stated:

I live alone now so it's only myself that I'm cooking for, so it hasn't been hard... [If I go out] I sometimes refuse desserts, but other than that, I haven't done any major changes... I try to limit the amount I eat now, but it's not a problem (JD).

While another described her friends reaction to her diabetes as:

They [friends] all say oh this is awful VS: we eat in front of you. I say it doesn't bother me one bit. Go ahead. I've just gotten used to eating that way... And if I go to club and they have a nice dessert, I never touch it (VS).

In contrast, those who did not eat regular meals or had a self-proclaimed sweet tooth found making dietary changes difficult, and in some instances had no desire to make them. One participant stressed the importance of sensory fulfillment:

I only make the ones [changes] I like. If I don't like it I'll have to make it somewhere else. For an overweight heavy person, if your mouth's not satisfied, you'll keep eating even if you're not hungry... It's the taste that's important (MP).

Another participant considered eating behavior benign compared to other behaviors and therefore was not about to make changes.

Well look, I don't drink, I don't smoke, I don't take drugs, and I don't do anything else except eat. That's my one and only vice (RW).

Still others were finding their way, adjusting to circumstances as they arose. One participant who had diabetes for over 18 years stated:

I'm still changing what I eat. I haven't found exactly the way I want to go yet (BO).

Confusion over changes in nutrition recommendations. Many participants referred to the 1994 changes made by the American Diabetes Association regarding nutrition recommendations and principles for people with diabetes. Most participants read food labels to help them select foods they thought were beneficial for their diabetes. However, some weren't sure what to look for anymore and found it difficult to balance carbohydrate and fat. During many of the interviews participants expressed a strong sense of frustration.

It was very confusing when they first changed that [sugar to carbohydrates] with me. For years when I first started, they told me no sugar. So I wasn't eating anything with sugar in it. Any form of sugar. I even checked the label on bread. Well, now they go by the carbohydrates, which I'm not very fond of. Yet, you're supposed to have that as the bottom or base of the pyramid. So that's where I find it difficult (BO).

Another statement illustrated the growing frustration felt around eating.

I'm thinking I can't eat this, I can't eat that. I said to Dr. S, you know everything I've been eating they say I can't eat. I said I don't know where to go from here (VS).

A few participants who read food labels indicated they knew they should watch carbohydrate and fat, but were uncertain how much was an appropriate amount.

I'm not really up on how many carbohydrates a day or anything like that. I think it's like 15 grams but that's over my head (MP).

It's like a comparison for different brands. Which is the lowest in carbohydrates, fat, that type of thing... The one that concerns me right now are the carbohydrate. Before I was watching the fat and fat percentage (GK).

Reiterating this sentiment is the response by another participant:

I don't know that it's difficult [to make changes], it's time consuming. I pick up something; I look at it and says, well this is in the carbohydrate range but then something else will say saturated fat 9 grams. and I think Ahh... Mainly what I watch now is the saturated fat (JD).

I felt like I needed to look after my cholesterol problem and cut down on things that had a lot of cholesterol in them. And then I find out that's not totally true, that you need to cut down on your carbohydrates, that's probably more important. I figure, does that mean I can eat liverwurst? Cause I love liverwurst and I've been away from it for years. So, I bought a big package of liverwurst and ate it for lunch everyday for about a week trying to get my full of that (PM).

Another participant expressed concern about the mixed messages she was receiving regarding nutrition for her diabetes and that for other health issues.

I take this Coumadin. I had never heard of vitamin K until this year. They say to stay away from lettuce.... no more tea... but I just love my salad and that's good for my diabetes (VS).

Soy. One third of the participants used soy products in one form or another.

None identified soy as being beneficial for diabetes, but used it as a source of protein and calcium, or because they were lactose intolerant.

I just feel like it doesn't give me that bloated feeling that regular milk gives me (PM).

When I first started taking it my friend in California lowered her figures on her osteoporosis with soy, and I was diagnosed with osteoporosis also, so I started [using soy]. I add soy powder to smoothies, and soy power bars...and I have ordered some soy cereal (BO).

Fiber. Although aware that fiber was beneficial for health, most of the participants associated insoluble fiber as a way to treat or prevent constipation and soluble fiber in relationship to heart health. None mentioned the potential fiber has for reducing high blood glucose or the relationship a high fiber diet has to cancer prevention.

I use wheat germ and brewers yeast; it's good for my digestion, and Metamucil (BO).

I have Grape Nuts and the Fiber One. it has the sweetener in it, but it's the nutritious one... I've eaten those two for I don't know how many years. Although I can't say I like it real well but it's supposed to be good for me. I put the Grape Nuts in first and put this on top [Fiber One] (VS).

Another participant mentioned fiber as helping her avoid low glucose reactions.

In the morning, I'd eat a bowl of cereal and about two hours later I would get so shaky... they said that's your blood sugar dropping. I've changed the type of cereal I eat and I don't have that anymore because it's higher in fiber (MP).

Dietary Supplements

Chronic disease and long term use of medications affect the body's ability to absorb and use nutrients. Eight of the nine participants used some form of vitamin, mineral or herbal supplement. However, supplements were not readily identified as being beneficial for the control of diabetes, rather they were taken for other health conditions.

Sources of information on supplements. Participants indicated a variety of sources for dietary supplement information. Friends, television, the Internet, women's magazines, "people talk" and Paul Harvey were all cited. Most participants were reluctant to discuss supplement use or alternative treatments with their physician.

Family members influenced supplement use for some participants. Daughters were mentioned as the primary source of supplements:

My daughter sent me a bottle and its got calcium, potassium and magnesium, and they're real good (TY).

My daughter-in-law is a very healthy person, very health conscious: she's given me lots of supplements (MP).

The media was another way individuals heard about supplements. One participant who was already taking a number of supplements stated the following:

Right now, I hear Paul Harvey advertising one. He claims that people got their sight back but I've been scared to talk to them. Occul, ocul, livite he advertises. Occulivite I think it is. And he's named two people that have gotten their eyesight back and were doing so great. And I've been tempted to call that number. But I thought after I call, I shouldn't, I'd have to know something about it before I'd start (VS).

The news and television were cited as being a source of information for a number of participants. As one participant stated:

You hear all about everything [vitamins] now a day on it [television]. But I can't take all of them! (JD).

One participant did discuss supplement advice with her physician.

I listen to the news, but I'll tell you what, I listen to my doctor, what he tells me to do, that's what I do. And if I see something and I wonder, I'll ask him, he usually says no (GK).

In general, herbs were viewed with more distrust than vitamin/mineral supplements or "healthy natural foods". One participant stated:

I'm not much into the herbs. I've been taking flax seed. I go to the (health) food store and they grind it for you, you don't want the whole seed. I eat that on my breakfast food and different things. It's a healing... A lot of them [friends] takes the oil but I went and got the seed. I don't know if the oil is any better or not (TY).

I have friends that have tried to get me to take a lot of this herbal stuff and I was reading in a women's magazine one day and two of the things this one friend had been trying to get me to take [ginkgo and ginseng] said diabetics should not take them. And I don't really take a lot of that kind of stuff, but I have nothing against vitamins, minerals, and things because I think there are a lot of people that need it. But I think as long as my lab work is always ok, and I've never had, except after I had the hip, had a doctor suggested I take them. But I certainly wouldn't mind taking them (EB).

Another said:

All those things [herbs] I think are hard to work in to where you might get enough to do yourself any good (MP).

You get kind of panicky when you have this mess [diabetes]. You hear things and you think now they did tell me one time that you shouldn't take too many herbs? (TY).

One participant did not recall how she heard of bilberry, but has been taking it for years.

I did that [bilberry] on my own. I don't remember who told me, someone told me it was so good. I don't know if it's helped me much or not. Maybe it's helped me from getting worse. I don't know (VS).

Beliefs concerning supplement use in relationship to diabetes. The majority of the participants took a multi-vitamin. General reasons for use were for nutritional insurance in light of a reduced appetite.

More than for my diabetes. I take it [multi vitamin] because of my age, and the fact that I can't hold as much [food]. When they say I should have this much carbohydrate and this much protein and this much fruit and this much vegetables and I eat what I can hold. Then I run out of space and can't finish anything or I leave one of those things out entirely. I feel I need some help (BO).

Antioxidants include vitamins C, E, beta-carotene, selenium and flavonoids.

Antioxidants have been shown to destroy free radicals that are believed to contribute to many diseases as well as aging. A number of participants indicated they used vitamin C and vitamin E primarily to reduce their risk of heart disease.

They just say they're [vitamin C and vitamin E] real good for your health. It's supposed to fight off cancer and heart disease. That's what I heard. Figure it can't hurt (MP).

Vitamin E is good for the heart and stuff like that (TY).

I think at my age a little more vitamin C might do me good and it will help with colds. It's very difficult when I do get sick (PM)

Calcium supplements were also used by many of the participants.

After my hip replacement I started taking calcium. My doctor didn't think I was eating enough food [high in calcium] (EB).

You'd think I had a drug store. I take these for your bones (VS).

One participant stated using vinegar, lemon and water to aid digestion, but stopped after not experiencing any improvement.

I had heard that vinegar and lemon was real good for the system. I was doing it when I was bothered with GERDS a lot. Somebody said it would help out. Well I took it for quite awhile but I didn't see much of a difference...so I stopped (PM).

Arthritis was frequently mentioned as a reason for taking supplements.

I take glucosamine and chondroitin for my arthritis. I started taking it probably 4 or 5 years ago...and it was real expensive then it wasn't massively produced. It was getting too expensive and I quit taking it. It was like 2 or 3 weeks later and I could tell the difference. I hurt. I started taking it again and it got better. So, I do believe in it. Luckily, it has gotten cheaper (MP)

Finally, one participant used garlic:

Well, they say garlic is good for you and it is. I have arthritis, and it seems like it even helped that. I take the garlic tablets. They're supposed to be odor free (TY).

Relationship with Medical Personnel

For these participants, finding a physician and developing a relationship with him or her affected the care and outcome of their diabetes. Initial distrust and dislike caused one participant to tune out the message of diabetes.

When I was first told I had diabetes, I'm going back about 7, 8 years ago. The doctor that told me, I did not approve of the way she told me. "You have diabetes, any medication you take is not going to cure it." And I said to her I know they haven't yet found a cure for diabetes. She didn't tell me anything. That's what annoyed me about her. And I never went back to her. And since then, I have just been ... what is the word I want to use for just putting my head in the sand? I'm in denial, I have been in denial (RW).

Other participants stated they felt overwhelmed with their diabetes diagnoses.

I have to admit how little of that information I have actually read religiously that I got when I first got diabetes and the doctor gave me pamphlets. Jane [diabetes

educator] gave me pamphlets, but I can't really remember if there was stuff they told me would be especially good because of diabetes (EB).

I was very emotional. Even though in my mind I knew I had it [diabetes], I didn't accept it and that's scary (MP).

The majority of the participants appeared satisfied with the quality of health care they were receiving and had no desire to see a specialist such as an endocrinologist. As one participant explained:

I've been seeing Dr. S. for over 20 years...He knows me, and I don't want to see anyone else...His wife is going to come fill my insulin [syringes]. He tells me to call him at home, but I can't be doing that (VS).

However the progression of diabetes changed the relationship participants had with their physician.

I feel like I'm at the doctors for the tiniest little thing. Every time I get anything, I end up having to go to the doctors. I used to be able to get a little infection and take care of it myself or I would not have to go, and now he keeps reminding me I'm not going to be able to do this anymore. After you are diabetic, you just don't have the same power to ward off all those things, you're, going to need an antibiotic when you didn't used to. That's been kind of a frustrating thing for me because I think I'm healthy...he's always saying that's going to happen when you're a diabetic (EB).

Well my eyesight wasn't as good and when I went to Dr. H he said you have macular degeneration. And I said what's that? And then he explained it to me. And I was terribly fussed up with it. He said there's no cure for it. He just scared the life out of me. So, I learned I had to live with it. Now my eyes are blurry (VS).

Frequently participants met with a diabetes educator or registered dietitian to help them adjust to dietary regimens. Most participants found the diabetes educator and/or dietitian to be helpful and liberating. Some respondents felt the flexibility of food choice allowed them incorporate previously thought of forbidden foods.

Like Amy [diabetes educator] says, if I want a piece of cake I'll have a piece of cake. I just don't have too much (TY).

From the meetings I've been to, there isn't anything that is really bad, it's just if you eat too much of any one thing. If you eat in moderation or in the right serving size compared with other things you are eating that is ok (BO).

Adjusting to Diabetes and Co-morbidities

All participants experienced one or more chronic illnesses of varying severity in addition to type 2 diabetes. For some, diabetes was their primary concern. For others, diabetes was considered less important than another disease.

It's [diabetes] more important than anything to me right now. It's hard to control; you've got to be real careful...I check my [blood] sugar 6 times a day (GK).

One participant had multiple sclerosis (MS), which overshadowed her diabetes. However she indicated her management of MS helped her diabetes. Her dietary changes were primarily made to reduce the side effects of MS and strengthen her immune system, yet she identified these as beneficial for diabetes.

I try to keep away from gluten, wheat products, wheat bread. I used to eat a lot and it seems like for some reason it would affect me [causing] fatigue, which comes with MS. I try to limit bread. I use potatoes in moderation. Instead of a big potato, I eat a small one. Pasta, I love pasta but I eat it in moderation (PM).

Arthritis was identified as a physically debilitating co-morbidity by more than half of the participants. Arthritis can affect diet by making it difficult to shop and prepare food. Additionally, arthritis can limit exercise due to joint and muscle pain, which can hinder diabetes management.

When I was in California [visiting my daughter] I went to the YMCA. They had a program called twinges in the hinges: it was an exercise program in the pool. It was through the arthritis association that recommended it. Because your weight is off your joints when you're exercising...it was great. But they don't have anything like that here. They have a pool down where my son lives, but their classes are at 8 in the morning and it's so cold here! So I haven't done that (MP).

Vision loss affected one participant's ability to care for her diabetes. She created unique ways of sorting her medications for various ailments and the time they need to be taken. She relies on others for label reading and assistance with shopping. She commented:

...I think this deal [vision loss] is so; it's hard on your nerves because you can't do things like you used to and you get all fussed up about it, which probably is not good. But I do. It makes me very nervous when I can't figure something out (VS).

Cardiovascular disease was evident in half of the participants; however none associated heart disease with diabetes. For these participants heart disease was a separate and distinct entity. Medications were frequently taken for hypertension, fluid retention and blood clotting. Of particular concern was the need to plan activities around the use of diuretics to avoid potentially embarrassing situations.

Although nutrition recommendations for diabetes are beneficial for individuals with heart disease, some of the participants felt overwhelmed and confused by what they interpreted as mixed messages. The two most frequently stated concerns surrounded fat versus carbohydrate and the interaction of medication such as coumadin with perceived healthy foods for diabetes.

Osteoporosis was another health condition mentioned by a number of participants. One participant had broken her back; two other participants had hip replacements. Exercise was identified as being beneficial for osteoporosis as were calcium supplements, which were taken by half of the participants.

My hip and spine no longer have osteoporosis because of the exercises I've been doing and my medication and then eating soy. Now I have a lot of things to exercise on my wrists to build them up (BO).

Rural Values of Independence

The sense of independence and desire for self-sufficiency was evident by most of the participants. Participant's level of knowledge and assertiveness as well as their overall health influenced their attitude. Some participants had close ties to family members and friends but all identified wanting to be able to care for themselves. As one participant described:

I feel I'd like to do for myself as long as I can. I kind of like to keep my house. keep my cooking. something to do. Cause I worked hard all my life and I'm just not used to sitting and doing nothing. I'm just not good at it (VS).

For another participant, independence and self-sufficiency was expressed in what she was not willing to do in managing her diabetes.

I'll be 75 next month. am I going to start not eating any sugar things or pasta and breads and cakes and chocolates. am I going to stop doing that at my age? Now maybe years ago when I was younger, I would have, but I'm not going to now. The doctor says to me...you're going to drop dead any day now. Well, I've lived and I've eaten everything I've wanted to and enjoyed it (RW).

Still others maintained they liked having a sense of control over their disease, especially their medications. Although this participant described her kitchen counter as a drug store, she also states:

They tell me to get a pillbox, but I don't want a pillbox. I know what I take and I have my own system (VS).

A few participants expressed desire to control their pain and avoid medications as much as possible:

My leg hurts from my hip clear down. I can hardly stand it. I'm in pain most of the time.... I take Motrin and aspirin. Oh, they gave me a prescription for some

Valium and some other one, but I don't want to take those high ones. I try to get by on my own (TY).

There isn't a day that goes by I don't have pain. I just space it out, pretend it's not there. I just go on with my daily activity. If it gets too extreme it takes it's toll on me and I know I have to lay down (MP).

Finally, one participant described the importance of having a sense of control over her diabetes by the following:

I think people that have certain diseases can control them. The best way to control them is to eat right and exercise and to have a good outlook on life and just be thankful that you're here...some diseases you're going to have the rest of your life, and you control them before they control you. It's the best thing I can say. Control them: don't let them take over your life, even though they do a little bit (PM).

The personal account of the meanings food has for these participants parallels the purchase of and life in a house. Moving requires change, and change consists of involvement. For example, the stages associated with buying a home include finding a realtor, taking into account if it is a primary or secondary home and choosing a location. The relationship participants developed with their health care provider was similar to that of a realtor. Finding the right physician and establishing a trusting and comfortable relationship influenced the course and control of their diabetes.

All of the participants had health concerns in addition to diabetes, most notably heart disease and arthritis. A second home, in this case diabetes, requires maintenance and upkeep in addition to other health concerns. Diabetes may compete for attention and conflict with the other "house".

The physical home of these participants, rural northwest Colorado, suggests that location is truly important. Rather than moving to a more urban area where services are

plentiful and the weather less extreme, these women were intent on remaining in their home and caring for themselves to the best of their ability.

The experiences participants had with food and eating are comparable to rooms within a house. Different rooms correspond to different experiences. Memories associated with food are similar to the history contained in a cozy library. The participant's personal accounts of their youth evoke visions of storytelling in front of a crackling fireplace situated between bookshelves containing memories of farming, ranching, and cooking.

Socialization, acceptance, and support of friends represent activities occurring in a great room or living room. These participants were anxious to fit in with friends and partake in activities such as cards, clubs, church and eating out.

The should/shouldn't syndrome is suggestive of a basement filled with items that should be sorted, repaired or given away. Daily conflicts and frustration regarding diabetes and decisions about food choice were evident from participants. Other activities may offer greater temptation than cleaning out the basement, but the consequences and guilt of what has been left undone remains.

The use of dietary supplements evokes thoughts of closet, where miscellaneous items are stored but not seen. Many participants used supplements, but needed prompting to discuss them, and few discussed them with their physicians.

Finally, for many people a house is not a home until they have taken down a few walls or at least moved the furniture around. Change occurs in a home as it does in the eating patterns and attitudes of people with diabetes. Balancing daily food desires with

healthy food choices requires planning. Many participants are still looking for the ideal arrangement.

Summary

In summary, these findings revealed how nine women with type 2 diabetes experienced the meaning of food. Eight themes emerged from the in-depth interviews conducted with the participants. For these participants the essence of eating is an evolving, continuous experience. Eating incorporates the total life experiences of the participants. Memories, relationships, and personal experiences contributed to the meaning of food. Changes in the status of their diabetes and recommendations from health professionals influenced the meaning of food. Acceptance of these changes was evident, and for some, diabetes has led to healthier eating habits and a happier outlook on life.

CHAPTER V: DISCUSSION

The purpose of this study was to describe the meaning food and eating had for older women with type 2 diabetes living in rural northwest Colorado. A phenomenological approach and qualitative analysis provided new insights and broadened existing knowledge of the meaning food has for this population. A phenomenological approach requires the researcher to “paint a picture” of the situation or event under study rather than determine cause and effect (Patterson & Sloan 1994).

Using the metaphor of a house, participants made clear that just as no one house is suited for everyone, neither are the factors that are associated with, or those that influence eating for women with diabetes. Each person’s life situation is unique as is each person’s body and understanding both is essential to providing effective diabetes care.

This chapter includes five sections: (1) Discussion of the findings, (2) Limitations of the study, (3) Implications for education, (4) Recommendations for future research, and (5) conclusion.

Discussion of the Findings

Nine women ranging in age from 62-88 participated in this study. Individual in-depth interviews were conducted to answer the following questions:

1. From the perspective of the individual, what meaning does food and eating play in type 2 diabetes?
2. What are the underlying themes and contexts that account for these meanings?

The findings of this study substantiated previous research on various aspects of diabetes and contributed to the existing knowledge of the meaning of food for individuals with type 2 diabetes. Nutrition is an integral component of diabetes management. Yet participants in this study indicated that they do not eat just to obtain the nutritional value of food. A broad range of factors other than health motivated food choice. Food reflected the past and conjured up memories of youth. Lifelong eating practices affected present choices but these choices were tempered by personal, social, medical and societal expectations. Without an understanding of the meaning of food, improvement in nutrition for individuals with diabetes is unlikely.

Considerable consistency in participants' recollection of food memories was apparent. All participants were raised or lived most of their childhood and early adult life on or near ranches and farms. Memories of food served as "personal constructs" or cognitive factors that individuals derived from personal experience (Bell, Stewart, Radford & Cairney, 1981). An example of a common construct found in this study was the perception of a good meal. All participants identified meat and potatoes as the standard of a "good meal" during their youth although this changed over time.

This study supported and elaborated on previous findings by Falk et al. (1996) and Furst et al. (1996). Memories connected to food or life course experiences were major factors in shaping current food preferences. The intimate connectedness to food sources and personal history of food use influenced how some participants continued to prepare meals.

For others, present food selection and preparation was modified to meet the changing needs associated with age, living situation, health and nutrition knowledge. For the participants in this study, eating often took place in a social setting that incorporated the interaction of others. Meaningful relationships with others whether in a ladies group, bridge club or church positively affected their self-care. Participants expressed a strong desire to partake in social activities and placed high value on friends as a source of support and comfort.

Davis and Magilvy (2000) found the concept of community significantly facilitated the management of chronic illness of elderly living in rural areas. In their study, church was the strongest and most important community. Chin, Polonsky, Thomas and Nerney (2000), also found religion was a prominent means for understanding and coping with illness. However, religion was not a common theme present in this study. Only one participant mentioned the importance of belonging to a church, while a few others focused on the importance of faith as a source of comfort and guidance. Church attendance appeared to be more akin to social support than religion.

Social support had a positive effect on appetite and food choice. Those participants who shared meals or prepared meals with others indicated they consumed more vegetables and less fat than when they ate alone. This supports McIntosh, Shifflett and Picou's (1989) conclusion that elderly who had an extensive friendship network had more adequate diets than those who did not have an extensive support network. Of additional interest, their findings indicated that a network of friends was more beneficial than marriage in relation to good nutrition.

Patterson and Sloan's (1994) phenomenological study on type 1 diabetes also identified social support as beneficial to the success of diabetes control. Their participants indicated they had to learn to ask for and accept support from others. Perhaps because of the long-standing involvement in the community or the age of participants in this study, support was readily available from neighbors, friends and family.

Participants indicated they wanted to fit in with a group, although the eating habits of others did not usually affect their food choices. For most, eating with friends or eating away from home was not difficult; they simply had smaller portions of a particular food or refused food. In contrast to findings by Savoca and Miller (2001), none of the participants found eating out in restaurants difficult. However, refusing offers of inappropriate foods at someone's home was reported as being problematic. In general, participants did not feel that their diabetes or diet caused them to miss out on any social events. In some instances, participants maintained their commitment to a healthy diet to insure participation in social activities.

Overall, participants were relatively knowledgeable about their diabetes. Participants indicated that choosing and consuming "healthy foods" such as vegetables and fruits would be beneficial for their diabetes. However, they were divided as to reasons for actually selecting the foods they did. Most participants stressed the health value of food over convenience or price. These results are consistent with findings from Rappoport et al. (1992). On the other hand, a few participants stressed the importance of

taste and pleasure over the health benefits of food, supporting findings by Glanz et al. (1998) and Krongl et al. (1982).

Paisley, Sheeshka and Daly (2001) identified the “should syndrome” in their qualitative investigation of the meaning of eating fruits and vegetables for adult couples. In their study, the “should syndrome” described a morality concerning fruit and vegetable consumption. Changes in the status of fruits and vegetables occurred over their participant’s lifetime due to changes in health and nutrition. In the present study, a should/shouldn’t syndrome also emerged. Participants believed that food choices and food preparation methods could affect their health but this knowledge was not always consistent with their behaviors. Participants expressed guilt for choosing inappropriate foods or avoiding foods they believed to be healthy choices.

Feelings of frustration were evident by a few participants. Frustration generally resulted from a conflict in what patients felt they should do, what they have done in the past; advice received from others and expected health results. As in findings by McCord and Brandenburg (1995), this frustration was directed at both themselves and their diabetes. Two patients directed their frustration at their physicians stating they received either conflicting information or insufficient information about their disease.

People with diabetes face changes that provide opportunities to modify dietary habits. Results from this study indicated that participants were aware of the relationship between diet and diabetes and were willing to make some changes. For most participants, dietary change appeared to be an ongoing self-motivated process.

Several researchers have focused on dietary change in individuals with diabetes. Glasgow et al. (1992) found older people with diabetes were able to make substantial

lifestyle changes. In this research, dietary changes were not as difficult as most of these women anticipated. Participants made dietary changes along a continuum ranging from drastic change (avoidance of sugar in all forms, avid label reading) to those who made no change at all. The majority of participants were clustered in the middle describing moderation and balance as key aspects of food choice. Specific dietary strategies included reducing portion size and limiting sugar, carbohydrate and fat intake.

For a few participants, any change was stressful, even if intended to make life easier or provide a more liberalized diet. An example mentioned by a number of participants was the change in the 1994 ADA dietary guidelines emphasizing total carbohydrate rather than sugar. As one participant stated: "I just get all fussed up with change" (VS).

The majority of participants stated they read food labels and referred to this information when selecting foods. Surprisingly, although participants discussed carbohydrates and were aware of the relationship of carbohydrates to blood glucose, they frequently focused on fat when reading food labels. Miller, Warland and Achterberg (1997) had similar findings in their study of food purchase decision making of women with type 2 diabetes.

A few participants who were concerned about their triglycerides attempted to differentiate between saturated and unsaturated fat. Their understanding of the food label was not always accurate, but they were earnest in their attempt to read them. Previous research by Miller, Probart and Achterberg (1997) indicated confusion over the differences between saturated and unsaturated fat and the relationship to cholesterol.

Study participants were conscious of the benefits of fiber in their diet but associated fiber primarily to prevent or treat constipation. Fiber was not mentioned as beneficial for diabetes. Of interest are the findings of Glanz et al. (1994) that participants in their study were more prepared to change their dietary fat intake than their fiber intake.

Only three participants indicated they consumed soy products. This was not surprising, given the ranching community in which they lived. Participants who used soy identified it as beneficial for the prevention and/or treatment of osteoporosis or digestion. None identified soy as beneficial for heart disease or diabetes.

Some participants found that their lives had improved since their diagnosis of diabetes. Eating healthier was one part of an overall change in behavior patterns leading to a more enjoyable and fulfilling life. Participants reported that diabetes had helped them to healthier dietary and exercise habits and that having diabetes had taught them to appreciate life more and not take things for granted. This corroborates research findings by McCord and Brandenburg (1995), and Paterson and Sloan (1994).

Participants in this study indicated the changes they made in their life because of diabetes were conscious decisions that evolved over time. As one participant said after having diabetes for 18 years, "I'm still changing what I eat. I haven't found exactly the way I want to go yet" (BO). The process of transformation was explored in individuals with type 1 diabetes by Paterson, Thorne, Crawford and Tanko (1999). They described transformation as an evolving nonlinear process in which participants made a conscious decision to "identify and interpret a challenge and, in so doing, created a new relationship with the illness and with those who provide health care" (p.799).

A significant finding in this study was the role dietary supplements had in the lives of women with type 2 diabetes. Supplements were used by all but one participant with the number of supplements used varying from two to six a day. This finding concurs with results from Radimer, Subar and Thompson (2000), who found that age was one of the most important factors in nutritional supplement usage with highest usage in later middle and earlier older ages. Participants were more likely to use vitamin/mineral supplements than herbal supplements, which they viewed with uncertainty.

Individual supplements were associated with conditions that may compound diabetes but were not taken with diabetes in mind. Reasons for use were to prevent or treat other health conditions such as osteoporosis, heart disease, arthritis and vision loss. Supplements were generally used appropriately for the intended conditions. Multi-vitamins (one a day) were used by most participants because of age and as insurance against an inadequate diet.

Calcium was mentioned the most frequently in relationship to preventing or treating osteoporosis. Vitamin C and vitamin E were used to enhance heart health. One participant took bilberry and lutein in hopes of improving her eyesight. [Lutein and bilberry are both antioxidants that target eye tissue. Lutein has recently received considerable research and is being added to a number of multivitamins. Lutein is accumulated in the retina, which is responsible for visual processing. Bilberry has been found to help restore night vision and helps maintain capillary action in the retina (Carver, 2001)].

Glucosamine combined with chondroitin, and garlic were used to alleviate arthritis pain by two participants. Glucosamine has been shown to be safe and effective in reducing pain and functional limitation for people with arthritis (Towheed & Anastassiades, 2000). Research substantiating the benefits of garlic in relation to arthritis is inconclusive. However, the oils in garlic cloves have a weak effect in lowering fasting glucose (Mozersky, 1999).

Whereas participants discussed supplement use with friends and family, the majority were reluctant to discuss supplement use with their physician. Similar findings were reported by Eisenberg et al. (1998) and Shaw et al. (1998). However, as evident from personal experience and findings by Radimer et al. (2000), people do ask nutritionists about dietary supplements.

The intent of this research did not initially involve studying physician- patient interaction; however, it became clear that the relationship participants established with health care providers strongly influenced their overall self-care. Patient's satisfaction with physician communication has been found to relate directly to treatment compliance (Glasgow & Toobert, 1989). A physician- patient relationship is considered positive if physicians provide clear explanations of the disease and effective aspects of treatment (O'Hair, O'Hair, Southward & Krayner, 1987). Some suggest that physicians may be even more influential among elderly patients (Beisecker, 1990).

Participants indicated that once they found a physician they were happy with they did not want to change or see a "specialist". They reported they liked their physician to spend time and explain things to them. Two participants indicated that physicians either scared them with warnings or had poor bedside manners, leaving them feeling frustrated

and unmotivated. Most participants felt the care and information they received from diabetes educators, dietitians and nurses was very helpful.

In keeping with findings from Chin et al., (2000) co- morbidities, especially if symptomatic, would sometimes take priority over diabetes. This was especially true for one participant with multiple sclerosis. However, she found her dietary treatment for multiple sclerosis benefited her diabetes as well.

The most frequently stated co-morbidities were heart disease and arthritis. Similar to findings by Savoca and Miller (2001), participants did not understand the relationship between diabetes and heart disease, and treated each as a separate disease. In 1999, researchers from the American Heart Association suggested that from a cardiovascular point of view “diabetes is a cardiovascular disease” (Grundy et al., 1999, p.1134). Although the goal for medical nutrition therapy for diabetes includes glycemic, lipid and blood pressure control, participants did not identify effective strategies for diabetes as beneficial for heart disease or vice versa.

Arthritis was mentioned by many participants, and therefore should be addressed as a confounding aspect of diabetes in the elderly. Joint pain and stiffness restricted exercise for a few participants and contributed to overall pain. Arthritis can also limit the ability to shop, prepare and consume food. The U.S. Department of Health and Human Services identified arthritis as the most frequently occurring condition in the elderly, with it affecting 49% of those over age 65 (Administration on Aging, 2001).

For one participant, decreased vision impaired her mobility and therefore was extremely distressing. Although she still maintained an active social life, it did limit her ability to go shopping and read food labels on her own, to travel and exercise.

Women in this study were unique in that they had lived a primarily rural existence and continued to maintain an independent lifestyle. With the emphasis on managed care, clinics and specialists, it was enlightening to view how these women managed a number of diabetes decisions on their own. Having no endocrinologist for 200 miles, harsh winters, and limited public transportation, these women appeared to be hardy and self-reliant in their ability to care for themselves.

These women exhibited both physical as well as psychological hardiness. Kobasa (1982) describes characteristics of individuals who are psychologically hardy as having certain characteristics referred to as the three Cs. First, these individuals are open and willing to change. They see life events as challenges rather than problems. Second, they feel a sense of commitment to family, friends and goals. Third, they have a sense of control over their life.

Many of these women had taken an active role in their health care by becoming involved in the management of their disease. They frequently obtained information on nutrition, especially dietary supplements on their own. Davis and Magilvy (2000) describe this as the "rural culture of survival". In keeping with other findings by Davis and Magilvy (2000), participants in this study were reluctant to visit physicians unless necessary and preferred to treat minor illnesses on their own.

Unlike findings from Hunt et al., (1998) participants in this study did not want to rely on medications more than necessary. They preferred to "tough it out" or use over the

counter remedies as opposed to prescription medications. This determination for self-care emphasized the independence and self-sufficiency evident in these participants.

A few participants alluded to the importance of the mind-body connection, especially as it related to their experience with personal stress. A positive mental attitude was considered an important aspect of their self-care.

This study did not include a clinical examination or biochemical testing such as blood glucose or HbA1c as a measure of diabetes control or dietary success. Rather, this research focused on participants' feelings and experiences to provide an interpretive explanation of the meaning of food for these participants. Food is more than what one eats and modification of food and eating habits are an important part of diabetes treatment. The more we as health care providers understand about the meaning food has for our patients, the more effectively we can empower our patients to positively affect their health.

Limitations of the Study

The findings from this study have limited generalizability because of the homogeneity of the participants, primarily Caucasian women over the age of 60 with type 2 diabetes. The findings of the study reflect the specific views of women from a rural background and may not apply to women living in urban communities or those from more culturally diverse backgrounds. In addition, only two of the participants lived with another person, the majority shopped and prepared meals for themselves.

Another potential limitation was the variation in the number and severity of co-morbid conditions participants had in addition to type 2 diabetes. The length of time of

having diabetes combined with their overall health may have accounted for the variation in some of their responses.

A final limitation of the study was the sampling method used. Participants were nominated by nurse educators, indicating they had some contact with health care providers and were willing to discuss their diabetes. As a result, women who did not seek regular health care were not represented in this study.

Implications for Education

The findings from this study provide a greater understanding of the meaning of food for elderly women with type 2 diabetes. This study has a number of implications for diabetes and nutrition education. Variations in attitudes among patients with diabetes will affect how they receive and interpret information. However, a better understanding of the personal meaning of food will allow health care providers to develop approaches to diabetes management that will best meet the needs of their patients.

First, an optimal treatment approach involves knowing the patient. Dietary behavior should be studied within the context of the individual's life and their reality. Although women with type 2 diabetes are similar in some regards, each is unique and has had a lifetime of individual experiences. Health care providers should take the time to find out what is important to them and try to adapt recommendations around those issues. Asking questions such as "Tell me about your life with diabetes" and "How does diabetes affect your eating?" may elicit valuable insight. The use of a nutrition screening tool may also help to detect other elements (economic status, dental needs, alcohol use) that may hinder or compound diabetes management.

Physicians should be especially mindful in how they diagnosis diabetes in the elderly. Some patients may exhibit signs of frustration and sadness especially if they have recently undergone other lifestyle changes (death of spouse, change in living situation). Health care providers may want to stress the potential positive aspects that diabetes has for many people. This should not negate the seriousness of diabetes, but serve to remind patients that some good often comes from bad. Hearing this at the time of diagnosis may be especially important. For patients with established diabetes, health care providers should focus on their self-perceived progress.

Additionally, some older participants may be reluctant to make changes, and this should be acknowledged and accepted. Assessing their readiness and willingness to change should be considered when providing nutrition counseling. For example if a patient is following a healthy diet, even if it appears overly restrictive to the health care provider, it may not be worth persuading them to modify their current routine. New information should be provided, but the decision as to if and how to incorporate it should be left to the patient.

Older patients with diabetes should be viewed within the realm of their overall health. Many patients will have confounding diseases that they feel compete with diabetes. Sensitive and tactful questions could identify discrepancies between their thoughts about their various illnesses and the reality of them. Stressing that beneficial treatment for diabetes will help their heart disease, arthritis or other illnesses may alleviate the feeling of being overwhelmed by a multitude of diseases and health care rules.

Women in this study desired and were willing to share their experiences with diabetes. Health care professionals should find out from newly diagnosed patients how they prefer to learn. Individuals with long standing diabetes could act as mentors for newly diagnosed older women. Physicians could provide a list of patients willing to do this for newly diagnosed patients.

When interviews were conducted in the participant's home, participants were anxious to open cupboards or their refrigerator to identify the foods they consumed and point out what they looked for on food labels. While it is unrealistic to provide home visits for all patients, registered dietitians and diabetes educators should strive to create an environment where patients feel accepted and willing to explore nutrition issues.

Health care providers should become familiar with culturally accepted foods and local store layouts. Sample containers of commonly consumed food on display in the office can assist clients in understanding and making healthful food choices. From this study and others (Miller, Warland, & Achterberg, 1997) continued education on reading and understanding food labels is indicated. Participants indicated they became confused when deciding between fat and carbohydrate, and focusing on the sugar content of a food further compounded this. Health care providers should consider the overall need and consumption practice of a patient then provide general guidelines. Rather than stressing the food label itself, which is difficult for many elderly to read, stress the importance of portion control of food. Emphasize that there are no bad foods and moderation is the key. Dietitians could teach patients to use their hand (fist, palm, thumb) as a tool to visualize the quantity of a food or use the plate method to ensure a variety of food.

Health care professionals should respect the independent nature of many rural dwelling patients. Many participants sought information on nutrition and dietary supplements on their own or listened to advice from questionable sources. Health care providers, especially physicians, should routinely ask patients about their use of vitamin, mineral or herbal supplements. Nutrients from supplements in addition to dietary sources should be assessed before recommending dietary changes or adding medications. Dietitians and diabetes educators need to continue to explore advances and controversies in vitamin, mineral and dietary supplement therapy. Health care providers could also have large print books, credible journals and magazines, videos and audiocassettes available for loan that focus on nutrition.

Finally, the influence and importance of socialization for older patients should be recognized. Meaningful relationships with others helped these participants feel connected and alive. Health care providers should recognize and assist patients in maintaining these relationships. As an example, eating at a friend's home may be socially enjoyable, but may create stress for the person with diabetes since they may feel pressured to eat inappropriately. Health care professionals can teach patients socially acceptable refusal skills so they can enjoy their social activities without jeopardizing their blood glucose.

Recommendations for Future Research

Additional research will help us understand how the older population makes decisions that affect their health. While most studies in diabetes address the physical and biological needs of the patients, more studies are needed that look inside to learn about

the person with diabetes. An intriguing question that has not been addressed in this research is how alternative and complementary therapies, such as positive thinking, massage, relaxation, meditation, and music therapy fit in with diabetes management and chronic disease. Although religion was not a prominent finding in this research, the spiritual component of health warrants further investigation.

Another area that would be worth examining is the meaning of food for men and women with chronic disease living in urban environments. Would similar themes emerge with elderly men? Would the geographical and cultural setting patients grew up in reflect their current food choices? How would specific ethnic groups respond, especially those with engrained dietary customs (Pacific Islanders, Native Americans, Mexicans)? Do food taboo's still exist in relationship to chronic disease?

Lastly, additional effort should be applied toward identifying how the media, and which components of the media, affect food and supplement choices of individuals with a variety of chronic diseases including diabetes.

Conclusions

The nine women who participated in this study shared valuable insights into the meaning food had for them in relationship to their diabetes. It was the intent of this research to capture their experiences and gain a better understanding of the essence of eating for them.

The essence of eating varied among individuals; it also evolved within an individual over time. Each participant presented herself as a distinct entity and expressed a diverse set of opinions and thoughts across each theme, limiting correlations and interrelationships. For example, some participants were willing to make compromises to

maintain their health, while others felt they had lived a happy and productive life and were not going to make changes. Participants indicated that their relationship with their physician was important and they wanted them to take time and explain things, yet many participants preferred to acquire information about diabetes on their own. Nonetheless, the sense of independence, self-sufficiency, and control had a central role for all participants.

These findings suggest that health behavior theories and conceptual frameworks may not fit especially well for elderly rural women with type 2 diabetes. In part, this may be because of the assumption that people will organize their life around diabetes, whereas the reality for these participants was, diabetes and the restrictions that accompany it are but one part of their life. Diabetes was not the first obstacle they encountered in sixty or more years and for the majority, it was not the most important. Participants integrated their diabetes care including eating, with other aspects of their lives. Regardless of this, components of social learning theory appear the most promising for understanding factors that determine diabetes related behavior among elderly patients with diabetes.

For these participants the essence of eating was an evolving, continuous experience. A number of factors contributed to the meaning of food including memories, relationships, and personal events. The following epitomizes the evolving nature of meaning: (Rogers, 1962).

How any person behaves at a given moment is a direct expression of the way things seem to him at that moment... What a person does, what a person learns, is a product of what is going on in his unique and personal field of awareness. People behave in terms of their personal meanings (perceptions) existing for them at the moment of action.

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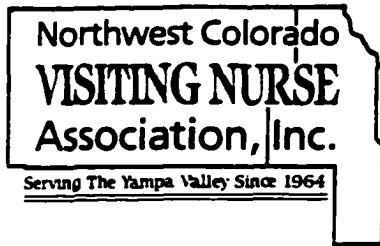
APPENDIX A
CHARACTERISTICS OF THE STUDY PARTICIPANTS

Characteristics of the Study Participants

<u>Demographic variables</u>	<u>Percent of participants</u>
<u>Age</u>	
60-70	33% (3)
70-80	55% (4)
80-90	22% (2)
<u>Ethnicity</u>	
Caucasian	88% (8)
Hispanic	11% (1)
<u>Living situation</u>	
Living alone	66% (6)
Living with spouse, significant other or relatives	34% (3)
<u>Length of time diagnosed with diabetes</u>	
> 15 years	22% (2)
5 - 10 years	11% (1)
2 - 5 years	55% (5)
1 year	11% (1)
<u>Current medications</u>	
Taking insulin	22% (2)
Taking oral medication	88% (8)
Insulin and oral medication	11% (1)
No diabetes medication	11% (1)
<u>Co morbidity</u>	
Diabetes with no other disease	0%
Diabetes with 1-2 other diseases	55% (5)
Diabetes with > 3 other diseases	45% (4)
<u>Location of interview</u>	
Participants home	77% (7)
Researchers office	22% (2)

APPENDIX B

**LETTER OF APPROVAL FROM THE NORTHWEST COLORADO VISITING
NURSE ASSOCIATION**



October 23, 2001

745 Russell Street
Craig
Colorado 81625
Phone (970) 824-8233
Fax (970) 824-2548
TTY: (970) 824-8233

Box 770417
Steamboat Springs
Colorado 80477
Phone (970) 879-1632
Fax (970) 870-1326
TTY: (970) 879-1632

Box 10
Hayden
Colorado 81639
(970) 276-3512

Box 566
Oak Creek
Colorado 80467
(970) 736-2412

To Colorado State University:

I am writing to express my support and to acknowledge the validity of Lynne Oldham's doctoral research study entitled, *The Essence of Eating: A Phenomenological Study of Type 2 Diabetes*.

I have reviewed Lynne's study in its entirety and feel that her study addresses a growing population segment that has been under researched but which is critical to the Northwest Colorado Visiting Nurse Association and a growing number of organizations. Lynne's qualitative study will focus on rural elderly individuals with type 2 diabetes. Understanding these individuals' unique challenges, opinions and perceptions will help us to more effectively treat and provide services and programs of care for an extensive rural population.

The Northwest Colorado Visiting Nurse Association has determined that the individuals involved in her study will be adequately protected and will participate voluntarily.

Our agency covers a geographic area the size of Connecticut and is predominately rural, with pockets of frontier communities interspersed throughout. I encourage and support Lynne's work with a pool of participants who may come from our agencies' established senior wellness clinics. I also give my consent to Lynne to involve the nurses conducting these clinics to aid in recruitment of participants and promote her study during these clinics. In addition, Lynne may use our facilities to conduct interviews and discuss the study with potential participants.

I am confident her results will provide insights that will benefit not only our organization and others like it but anyone with an interest in type 2 diabetes.

Sincerely,

Susan B. Birch, MBA, RN
Executive Director

APPENDIX C

HUMAN RESEARCH COMMITTEE PROJECT APPROVAL

COPY

Office of Regulatory Compliance
Office of Vice President for Research
and Information Technology
Fort Collins, CO 80523-2046
(970) 491-1563
FAX: (970) 491-2293

MEMORANDUM

TO: Brian Cobb, School of Education, 1588

FROM: Celia S. Walker, Regulatory Administrator for the
Human Research Committee

SUBJECT: PROJECT APPROVAL

Title: The Essence of Eating: A Phenomenological Study of Type 2 Diabetes.
Protocol No.: 01-291H
Funding Agency: N/A
Funding Agency Deadline: N/A

DATE: November 12, 2001

I am pleased to inform you that the above-referenced project was approved by the Human Research Committee on November 12, 2001 for the period November 12, 2001 to October 8, 2002 with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. It is the investigator's responsibility to obtain this consent form from all subjects. *NO changes may be made to this document without first obtaining the approval of the Committee.* **Approval is for 20 adults older than 60 years of age with Type 2 Diabetes living in NW Colorado.**

A status report of this project will be required within a 12-month period from the date of approval. You will be sent a reminder approximately two months before the protocol expires. The Principal Investigator will report on the numbers of subjects who have participated this year and project-to-date, about problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary form (H-101) is available from the Regulatory Compliance web page (see below). Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

It is the responsibility of the investigator to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research. It is also the investigator's responsibility to notify the Committee of any changes in experimental design, participant population, or consent procedures or documents. This can be done with a memo which completely describes the changes and their consequences (new consent form or cover letter, or altered survey instrument, for example). Students serving as Co-Principal Investigators may not alter projects without first obtaining PI approval. The PI is ultimately responsible for the conduct of the project.

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647 issued July 1, 2001. If approval did not accompany a proposal when it was submitted to a sponsor, it is the researcher's responsibility to provide the sponsor with the approval notice.

Please direct any questions about the Committee's action on this project to me for routing to the Committee.

Additional information is available from the Regulatory Compliance web site at
www.research.colostate.edu/regulatory/

Attachment

xc:✓Lynne Oldham w/attachment

APPENDIX D
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH
PROJECT

**COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT**

TITLE OF PROJECT: The Essence of Eating: A Phenomenological Study of Type 2 Diabetes

NAME OF PRINCIPAL INVESTIGATOR: Brian Cobb, PhD

NAME OF CO-INVESTIGATOR: Lynne Oldham, MEd, RD

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:
Lynne Oldham (970) 879-1752

SPONSOR OF PROJECT: Northwest Colorado Visiting Nurse Association

PURPOSE OF THE RESEARCH:

The purpose of this project is to understand what it is like for you to make choices about eating.

PROCEDURES/METHODS TO BE USED:

The co-investigator will contact you either by telephone or at a senior wellness clinic. An interview time will be set up at your home or other convenient location. The interview will take approximately one hour. You will be asked questions, which you may answer or decline. Questions will relate to the kinds of food you eat and supplements you may use. A follow up interview may be requested to verify your responses to questions asked. The interview will be audio taped. Your name will not appear on any form; an identification number will be used to coordinate your taped interview and notes taken during the interview. The tapes will be kept in a locked file cabinet and destroyed by incineration at the end of the study.

RISKS INHERENT IN THE PROCEDURES:

There are no known risks. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

BENEFITS:

Little research has been done on the needs of seniors with diabetes living in rural areas. This is an opportunity for you to express your feelings about diabetes and the choices you have to make about eating. Results from this research may allow health care providers to help others like you better manage their diabetes.

CONFIDENTIALITY:

Names and opinions of participants will be kept confidential. Your name will not appear on any form. An identification number will be used to coordinate your taped interview and notes taken during the interview. The co-investigator will have a list which links the codes and participants. The tapes will be kept in a locked file cabinet and destroyed by incineration at the end of the study.

LIABILITY:

Because Colorado State University is a publicly funded, state institution, it may have only limited legal Responsibility for injuries incurred because of participation in this study under Colorado law known as The Colorado Governmental Immunity Act. The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

Questions about participants' rights may be directed to Celia S. Walker at (970) 491-1563.

Page 1 of 2 Participant's initials _____ Date _____

PARTICIPATION:

Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

Participant name (printed)

Participant signature

Date

Witness to signature (project staff)

Date

Page 2 of 2 Participant's initials _____ Date _____

APPENDIX E
INTERVIEW GUIDE

Interview Guide**Project: The Essence of Eating: A phenomenological study of type 2 diabetes****Date:** _____ **Time of Interview:** _____**Location:** _____**ID code:** _____**Briefly, describe the project and request permission to audiotape the interview.**

I'd like to tape record what you have to say so that I don't miss any of it. I don't want to take the chance of relying on my notes and thereby miss something you say or inadvertently change your words somehow. So, if you don't mind, I'd very much like to use the recorder. If at anytime during the interview you would like to turn the tape recorder off, all you have to do is press this button and the recorder will stop.

Questions:

- 1) When you think of diabetes, what words come to mind?
- 2) What led up to your diagnosis of diabetes?
- 3) What kinds of changes in your life have you made because of diabetes?
- 4) When you think of eating, what words come to mind?
- 5) How does your diabetes affect the types of foods you choose? (What kinds of changes in your eating habits have you made because of diabetes?)
- 6) Are there foods that you associate as being good for a person with diabetes?

- 7) Are there foods that you associate as being bad for a person with diabetes?

Transition to vitamin/herbal supplements

Now I would like to talk with you about some other things you may use that affect your health.

- 8) What kinds of home remedies do you use for your diabetes or other health conditions? Are there herbs, vitamins or other treatments you use to care for your diabetes or other health concerns? (Massage, acupuncture, aromatherapy, magnets, relaxation, etc.)
- 9) How do you feel about vitamin supplements? What types of vitamins do you associate as being good for a person with diabetes?
- 10) Are you familiar with herbs? How do you feel about using herbal supplements? What types of herbs do you associate as being good for a person with diabetes?

You've been very helpful. I'd be interested in any other feelings and thoughts you'd like to share with me to help us understand your experience with diabetes.

Thank the individual for participating in this interview. Assure her of confidentiality of responses and the potential of a future interview for clarification of responses.