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Education Models for Teaching Adults about Modifying Dietary Carbohydrate and Controlling Weight

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
2018

Abstract

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EdS, Walden University, 2016

MA, Northcentral University, 2016

MS, Brigham Young University, 1984

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

The prevalence of diabetes and other pathophysiological conditions has been correlated with the incidence of obesity. A large portion of an adult community in the northwestern United States suffers from excessive weight that has been linked to premature mortality rates and certain forms of diabetes. Excess calories from carbohydrate have been shown to increase weight. Therefore, diets that are modified in carbohydrate and calories may help mitigate weight and obesity comorbidities. This qualitative, single case study's purpose was to explore the methods health care professionals use for teaching adults about controlling weight. Altheide and Johnson's analytic realism theory, in which they describe how the experiences of educators and learners affect the way information is perceived, formed the conceptual framework for this study. An illustrative case study paradigm was used to identify the perceptions of licensed health care practitioners regarding the current adult teaching methods for modifying dietary carbohydrate and excess weight. Using a purposeful sample, data were collected in 2 phases with 5 licensed health care practitioners: Phase 1 entailed an open-ended electronic questionnaire and semistructured telephone interviews with open-ended questions during phase 2. Data were analyzed through coding and aggregation by NVivo and Tosmana software, respectively. The findings indicated that the American Diabetes Association (ADA) plate method was the most effective teaching model for controlling weight and carbohydrate intake. Consequently, the ADA plate method was used to create a professional development program to teach health care educators about nutrition instruction methods for adults. The study contributes to positive social change by enhancing preventive health measures for the local adult population through diet therapy education.

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Dedication

I dedicate this paper to my wife, Jayna, who lovingly supported and encouraged me through my doctoral degree. Her inspiration and love became the framework for my visions of the future. I also dedicate this work to my great-grandmother, Lessie Atelia Tucker-Reddick, who inspired me at a young age to search for knowledge and to embrace truth.

Acknowledgments

It is with deepest gratitude that I acknowledge the superb guidance from my doctoral chair, Dr. Maureen Ellis, who mentored my mind and soul during the challenging times of my doctoral study. I am also grateful for Dr. Robert Throop's contributions to my academic success. Finally, I feel that it is most appropriate to acknowledge the help of that supreme power who directs and enlightens the minds of all people in their quest for knowledge and truth. I am eternally grateful for His influence.

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Section 1: The Problem

Introduction

Obesity has been linked to coronary heart disease, diabetes, some forms of cancer, and stroke (Centers for Disease Control and Prevention [CDC], 2016; National Center for Chronic Disease Prevention, 2015; Ndumele et al., 2016; Ogden, Carroll, Kit, & Flegal, 2014). Medical expenditures associated with obesity among adults in the United States have been estimated at 147 billion dollars annually (CDC, 2016). Based on the research of the Academy of Nutrition and Dietetics (2016), the American Diabetes Association (ADA; 2016), and the World Health Organization (2016), various North American communities have unhealthy eating habits and there is a need for effective public health approaches to educate U.S. citizens about controlling weight through dietary measures.

The Local Problem

In a U.S. urban area of the Pacific Northwest, 86% of the adult residents are overweight and nearly 8% of the population has diabetes, a disease that has been linked to obesity (Mahan, Escott-Stump, & Raymond, 2012; Northwest Center for Public Health Practices, 2012; Oregon Medical Association, 2016). The local diabetes rate exceeds the state average of 7.2% (Oregon Health Authority, 2013). Obesity in the local area contributes to 1,500 deaths annually (Institute for Health Metrics and Evaluation, 2015; Robert Wood Johnson Foundation, 2016). Local adults could benefit from dietary weight loss education, because increases in weight can be directly proportional to the amounts and types of foods ingested (Barabas, Tengblad, & Ostgren, 2016; Kaartinen et al., 2016; Tonstad, Malik, & Haddad, 2014). Modifying the intake of the carbohydrates known as

starches and *sugars* has been shown to encourage weight loss (Barabas et al., 2016; Kaartinen et al., 2016). Based on data from the Northwest Center for Public Health Practices (2012), citizens in the local area have a high intake of carbohydrate-rich foods. Calories derived from this excessive carbohydrate intake may contribute to weight problems (Mahan et al., 2012). Alexandraki, Palacio, and Mooradian (2015) and Guildbrand et al. (2014) demonstrated how a low intake of carbohydrate decreased obesity by encouraging weight loss. Consequently, dietary carbohydrate education should teach consumers how to avoid an excessive intake of calories from starches and sugars to reduce weight.

The ADA (2015) has prescribed models for teaching individuals how to control their dietary carbohydrate intake. One of these models is known as the *diabetic exchange list,* a food group directory that helps consumers count the grams of carbohydrate and calories they consume (Hope & Kulkarni, 2011; Wheeler, 2014). However, serving sizes vary in these food groups and some of the areas have more than 100 choices for consumers to learn and implement into a healthy diet (Mahan et al., 2012; Wheeler, 2014). To simplify counting grams of carbohydrate and calories, the ADA has developed a teaching model using a plate divided into three sections with low carbohydrate foods comprising 50% of the plate. Nonetheless, Aston (2013), De Fatima Ferreira Grillo et al. (2013), and Ross (2013) implied that the current ADA carbohydrate counting methods may be inadequate for teaching consumers about controlling weight through limiting dietary carbohydrate calories. Furthermore, learning deficits may exist among health care professionals who use carbohydrate counting techniques based on ADA guidelines (Ho,

Soh, Walter, & Touyz, 2011; Wirth et al., 2014). For example, Kawamura et al. (2015) showed that health care professionals and patients inaccurately calculated the grams of the carbohydrate in foods even though they were familiar with the carbohydrate counting techniques based on ADA guidelines. Therefore, the current nutrition education methods may create a gap in practice because health care providers and consumers may not understand how the existing dietary carbohydrate counting methods work.

Rationale

Evidence of the Problem at the Local Level

The venue for the study encompassed an urban area of 81,000 inhabitants. Caucasians comprised over 80% of the local population and more than 65% of the community exceeded 19 years of age (Office of Economic Analysis, 2016). The percentage of local adults who completed secondary education was below the U.S. national high school graduation rate (Noone, 2015). Because obesity rates among adults who did not graduate from high school were higher than those who completed postsecondary education, the local deficit of high school graduates may be one reason that the municipal adult diabetes rate related to obesity was higher than the regional rate (City-Data, 2017; Health Resources & Services Administration, 2015). Figure 1 illustrates the increased local diabetes rate that occurred from 2013 through 2015.

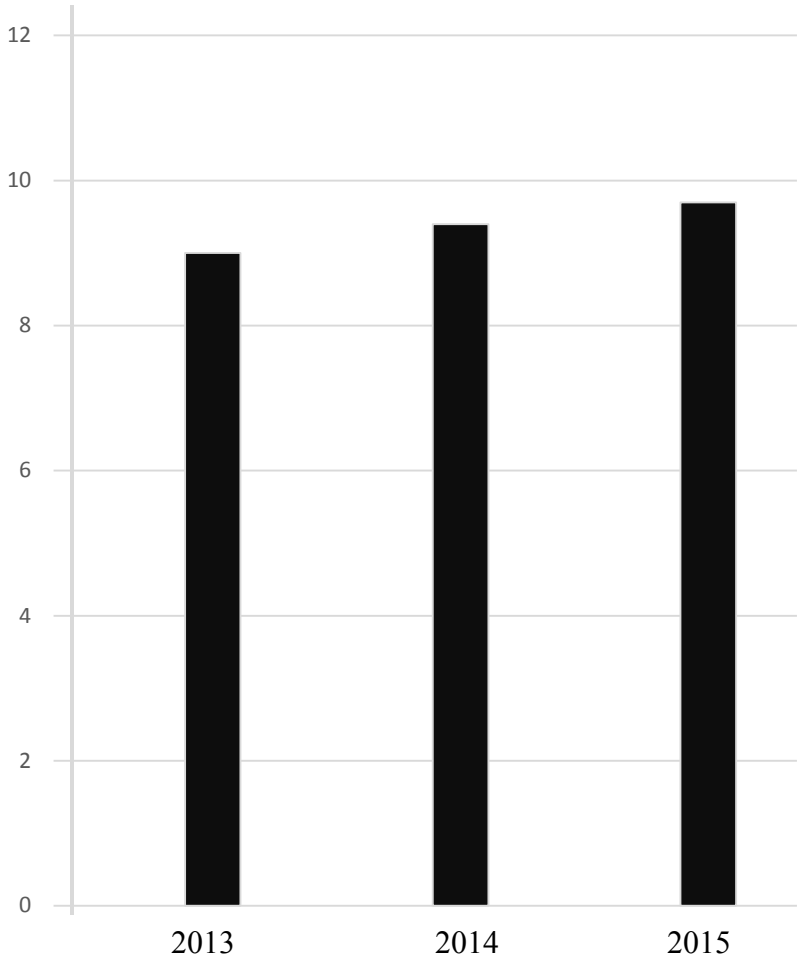


Figure 1. Local diabetes rate 2013-2015. An example of the percentage rise in the local diabetes rate based on data from more than 25,000 individuals seen at a municipal clinic. Local statistics showed approximately 82% of adults who were diagnosed with diabetes were also overweight or obese (Buelow & Ngo, 2012). Excess weight also played a significant role in the incidences of chronic cardiovascular, pulmonary, somatic, and endocrine diseases. Table 1 illustrates how local overweight adults were more prone to these chronic diseases than healthy-weight adults.

Table 1

Local Adult Weight Status and Chronic Disease

	Healthy Weight	Overweight
Arthritis	30.0%	67.7%
Asthma	27.2%	71.8%
Heart Disease	27.4%	68.6%
Stroke	27.8%	68.6%
Diabetes	17.6%	81.7%
Cancer	37.6%	62.9%

Note. The table illustrates the correlation of weight to the incidence of chronic disease of adults in the local area.

The local data showed that 81.7% of adults diagnosed with diabetes were overweight or obese, whereas the association of other chronic diseases to excess weight was 62.9%-71.8%. Because diabetes can contribute to cardiovascular disorders, neuropathies, and certain forms of cancer, a decrease in the local diabetes rate may also reduce the rate of heart disease, nerve damage, and oncological conditions for adults in the municipal vicinity (Powers et al., 2015). Based on the relationship of diabetes to excess weight, a reduction in the local obesity rate may also mitigate the incidence of diabetes and the chronic diseases induced by diabetic conditions. Some of these chronic

diseases caused by diabetes may shorten the life of U.S. citizens by a decade (Gregg et al., 2012). Consequently, the local mortality rate may decrease if the incidence of diabetes could be reduced.

Evidence of the Problem from the Professional Literature

The CDC (2011) reported that 90-95% of adults who have diabetes contracted the disease due to excessive weight, whereas Ndumele et al. (2016) and Ogden et al. (2014) showed that excessive weight contributed to cardiovascular disorders and other pathophysiological conditions. The results of their studies implied that ill health might be reduced through weight management. Proper weight maintenance may be accomplished by controlling calories derived from dietary carbohydrate intake (Kasyhap, Louis, & Kirwan, 2011; Visek, Lacigova, Cechurova, & Rusavy, 2014; Wheeler, 2014; Zipp, Roehr, Weiss, & Filipetto, 2011); therefore, health may be improved by modifying the amount of carbohydrate in the diet to control weight. The purpose of this qualitative, single case study was to determine the types of methods health care professionals use for teaching adults about dietary measures for proper weight maintenance.

Definition of Terms

The following definitions and terms guided this study:

Allied health practitioners: Licensed health care providers who are not doctors, dentists, or nurses (Dorning & Bardsley, 2014).

Balanced diet: A diet that meets the nutritional needs of individuals based on their age, gender, health status, and other factors (Mahan et al., 2012).

Carbohydrate(s): For the purposes of this study, carbohydrate refers to starches and sugars (Mahan et al., 2012).

Carbohydrate counting: A method for tallying grams of carbohydrate (starches and sugars) found in different foods (Wheeler, 2013).

Complex carbohydrate: Carbohydrate found in foods high in fiber, vitamins, and minerals that does not have an immediate effect on blood-sugar levels (Mahan et al., 2012).

Concentrated sweets: Sugar or foods high in sugar that have an immediate effect on blood sugar levels (ADA, 2015; Mahan et al., 2012).

Diabetic exchange list or *exchange list:* These terms constitute an ADA instructional paradigm for teaching consumers about modifying dietary carbohydrate (ADA, 2015).

Glycemic targets: Standards for appropriate levels of sugar in the blood (Mills, 2013; Tasky, 2013).

High quality carbohydrate. Complex carbohydrate (Mahan et al., 2012).

Hyperglycemia: Denotes high blood sugar (ADA, 2015; Pronsky & Crowe, 2012).

Hypoglycemia: Denotes low blood sugar (ADA, 2015; Pronsky & Crowe, 2012).

Insulin: A hormone that lowers blood-sugar levels (Gropper & Smith, 2012; Mahan et al., 2012).

Insulin response: When the body secretes insulin due to rising blood-sugar levels (Gropper & Smith, 2012).

Macronutrient: A nutrient such as a carbohydrate, protein, or fat that adds calories to the diet (Gropper & Smith, 2012; Mahan et al., 2012).

Metabolism: Chemical processes that occur in the body to sustain life. These chemical processes involve macronutrients and micronutrients (Gropper & Smith, 2012; Mahan et al., 2012).

Micronutrient: A nutrient such as a vitamin or mineral that does not add calories to the diet (Gropper & Smith, 2012; Mahan et al., 2012).

Polyphagia: Overeating or an excess intake of foods and beverages (Mahan et al., 2012).

Postprandial: After a meal or after the ingestion of food and beverages (Mahan et al., 2012).

Significance of the Study

In this qualitative project study, I explored the methods health care educators use to teach adults about dietary carbohydrate intake for weight control, illustrating the perspectives of health care educators regarding instructional paradigms for training adults in dietary measures for weight control (see Major, 2013). Because these weight control instructional methods are used for preventive health measures, the results of this study may contribute to positive social change by decreasing the local obesity rate, reducing diseases related to excessive weight gain, and mitigating the incidence of premature mortality (see Barabas et al., 2016; see Kaartinen et al., 2016; see Mahan et al., 2012; see Robert Wood Johnson Foundation, 2016). Hassanzadeh et al. (2016) and Tchicaya, Lorentz, Demarest, Beissel, and Wagner (2015) showed that weight loss education for

diabetes, physical health, and mental stability correlates with improved social functioning by improving the health related behavior of individuals.

Guiding Research Questions

Diet education to maintain a healthy weight has been shown to mitigate pathophysiological conditions that cause diabetes, and carbohydrate restricted diets have been shown to encourage weight loss (Barabas et al., 2016; Guildbrand et al., 2014). Therefore, the local populace may benefit from nutrition education paradigms that emphasize carbohydrate modified diet therapy and weight loss. The efficacy of these didactic programs was evaluated through the perceptions of local health educators.

The research question (RQ) addressed the perceptions of health educators regarding the currently prescribed ADA methods for teaching adults about proper weight maintenance and dietary carbohydrate modification, while also explaining the types of learning models that health educators use to teach adult consumers about controlling weight and dietary carbohydrate (Alexandraki, Palacio, & Mooradian, 2015; ADA, 2016; Guildbrand et al., 2014). The RQ guiding this study was the following:

RQ1: What are the perceptions of licensed health care educators regarding the currently prescribed ADA adult teaching methods for modifying dietary carbohydrate intake to control weight?

This research question was supported by the following subquestion:

SQ1: What teaching methods are being used by licensed health care educators to teach adult consumers about dietary carbohydrate modifications for controlling weight?

Understanding the types of teaching methods licensed health care professionals used to teach adult consumers about dietary carbohydrate modifications for controlling weight was important because this information could lead to improvements in professional development and practice in the local area.

Crossover analysis was used for assessing and interpreting the responses to the research question and subquestion (Frels & Onwuegbuzie, 2013). This instrument allows researchers to use "qualitative open-ended [research] questions [to] contextualize [any] qualitative interview responses [lending] clarity to the voice of a participant" (p. 188). The tool's reliability and validity were assessed through relevant information saturation and triangulation of the interview data responses.

Review of the Literature

Introduction

The conceptual framework for this study focused the literature review by providing empirically-based factors that affect dietary carbohydrate and weight control instruction and comprehension. The library databases used for the literature research included Walden University, Northcentral University, ProQuest Dissertations, Dissertation Genius, and Google. The key search terms were *diet instruction, carbohydrate, diabetes, nutrition education,* and *obesity.* The dates of all peer-reviewed primary research articles were from 2011 through 2017. The types of literature reviewed included professional journals, periodicals, and nutrition texts.

Conceptual Framework

I sought to identify perceptions of licensed health care educators regarding the currently prescribed adult teaching methods for controlling dietary carbohydrate intake and weight. The goal of the qualitative project study was to clarify methods health care practitioners use to teach adults about dietary carbohydrate modifications and weight control.

The conceptual framework that guided the study was based on an interpretive validity model known as *analytic realism* (Altheide & Johnson, 1994; DeLuca, 2011). This paradigm is used to assess the way individuals conceptualize information through their interactions with others (Denzin & Lincoln, 2005). The following are constituents of the framework: (a) contextualization, (b) interaction, (c) perspective, (d) reader roles, and (e) style. Contextualization includes assessing the relationship between what is observed and how these observations relate to the context of time and place. Interaction describes the influence of the researcher in the investigation. The perspective includes the views of the participants. Reader roles describe how others may perceive the information in the investigation, whereas style indicates the communication medium in which the information is transmitted. These parts of analytic realism help to describe a "dichotomy of realism [verses] idealism, and other conceptual dualisms, as being incompatible with the nature of lived experience and its interpretation" (p. 489). In the case of health education, this quotation refers to how the life experiences of instructors and learners may alter the interpretation of the information conveyed (De Fatima Ferreira Grillo et al., 2013; Leppink, Paas, Van der Vleuten, Van Gog, & Van Merriëboer, 2013). Based on

the writings of Bem (1967) and Laird (2007), individuals may misunderstand instructions if they have no personal experience related to the information that is conveyed to them. Health practitioners and consumers who lack life experiences associated with modifying dietary carbohydrate intake and calories for weight control may misinterpret established guidelines for controlling the consumption of excess calories from starches and sugars.

Diabetic Exchange List

A traditional paradigm for modifying calories from carbohydrate and other macronutrients is known as the diabetic exchange list. Examples of foods from the diabetic exchange list are featured in Table 2. The respective table does not show the food group entitled *free foods* because this area focuses on foods that do not significantly contribute calories or macronutrients to the diet.

Table 2

Diabetic Exchange List

	Carb	Protein	Fat	Calories	Examples
Starch	15	3	1	80	Grains, potatoes, corn, and most legumes
Fruit	15	0	0	60	Fruits except coconut and avocadoes
Milk	12	8	5	120	Low-fat milk and yogurt
Vegetable	5	2	0	25	Vegetables low in starch/fat
Meat	0	7	5	75	Animal flesh, eggs, and cheeses
Fat	0	0	5	45	Fat, bacon, avocadoes, olives, coconut, nuts

Note: An illustration of the traditional ADA prototype for teaching dietary carbohydrate and caloric intake.

An example of the complexity of this teaching model is illustrated in Table 3. The table shows a few examples from the starch group (see Wheeler, 2014). The starch group is one of six major food groups in the model featured in Table 2. The foods in this group have various serving sizes of grains, vegetables, and other foods. Vegetables in the starch group are those high in carbohydrate (e.g., corn), but vegetables low in carbohydrate are found in a different food group. These low carbohydrate vegetables (e.g., broccoli, spinach) are in the vegetable group. There are also vegetables such as olives that are in the fat group with 0 grams of carbohydrate per serving (Table 2). Consequently, consumers must learn that some vegetables are fats or starches based on their nutritional composition (Wheeler, 2014).

Table 3

Examples of Starches on the Diabetic Exchange List

Examples of Starches	Serving Sizes	Grams Carbohydrate
Bread	1 slice	15
Bran cereals (e.g., Grape Nuts)	1/3 cup	15
Bran cereals, flaked	1/2 cup	15
Cooked cereals	1/2 cup	15
Other ready-to-eat, unsweetened cereals	3/4 cup	15
Pasta or rice(cooked)	1/3 cup	15
Baked beans	1/4 cup	15
Lima beans or Peas	1/2 cup	15
Corn	1/2 cup	15

Note: The table displays examples of starches in the diabetic exchange list.

The original purpose of the diabetic exchange list system was to allocate foods into groups that have the same amounts of macronutrients and calories per serving (ADA, 2015; Marcason, 2012; Visek, Lacigova, Cechurova, & Rusavy, 2014, Wheeler et al.,

2014). Nonetheless, these serving sizes of foods are diverse and confusing (Dandan et al., 2013; Wirth et al., 2014; Zipp et al., 2011). For example, a serving of All Bran is 1/3 cup while another ready-to-eat cereal is a 3/4 cup serving. There are also problems with the allocation of dairy foods to food groups. For instance, cheese is not in the milk group because its carbohydrate per serving is 0 grams, whereas a serving of milk is 12 grams of carbohydrate. Cheese is found in the meat group that also includes fish, beef, pork, chicken, and eggs (Table 2). Some legumes are in the starch group while others are included in the vegetable group. Therefore, if a person decides to have a 1/2 cup serving of lima beans, the individual ingests approximately 15 grams of carbohydrate and 80 calories because the respective legume is consigned to the starch group. If a person wants a 1/2 cup serving of wax or green beans, the individual will ingest 5 grams of carbohydrate and 25 calories because these legumes belong to the vegetable group. Therefore, one type of legume may be 3 times the amount of carbohydrate and calories than another. Moreover, mixed foods such as soups or casseroles also pose problems because the carbohydrate and caloric content of these foods vary based on the recipe (e.g., soups with more starchy vegetables are higher in calories than soups with vegetables low in starch). The diversities of food groups, serving sizes, and carbohydrate content are illustrated in Table 4.

Table 4

Examples of Diversities in the Diabetic Exchange List

Food	Food Group	Serving	Carbohydrate	Calories
String Beans	Vegetable	1/2 cup	5	25
Pinto Beans	Starch	1/2 cup	15	80
Olives	Fat	8 large	0	45
Apple	Fruit	1 small	15	60
Tomato	Vegetable	1 large	5	25
Coconut	Fat	2 tbs.	0	45
Milk	Milk	1 cup	12	120
Cheese	Meat	1 oz.	0	100

Note. The table shows examples of diversities in food group allocations, serving sizes, carbohydrate content, and calories among enclaves in the diabetic exchange list.

Critical Analysis of the Literature

Perceptions of Allied Health Nutrition Educators

Most licensed allied health practitioners who provide nutrition education to the public are Registered Dietitian Nutritionists (RDNs; Academy of Nutrition and Dietetics, 2016). Brady, Lordly, and McLellan, and Gingras (2014) investigated the impetus for individuals to become RDNs. The qualitative study involved 12 participants (ten females and two males) who were asked about their life history and professional work experiences. Data analyses were conducted through a team-based method in which the researchers spent 48 hours identifying emergent themes and specific focus topics (Lordly, McLellan, Gingras, & Brady, 2012). The principal theme produced by the analysis was that the participants became RDNs because of the occupation's compatibility with self-identities established prior to entering the field. These self-identities involving body

image, cooking, and food consumption were paramount for females, but both genders felt that the role of food in enhancing their physical performance was a major factor in becoming an RDN. Consequently, RDNs perceive food to be a major factor in health and functioning. Schumacher (2014) found that these perceptions of food as the primary focus for preventative health tends to make RDNs consider nondietary therapies as being less important to the health of individuals than therapeutic nutrition interventions.

Social Implications of Nutrition and Health Education

Many studies have shown the benefits of health education programs. Rustad and Smith (2013) attempted to improve the health of 118 ethnically diverse, low income women through nutrition education programs that identified healthy foods, estimated caloric requirements, and introduced food budgeting. Data analysis done through paired *t* tests and Pearson correlations showed that experiential and interactive nutrition education sessions improved the health behaviors of low income women who were 24-45 years of age. Miller et al. (2014) described the positive effects of nutrition education for obese African American women suffering from diabetes (n=24). Chi-square tests were used to assess the association of self-care behaviors and nutrition education. Improvements in self-care for diabetes were influenced by the nutrition education paradigms used by the health educators. Babatunde, Himburg, Newman, Capa, and Dixon (2011) evaluated the effectiveness of nutrition education for osteopathic conditions in African American adults by using a cross-sectional experimental design and convenience sampling (n = 51 for the comparison group and n = 59 for the study group). The education sessions included short presentations and hands-on experiences in a uniform format. The nutrition education

sessions improved calcium intake and enhanced osteoporosis knowledge among the study-group participants. Ansburg and Heiss (2012) explored methods for educating North American geriatric populations about nutrition and health. The investigation found that instructional materials for geriatric individuals should be based on the age-related changes in cognition. These changes include a decline in the cognitive resources for processing information. The results of the study showed that geriatric individuals experience decreased reading comprehension and they have difficulties in associating knowledge to the contexts in which information is acquired. Consequently, nutrition education programs for older adults should ensure that written communication is concise and is related to the context of experience encountered by the geriatric population.

Nutrition and Health Education Models and Instruments

Researchers have investigated the way adults acquire information through health education. Using constructivist health education models, Taylor and Hamdy (2014) discovered that adult learners experience a *dissonance phase* when they realize their existing knowledge is insufficient. Learners must experience this dissonance phase before they can progress to higher erudition stages in which knowledge is refined, organized, and applied. Adults progressed quickly through the dissonance phase when they associated unfamiliar information to the previous knowledge they had acquired in the learning environment. Bergman et al. (2015) used a pretest-posttest control group design to investigate how well health care students acquired knowledge when they learned in context (e.g., a hospital environment) or out of context (e.g., a traditional classroom). Analysis of covariance was used to assess variables of the test scores.

However, Bergman et al. (2015) found no significant differences in test scores between health care students who learned in context and those who learned out of context. Jarvis (2012) conducted a qualitative study that investigated the effects of adult weight loss education programs created by commercially operated weight management organizations (e.g., Weight Watchers and Slimming World). The research analyzed the accounts of 38 adult participants who had successfully lost weight by attending weight loss classes conducted by weight management businesses. The investigation showed that adults were taught through a narrative of high motivation and support that was "often lacking from health professionals" (p. 153). Weight loss classes developed by commercial weight management organizations helped adults to make significant dietary changes for acute weight loss, but these healthy eating habits failed to encourage long-term weight reduction.

Springvloet, Lechner, de Vries, and Oenema (2015) conducted a triad-enclave randomized control trial using virtual nutrition education to test the way adults conceive dietary knowledge and apply environmental factors to improve their health. Participants were arbitrarily assigned to a basic intervention group (n = 456), a plus intervention group (n = 459), and a control group (n = 454). The basic and plus intervention groups were both taught how to increase vegetable and fruit intake while decreasing the consumption of snacks that were high in calories and saturated fat, but the plus intervention group receive additional information regarding shopping economics and environmental factors affecting food availability. The control group received generic, nontailored information about fruits, vegetables, and high caloric snack foods with

saturated fat. Multiple logistic regression analyses assessed equality among the groups for baseline demographics that entailed gender, level of education, age, and ethnicity. Virtual nutrition education significantly improved the vegetable intake for the least-educated participants among all groups in the study.

Marewski and Gelernter (2012) showed how heuristic instructional paradigms have been used in health education and therapy practices as "decision strategies that ignore part of the available information, basing decisions on only a few relevant predictors" (p. 77). Furthermore, Gigerenzer and Gaissmaier (2011) and Dandan et al. (2013) found that heuristic education methods were cognitive strategies for learners to acquire information through algorithmic shortcuts for estimating values. The diabetic exchange list is a heuristic education model that helps consumers to modify their intake of carbohydrate and calories by estimating the average grams of carbohydrate per food group (Warshaw & Kulkarni, 2011; Wheeler, 2013). Consequently, the ADA methods of dietary carbohydrate instruction allow consumers to count the grams of carbohydrate in a meal based on a few pertinent facts. These carbohydrate counting techniques were explored further by Zipp, Roehr, Weiss, and Filipetto (2011), who showed that carbohydrate counting education using the diabetic exchange list improved glycemic targets for diabetic adults.

Watts et al. (2011) derived a quantitative statistical instrument known as the *adult carb quiz* (ACQ) from the heuristic educational structure of the diabetic exchange list. The ACQ was used by Mills (2013) and Tasky (2013) to assess the dietary carbohydrate knowledge of diabetic adults, adolescents, and children. The respective tool encompassed

six domains: (a) carbohydrate food recognition, (b) carbohydrate food content, (c) nutrition label reading, (d) glycemic targets, (e) hypoglycemia prevention and treatment, and (f) carbohydrate content of meals (Cleamons, 2016). The ACQ exhibited validity and reliability for the whole instrument and good to excellent internal consistency for the knowledge domains (Cleamons, 2016). The split-half reliability for the entire instrument corrected by the Spearman-Brown prediction formula was 0.90, whereas the Kuder-Richardson 20 coefficients for each of the six domains of knowledge ranged from 0.75 for Counting Carbohydrates in a Meal to a maximum index of 0.88 for Recognition of Carbohydrate Foods (Cleamons, 2016). The Counting Carbohydrates in Single foods domain possessed a Kuder-Richardson 20 coefficient of 0.86 (Watts et al., 2011). Validation studies for the instrument were conducted with patient participants in various hospital settings (Mills, 2013; Tasky, 2013; Watts et al., 2011). Clinical nutrition specialists rated the carbohydrate counting abilities of the patient participants. There was a significant correlation of knowledge ratings with the counting carbohydrate participants' exam scores (Cleamons, 2016). Other measures of construct validity indicated that the measure might be sensitive to assessing the quality of carbohydrate education over time and in its ability to differentiate between poor knowledge and above-average knowledge food groups high in starches and sugars (Watts et al., 2011). For example, out of a maximum score or 43, the average score for all patient participants was 23.9 (Cleamons, 2016). Nonetheless, clinical nutrition specialists had a mean expert score of 41.4. The difference between the mean expert score (41.4) and the mean of all patient participants (23.9) was significant ($p < 0.0001$) (Cleamons, 2016). A gap of this

size must include differences in the mean scores of one or more of the three domains that encompassed carbohydrate food recognition, determining carbohydrate grams in single food items, and estimating the grams of carbohydrate in a meal (Watts et al., 2011). The carbohydrate food recognition domain had a 0.88 reliability index for 19 constituents, whereas the domains regarding counting carbohydrate in single foods and counting carbohydrate in a meal had 0.86 and 0.75 reliability indexes, respectively. These two domains involved 10 items altogether.

Dietary Carbohydrate and Health

Meal plans limited to 130 grams of carbohydrate per day are considered low-carbohydrate diets (Mahan et al., 2012; Wylie-Rosett, Aebersold, Conlon, Isasi, & Ostrovsky, 2013). Based on the diabetic exchange list, 130 grams of carbohydrate per day would roughly entail 2 slices of bread, 1 ½ cups cooked vegetables, 2 cups of canned fruit (no added sugar), and 2 cups of low-fat milk (American Diabetes Association, 2015; Warshaw et al., 2011; Wheeler, 2014). However, a diet is considered high in carbohydrate if 65% or more of the total daily caloric load comes from carbohydrate (American Diabetes Association, 2015; Mahan et al., 2012; Wylie-Rosett, Aebersold, Conlon, Isasi, & Ostrovsky, 2013). For example, a high-carbohydrate diet that provides 1800 calories per day would contain 1170 carbohydrate calories (about 293 grams of carbohydrate).

Lennerz, Alsop, Holsen, Stern, Rojas, Ebbeling, Goldstein, and Ludwig (2013) compared the effects of high carbohydrate and low carbohydrate meals on blood-sugar levels and hunger mechanisms in obese adult males. Meals high in carbohydrate

increased postprandial blood sugar levels and insulin response, whereas low carbohydrate meals slowed the rise of postprandial blood sugar and insulin response, concluding that postprandial hyperglycemia from high carbohydrate intake affected hunger centers in the brain resulting in increased caloric intake and weight gain (Lennerz et al., 2013). However, ingesting meals low in carbohydrate slowed the return of hunger and enhanced weight loss. Chandler-Laney et al. (2014) also demonstrated how moderate increases in dietary carbohydrate facilitated weight gain by encouraging a premature return of hunger. Overweight adults with no significant health problems (n = 64) participated in the study. These participants were divided into two enclaves: one group received a high-carbohydrate/low-fat (HCLF) diet while another group received a low-carbohydrate/high-fat (LCHF) diet. Participants who ingested LCHF meals reported decreased hunger and longer periods of satiety than those who consumed HCLF meals. Consequently, a LCHF diet may aid in weight-loss by decreasing the desire to ingest food.

Several studies have shown that low carbohydrate diets may be good for sustained weight loss without causing adverse effects on organ systems. Kaartinen et al. (2016) conducted a pooled analysis that included three cross-sectional population based studies that involved 12,342 adult participants from Finland. The research investigated the relationship of sugar intake to obesity. Responses to food frequency questionnaires and anthropometric data were analyzed through logistic regression analysis. Lactose ingestion from dairy products had a positive association with obesity. However, dietary sugars ingested from high-fiber food sources such as fruits had an inverse relationship to obesity. Mozaffarian, Lee, Kennedy, Ludwig, Mozaffarian, and Gortmaker (2013)

identified a ratio of 1 gram of fiber to every 10 grams of starch or sugar as a benchmark for a healthy whole-grain food product. Whole-grain products with the respective ratio of fiber to starches and sugars were healthier than processed foods that were low in fiber, starch, and sugar ($P = 0.003$). Nevertheless, the role of dietary fiber in weight loss may have been devalued by the investigation of Tonstad, Malik, and Haddad (2014) who performed a randomized controlled trial study that revealed how high-fiber diets (35.5 – 42.5 grams of fiber per day) compared to low-carbohydrate diets in enhancing long-term weight loss in obese adults ($n = 179$). After 52 weeks of therapy for both diet types, the adults who ingested low-carbohydrate diets experienced sustained weight loss better than those who consumed high-fiber diets. Hu (2013) showed that carbohydrate intake from low-fiber, sugar-sweetened beverages enhanced weight gain due to their high caloric content and their inability to produce postprandial satiety. Consequently, the high-caloric load and low-satiety strength of these drinks may contribute to excess weight. Jurasacheck, Chang, Appel, Anderson, Crews, Thomas, Charleston, and Miller (2016) investigated how low carbohydrate diets affected the kidney function in adults ($n = 163$). Low carbohydrate diets were found to have no detrimental effects on the kidney function of healthy adults. Noakes (2013) conducted a study ($n = 127$) that showed an average weight loss of 15 kilograms (a 12 - kilogram standard deviation) in adults who ingested low carbohydrate, high fat (LCHF) diets. The comorbidities associated with excessive weight were also attenuated (e.g., blood pressure, blood sugars, and blood levels of cholesterol); LCHF diets that were <75 grams of carbohydrate per day reduced weight faster than diet plans containing higher levels of carbohydrate. Renault, Carlsen,

Norgaard, Nilas, Pryd, Secher, Cortes, Jensen, Olsen and Halldorsson (2015) investigated the connection between dietary carbohydrate intake of obese pregnant women (n = 222) and the body composition of their progeny. Lowered carbohydrate intake during the last trimester of pregnancy produced healthy newborns with lower amounts of fat tissue than infants born to women who consumed higher amounts of dietary carbohydrate during the last three months of gestation. Elidottir, Thorhallur, Hadlorsson, and Ramel (2016) showed that low-carbohydrate diets among adult Icelanders (n = 54, ages 22-66) did not compromise their cardiovascular health. The diets were low in fiber (average intake 11 grams per day), low in sugars and starches (about 8% of the total calories), and high in red meats and saturated fats. Even though the diets were of poor quality and caused some of the participants to gain weight, the cardiovascular risk factors (e.g., cholesterol and other fatty substances in the blood) remained within normal ranges. Hu, Yao, Reynolds, Whelton, Nui, Li, He, and Bazzano (2015) conducted a randomized control trial that showed how cardiovascular health in obese adults (n = 148) was affected by low carbohydrate (<40 grams carbohydrate/day) and low fat (<30% of the total calories in fat) dietary intake. The low-carbohydrate diets improved the biomarkers for cardiovascular health (e.g., decreased vascular inflammation) and enhanced the incidence of weight loss better than the low-fat diets. Ahmadi-Abhari, Luben, Powell, Bhaniani, Chowdhury, Wareham, Foruouhl, and Khaw (2014) explored the relationship of diabetes to dietary carbohydrate intake in 749 adult diabetics who were compared to a randomly chosen subcohort sample of over 3,400 participants. Seven-day food diaries were used as a reference for the study and modified Cox proportional hazards regression analyses were

used for evaluating data. The intake of table sugar and starch were not significantly related to diabetes risks, whereas the ingestion of sugars known as fructose (e.g., sources found in honey and fruits) and glucose (e.g., sources found in corn syrups and grapes) were associated with the risks of diabetes.

Salvia, D'Amore, Graziano, Capobianco, Sangineto, Paparella, de Bonfils, Palasciano, and Vacca (2017) investigated lowering the carbohydrate content of a Mediterranean diet (a diet high in vegetables, fruit, nuts, legumes, and virgin olive oil) for encouraging weight loss and for improving the health of individuals suffering from high blood pressure, hyperglycemia, and high blood fats (e.g., cholesterol). The participants experienced six months of low-carbohydrate Mediterranean diet therapy that was not restricted in calories. Participants who restricted evening dietary intakes of starches and sugars obtained targeted weight loss goals (body mass index was reduced by 8%) and experienced healthy blood levels of sugars and fats.

Implications

The purpose of this qualitative case study was shared with local physicians, nurses, allied health personnel, and public-health educators who counsel adult consumers about dietary carbohydrate modifications and weight loss. The findings of this study identified the ADA plate method as the most effective paradigm for teaching adults about carbohydrate modifications and weight control. This instructional paradigm was used to create a professional development program for instructing health care educators about teaching dietary carbohydrate modifications and weight control measures to adults. The professional development program was the project deliverable.

Summary

A reduction in calories from dietary carbohydrate may help reduce the incidence of obesity and mitigate diseases related to excessive weight gain. Some methods for teaching adults about carbohydrate and calorie control are prescribed by the ADA, but studies have found that these erudition models may be difficult for practitioners and consumers to comprehend (Ho et al., 2011; Kawamura et al., 2015; Wirth et al., 2014). Consequently, this lack of understanding among practitioners and consumers may have created a gap in practice. An attempt to evaluate this possible gap in practice locally was accomplished through a qualitative, single case study that determined the kinds of educational paradigms local health care professionals used for teaching adults about weight loss and dietary carbohydrate modifications.

The information in Section 1 addressed education methods for obesity prevention and for the attenuation of comorbidities associated with excessive weight (e.g., diabetes and cardiovascular diseases). The research tool known a Crossover Analysis by Frels and Onwuegbuzie (2013) was introduced in conjunction with a conceptual framework that explained how teaching and learning can be affected by the values and experiences of instructors and learners (Gigerenzer & Gaissmaier, 2011). Section 2 will present the methodology of the group study. The methodology will present information about the study's design, participants, data collection methods, data analyses, and limitations. Section 3 will describe the project in more detail by presenting the rationale, literature review, evaluation plan, and implications of the study. Section 4 will include the project's

strengths and weaknesses, alternative approaches to the study, reflections, and future research implications, applications, and directions.

Section 2: The Methodology

Introduction

In Section 2, I will delineate the methodology for this study. I will also provide an overview of the study followed by a discussion regarding the research design, participants, ethical considerations, and techniques for data collection and analysis. Descriptions of the assumptions, limitations, and strengths of the study are presented at the end of this section.

Overview of the Study

The purpose of this study was to ascertain the methodologies health care professionals use for teaching adults about modifying their dietary carbohydrate intake and controlling their weight. The RQ that guided this study was the following:

RQ1: What are the perceptions of licensed health care educators regarding the currently prescribed ADA adult teaching methods for modifying dietary carbohydrate intake to control weight?

This research question was supported by the following subquestion:

SQ1: What teaching methods are being used by licensed health care educators to teach adult consumers about dietary carbohydrate modifications for controlling weight?

Jarvis (2012) implied that the educational skills of health care professionals in medical settings may be inferior to those educators who are employed by private weight management businesses such as health spas and gyms. Therefore, understanding which instructional methods licensed health care professionals use to teach adult consumers

about dietary carbohydrate modifications and weight control clarified the scope of medical and allied health erudition practices.

Justification for the Research Design and Approach

I used a qualitative, illustrative case-study model to assess the views of licensed health educators regarding instructional paradigms for teaching adults about proper weight maintenance. Illustrative cases are framed to bring awareness to issues that may be obscure (Smith, 2015; University of Florida/Center for Instructional Technology and Training, 2012). In this instance, I explored the perceptions of licensed health educators regarding the prescribed ADA teaching methods for monitoring dietary carbohydrate intake and calories as part of a healthy weight maintenance program. Because the information obtained from the study may have been influenced by the way health care educators interpreted the efficacy of ADA education materials, the validity of these interpretations may have also been influenced by their past experiences in health education settings. Through analytic realism, I uncovered commonalities and differences in the information related to the experiences and perceptions of the health care instructors, myself, and others who may observe the results of this study (De Fatima Ferreira Grillo et al., 2013; Leppink et al., 2013). The information in Table 5 shows how the research design of the study may be understood through the respective framework.

Table 5

The Research Design and Analytic Realism

Framework Constituent	Framework Constituent Definition	Framework Constituent's Relationship to the Current Study
Contextualization	Assessing how the observations relate to the context of time and place.	The observations of health care educators who instruct adults in the context of a municipal setting in the northwestern area of the United States during the year 2017.
Interaction	The influence of the researcher in the investigation.	The researcher is a health care educator who has the same licensure, academic training, and practitioner experiences as the health care participants in the study.
Perspective	The views of the participants.	The views of the participants are circumscribed by the commonalities in the type of clinical practices (health care education for weight control), time (2017), and clientele (adults who are primarily Caucasian) in a municipal area of the U.S. Pacific Northwest.
Reader roles	How others perceive the investigative results.	The perceptions of outside observers are circumscribed by time (2017), place (U.S. Pacific Northwest), and subject (educating adults in modifying dietary carbohydrate and weight).
Style	The communication mediums.	The communication mediums are outpatient clinics and inpatient medical centers.

Note. The table presents information about the framework of analytic realism as it relates to the group study entitled "Evaluating Education Models for Teaching Adults about Modifying Dietary Carbohydrate and Controlling Weight."

To identify subtle differences in the data, I used qualitative comparative analysis (QCA), as defined by Legewie (2013) as appropriate for within-case analysis and formalized cross case comparisons. The overall goal of QCA is to identify the elemental set of conditions or factors that are responsible for all observed outcomes, as well as the absence of observed outcomes (Drozdova & Gaubatz, 2016). Ragin (2014) stated that QCA is an analysis of relations among constructs or sets of information (instead of evaluations of correlations among variables), and it provides more direct links to theoretical concepts than quantitative methods.

Participants

Criteria for Selecting Participants

Participants in the study should be licensed health care professionals who have experience in teaching adults about weight loss. Green, Sim, and Breiner (2013) discussed how health care professionals who educate consumers in preventive and therapeutic health treatments could provide the best information about "what works [for] the specific context of [their] communities and health care settings" (p. 44). Because the specific context of the investigation encompassed nutrition therapy for adults, the participants for this study were RDNs. Minimum requirements for these nutrition professionals included a baccalaureate degree in foods and nutrition, a dietetics internship in public health and clinical organizations, and a national registry exam for credentialing as RDNs (see Abad-Jorge, 2012; see Academy of Nutrition and Dietetics, 2016; see Accreditation Council for Education in Nutrition and Dietetics, 2016). There were five RDNs who agreed to participate in the study, which was based on Ragin (2014), who

stated that QCA evaluations for detecting subtle differences in the data require at least five participants. Purposive sampling techniques were used to select RDNs who frequently instruct adults on carbohydrate modified diets and weight control. These practitioners had at least 6 months of experience in instructing adults regarding dietary carbohydrate and weight control. The criteria mentioned in the Local Academy of Nutrition and Dietetics Contact Letter (Appendix B) ensured that apposite participants were included in the study.

The initial recruitment for study participants occurred through contacting a local chapter of the Academy of Nutrition and Dietetics (see Appendix B). Further recruitment transpired through snowball sampling procedures as described by Creswell (2012) and Fraenkel, Wallen, and Hyun (2014). Snowball techniques involve nonprobability sampling methods in which study participants recruit others to be in the study.

A researcher-participant relationship was established through consultation sessions with the local Academy of Nutrition and Dietetics president (or designee) who referred RDN professionals whose work experience and training would be beneficial to the study. I met with the prospective participants through face-to-face contacts, semistructured telephone interviews, and e-mail communication. The purpose of these contact sessions was to answer any questions the participants had about the study.

Access to Participants

Obtaining access to the study participants necessitated three consent structures. First, an application was submitted to the Institutional Review Board (IRB) of Walden University to conduct the study (Walden University IRB for Ethical Standards in

Research, 2014). This IRB application outlined the research questions, participant pool, study scope, and data collection and analysis procedures. I simultaneously procured permission from the local Academy of Nutrition and Dietetics president (see Appendix B) to conduct the study using RDNs who were registered or licensed to practice in the local area (Academy of Nutrition and Dietetics, 2016). Once these RDNs had been identified by the respective organization, I acquired permission from the prospective participants. All potential participants were sent a letter of participation (see Appendix C) that outlined my role as the investigator, the university associated with the study, an explanation of how participants were selected, a list of participant rights, an outline of the purpose and benefits of the study, the data collection methods, an inventory of potential risks for participating in the study, and the methods for ensuring confidentiality. The letter included an area for the participants to sign and date for their consent to be involved in the study.

Protection of Participants

Measures were taken to safeguard the rights and safety of all participants. No information was collected until approval had been granted from the IRB (Walden University Approval # 08-17-17-0471886). The IRB assures that there is informed consent, equitable procedures, and minimal risk, while also verifying that the potential benefits of the research outweigh the potential risks (Walden University IRB for Ethical Standards in Research, 2015). At no time did the community partner make direct contact or solicit participants on my behalf; instead, a link was made available directing

participants to my Walden University e-mail. The participants were asked to contact me by e-mail, phone, or in person to express their interest and willingness to participate.

All information obtained from the sample participants was secured in a locked, computerized database that was accessible only to me. Digitally stored information was stored on a password-protected device. Physical documentation with participant information was stored in a locked safe. Furthermore, I made use of pseudonyms to identify the participants for ensuring confidentiality. The data collected for this qualitative single-case study will be kept safe for 1 year after the study is concluded and then destroyed through burning, breaking or shredding for all physical documentation, and through permanent deletion of any virtual data on my computer. Participation in the research investigation was strictly voluntary. All participants were informed of the risk-benefit criteria of the study, the importance of informed consent, and the rights of individuals involved in the case study.

Setting and Sample Participants

The setting involved outpatient clinics and medical centers in a municipal area of the Pacific Northwest. The participants were licensed allied health professionals who teach adult patients how to modify their dietary carbohydrate intake and weight. All five participants were Caucasian females because there were no male or non-Caucasian RDNs in the local area to take part in the study.

Sampling Technique

Purposeful sampling was used to select five participants who were experienced in teaching adults about modifying dietary carbohydrate and weight. The respective

sampling method was homogeneous because all participants had similar characteristics and experiences (i.e., RDNs who are female, Caucasian, and possess at least 6 months of professional practice in teaching adults about dietary carbohydrate modifications for controlling weight). Based on the recommendations of Creswell (2012) and Fraenkel et al. (2014), homogenous sampling was used because the research questions addressed in the study were specific to the characteristics of a group of allied health professionals who convey nutrition information to adult consumers living in a specific geographical area of the United States.

Data Collection

The case study involved how health care educators perceived the role of ADA training models in teaching adults about weight control and modifying dietary carbohydrate. The data generated from the study were derived from the participants' responses to open-ended queries. Data collection took place over two phases. The first phase involved an electronic questionnaire (see Appendix D) and the second phase entailed semi structured telephone interviews (see Appendix E).

Electronic Questionnaire

In the first phase, participants responded to an electronic questionnaire of open-ended questions (see Appendix D). The introduction to the electronic questionnaire stated that participants should avoid disclosure of any specific and personal information of patients, although the questions were not formulated in a way to encourage unintended disclosure. The queries were based on the research question and subquestion:

1. What are your perceptions regarding the current American Diabetes Association methods for teaching adults about modifying dietary carbohydrate (starches and sugars) for controlling weight?
2. What would you change regarding the current methods for teaching adults about modifying dietary carbohydrate for controlling weight?
3. Do you feel that the current American Diabetes Association methods for teaching adults about modifying dietary carbohydrate for controlling weight is lacking in any way, if yes, how are they lacking?
4. What methods do you use to teach adults about modifying dietary carbohydrate (starches and sugars) for controlling weight?
5. Do you perceive your methods to be successful or unsuccessful? Why?
6. What challenges have you encountered in teaching adults about modifying dietary carbohydrate for controlling weight?

Telephone Interviews

Once the responses to the initial interviews were received, the second phase of data collection occurred with the participants through semistructured telephone interviews using the research guidelines of Block and Erskine (2012), who stated that "telephone interviewing is appropriate when [the] questions are open-ended [and] telephone interviews appear effective where there is a purposeful [qualitative] sampling strategy to answer the specific theoretical question" (p. 437). Because a semistructured interview paradigm was used for the study, the initial responses of the participants to the queries required further probing (Creswell, 2012). The questions used for the

semistructured telephone interviews were developed from participants' responses to the electronic questionnaire to clarify subtle subject concepts of the study or to elucidate the motives of the participants (Xu & Storr, 2012). For example, the framework of the study encompassed how the participants perceived the efficacy of the educational models through social interactions with their clientele. As per the research of Carter and Fuller (2016), these types of interactions between educators and learners produce *symbolic interactionism* in which perspectives are created through meaningful interactions among individuals. Ascertaining these perspectives was an important component of the study because the findings of the investigation were grounded in the perceptions of the participants derived from a specific context.

The information collected from the interview responses were maintained in a research log. The research log contained notes regarding the interview responses, interactions between the researcher and participants, and evaluation reports. A reflective journal was also maintained for recording the cognitive and affective experiences that transpired during the study. All entries were annotated with specific dates and times. The research log and reflective journal were secured in a locked computerized database.

Initial access to the names of participants occurred through contacts with the state president (or designee) of the local organization of the Academy of Nutrition and Dietetics. These contacts were face-to-face meetings and communication through virtual means. Subsequent contacts with participants were through e-mails and semistructured telephone interviews.

Role of the Researcher

I am an RDN professional who has provided medical nutrition therapy and health education to U.S. Veterans suffering from posttraumatic stress disorder and other battlefield traumas. Many of these veterans suffer from polyphagia and obesity as a response to the trauma they have endured during their military service. These veterans' eating habits substantiate the conclusions of the study performed by Roberts, Campbell, and Troop (2013) who found that traumatized individuals often intake copious amounts of high-carbohydrate, high-calorie foods that contribute to weight gain. Consequently, I have had extensive experience in educating adults who require dietary carbohydrate modifications and caloric restrictions for weight loss. I currently practice in the municipal area and I am acquainted with other RDNs who work as nutrition educators locally. Based on my 25 years of experience, I have had little success in utilizing the current ADA methods for teaching consumers about controlling weight and dietary carbohydrate intake. Moreover, I feel that the ADA erudition methods tend to be too complicated and require extensive class sessions to help consumers integrate ADA diet regimens into their personal lives. These biases on my part had to be ameliorated to enhance the objectivity of the case. Nonetheless, the study by Converse (2012) indicated that my awareness of prejudices is sufficient for my discarding environmental influences and personal perspectives to discern the fundamental significance of a phenomenon. Furthermore, the research of Basurto and Speer (2012) indicated that the proper utilization of QCA as a research tool "relies heavily on [the] case and context knowledge of [the] researcher" (p. 170). Therefore, my credentials, occupational experiences,

perspectives, and familiarization of the context in which the investigation occurred were vital to the integration of QCA with the qualitative methods of coding and the development of themes. Because I am an RDN health educator who has practiced in the regional area for 10 years, I possess a good knowledge of the local context of the study and I am qualified to assess the clinical implications of the investigative outcomes (Abad-Jorge, 2012; Academy of Nutrition and Dietetics, 2016; Accreditation Council for Education in Nutrition and Dietetics, 2016). Moreover, Lazarus (2017) indicated that credentialed RDNs are the most qualified allied health practitioners to assess the efficacy of dietary regimens for controlling weight and improving health.

Data Analysis

The information obtained from the interviews was processed through Computer Assisted Qualitative Data Analysis Software (CAQDAS). With the aid of CAQDAS, the data were analyzed through a qualitative progression from coding to the creation of thematic ideas for constructing a case study (Creswell, 2012; Fraenkel et al., 2014; Laerd Dissertation, 2012; Saldana, 2013). The information was organized through CAQDAS protocols that encompass data preparation, organization I (file naming), organization II (data grouping), coding, memos for postulating outcomes, and output (Cleamons, 2015; QSR International, 2016; University of Surrey, 2011). These CAQDAS protocols involved gathering data for teaching adults about dietary carbohydrate and caloric intake, identifying differences and commonalities in the education methods, and finding out if improvements can be made to the currently accepted nutrition education paradigms. The evaluation of this information included the following steps:

1. Analyze the information obtained from the research through a coding process. In this study, a code was a word or phrase that assigned attributes to data. The coding procedure was a "transitional process between data collection and [a] more extensive data analysis" (Saldana, 2013, p. 5).
2. Use the codes to identify patterns.
3. Employ the pattern codes in identifying concepts.
4. Group the concepts derived from the pattern codes into categories.
5. Group the categories derived from the concepts into themes.

There were complex patterns identified in the relationships among the variables that required QCA to be employed for aggregating diverse factors into clusters or conditions (Cragun, Pal, Vadaparampil, Baldwin, Hampel, & DeBate, 2016). The QCA process centers on the idea of complex causality that creates outcomes from multiple paths or combinations of variables (Drozdova & Gaubatz, 2016). For example, there were some diverse perceptions of the current ADA dietary carbohydrate teaching methods among the study's participants: Most of the participants felt that these erudition models were too difficult for many adults to understand and follow, but one participant felt that the contemporary education models could be adjusted to all cognitive levels for enhanced consumer compliance. Consequently, QCA helped ascertain, delineate, and interpret the diverse reasons for the outcomes identified in the study.

Sehring, Korhonen-Kurki, and Brockhaus (2013) stated, "QCA is [intended for] a small to intermediate number of cases [allowing] systematic cross-case comparison without neglecting case complexity [for] medium-range generalization and theorizing"

(p. 1). Compass software (Tosmana) was used for qualitative data analysis for identifying causal conditions among the cases through the following steps:

1. Ascertain outcomes and identify cases that characterize the outcomes (known as *positive cases*).
2. Determine cases that have equivocal relationships or insufficient connections to the outcomes (known as *negative cases*).
3. Combine expressions for all possible outcomes through utilizing a *Truth Table* that employs Boolean logic for one or more of the operators known as *And, Or,* and *Not* to describe conditions that may exist (James et al., 2016; Plowwright, 2015).
    a. The *And* operator indicates that when condition A and condition B are present, this combination will cause condition C to exist. Alternately, the *And* operator may also indicate that when condition A and condition B are present, this combination will cause condition C not to exist.
    b. The *Or* operator indicates that when conditions A or B is present, condition C will exist. Alternatively, the *Or* operator may also indicate that when condition A or B is present, condition C will not exist.
    c. The *Not* operator indicates that when condition A is present, but not condition B, then condition C will exist. Alternately, the *Not* operator may indicate that if condition A is not present, but condition B is present, then condition C will exist.

   d. The *And, Or,* and *Not* operators can also be combined through qualitative algorithms to derive multiple conditions and the relationships among the different combinations of conditions (Ragin & Davey, 2014).

4. Establish major causal conditions from the expressions that may affect outcomes.
5. Aggregate causal conditions into *recipes* (various combinations or groups of conditions that cause the outcomes).

A connection of patterns to themes may be established when causal conditions have been categorized and linked to outcomes (Ragin, 2014). In the case of qualitative health care studies, De Santis and Ugarriza (2000) described outcomes as groups of data that pinpoint the primary issues of an investigation.

The method for dealing with discrepant cases can be expedited through QCA truth tables that show the number of causal factors that created a set of conditions or cases (Legewie, 2013). Boolean algebra can be used to connect the number of these cases that were observed in the study to an outcome by assigning consistency scores to the results. For instance, Table 6 illustrates how discrepant cases may be identified through consistency scores in the range of 0.01–0.99. The second consistency value of 0.33 in Table 6 is known as a *contradictory row* of a truth table (Fiss, 2012). This contradictory row value of 0.33 implies a discrepant case in some crisp-set QCA (csQCA) procedures.

Accuracy and Credibility of Research

Two methods of data collection were used to obtain information for the study: Open-ended questions via an electronic questionnaire and semistructured telephone interviews (Block & Erskine, 2012; Yin, 2014). Once the responses to the electronic questionnaire and semistructured telephone interviews were coded, the accuracy of the information was verified further through member checking.

Table 6

A Truncated Example of a QCA Truth Table (csQCA)

Causal Factor 1: Patient Education	Causal Factor 2: Family Support	Causal Factor 3: Food Budget	Number of Cases	Outcome of Diet Compliance Present from the Observed Case(s)	Consistency Score
1	1	1	1	1	1.00
0	1	0	3	0	0.33
0	0	0	1	0	0.00

Note: The table is a truncated example of a QCA process utilizing Boolean algebra for determining methods to deal with discrepant cases.

Assumptions, Limitations, Scope, and Delimitations

Assumptions

There were two assumptions that pertained to the study. The first assumption was that a designee from the local Academy of Nutrition and Dietetics organization would provide me with the names of prospective participants with qualifications and

professional experiences that are relevant to the purpose of the study. The second assumption was based on the Standards of Practice and Professional Performance Guidelines (2013) that require all RDN professionals to be honest, competent, and upright in all aspects of clinical praxis and professional comportment.

Limitations

The qualitative study was bound to a specific local context. Consequently, the information derived from the study attempted to explain a phenomenon rather than present the results of a sample that can be generalized to a population outside a specific geographic location in the Northwestern United States.

Scope

The scope of the study focused on the perceptions of RDN professionals who teach adults about controlling carbohydrate intake and weight. These RDNs shared their views on the efficacy of the traditional education methods proposed by the ADA and commented on alternative methods that may be used in educating adult consumers about dietary carbohydrate modification for controlling weight.

Delimitations

The study highlighted the perceptions of allied health practitioners who are registered through the Academy of Nutrition and Dietetics to teach consumers about the role of nutrition in treating diseases such as diabetes and obesity. The study does not include perceptions of physicians, nurses, and other licensed health care providers who may provide nutrition education to consumers.

Data Analysis Results

This section contains the data analysis results. Prior to presenting the results, a summary of the data collection, data analysis, and evidence of trustworthiness will also be presented. The summary will be followed by the presentation of the findings in which I included themes. The key points of the results of the data analysis will be summarized at the end of this section. This summarization will also be used as a segue for section 3.

The findings of the study were guided by the purpose and the research question of the investigation. The purpose of this study was to ascertain the methodologies health care professionals use for teaching adults about weight maintenance through modifying dietary carbohydrate intake. Hence, the following research question directed the study:

RQ1: What are the perceptions of licensed health care educators regarding the currently prescribed ADA adult teaching methods for modifying dietary carbohydrate intake to control weight?

This research question was supported by the following subquestion:

SQ1: What teaching methods are being used by licensed health care educators to teach adult consumers about dietary carbohydrate modifications for controlling weight?

Study Setting

The setting of the study involved three outpatient clinics and three medical centers in a municipal area of the Pacific Northwest. These clinics and medical facilities were part of the Veterans Health Administration, a federal health care organization that provides medical care to U.S. veterans in all 50 states and commonwealth (U.S. Department of Veterans Affairs, 2017). One of the three medical centers admit veterans

who require rehabilitation therapies for substance abuse and pathopsychological conditions. The other two medical centers are hospitals that provide periodic, adjunct medical services to veterans (e.g., surgical procedures or extensive medical exams and treatments for pathophysiological illnesses).

Demographic Data

Because the study involved nutrition education for dietary carbohydrate modifications and weight control for adults, only licensed allied health educators (RDNs) who provide medical nutrition therapy were included in the study. There were no male or non-Caucasian RDNs in the local area; therefore, all the participants were Caucasian females. I used purposive sampling to select participants. The inclusion criteria for participation were registration with the Academy of Nutrition and Dietetics and at least six months of experience in instructing adults regarding dietary carbohydrate modifications and weight control. Five participants met the criteria and were recruited to join the study.

Data Collection Phases

To begin the data collection phase of the study, permissions from the IRB Walden University, the local Academy of Nutrition and Dietetics President, and informed consent from the participants were obtained. Pseudonyms were assigned to the participants. These aliases included an alphanumeric code in which the first two digits were the ordinal response number to the invitation letter (see Appendix C) followed by a double alpha-ID to identify the respondent's location. The last digit of the alphanumeric code was the first initial of the participant's name. For instance, if the third respondent's first name were

Catherine who worked in an outpatient clinic, then her alphanumeric code could be 03FFC. The collected digital data were stored in a password-protected, encrypted device that was accessible only by me. All hard copies of the data were stored in a tamper-proof device that was also accessed only by me.

Data collection involved two phases: An electronic questionnaire and a telephone interview. Five electronic questionnaires (Appendix D) containing open-ended questions were initially distributed to the participants. All five questionnaires were fully completed by the participants. After reviewing the responses of all participants to the questionnaire, I conducted semistructured telephone interviews with each respondent. I then transcribed all collected data in Microsoft Word files and uploaded the information into a CAQDAS software program known as NVivo 11. I used this software to help store, organize, manage, and analyze the data.

Data analysis progressed from coding to the construction of themes (Creswell, 2012). Themes were derived from the patterns in the data. Discrepant cases were analyzed through qualitative comparative analysis (QCA) through Boolean algebra (Legewie, 2013). Generally, QCA is used to provide a systematic comparison of a small number of cases when causal complexities are integral to the social phenomenon under study (Ragin, 2008). I considered QCA to be suited for this study, as the aim of the study was to describe and ascertain potential causalities among relevant methodologies that health care educators used for teaching adults about weight maintenance and dietary carbohydrate modifications.

Evidence of Trustworthiness

To increase the trustworthiness of this study, I used credibility and dependability techniques. First, data triangulation was employed through using two data sources and telephone interviews to support the data from the electronic questionnaires. Second, I used member checks through returning the transcripts to the participants for review. The participants checked the transcripts for accuracy and were given the opportunity to make any changes they saw fit.

Findings

This section includes the presentation of the study findings. Six themes were derived through identifying patterns and relationships among the data: (1) perceptions regarding ADA methods, (2) present diet information needs simplification, (3) ADA method is confusing, (4) dietary teaching methods for controlling weight, (5) diet compliance is dependent on the patient, and (6) teaching challenges in educating adults. Themes 1 and 4 each contained two subthemes. Subthemes for theme 1 were the following: (1) ADA protocols focus on blood-sugar control, but weight loss guidelines are equivocal and (2) ADA protocols have no clear guidelines regarding portion sizes and food quality. Subthemes for theme 4 were the following: (1) teaching a balanced diet and (2) providing a detailed explanation of the diet. The relationship of each theme and subtheme to the research question and subquestion is illustrated in Figure 2.

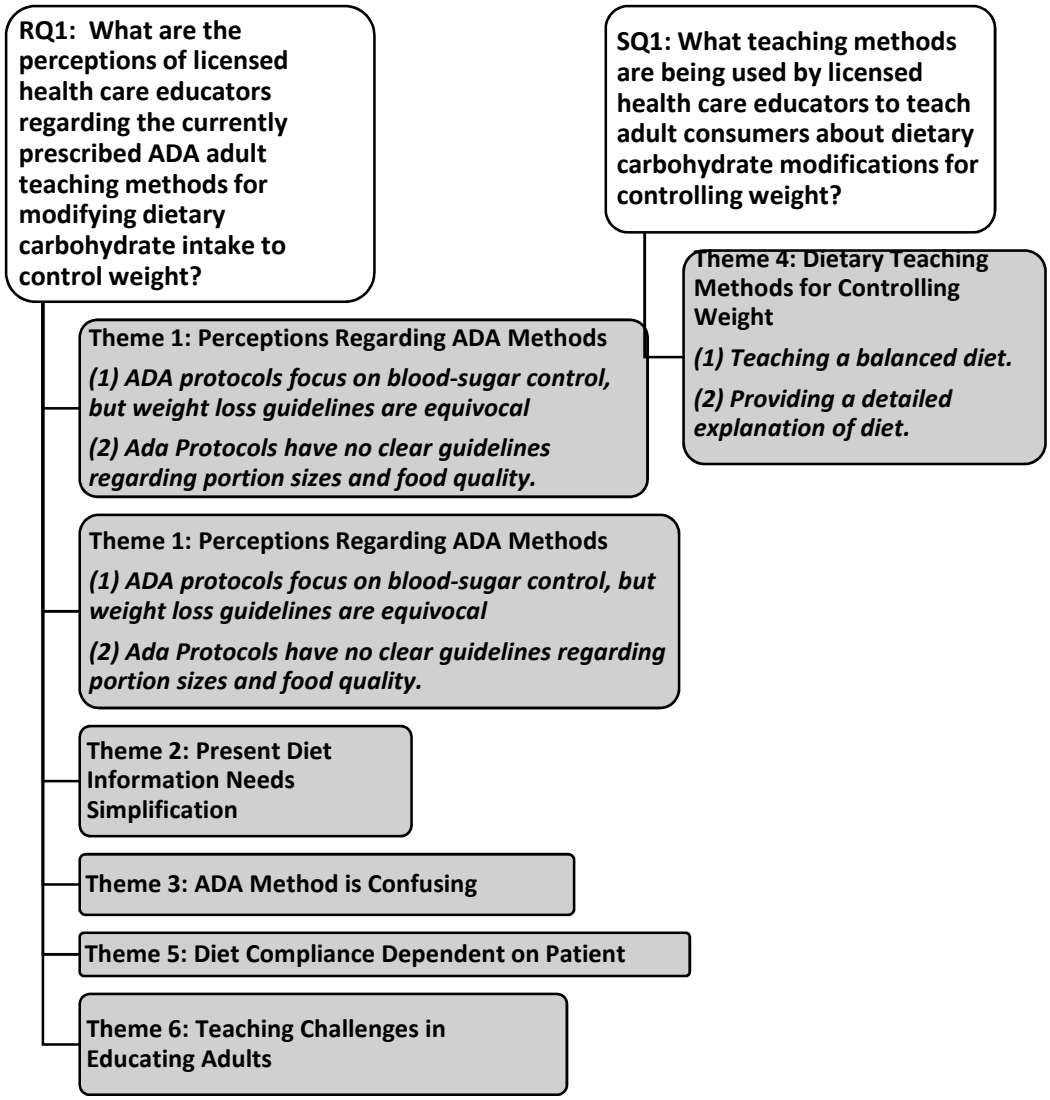


Figure 2. Theme and subtheme relationships. The figure shows how the themes and subthemes relate to the research question (RQ_1) and subquestion (SQ_1).

Theme 1: Perceptions Regarding ADA Methods.

The participants believed that the current ADA methods involved teaching adults how to make healthy food choices to control blood sugar and maintain a healthy weight, rather than focusing on weight loss alone. Generally, the health care educators used the ADA plate method, which was defined by participant 04DDC as, “limiting starches and

carbohydrates to a quarter of your plate along with a serving of milk and fruit (or 3 carb choices).” However, the participants also perceived that the current ADA guidelines were unclear regarding the recommended portion sizes and food quality. For instance, as participant 02FFM explained, “Food labels tend to confuse ADA’s definition of a quality carbohydrate.” Participant 02FFM provided an example, saying that, “Some consumers think bread labeled as ‘Wheat Bread’ means that all the bread is made with 100% whole wheat flour when it may be as much as 50% white, refined flour.” Following these perceptions, I derived two subthemes from the data about ADA methods: (1) ADA protocols focus on blood-sugar control, but weight loss guidelines are equivocal and (2) ADA guidelines are unclear about portion sizes and food quality.

Based on the electronic questionnaires and the telephone interviews, the participants revealed that the current ADA methods provided more emphasis on controlling blood sugar rather than weight loss. In the electronic questionnaire, participant 04DDC highlighted that she used ADA methods to teach patients “how to follow a diabetic diet, count carbohydrates and manage their blood sugars.” Nonetheless, Participant 04DDC said in the telephone interview that she did not recommend ADA methods such as the exchange lists for weight loss education. She gave the following explanations in the questionnaire:

> Personally, I feel like I have difficulty using the diabetic exchange list with all my patients because it’s complex, time consuming to follow, and often times needs a certain knowledge level to comprehend. I also feel that diabetes education needs to be very individualized, it is not a one-size-fits-all.

Similarly, participant 05EEK mentioned that, “My understanding of the American Diabetes Association recommendations for weight loss on its own does not emphasize dietary carbohydrate to control weight, rather to control blood sugars. Their recommendations for weight loss mimics that of the USDA My Plate.” In the telephone interview, participant 05EEK continued to explain that she might use ADA methods for weight loss for diabetic patients or patients with blood sugar problems. The participant felt that ADA methods were primarily for diabetics. She discussed how some RDNs used the Mediterranean diet for controlling weight, but she felt that patients may not be able to control their weight on a Mediterranean diet unless they controlled calories through the number and sizes of food servings. Participant 05EEK’s approach was traditional in the sense that decreasing calories resulted in decreased weight.

Moreover, participant 03CCS’s statement supported the claim that the emphasis of ADA methods was on carbohydrate food choices modification for “controlling blood sugar, not weight.” However, in the telephone interview, the participant was unable to provide an exact “yes” or “no” when asked about her perception on using ADA methods for weight loss. She perceived that dietary instructions must be individualized, and that ADA methods may be appropriate in some situations (e.g., an overweight person who has excessive carbohydrate intake or an overweight person with diabetes). I noted that participant 03CCS avoided the details of the ADA exchange list as a teaching method for most of her patients. The individual preferred to use the ADA plate method for initial education sessions to help patients limit the portion sizes of foods, and to help patients understand what foods should be consumed for a healthy diet. The participant stated that

limiting dietary carbohydrates for weight control should be based on a number of factors that include patient diagnoses and food intake history (e.g., if the patient's obesity is due to an excessive intake of too many high-carbohydrate foods, then using some ADA methods for teaching the patient to limit dietary carbohydrate are appropriate).

In the telephone interview and in the electronic questionnaire, participant 01AAK stated that "[I] would not use ADA methods for weight loss unless the person instructed had blood sugar problems." Furthermore, the participant would only prescribe carbohydrate limited diets to overweight people with blood-sugar problems. However, the participant preferred to use the plate method as an instructional design for most of her clients who needed weight loss.

Some participants believed that the ADA plate method may be helpful in making healthy food choices. Participant 05EEK mentioned in the electronic questionnaire that:

> The recommendations to choose whole grains over refined grains is helpful in terms of heart health and for overall fullness from fiber which should lead to decreased intake. Choosing less concentrated sweets is helpful because they are added calories, also I find they are addictive and leave individuals that consume a lot of them craving more.

Although the majority of the participants agreed that the current ADA methods may be used in controlling blood sugar, most participants perceived that the current ADA methods had no clear guidelines regarding portion sizes and food quality. For, instance participant 01AAK stated that ADA methods may be found on the ADA website, but these methods did not emphasize the portion sizes of the prescribed foods to eat. In

Figure 3, it may be observed that the information on the ADA plate method includes recommended proportions of starch, bread, meat, vegetables, fruit, milk, fat, and other foods, yet the figure did not specify how much of each food group must be consumed. Nonetheless, ADA also provides the diabetic exchange lists, in which serving sizes from different food groups are listed. The participants, however, perceived that the information from The diabetic exchange list may be overwhelming for their patients.

Figure 3. The ADA plate method. The figure shows the recommended proportion of starch and bread, meat, vegetables, and other foods; however, portion sizes are not specified.

Participant 01AAK reiterated that the information on the ADA website was too vague for people to understand, and the amount of information may be overwhelming. An example of the diabetic exchange list from the ADA website may be found in Figure 4. The respective figure was part of a document advocating high fiber foods for improving the health of consumers. These high-fiber foods were designated by an

asterisk. The document also contained tips on food preparation and recommended that consumers seek help from an RDN to understand the full intent of the website's contents.

CEREALS/GRAINS/PASTA	
*Bran cereals, concentrated (such as Bran Buds, All Bran)	1/3 cup
*Bran cereals, flaked	1/2 cup
Bulgur (cooked)	1/2 cup
Cooked cereals	1/2 cup
Cornmeal (dry)	2 1/2 tbsp
Grape Nuts	3 tbsp
Grits (cooked)	1/2 cup
Other ready-to-eat, unsweetened (plain) cereals	3/4 cup
Pasta (cooked)	1/2 cup
Puffed cereal	1 1/2 cups
Rice, white or brown (cooked)	1/3 cup
Shredded wheat	1/2 cup
*Wheat germ	3 tbsp
DRIED BEANS/PEAS/LENTILS	
*Beans and peas (cooked) (such as kidney, white, split, blackeye)	1/3 cup
*Lentils (cooked)	1/3 cup
*Baked beans	1/4 cup
STARCHY VEGETABLES	
*Corn	1/2 cup
*Corn on the cob, 6 in.	1 long
*Lima beans	1/2 cup
*Peas, green (canned or frozen)	1/2 cup
*Plaintain	1/2 cup
Potato, baked 1 small	(3 oz)
Potato, mashed	1/2 cup
Squash, winter (acorn, butternut)	3/4 cup
Yam, sweet potato	1/3 cup

Figure 4. Sample diabetic exchange list. The figure shows the recommended serving sizes of some high-carbohydrate foods from the starch food group.

Nonetheless, participant 01AAK also revealed that the information from the ADA website may be helpful to consumers if "education was provided to them by a trained professional." Similarly, participant 02FFM shared in the questionnaire:

> I am not sure there are clear guidelines from the ADA for diabetics and for others who want to lose weight. Most of their guidelines need further clarification from a clinical professional trained in medical nutrition therapy. They do discuss the quality of carbohydrates and make recommendations for the best choices, but these guidelines are still unclear.

Furthermore, in the telephone interview, participant 02FFM claimed that the ADA guidelines were either too general or too complicated for consumers to comprehend without further guidance from a nutrition professional. She stated that she used the ADA plate method for most of her weight loss programs. However, she said that the ADA guidelines tend to confuse consumers about healthy carbohydrate choices (e.g., whole wheat bread vs. wheat bread, in which "some consumers think bread labeled as 'Wheat Bread' means that all the bread is made with 100% whole wheat flour when it may be as much as 50% white, refined flour").

Theme 2: Present Diet Information Needs Simplification.

When asked about what the participants would change regarding the current ADA methods for teaching adults about modifying dietary carbohydrate and weight control, the participants shared mixed opinions. Four participants stated that they would use "simpler terms" in educating adults, whereas one participant mentioned that she would not change anything. However, all the participants agreed to the use of the plate method for dietary carbohydrate control and weight loss. Participant 05EEK, who claimed that she would not change anything in the current methods, shared that she would continue using the plate method to teach adults about diet and weight loss. Participant 05EEK shared in the electronic questionnaire:

> I wouldn't make changes. I would continue to emphasize controlling the intake of calories utilizing the plate method, rather than the diabetic exchange list system. However, I do not agree with the use of the Mediterranean Diet for weight loss

> unless people are taught how to limit calories through controlling the number and sizes of food servings.

The other four participants mentioned that they would continue teaching the plate method through simplistic terms. Participant 02FFM stated, "This simplicity is not addressed in all basic ADA diet materials. For example, avoid excessive information from the ADA exchange lists as much as possible and emphasize a simplistic plate method approach." Participants 01AAK, 03CCS, and 04DDC emphasized simplifying the terms for serving sizes. Participant 04DDC claimed, "If I would change something within this model, I would probably try to make it easier for the consumer to identify portion sizes within the recommendations." Similarly, participant 03CCS stated:

> I would include more specific portion sizes for CHO foods instead of just a quarter of your plate (if using the plate method). However, it depends on the learning ability of the audience: For many of my elderly patients and their caregivers, a more general approach is best. This general approach includes the plate method without getting into the specifics of counting grams of carbohydrate. In this way, I emphasize healthy food choices instead of concentrating on one macronutrient like carbohydrate.

Theme 3: ADA Method is Confusing

Most of the participants felt that the current ADA methods for teaching adults about modifying dietary carbohydrate and controlling weight was confusing. The participants reiterated that the ADA exchange list and the guidelines on portion sizes were confusing for many consumers. Participant 01AAK highlighted that,

"Understanding the ADA exchange list is difficult for most people to understand because it contains so much information about different quantities and types of foods." Participant 02FFM said that identifying foods with high-quality carbohydrates is subjective and confusing to consumers. Consequently, the participant felt that more specific information is needed for the public. Participant 02FFM believed that the specific information could be defined as "simplistic and succinct wording about what to do in specific steps with visual drawings to help consumers understand the material." Consequently, participant 04DDC also gave the following perception:

> Personally, I feel like there is a lack of education with regards to portion sizes and estimations. For example, in the Exchange list for diabetes, they state that 1 piece of bread is 15g of carbs, [but] currently bread on the shelves can range anywhere from 12-35g per slice. This can be confusing for the patient and cause frustration when they feel like they are following the diet recommended, but not seeing a change in their blood sugars. I feel like there are limited recommendations of what types of carbs to eat--complex vs. simple.

Nonetheless, two participants believed that the current ADA methods were not lacking in any way. Participant 05EEK noted that ADA methods may be effective in teaching adults about modifying dietary carbohydrate for controlling weight, "because emphasis is not placed on carbohydrates alone except for when counseling on improving blood sugar levels." On the other hand, participant 03CCS expressed that the current ADA methods were "not necessarily" lacking because the current ADA methods were to

be used for guidance, whereas the assessment, execution, and follow-up were dependent on the health care educators. Participant 03CCS made the following claim:

> No, not necessarily. I think it is up to the clinician to assess their patients and individualize recommendations as they see fit. ADA gives general guidance which overall matches the Dietary Guidelines for Americans. In other words, I usually avoid the details of the ADA exchange list as a method for teaching weight control.

Theme 4: Dietary Teaching Methods for Controlling Weight

All the participants agreed to use the plate method to teach adults about modifying dietary carbohydrate and controlling weight. The participants stressed that along with the plate method, teaching adults about modifying carbohydrate for controlling weight also involved (1) teaching a balanced diet and (2) providing a detailed explanation of diet. Instructing consumers about a balanced diet with detailed information were two emergent subthemes derived from the data.

The participants all used teaching balanced diet for their patients to control weight. However, the participants had different perspectives on what constituted a balanced diet. Participants 03CCS and 04DDC believed in using the plate method to explain balanced diet to their patients. Participant 04DDC explained that, "I will likely start with the Plate model and work from there on counting the yellow triangles as carbohydrates and teaching what foods will raise blood sugar and what foods will lower blood sugar." Meanwhile, participant 03CCS said that:

> I educate them on portion control (will often measure actual food in the home), sources of added sugars and how they contribute to excess calorie intake, and healthier sources of carbohydrate. I may use the plate method to educate them on sources of carbohydrate and as a visual for overall dietary balance.

Participant 03CCS added that:

> They do recommend educating individuals on the importance of choosing healthy carbohydrate food sources (whole grains, fruits, vegetables, etc.), limiting refined carbohydrate and added sugars, and portion control for weight management. General tool used seems to be the plate method. This is a reasonable approach to me and matches how I practice. I use the plate method as a starting point to help patients understand a balanced diet and portion sizes.

Similarly, participant 05EEK also believed in balancing calorie intake as part of a balanced diet. Participant 05EEK stated:

> I recommend high fiber, low sugar, limited carbohydrate to ¼ plate in general. However, if an individual chooses to consume higher carbohydrates, they could still lose weight as long as they monitor their total calories. I emphasize calories and balance versus focusing on carbohydrate restriction unless someone is diabetic.

For participant 01AAK, teaching modified diet therapy for controlling weight involved teaching clients how to follow a balanced diet and lifestyle. In other words, the participant taught her patients proper eating habits while also emphasizing an appropriate level of physical activity.

As health care educators, the participants also believed that their methods in teaching adults about modifying diet for controlling weight included providing a detailed explanation of the diet. While information was available to the patients, the participants perceived that part of their job was to guide and follow-up on the progress of the patient for the diet therapy to be more effective. Participant 02FFM noted the following in the electronic questionnaire:

> I make sure I know what patients are currently eating and what they know about diet--what they need to and want to learn. I try to explain carb quality in detail and I work to understand what the patient believes carbs are and help clear up misconceptions.

Participant 04DDC shared that she helped the patients "go into carbohydrate counting, label reading, and [identify] carbohydrates," whereas participant 03CCS said that she provided specific recommendations about the diet in terms of portion sizes. Participant 03CCS claimed:

> If they have diabetes I would be more likely to give a specific recommendation for the amount of carbohydrate to have at meals and snacks. By specific recommendations, I mean that I utilize a dietary caloric level to teach portion sizes and types of foods to be used at each meal. I teach the patient to count grams of carbohydrate at each meal if the person has blood sugar problems and/or if the person is overweight due to an excessive intake of high-carbohydrate foods. However, the majority of the patients I teach weight management to are either

> showing the initial signs of diabetes or already have diabetes. That means they need dietary carbohydrate control education.

Theme 5: Diet Compliance is Dependent on the Patient.

Generally, the participants perceived that the education methods they used in teaching adults about modifying dietary carbohydrate and controlling weight were successful. These successes were due to their follow-up sessions with their clients to enable positive, incremental changes in their clients' lives. The participants aimed for long-term results, as participant 01AAK shared, "I am able to follow-up with my patients long term and am able to see the changes. My education methods are allowing people to lose weight successfully without emphasizing low-carbohydrate diets." Similarly, participant 02FFM expressed that "follow-up helps a lot." Participant 02FFM believed that follow-up allowed her to check on whether her patients were "ready to learn" and were "really listening." Participant 04DDC also claimed that the success of the current ADA methods depended on the "commitment" and "interpretation" of the patients. Participant 04DDC expressed the following:

> It really depends on the patient and their level of commitment to the recommendations and how they have interpreted the education. Sometimes I have patients who will cut out "all carbohydrates" from their diet to lose weight. With these patients, they may end up losing weight short term, however due to the extreme change in diet, they tend to rebound once they stop restricting. I see the best results from patients who cut out the added sugar in their diet from soda,

condiments, pre-packed foods and candy, and increase their fruit and vegetable intake.

On the other hand, participant 03CCS considered her methods successful in terms of seeing small changes within her patients. Participant 03CCS shared:

> Generally successful with my patient population. By successful, I mean that they are able to reduce portion sizes of certain foods that they had previously been intaking excessively. I base education on problems identified through food recalls and overall clinical picture. I assess their motivation for change and focus on small changes.

Nevertheless, participant 05EEK perceived that the success of her methods depended on focusing on the entirety of the diet. Participant 05EEK mentioned the following:

> Yes, because I am evaluating an individual's diet in its entirety versus focusing on a specific macronutrient such as carbohydrate. If I only focused on limiting carbohydrates, then someone could still overconsume [many] high fat foods which would prevent successful weight loss.

Theme 6: Teaching Challenges in Educating Adults.

Participant 05EEK revealed that she had not encountered any challenges in teaching adults about modifying dietary carbohydrate and weight. However, the other four participants identified different challenges in teaching adults about dietary carbohydrate and weight modifications. The challenges were mainly focused on the available information in the current ADA methods. Participant 01AAK and 02FFM

believed that the challenge in teaching adults about modifying dietary carbohydrate for controlling weight was misinformation. Participant 02FFM explained that, "Misinformation from websites, popular diet theories, often a general lack of interest in eating healthy." Participant 01AAK highlighted the misinformation on which food were considered "unhealthy or bad." Participant 01AAK shared the following:

> I think it gets a little tricky when we focus on one food or one food group. I often hear people refer to carbs as unhealthy or bad for you. Eating too many calories, regardless of the food group, can lead to weight gain. I think education on carbohydrate is important for controlling blood sugars and diabetes. It must be tied in with overall diet, portion control, and physical activity.

Participant 03CCS also believed that information on the current ADA methods presented challenges in teaching adults about modifying dietary carbohydrate for controlling weight. She expressed the following:

> Giving them specific recommendations for amount of CHO to have at meals or specific portion sizes without being overwhelming / too complicated for the patients and/or their caregiver.

Nonetheless, participant 04DDC claimed that the challenge in teaching adults about modifying dietary carbohydrate and controlling weight was the accessibility of healthy options for her patients. The participant perceived that despite teaching the patients of healthy options such as complex carbohydrates, healthy options were not always readily available in the market. The participant noted the following:

> I think the biggest challenge is some patients are too extreme with carb cutting and some patients are too relaxed. Carbohydrates are found in many of the foods we eat and I personally feel like they are very easy to get in our standard American diet. It is harder to get complex healthy carbohydrates which I see a lot of my patients struggling with day to day.

QCA Analysis

A more extensive evaluation to identify causal conditions that contributed to outcomes (results) was expedited through a QCA analysis. This analysis began by creating a csQCA truth table by using Tosmana software to generate complex, parsimonious, and intermediate solutions to understand how the participants arrived at their decisions regarding teaching models and ADA guidelines (Cronqvist, 2017). The truth table helped me to determine causal conditions that are considered necessary for the outcome of adherence to the erudition paradigms and ADA protocols. A csQCA analysis was appropriate for the small dataset of the current study due to the context of the current study and the use of qualitative data (Legewie, 2017). First, interview and open-ended survey responses from the five participants were organized into an Excel spreadsheet. Then, responses were reviewed to generate factors for analysis that considered all constituents influencing the efficacy of the ADA-developed dietary teaching models and guidelines. The following seven factors were generated through this process: (1) ADA plate method for teaching blood-sugar and weight control, (2) ADA guidelines for teaching blood-sugar and weight control, (3) ADA guidelines for teaching only blood sugar control, (4) ADA guidelines for teaching diabetic patients, (5) ADA guidelines for

teaching only weight control (6) physical activity for weight control, and (7) The efficacy of ADA guidelines as teaching methods. A two-point, dichotomous rating scale was used for the factors (0 = absent and 1 = present).

Table 7

A csQCA Truth Table: Data Entered into Tosmana

Participant (Case ID)	Factor 1	Factor 2:	Factor 3:	Factor 4:	Factor 5:	Factor 6:	Factor 7:	Outcome:
P1	1	1	1	1	0	1	1	0.33
P2	1	0	1	1	0	0	1	0.33
P3	1	1	1	1	0	0	1	0
P4	1	0	1	1	0	0	0	0.33
P5	1	1	0	0	0	0	0	0

Note: The table includes an initial analysis utilizing dichotomous ratings.

Table 7 depicts the data that were entered into Tosmana after rating each factor using the dichotomous scale to identify whether each factor was present in the participants' responses. Because the rating scale was dichotomous, the determination of discrepant cases appeared to be equivocal. My conclusions about the inadequacy of utilizing a dichotomous rating scale were verified by a QCA expert who suggested that a multi-variable QCA (mvQCA) be implemented to enhance the accuracy of the results (Hausebrouk, 2016; Precision Consulting, 2017). Consequently, the participants' identifiers were uploaded as case identifiers and the outcome variable involving adherence to ADA dietary guidelines was created and rated using a multiple-point scale based on the findings from the csQCA and CAQDAS information. The multiple-point scale was appropriate because the factors' contributions to the outcomes of the study could not be interpreted accurately utilizing a tool that only allowed inclusion or

exclusion based on a dichotomous measurement (Lewegie, 2017). This multiple rating scale was used to rate the degree of each factor for each participant. The ratings consisted of no evidence (0), very weak evidence (.20), weak evidence (.33), strong evidence (.66), very strong evidence (.80), and strongest evidence (1).

Table 8

Factor Ratings for Teaching Carbohydrate and Weight Control

Factors	Rating	Adherence Strength Evidence
(1) ADA plate method for teaching blood-sugar and weight control	1.00	Strongest
(2) ADA guidelines for teaching blood-sugar and weight control	0.20	Very Weak
(3) ADA guidelines for teaching only blood sugar control	0.80	Very Strong
(4) ADA guidelines for teaching diabetic patients	0.66	Strong
(5) ADA guidelines for teaching only weight control	0.00	None
(6) Physical activity for weight control	0.20	Very Weak
(7) The efficacy of ADA guidelines as teaching methods	0.33	Weak

Note: The table illustrates numerical ratings of factors for controlling dietary carbohydrate and weight, as well as the adherence strength of the evidence to the factor ratings.

The ADA plate method was perceived as being the most relevant to teaching adults about controlling dietary carbohydrate and weight. Consequently, the ADA plate method should be included in the paradigm for the project deliverable (professional development program). Though RDNs deemed ADA guidelines as appropriate for teaching modifications in dietary carbohydrate for controlling blood-

sugar levels, these same guidelines were considered inappropriate teaching tools for people who only needed to lose weight. The low rating that RDNs gave to the non-dietary factor (physical exercise) for controlling weight is further evidence of the research findings by Schumacher (2014): RDNs perceive nutrition interventions for health to be superior to non-dietary therapeutic measures.

Summary

The purpose of this study was to ascertain the methodologies health care professionals use for teaching adults about weight maintenance through modifying their dietary carbohydrate intake. Five Caucasian female RDNs who had at least six months of experience teaching carbohydrate modified diets and weight control to adults were the participants in this study. These health care educators perceived that the ADA plate method was the best paradigm for teaching adults about modifying dietary carbohydrate and calories for controlling blood sugar and weight. Nonetheless, the participants perceived the overall ADA guidelines as unclear. For instance, although diagrams of the ADA plate method are available online, the participants thought that these images did not include specifications for portion sizes. This lack of portion-size specifications may be confusing for consumers. Furthermore, despite the diabetic exchange list being available online, the participants thought that many consumers might find the information confusing or overwhelming. Therefore, the participants believed that individuals needed guidance from licensed health professionals to used the ADA guidelines properly.

Generally, the participants also perceived that the current ADA methods tended to confuse people. This perception was emphasized by one participant who stated that the

current ADA methods were to be used for guidance, while the assessment, execution, and follow-up were dependent on the skills of health care educators. Furthermore, the participants felt that the current ADA methods may be more helpful if simpler terms were used. The participants generally agreed to continue using the plate method in teaching adults about diet and weight control. Nonetheless, the participants want the current ADA terms to be simplified so that consumers may more easily understand them. However, the participants also believed that part of their job as health care educators was to guide individuals regarding their diets.

The methods used by the participants in teaching adults about modifying their eating habits to control weight included teaching their clients about consuming a balanced diet. Nonetheless, the participants felt that conveying balanced-diet information involved detailed explanations of foods, food portion sizes, and the amounts of different foods to consume. The participants through using the ADA plate method usually conveyed these detailed explanations. The plate method was also used to teach a balanced diet, but the participants had varying perceptions of what constituted a balanced diet. For instance, some participants believed that the proportions shown in the plate method constituted a balance diet, while others believed that the role of calorie counting was important in providing a balanced diet. Only one participant mentioned that a balanced diet should be augmented with physical activity for effective weight control.

The success of diet therapy for weight loss was perceived to be ultimately dependent upon the desires and perceptions of the consumer. The RDNs found that developing follow-up routines were helpful in assisting their clients to maintain or to lose

weight, whereas the creation of long-term goals helped their clients to evaluate the success rates of their eating habits. The challenges experienced by the participants in teaching adults about modified diets for weight loss included consumers being misinformed about nutrition therapies, clients misinterpreting complicated information about nutritional practices, and individuals improperly limiting their healthy food choices. These factors indicated that the way adults misperceive information related to nutrition might interfere with their acquisition of new knowledge regarding diet therapies (Dandan et al., 2013). Often these misperceptions occurred when adults with specific biopsychological diagnoses attempted to apply general nutrition guidelines for a healthy population to themselves (Lyons, 2014; United Health Foundation, 2016). These general nutrition guidelines do not include specific dietary needs for diseased states or for diagnostic therapies that treat physiological and psychological conditions (U.S. Departments of Health, Human Services, and Agriculture, 2015). Hence, the project deliverable (professional training program) should include biopsychological parameters that address these issues.

Conclusion

Section 2 described how the research methodology may provide information about the types of methods RDN professionals use to teach adults about controlling weight through modifying dietary carbohydrate intake. The justification for the research design and approach were elucidated through the framework of Analytic Realism (Altheide & Johnson, 1994). The aspects of sampling protocols and data analyses were also explained (Creswell, 2012; Fraenkel et al., 2014; Laerd Dissertation, 2012; Ragin,

2014; Yin 2012). The closing comments of Section 2 entailed a discussion of the ways in which the results of the study may be circumscribed. The rationale, literature review, plan of evaluation, and study implications of the project will be detailed in Section 3. The project's assets and constraints, alternative approaches to conducting the study, reflections, and implications, applications, and directions for future research will be described in Section 4.

Section 3: The Project

Introduction

Regional data showed that excess weight and high carbohydrate intake were common problems in the local area, and the research studies implied that reducing dietary carbohydrate intake may enhance weight loss and mitigate the incidence of diseases that result from obesity. Education methods developed by the ADA use carbohydrate modifications as a constituent of weight maintenance programs. These ADA learning models were investigated through the perceptions of RDNs who provide diet education to the local populace. To develop a project, the evaluation of these RDN perceptions was used to identify the best education practices for teaching adults about modifying dietary carbohydrate intake and maintaining a healthy weight. The analysis results of these perceptions were presented in Section 2. Overall, this analysis showed that the best way to teach people about dietary measures for carbohydrate control and weight maintenance was to focus on the ADA plate method and include specific details regarding serving sizes of all foods. Consequently, the insights derived from the respective analysis will be used to develop a professional development project for training medical, allied health, and public health educators about nutrition education models for modifying carbohydrate intake and controlling weight. In Section 1, I addressed research studies about the perceptions of allied health nutrition education providers known as RDNs, social implications of nutrition and health education, learning models and instruments used in the health and nutrition sciences, and dietary carbohydrate's role in health. These research findings suggested that RDNs perceived food to be the primary therapy for

improving health and preventing disease. The literature was also used to illustrate the social implications of nutrition education through teaching individuals about preventive and therapeutic dietary practices. Examples of these preventive and therapeutic nutrition praxes involved teaching consumers about ways to modify carbohydrate intake and methods for maintaining a healthy weight.

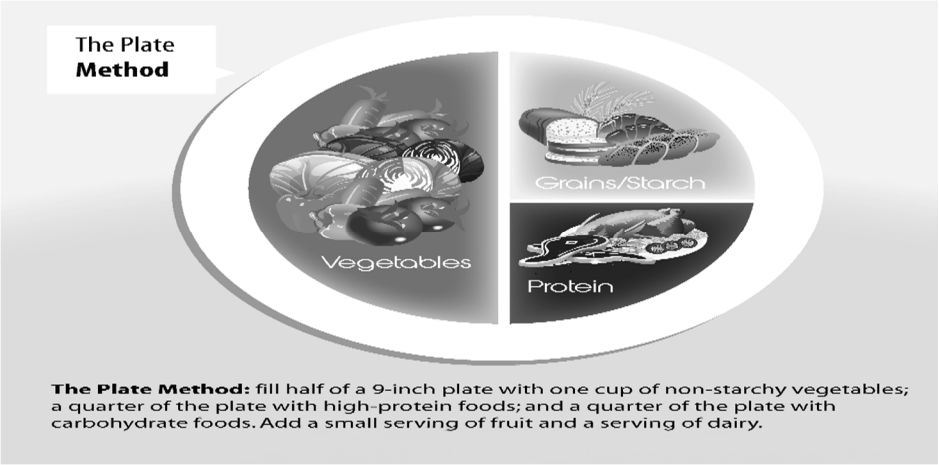
In Section 3, I will describe the project. I will also discuss the project goals and rationale, relevant literature supporting the training model, implementation paradigms, and evaluation methods. The implications for social change and concluding thoughts are featured at the end of this section of the study.

Description of Goals

The project associated with the study involves training local health educators about methods for modifying food consumption to improve the health of adults. Appendix A includes a detailed outline of the 3-day training project that provides medical, allied health, and public health personnel with basic tools to teach adult consumers about methods for modifying dietary carbohydrate intake and controlling weight.

The project study was executed to evaluate the current ADA teaching methods as tools for dietary carbohydrate modifications and weight loss. The evaluation of the respective education models was expedited through analyzing the perceptions of RDNs who use these nutrition education paradigms to instruct U.S. consumers in the Pacific Northwest. The study was performed after receiving IRB approval. The investigation showed that RDNs used the ADA plate method frequently to educate adults about

modifying dietary intake for controlling blood sugar levels and weight, but the participants felt that the ADA paradigm had unclear guidelines regarding the types and quantities of foods. Hence, one goal of the training project is to use the ADA plate method while also specifying the types and quantities of foods to be consumed for ensuring the proper intake of macronutrients and micronutrients (Figure 5).



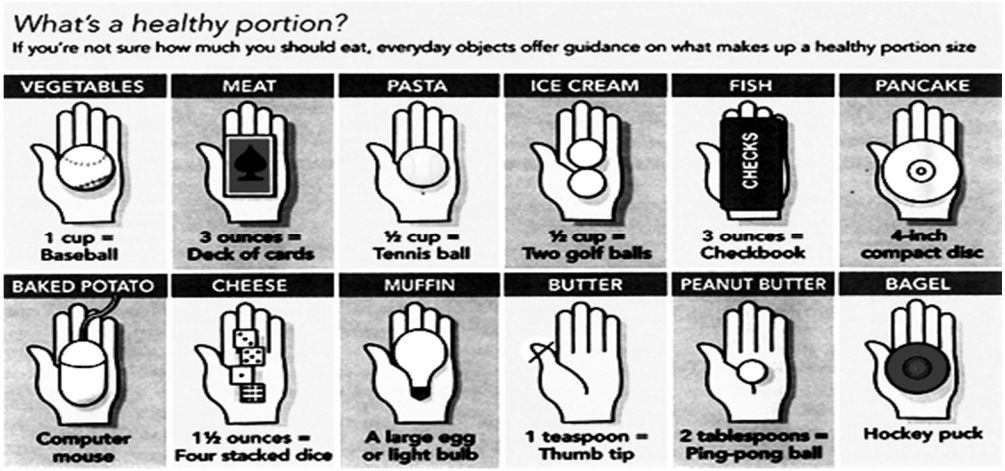


Figure 5. Types and quantities of foods. The figure helps consumers associate portion sizes of different foods with common objects (e.g., deck of cards or a tennis ball).

The study participants also felt that successful outcomes of nutrition education were primarily dependent upon the desires and perceptions of the individuals being taught. The aspirations and fortitude of an individual to adhere to dietary instructions may be due to physiological and psychological factors (Fairburn, 2013; Nakstad, 2014; O'leary, O'Brien, O'Connor, & Cryan, 2014). Therefore, teaching health educators about the biopsychological impacts on dietary habits should be included as another goal in the professional development project. Examples of these biopsychological influences are listed in Table 9. Based on the research of Haarhoff, Thwaites, and Bennett-Levy (2015), the emotional effects of these biopsychological influences should be understood through a paradigm of empathy on the part of the practitioner.

Table 9

Examples of Biopsychological Impacts on Dietary Habits

Biopsychological Impacts	Dietary Habits
Gender	Hormonal differences due to gender may affect the individual's nutritional needs, response to certain medications, and food consumption.
Age	Dietary requirements change with senescence; pharmacological therapies may increase with age requiring more emphasis on food-medication interactions.
Food Attitudes	Eating habits may change based on physiological and/or psychological health (e.g., binge-eating, anorexia, or polyphagia).
Medications	Drug therapies for physiological and/or psychological conditions may increase or decrease the person's needs for certain macronutrients and micronutrients in the diet.

Note: The table shows how biopsychological factors affect nutrition requirements and dietary habits.

The dyadic goals of the project encompass two major objectives: The first objective is to help health care educators understand how to present basic dietary guidelines for blood sugar and weight control, and the second objective considers the biopsychological parameters that affect dietary habits. The ADA plate method will be used for teaching basic dietary guidelines for weight and blood sugar control, but participants must also be taught how different biopsychological factors may affect the way the ADA plate method is used. For instance, participants should be aware of which foods are highest and lowest in carbohydrate when they speak to adult consumers who require insulin injections or oral hypoglycemic drugs (Bowen et al., 2016). Consequently, the goals of the project are to help educators in the fields of medicine, allied health, nursing, and public health understand basic nutritional guidelines through the ADA plate paradigm, while also recognizing how those dietary parameters may be circumscribed by biopsychological factors.

Rationale

The project was chosen to address the high obesity-related comorbidity rate in the local area (see Northwest Center for Public Health Practices, 2012; see Oregon Medical Association, 2016). Alexandraki et al. (2015) and Guildbrand et al. (2014) demonstrated how modifying the calories from dietary carbohydrate encouraged weight loss. Because the ADA has prescribed weight loss measures that may include dietary carbohydrate modifications, ADA education paradigms were considered for teaching adults about how to modify food intake for weight loss (Wheeler, 2014). Comments were solicited from RDNs who used various forms of the ADA education models. After qualitatively

analyzing these comments, a professional development project was created based on the education praxes of the respective RDNs. The project uses these practice-based methods in a training program for health education practitioners who advise adults regarding nutrition principles for blood sugar control and weight loss.

Review of the Literature

The focus of the literature review was on the professional growth of health education practitioners in the medical, allied health, and public health fields. The findings of the study implied that the professional development of these health educators may be enhanced through learning nutrition pedagogical approaches that inform adult consumers about dietary modifications for controlling carbohydrate intake and weight (Hivert, McNeil, Lavie, & Arena, 2017; Mogre, Steven, Aryee, & Scherpbier, 2017). Furthermore, Lenders et al. (2014) indicated that addressing nutrition issues and dietary education should be an aspect of quality improvement for health care practitioners. Therefore, a plan for 3-day professional seminar regarding nutrition education appears to be a viable strategy for improving the practices of local health educators.

To create a successful project, the literature review involved the use of the following database searches: ERIC, EBSCO, ProQuest Central, Google Scholar, and Thoreau. These probes included *professional development, professional development + nutrition, professional development + allied health, public health + nutrition+ professional development, diet education + professional development, medicine+ professional development+ nutrition.*

Professional Development

The provider-patient relationship. A principal construct through which health care practitioners undergo professional development involves their relationships with those whom they care for (Lawson et al., 2017). An important part of this professional growth involves empathetic communications with clients (Formosa, 2015; Hopkinson, Brown, Okamoto, & Addington, 2012). Instructional sessions between health care providers and clients are an important vehicle for empathetic communications that improve health outcomes (Hopkinson et al., 2012; Ruiz-Moral, Perula de Torres, Monge, Garcia-Leonardo, & Caballero, 2017). An important element of professional development among doctors, nurses, allied health providers, and public-health practitioners involves conveying information to patients or consumers in empathetic ways. For instance, Haarhoff et al. (2015) investigated self-practice and self-reflection erudition methods for the professional development of licensed therapists. The self-practice phase entailed therapists using cognitive behavioral therapy skills on themselves, followed by a self-reflective phase that allows therapists to integrate their own feelings generated from cognitive behavioral therapy self-analysis into their clinical practices. The results of this professional development paradigm were improved service to patients and increased empathy on the part of the health care providers.

Hayes (2016) advocated constructive alignment in which professional development is enhanced by education sessions that tie knowledge to practice. The respective researcher apportioned learning into cognitive, psychomotor, and affective domains. Understanding theoretical knowledge is the primary component of the cognitive domain, whereas the psychomotor domain involves the application of knowledge to

practice or therapeutic procedures. However, only the affective domain of learning is used to teach the practitioner how to relate to the values and beliefs of others. Examples of these value-belief relational paradigms include teaching health care educators about compassionate ways to explain bad eating habits to emotionally fragile binge-eaters or teaching physicians how to benevolently convey disheartening information to patients and their families (Griffiths, Ewing, Wilson, Connoly, & Grande, 2015). The role of the affective learning domain in professional development was also highlighted by Yoo and Carter (2017) and Zembylas (2014), who stated that acquiring knowledge from others and conveying information to those we teach is primarily an emotional process. Hence, professional development through knowledge acquisition involves understanding the affective aspects of patient learning and health care provider teaching.

Mediums of learning. Maher et al. (2017) and Weglicki, Reynolds, and Rivers (2015) investigated methods for providing efficacious professional development to allied health practitioners and nurses who worked in outpatient clinics. They conducted a phenomenological study and analyzed data from semistructured interviews that were given to 16 individuals. One theme related to learning emerged as a constituent of professional development. The participants did not enjoy online learning due to the lack of response and reassurance involved in many virtual instructional methods. The participants preferred learning in workshops conducted by practice specialists who could guide and encourage them throughout the learning process. Furthermore, the study participants stated that their teacher-learner interactions via distance media were inferior to those in a traditional workshop setting that provides face-to-face communications

among practitioners in diverse health care fields. The respective views of these participants were substantiated in another study conducted by Lowman (2016). This investigation showed that the professional skills of speech language pathologists trained in face-to-face peer coaching groups were superior to those taught through web-based programs.

A professional development medium involving collaborations among various health care practitioners and physician's assistants (PAs) was also highlighted by Reinhold, Otieno, and Bacon-Baguley (2017). In this study, students shadowed health care professionals in various fields as part of a training program to become PAs. This training helped prospective PAs to gain respect for professionals in other clinical fields and encouraged them to advance interdisciplinary practices. Moreover, Mahdizadehl, Heydaril, and Moonaghi (2015) found that these types of interdisciplinary practices improved patient health care outcomes and reduced patient-care costs.

Richard et al. (2015) and Torres et al. (2017) found that effective professional development programs for public health educators and practitioners must be circumscribed within the context of the local community. The researchers advocated a training model known as the *health promotion laboratory.* The sequential constituents of this paradigm are illustrated in Table 10.

Table 10

Sequential Constituents of the Health Promotion Laboratory

Sequence	Examples for Each Sequence
(1). Identify the local issue and practice specialists	Issue: Lack of diabetic patient compliance in controlling dietary carbohydrate intake. Specialists: RDNs, certified diabetic educators (CDEs).
(2). Identify an approach	RDNs and CDEs acquaint management with the situation and identify qualitative and quantitative data associated with the identified issue. Once management concurs, a training program is formulated to help practitioners improve their instructional assessment skills.
(3). Define instructional medium and how knowledge will be transferred	Medium: Workshop. Knowledge Transfer: Application of knowledge in two different local contexts (Schunk, 2012).
(4). Identify interventions and themes discussed in the workshops	Apply workshop information and discussions to the contexts of the local area
(5). Develop partnerships	Develop partnerships with practitioners in the community who treat and educate diabetics.
(6). Implement a community-wide program	The program is implemented through the logic model for educating non-compliant diabetics (W. K. Kellogg Foundation, 2006).

Note: The table shows an example of sequences in a Health Promotion Laboratory paradigm.

Gower (2013) encouraged the professional development of allied health personnel through sustainable care services that have a positive effect on the environment. For instance, the researcher not only pointed out how obesity-related diseases have been correlated with the overconsumption of unhealthy processed foods, but she also described how industrial processing methods of the respective foods harmed the environment. Furthermore, the investigation showed that 80% of greenhouse gas emissions are

associated with food production from livestock farming. Consequently, health care professional development may need to be a globally oriented medium that includes the interdisciplinary practices of environmental engineering, agriculture, and food technology.

Van Vuuren and Nel (2013) surveyed allied health practitioners who were dietitians, occupational therapists, and physiotherapists (n=258) regarding their professional development needs. Overall, the participants desired training in therapeutic interventions that were interdisciplinary in nature. For example, methods to treat a patient with swallowing problems may involve the expertise of nursing, dietetic, medical, and speech pathology fields. The study participants emphasized that instruction applied to practice is the best way to encourage the development of clinical skills.

Johnson, Prescott, and Lyon (2017) emphasized professional growth through giving individuals the opportunities to interact with different entities in their places of employment. The research implied that professional development emanates from learning in different contexts within an organization, while the evolution of professional development is enhanced when individuals integrate their occupational goals with those of their workplace. Likewise, Viljoen (2017) concluded that the amalgamation of occupational and institutional goals for professional growth in a health care environment requires instruction sessions that have been designed and implemented by those who will be the recipients of the training. However, Yarbrough, Martin, Alfred, and McNeill (2017) and Bindon (2017) found that effectual training for professional development

must address any value conflicts between the employees' occupational aspirations and the goals of the institutions in which they work to avoid a high turnover rate.

Biopsychological insights. Roberts, Campbell, and Troop (2013) and Peckmezian and Hay (2017) found that eating habits can be affected by biophysiological abnormalities that may be derived from stress-related impulsive behaviors. Because medications are often prescribed to control physiological and psychological factors of food ingestion, professional development programs for health care educators should include food-medication information (Milos, Bogojeska, Trajanov, & Kocarev, 2015). For instance, physiological mechanisms that control blood sugar and hunger may be modified by insulin and oral hypoglycemic drugs, whereas psychological behaviors that alter eating habits may be tempered through antidepressant therapies (O'Leary, O'Brien, O'Connor, & Cryan ,2014; Quirk, O'Neil, Pasco, Jacka, Housden, Berk, & Brennen, 2013). Understanding these biopsychological parameters helps health care educators comprehend individual intrinsic struggles and perceptions that may contribute to food-eating behaviors.

Implementation

The summarization of the research findings in Section 2 provided a paradigm for teaching dietary modifications for carbohydrate intake and weight control. These teaching models for controlling carbohydrate consumption and weight were based on the didactic practices of licensed nutrition educators known as RDNs. The design of the project reflects the therapeutic nutrition education practices of the respective allied health practitioners. For enhanced professional development, the medium by which the

information is conveyed will be based on the literature review in Section 3 which indicated that health care professionals prefer to learn in face-to-face workshops conducted by field experts who teach them how to apply theoretical concepts to therapeutic practices. The integration of theoretical principles and practices will be the framework for meeting the following program goals: Helping health care educators to present basic dietary guidelines for blood sugar and weight control that may be circumscribed by biopsychological conditions.

The essential elements of the project's implementation will be outlined in this section. These elements include essential resources, existing supports, potential barriers, probable solutions to barriers, proposed implementation timetable, and roles and responsibilities. The Veterans Health Administration (VHA) will support the project's essential elements because the data collected from the study were obtained from allied health educators who provided services to individuals served by this federal health care organization. Based on information from the Housing Assistance Council (2015), the veterans served by the VHA locally exceed 59,000 (about 16% of the local adult population). These data also indicated that the local VHA clinics and hospitals care for approximately 20% of all veterans residing within the state boundaries. Therefore, the VHA plays significant roles in the health care of local adults.

Essential Resources and Existing Supports

Implementation of the professional development plan will begin with soliciting assistance through the VHA Education Service and the Associate Director of Patient Care Service (ADPCS). These entities will provide the forms and procedures for conducting

the workshop and for seeking continuing education credit (CEC) from agencies that credential allied health occupations, nursing professions, and medical practitioners. Space for the training will be secured through the VHA Meeting Room Manager share point site (Meeting Room Manager, 2013). Equipment, educational materials, and refreshments will be supplied from the following VHA entities: Facilities Management Service, Education Service, and Director's Funds, respectively.

Potential Barriers and Probable Solutions to Barriers

Receiving CEC from credentialing agencies for the training may take several months. Many medical and allied health professions require CEC annually for licensure, so obtaining CEC approval from credentialing agencies would encourage attendance and participation. Conversely, not receiving CEC approval for the training may discourage participation. Furthermore, health care workers with direct patient care duties may not be able to adjust their patient counseling services to attend a three-day program. Enlisting the help of the VHA education service specialist who have work experience in obtaining CEC from diverse credentialing agencies may mitigate these barriers, and giving direct patient-care personnel a two-month notice before the training begins to prevent patient care appointments from being scheduled during the program time slots.

Proposed Implementation Timetable

Implementation of the professional development program would be during the fourth week of May 2018 after preliminary CEC from credentialing agencies has been approved for medical, nursing, and allied health personnel. Because primary care, public health, and other health care clinics are usually closed on the weekends, the three-day

training may take place May 25 – 27, 2018. Nonetheless, adjustments in scheduling on weekdays can be made to allow for maximum attendance. For instance, maximum attendance may be possible May 23-25, 2018, because outpatient load and administrative work usually decrease during the latter stages of the workweek.

Roles and Responsibilities

I will be the responsible party for writing and presenting this project study to the VHA Education Service and the ADPCS. I will also be available to assist these VHA entities in all aspects of the planning and implementation phases. The role of the ADPCS will be to secure approval from the VHA director in the local area. Once an approval has been given, Education Service personnel will expedite paper work to obtain credentialing agency CEC and assist in procuring space for the training through Facilities Management Service. I will arrange the refreshments for the program through the VHA Canteen Service with approval from the ADPCS. Though I will solicit teachers from the local RDN pool, I am prepared to present all modules of the training program if no other RDNs are available to teach.

Project Evaluation

The instructional design paradigm of Piskurich (2015) will be used as a preliminary evaluation tool for learning tasks prior to instructing the recipients. This evaluation method judges the frequency, importance, learning level, and risks of each learning task as it is applied to health care education practices. Task evaluations with the highest scores inform the instructor regarding the cognitive load and importance of each learning task. Those learning tasks with the highest scores may require more effort and

time for the instructor to teach than those with lower scores. I will evaluate the major learning tasks for each day of training utilizing a scale that is illustrated in Table 11. After completing the evaluation, a panel of three RDNs will review my learning tasks analyses and let me know if changes in the scores are needed.

Table 11

Applications to Practice: Carbohydrate Food Content

Learning Tasks	Frequency[a]	Importance[b]	Learning Level[s]	Risk[d]	Totals
Task 1: Identify foods highest in carbohydrate	4	4	3	4	15
Task 2: Identify foods with negligible carbohydrate	3	3	2	2	10
Task 3: Calculate total carbohydrate per meal	4	4	4	4	16

Note: The table shows learning task evaluations for calculating dietary carbohydrates.
[a]1=less than once monthly, 2=once monthly, 3=weekly, 4= daily for utilization in professional practices.
[b]1=could be omitted, 2=not critical, 3=moderately critical, 4=critical for utilization in professional practices
[c]1=not difficult, 2=somewhat difficult, 3=difficult, 4=very difficult for utilization in professional practices
[d]1=none, 2=minimal, 3=moderate, 4=high for utilization in professional practices

At the end of each day of classes, attendees will be given time to evaluate what they have learned and assess the strengths and weaknesses of the teaching methods. These formative evaluations will be used to improve instruction for each succeeding day of training. At the end of the three-day program, attendees will give a more extensive and

comprehensive evaluation. This evaluation form is featured in Appendix A. These daily and final evaluations by the attendees will be integrated into a prototyping evaluation model that examines erudition methods through iterations (Clark, 2015; Nafukho, Chakraborty, Johnson, & Cherrstrom, 2017). This evaluation method will proceed in two phases: (1) an interpretive design iteration (IDI), followed by (2) a release design iteration (RDI). The IDI will be the professional development program illustrated in Appendix A. Once the IDI has been evaluated by the participants, the data will be analyzed so that improvements can be made for future professional development programs that will be the RDI. Consequently, the IDI is performed first to evaluate the efficacy of the methods, functions, and features of a newly developed training program, whereas the RDI is the postevaluation product of the IDI. Though Clark (2015) stated that the RDI is the most complete and valid educational product, Nafukho et al. (2017) conceded that the effectual application of theoretical concepts to practice might be accurately exemplified during the IDI phase of evaluation. The example in Table 12 illustrates how the transferring of theoretical knowledge to practice skills may be employed and evaluated in the IDI and RDI phases to meet the learning goals of the professional development program.

Table 12

Knowledge Transfer Evaluation to Meet Learning Goals

Learning Goal	Fully Met (100%)	Met (75%)	Unmet (<75%)
Understand the ADA plate method	All the following are demonstrated by the learner: 1) identify high and low carbohydrate foods. 2) calculate total carbohydrate and calories per meal. 3) apply knowledge to a domestic situation of a patient. 4) apply plate method knowledge to a patient's diagnosis.	Three of the following are demonstrated by the learner: 1) identify high and low carbohydrate foods. 2) calculate total carbohydrate and calories per meal. 3) apply knowledge to a domestic situation of a patient. 4) apply plate method knowledge to a patient's diagnosis.	Less than three of the following are demonstrated by the learner: 1) identify high and low carbohydrate foods. 2) calculate total carbohydrate and calories per meal. 3) apply knowledge to a domestic situation of a patient. 4) apply plate method knowledge to a patient's diagnosis.
Understand the biopsychological influences affecting dietary habits.	All the following are demonstrated by the learner: 1) rehearse the general paradigm of physiological stress that may affect hunger. 2) rehearse a general paradigm of psychological stress that may affect hunger. 3) apply biopsychological effects on hunger to a domestic setting of a patient. 4) apply biopsychological effects on hunger to a patient diagnosis.	Three of the following are demonstrated by the learner: 1) rehearse the general paradigm of physiological stress that may affect hunger. 2) rehearse a general paradigm of psychological stress that may affect hunger. 3) apply biopsychological effects on hunger to a domestic setting of a patient. 4) apply biopsychological effects on hunger to a patient diagnosis.	Less than three of the following are demonstrated by the learner: 1) rehearse the general paradigm of physiological stress that may affect hunger. 2) rehearse a general paradigm of psychological stress that may affect hunger. 3) apply biopsychological effects on hunger to a domestic setting of a patient. 4) apply biopsychological effects on hunger to a patient diagnosis.

Note: The table shows two examples of how knowledge transfer may be used to accomplish learning goals.

The evaluation process of the professional development program involves several key stakeholders: Education specialists employed by the local VHA Education Service, regional health care educators, and the ADPCS. The education specialists are trained clinicians who have advanced degrees in education or a related field. Regional health care educators include licensed allied health and medical personnel working in public-health institutions and medical centers. The ADPCS is an executive-level registered nurse, with a doctoral degree in nursing or a related field, who supervises local VHA allied health and nursing staff.

Project Implications

McKinnon, Giskes, and Gavin (2014) studied how the nutrition knowledge of individuals was related to economic advancement and social progress. The respective researchers defined nutrition knowledge as an awareness of how nutrition improves health and mitigates disease, an understanding how different foods contribute diverse nutrients for human health, and an ability to apply healthy dietary practices to individual needs. The professional development project attempts to apply these three nutrition knowledge constituents to diet-therapy education models that teach adult consumers about modifying carbohydrate intake and weight. Therefore, the project may help advance positive social change by improving the health-related behaviors of individuals in the local region.

Section 4: Reflections and Conclusions

Introduction

In Section 3, I described a professional development project for training medical, allied health, and public health educators how to teach dietary carbohydrate modifications and weight control to adults. The two major project goals included teaching the respective educators how to present basic dietary guidelines regarding blood sugar and weight control, while also acquainting the educators with biopsychological factors that may affect food consumption. The rationale for creating the project was due to the high incidences of obesity and obesity-related diseases in the local area. I outlined the literature review to show research-based methods for the professional development of health care practitioners. The literature review also implied that the best medium for education health care practitioners is a face-to-face workshop in which field experts teach the application of theoretical concepts to practice. I also discussed project evaluation methods as well as the implications for positive social changes that may result the professional development training sessions.

My reflections and conclusions are provided in Section 4. These contemplations and deductions include a discussion of the project's strengths and limitations, recommendations for alternative approaches, reflective analyses about my learning processes and work, and future research applications and directions. The conclusion of Section 4 will encompass the essence of the study.

Project Strengths and Limitations

Strengths

The project was formulated to address the gaps in practice of health care providers who teach adults about dietary carbohydrate modifications and weight control. The project also addresses gaps in knowledge among health educators and consumers about carbohydrate counting and caloric determinations based on types and quantities of foods to be served per meal. The professional training program includes a simplistic plate method paradigm to help health care educators understand the proper food serving sizes at mealtimes and the variety of foods to be served to promote health. The education model is based on a familiar sample of a plate with specific portions and kinds of food to be served at each meal.

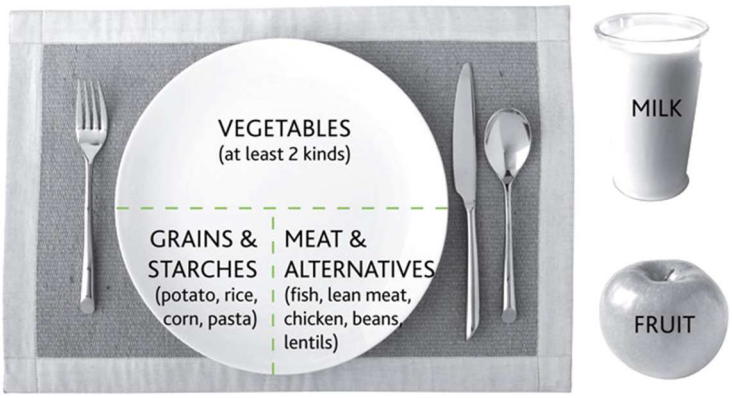


Figure 6. Plate method example. The figure shows a meal plan for one of three meals per day.

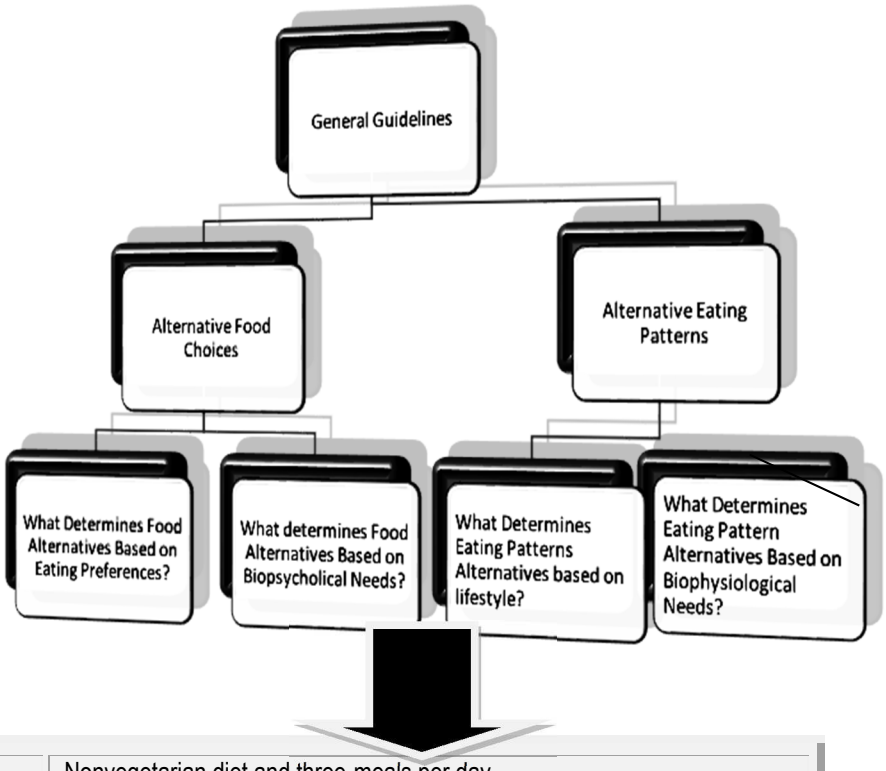
Limitations

The nutrition education model shown in Figure 5 is based on three meals per day with all food groups represented at each meal. This means that consumers are expected to have vegetables at breakfast, an uncommon practice among North Americans (Siegelbaum, 2014). Moreover, more than 40% of North Americans skip breakfast while

39% skip either lunch or an evening meal (Fantozzi, 2015). Therefore, it is expected that some local consumers may not follow a three meal eating pattern. The ADA plate method's only dairy food is specified as milk, not cheese, because a serving of milk has 12 grams of carbohydrate while a serving of cheese has none. Substituting cheese for milk is suitable for those with no blood sugar problems, but this substitution is not appropriate for people whose carbohydrate intake must be modified to maintain proper blood sugar levels (Wheeler, 2014). The ADA plate method can be adjusted for vegetarians who consume few or no animal products, but these substitutions may differ greatly from their animal food counterparts in carbohydrate and caloric content (e.g., unflavored almond milk is far lower in carbohydrate and calories than bovine milk). Consequently, the ADA plate method is most appropriate for a person who is a nonvegan and consumes three meals per day. Those who do not eat three meals per day or who do not consume animal products must make further adjustments to the dietary model.

Recommendations for Alternative Approaches

Alternative approaches should address possible ways to curtail the limitations of the project. Because the ADA plate method's general guidelines assume that adults eat three meals per day consisting of foods derived from animals and plants, alternative approaches need to expand these guidelines to include different eating patterns and habits. Health educators can be taught the general guidelines first, then taught how to specify the guidelines for various types of eating models as exemplified in the flow chart featured in Figure 7.



General Guidelines	Nonvegetarian diet and three-meals per day
Alternative food choices: preferences	Vegan (eats no animal products)
Alternative food choices: biopsychological factors	Ingestion of oral hypoglycemic drugs to control blood sugar. Substitute vanilla flavored soy milk for bovine milk and tofu or legumes for meat. Alternative choices for meat may add up to 15 grams of carbohydrate to each meal. No significant caloric changes due to alternative foods.
Alternative eating patterns: lifestyle	Work schedule and personal life allow three meals per day.
Alternative eating patterns: biopsychological needs.	Eats three meals per day to avoid blood-sugar highs and lows due to oral hypoglycemic drugs and diabetes. A snack at bedtime is required due to diabetes. This snack would consist of a serving of fruit and fat (e.g., fresh orange and 1 tablespoon of cashews).

Figure 7. Alternative approach to the ADA plate method: decision flow chart. The figure shows how to adapt the ADA plate method general guidelines to a vegan diabetic diet.

Figure 7 illustrates an alternative instructional approach for health care educators who provide nutrition therapy to a population based on a specific diagnosis. The flow chart in Figure 7 incorporates the two main goals for the training program: Teaching health care educators how to present basic dietary guidelines for blood sugar and weight control, while considering the views of the consumer through biopsychological parameters that affect dietary habits and health. The flow chart paradigm in Figure 7 is based on the logic model advocated by the CDC. This model aids in the creation and implementation of preventive health measures (U.S. Department of Health and Human Services, 2016). Kneal, Thomas, and Harris (2015) implied that the final outcomes of the logic model are to enhance the talents and abilities of individuals, improve behaviors and decision-making skills of consumers, and encourage socioeconomic and environmental progress of communities. On a local level, these logic model outcomes could be restated as enhancing the abilities of municipal residents to maintain healthy weights, improving the food consumption and procurement practices of individuals in the region, and encouraging beneficial dietary practices that attenuate medical costs for treating diseases in the provincial community.

Scholarship, Project Development, Leadership, and Change

When I compared the information in the literature review of Section 2 to the current nutrition education methods featured in the Data Analysis Results section of the doctoral study, I noticed that there were differences between what the research studies recommended for controlling weight and what practitioners advocated as dietary weight control measures. The research studies correlated dietary carbohydrate reduction to

weight loss, but RDN practitioners did not feel that limiting carbohydrate intake was enough for successful weight loss. RDNs would only consider dietary carbohydrate modifications for overweight individuals with blood sugar problems (e.g., diabetic). Nonetheless, the RDNs did recommend reducing the consumption of foods high in concentrated sweets (e.g., sweetened sodas or candy) as part of a healthy diet plan. Though the research studies found significant weight loss and health benefits in limiting total dietary carbohydrate, most of these low carbohydrate diets prescribed in the literature are not advocated by RDNs for weight loss (Evidence Analysis Library, 2017; Hu et al., 2015; Noakes, 2013; Thorhallur et al., 2016). Instead, RDNs encourage a reduction in total caloric intake for weight loss rather than focusing on a single macronutrient such as carbohydrate.

As an RDN practitioner myself, I realize that I must follow the practice guidelines of my credentialing agency to maintain my licensure and employment. Just as a licensed medical practitioner prescribes pharmaceuticals to treat disease, I prescribe diets to treat disease. Furthermore, the nutrition therapies I provide as an RDN are governed by my credentialing agency just as the types of pharmaceutical therapies administered by medical practitioners are regulated by their licensing organizations; the credentials that allow me to practice in my field also circumscribe how I practice. For instance, I cannot prescribe the low carbohydrate diets used for weight loss in most of the current research studies because they are not considered healthy based on the current nutrition guidelines (Academy of Nutrition and Dietetics, 2016; ADA, 2016; Office of Disease Prevention and Health, 2017). Consequently, the project is based on practices that are demarcated

by North American national guidelines rather than the information derived from the recent research investigations.

Reflections on the Importance of the Work

As I consider the impact of the work I have done for this study, I am reminded of the words of the ancient physician Hippocrates, "Let food be thy medicine and medicine be thy food [because] it is necessary for a physician to know [precisely] what man is in relation to what he eats and drinks" (Asiado, 2017, para. 2). I believe modern physicians accept this adage today because nutrition therapy is currently a constituent of many treatments prescribed by medical providers (Academy of Nutrition and Dietetics, 2014; National Board of Physician Nutrition Specialists, 2017). The types of foods we eat determine the kinds of nutrients that make-up our physical bodies. Furthermore, nutrition also has a complex relationship with psychological health because stress, anxiety, and other affective disorders influence food intake (Derom, Sayón-Orea, Martinez-Ortega, & Martinez-Gonzalez, 2013; Moreno-Dominguez, Rodriguez-Ruiz, Martin, & Warren, 2012; Smith & Segal, 2015). Consequently, our biopsychological make-up has a relationship with the nutrients we ingest: What we eat may affect how we feel and act, but how we feel and act may determine what we eat.

Implications, Applications, and Directions for Future Research

Individuals may develop over-eating behaviors as early as three years of age through environmental psychosocial influences (Braumgart-Rieker, More, Planalp, & Lefever, 2014). Therefore, dietary weight-loss education for overweight adults attempts to ameliorate bad-eating habits that may have begun in early childhood. The longevity of

these improper food-consumption behaviors may contribute to the difficulties adults encounter in making dietary changes that promote health. Thus, health care educators who teach adults about nutrition must assist their clients in overcoming maladaptive eating practices that may have occurred over protracted durations of time. Consequently, the project deliverable of this doctoral study must ensure that these didactic challenges are met through education methods that mitigate anxiety while encouraging curiosity. Taylor and Hamdy (2014) found adult learners experience a dissonance phase when they realize their existing knowledge of a subject is insufficient. This dissonance phase causes anxiety. Taylor and Marienau (2016) found that stimulating the curiosity of adult learners counterbalances the anxiety they may feel about the challenges of implementing new strategies into their lifestyles. Hence, developing an adult-learning program that attenuates affective dissonance while enhancing inquisitiveness about dietary weight loss methods, may aid in the reduction of obesity in local-area adults.

Applications and Future Research

This study has viewed diet education for controlling carbohydrate intake and weight through the perceptions of a small group of licensed health care educators. Based on these perceptions, the current ADA nutrition instructional model presents challenges when it is applied to health care education practices. Future research studies may need to be performed that test new education models based on the ADA prototype (the plate method).

A Future Research Possibility. A future investigation may involve a quantitative, quasi-experimental design based on a strategy of nonequivalent groups

(Cleamons, 2016). The investigation's purpose would be to compare the efficacy of the ADA plate method with a newly created instructional model that teaches adult consumers about carbohydrate and weight control. The instrument by Watts et al. (2011) could be used for the study, while the theoretical framework created by Taylor and Hamdy (2014) could be used to guide the study. The respective framework is known as *The Guide*, and its authors stated that "There are many theories that explain how adults learn [and] The Guide presents a model that combines many of the theories into a flow diagram that can be used by anyone planning learning" (p. e1561).

Proposed Analysis Strategies. To exclude extraneous variables and to enhance the validity of the results, the initial study should focus on adults of one gender with similar backgrounds in education and ethnic eating practices. The study participants would take a pretest to determine their knowledge of dietary carbohydrate. This pretest would encompass the following domains of the instrument created by Watts et al. (2011): Carbohydrate food recognition, counting carbohydrate in single foods, and counting carbohydrate in a meal (Cleamons, 2016). To ensure the proper nonequivalent group design of the study, an equal number of participants with diverse pretest scores would be distributed between two groups. After the membership of these two moieties has been established, one group would be instructed through the ADA plate method while the other group would be instructed through a newly developed model based on the ADA prototype. All instruction would be through a self-instructional, massive open online course (MOOC). After the instruction, all participants would take a posttest. The analysis would be based on the means of the two groups analyzed through *t*-tests. Consequently,

the null hypothesis would state that group means of the posttest will be equal, whereas the alternative hypothesis would postulate that the newly developed learning paradigm yields a significantly higher (or lower) posttest mean score than the ADA plate method.

Conclusion

Contemporary research studies have shown that low carbohydrate diets reduce weight, but most of these low carbohydrate regimens were deemed unhealthy because they did not meet the current national nutritional recommendations for U.S. citizens (Academy of Nutrition and Dietetics, 2016; American Diabetes Association, 2016; Office of Disease Prevention and Health, 2017; Evidence Analysis Library, 2017; Hu et al., 2015; Noakes, 2013; Thorhallur et al., 2016). In fact, only one of these research investigations indicated that carbohydrate reduction in healthy diets (e.g., Mediterranean diet) enhanced weight loss (Salvia et al., 2017). However, regardless of the nutritional content of the diet, the research indicated that lowering carbohydrate intake may mitigate postprandial hunger, whereas increasing carbohydrate consumption may do the opposite (Chandler-Laney et al., 2014; Hu, 2013; Lennerz et al., 2013). Despite the research findings regarding dietary carbohydrate modifications for weight loss, the licensed health care educators providing the data for this study felt that it was improper to focus on dietary carbohydrate reduction as a method for attenuating weight. These educators recommended total dietary caloric reduction as a weight loss method for the general adult population, and suggested that carbohydrate be modified only if the individuals suffered from blood-sugar abnormalities. Though the educators admitted that the current methods prescribed by the ADA tend to be complicated and ambiguous, all of them used the ADA

plate method frequently as a didactic tool for teaching dietary carbohydrate modifications and weight loss. Therefore, I found it necessary to create a project deliverable that used the plate-method paradigm. This project deliverable entailed my creating a professional development training program to help improve the practices of health care educators in the local area. The program constitutes the initial phase of a prototyping evaluation model that evolves and improves through iterations (Clark, 2015; Nafukho et al., 2017). A primary objective of this program is to improve the health of local citizens because Hassanzadeh et al., (2016), McKinnon et al. (2013), and Tchicaya et al. (2015) have shown that effectual health-related behaviors of individuals correlates with positive social progress.

References

Abad-Jorge, A. (2012). *Educational requirements for entry-level practice in the profession of nutrition and dietetics* (Doctoral dissertation). Walden University, Minneapolis, MN. Retrieved from https://search-proquest-com.ezp.waldenulibrary.org/pqdtlocal1005747/docview/1317633449/B61160F014E4508PQ/1?accountid=14872.

Academy of Nutrition and Dietetics. (2014). RDNs and medical nutrition therapy services. *Eat Right.* Retrieved from http://www.eatright.org/resource/food/resources/learn-more-about-rdns/rdns-and-medical-nutrition-therapy-services

Academy of Nutrition and Dietetics. (2016). What is a registered dietitian nutritionist? *Eat Right.* Retrieved from http://www.eatrightpro.org/resources/about-us/what-is-an-rdn-and-dtr/what-is-a-registered-dietitian-nutritionist

Accreditation Council for Education in Nutrition and Dietetics. (2016). *Individualized supervised practice pathways (ISPPs).* Retrieved from http://www.eatrightacend.org/ACEND/content.aspx?id=6442485529

Ahmadi-Abhari, S., Luben, R., Powell, N., Bhaniani, A, Chowdhury, R. Wareham, N., . . . Khaw, K. (2014). Dietary intake of carbohydrates and risk of type 2 diabetes: The European prospective investigation into Cancer-Norfolk study. *British Journal of Nutrition, 111*(2), 342-352. Retrieved from https://www-cambridge-org.ezp.waldenulibrary.org

Alexandraki, I., Palacio, C. & Mooradian, D. A. (2015). Relative merits of low-

carbohydrate versus low-fat diet in managing obesity. *Southern Medical Journal. 108*(7), 401-467. doi:10.14423/SMJ.0000000000000308

Altheide, D., & Johnson, J. (1994). Criteria for assessing interpretive validity in qualitative research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (pp. 485-499, Thousand Oaks, CA: Sage.

American Diabetes Association. (2015). Carbohydrate counting. Retrieved from http://www.diabetes.org/food-and-fitness/food/what-can-i-eat/understanding-carbohydrates/carbohydrate-counting.html

American Diabetes Association. (2016). Create your plate. Retrieved from http://www.diabetes.org/food-and-fitness/food/planning-meals/create-your-plate/.

Ansburg, P. I. & Heiss, C. J. (2012). Potential paradoxical effects of myth-busting as a health education strategy for older adults. *American Journal of Health Education, 43*(1), 31-36. Retrieved from http://files.eric.ed.gov/fulltext/EJ978261.pdf

Asiado, T. (2017). Hippocrates bio. *Edible Wild Food.* Retrieved from http://www.ediblewildfood.com/bios/hippocrates.aspx

Aston, Geri. (2013, February). Diabetes: An alarming epidemic. *Hospitals & Health Networks.* Retrieved from http://www.hhnmag.com/articles/5848-diabetes-an-alarming-epidemic

Babatunde, T., Himburg, P., Newman, L., Campa, A., & Dixon, Z. (2011). Theory-driven intervention improves calcium intake, osteoporosis knowledge, and self-efficacy in community-dwelling older Black Adults. *Journal of Nutrition Education and Behavior, 43*(1), 434-440. doi:10.1016/j.jneb.2010.07.004

Barabas, G., Tenblad, A, & Ostgren, C. J. (2016). Low carbohydrate diet and obesity treatment in primary health care: Dietary advice after the new Swedish report. *Biomed Central Nutrition, 2*(4), 1-6. doi:10.1186/s40795-015-0042-6

Basurto, X. & Speer, J. (2012). Structuring the calibration of qualitative data as sets for qualitative comparative analysis (QCA). *Field Methods, 24*(2), 155-173. doi:10.1177/1525822X11433998

Braumgart-Rieker, J. M., Moore, E. S., Planalp, E. M., & Lefever, J. B. (2014). Psychosocial pathways to childhood obesity: A pilot study involving a high risk preschool sample. *Eating Behaviors, 15*(4), 428-531. doi:10.1016/j.eatbeh.2014.07.004

Bem, D. J. (1967). Self-perception: An Alternative interpretation of cognitive dissonance phenomena. *Psychological Review, 74*, 183-200. Retrieved from http://dbem.ws/SP%20Theory%20Cognitive%20Dissonance.pdf.

Bergman, E. M., de Bruin, A. B. H., Vorstenbosch, M. A. T. M., Kooloos, J. G. M. Puts, G. C. W. M., Leppink, J., &… Van der Vleuten, C. P. M. (2015). Effects of learning content in context on knowledge acquisition and recall: A pretest-posttest control group design. *BioMed Central Medical Education, 15,* 1-11. doi:10.1186/s12909-015-0416-0

Bindon, S. L. (2017). Professional development strategies to enhance nurse' knowledge and maintain safe practice. *Association of Perioperative Registered Nurses Journal,106*(2) 99-110. doi:10.1016/j.aorn.2017.06.002

Block, E. S. and Erskine, L. (2012). Interviewing by telephone: Specific considerations, opportunities, and challenges. *International Journal of Qualitative Methods, 11*(4), 428-445. Retrieved from https://www.researchgate.net/publication/236980811_Interviewing_by_Telephone_Specific_Considerations_Opportunities_and_Challenges

Bowen, M.E., Canaugh, K. L., Wolff, K., Davis, D., Greogory, R. P., Shitani, A., . . . Rothman, R. L. (2016). The diabetes nutrition education study randomized controlled trial: A comparative effectiveness study of approaches to nutrition in diabetes self-management education. *Patient Education and Counseling, 99*(8), 1368-1376. doi:10.1016/j.pec.2016.03.017

Buelow, V. & Ngo, D. (2012). Oregon overweight, obesity, physical activity and nutrition facts. *Oregon Health Authority.* Retrieved from http://public.health.oregon.gov/PreventionWellness/Nutrition/Documents/Oregon_PANfactst_2012.pdf

Carter, M. J. & Fuller, C. (2016). Symbols, meaning, and action: The past, present, and future of symbolic interactionism. *Current Sociology Review, 64*(6), 931-961. doi:10.1177/0011392116638396

Centers for Disease Control and Prevention. (2013). Program performance and evaluation office (PPEO)—program evaluation. Retrieved from http://www.cdc.gov/eval/resources/

Centers for Disease Control and Prevention. (2016). Adult obesity causes & consequences. Retrieved from http://www.cdc.gov/obesity/adult/causes.html

Chandler-Laney, P. C., Morrison, S. A., Goree, L. T., Ellis, A. C., Casazza, K., Desmond, R., & Gower, B. A. (2014). Return of hunger following a relatively high carbohydrate breakfast is associated with earlier recede glucose peak and nadir. *Appetite, 80,* 236-241. doi:10.1016/j.appet.2014.031

Choo, V. L. & Sievenpiper, J. L. (2015). Sugars and obesity: Is it the sugars or the calories? *Nutrition Bulletin, 40*(2), 88-96. doi:10.1111/nbu.12137

City-Data. (2017). Public records: Online. Retrieved from http://www.city-data.com/city/Medford-Oregon.html

Clark, D. (2015). Types of evaluations in instructional design. *Big Dog & Little Dog's Performance Juxtaposition.* Retrieved from http://www.nwlink.com/~donclark/hrd/isd/types_of_evaluations.html

Cleamons, V. (2015). *Qualitative research: Major assessment #7.* Unpublished manuscript, Richard W. Wiley College of Education and Leadership, Walden University, Minneapolis, MN.

Cleamons, V. (2016). Research proposal: A quantitative research design to evaluate two education models for teaching adult males about dietary carbohydrates. *Research Gate.* Retrieved from https://www.researchgate.net/publication/309564224_Research_Proposal_A_Quantitative_Research_Design_to_Evaluate_Two_Education_Models_for_Teaching_Adult_Males_about_Dietary_Carbohydrates

Converse, M. (2012). Philosophy of phenomenology: How understanding aids research. *Nurse Researcher. 20*(1), 28-32. doi:10.7748/nr2012.09.20.1.28.c9305

Cragun, D., Pal, T., Vadaparampil, S. T., Baldwin, J., Hampel, H., & DeBate, R. D. (2016). Qualitative comparative analysis: A hybrid method for identifying factors associated with program effectiveness. *Journal of Mixed Methods Research, 10*(3), 251-272. doi:10.1177/155868981557023

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Boston, MA: Pearson Education, Inc.

Cronqvist, L. (2017). *Tosmana 1.54*. University of Trier, DE: Compass. Retrieved from https://www.tosmana.net/.

Dandan, T. Wenfu, L., Tianen, D, Nusbaum, H. C., Jiang, Q. & Qinglin Z. (2013). Brain mechanisms of the valuable scientific problem finding inspired by heuristic knowledge. *Experimental Brain Research, 228*(4), 437-443. doi:10.1007/s00221-013-3575-4

De Fatima Ferreira Grillo, M., Neumann, C. R., Scain, S. F., Rozeno, R. F., Gross, J. L., & Leitao, C. B. (2013). Effect of different Types of self-management education in patients with diabetes. *Revista da Associacao Medica Brasileira, 59*(4), 400-405. Retrieved from http://www.scielo.br/scielo.php?pid=S0104-42302013000400021&script=sci_arttext&tlng=en.

DeLuca, C. (2011). Interpretive validity theory: Mapping a methodology for validating educational assessments. *Educational Research, 53*(3), 303-320. doi: 10.1080.00131881.2011.598659

Denzin, N. K. & Lincoln, Y. S. (2005). *The sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.

Derom, M. L., Sayon-Orea, C., Martinez-Ortega, J. M., & Martinez-Gonzalez, M. A. (2013). Magnesium and depression: A systematic review. *Nutritional Neuroscience, 16*(5), 191-206. doi:10.1179/1476830512Y.0000000044

De Santis, L. & Ugarriza, D. N. (2000). The concept of theme as used in qualitative nursing research. *Western Journal of Nursing Research, 22*(3), 351-372. Retrieved from http://wjn.sagepub.com/content/22/3/351.full.pdf+html.

Dorning, H. & Bardsley, M. (2014, September). Focus on allied health professionals: Can we measure quality of care? *The Health Foundation.* Retrieved from http://www.qualitywatch.org.uk/sites/files/qualitywatch/field/field_document/Focus%20On%20Allied%20Health%20Professionals.pdf.

Drozdova, K. & Gaubatz, K. T. (2016). *Quantifying the Qualitative: Information theory for comparative case analysis.* Thousand Oaks, CA: Sage.

Eisner, E. (1997). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice.* Columbus, OH: Merrill.

Elidottir, A. S., Hallldorsson, T. I., Gunnarsdottir, I., & Ramel, A. (2016). Dietary intake and cardiovascular risk factors in Icelanders following voluntarily a low carbohydrate diet. *Plos One, 11*(8), 1-10. doi:10.1371/journal.pone.0156655

Evidence Analysis Library. (2017). Recommendations summary: Adult weight management (AWM) low carbohydrate diet. *Academy of Nutrition and Dietetics.* Retrieved from https://www.andeal.org/template.cfm?key=634.

Fairburn, C. G. (2013). *Overcoming binge eating: The proven program to learn why you binge and how you can stop.* New York, NY: Guilford Press.

Fantozzi, J. (2015, August). More than half of Americans skip breakfast at least once a week, study says. *The Daily Meal.* Retrieved from https://www.thedailymeal.com/news/healthy-eating/more-half-americans-skip-breakfast-least-once-week-study-says/081815.

Fiss, P. C. (2012, November). *Crisp and fuzzy set qualitative comparative analysis (QCA)*. Presented at the USC Marshall School of Business, University of Southern California. Los Angeles, CA. Retrieved from http://www.indiana.edu/~wim/docs/11_9_2012_Peer%20Fiss_slides.pdf.

Formosa, C. (2015). Understanding power and communication relationships in health care settings. *British Journal of Health Care Management, 21*(9), 420-424. Retrieved from http://eds.a.ebscohost.com.ezp.waldenulibrary.org/eds/pdfviewer/pdfviewer?vid=18&sid=37f1dcaa-e3ad-4943-997f-e5da86e955d2%40sessionmgr4010.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2014). *How to design and evaluate research in education* (9th ed.). New York, NY: McGraw-Hill Education.

Frels, R. K. & Onwuegbuzie, A. J. (2013). Administering quantitative instruments with qualitative interviews: A mixed research approach. *Journal of Counseling & Development, 91,* 184-194. doi:10.1002/j.1556-6676.2013.00085.x

Gigerenzer, G. & Gaissmaeier, W. (2011). Heuristic decision making. *Annual Review of Psychology, 62,* 451-482. doi:10.1146/annurev-psych-120709-145346

Gower, G. (2013). Sustainable development and allied health professionals. *International Journal of Therapy and Rehabilitation, 20*(8), 403-409. doi: 10.12968/ijtr.2013.20.8.403

Green, L. W., Sim, L., & Breiner, H. (Eds.). (2013). *Evaluating obesity prevention efforts: A plan for measuring progress.* Washington, DC: The National Academy Press.

Griffiths J., Ewing G., Wilson C., Connolly M., & Grande G. (2015). Breaking bad news about transitions to dying: a qualitative exploration of the role of the District Nurse. *Palliative Medicine 29*(2): 138–46. doi:10.1177/0269216314551813

Guildrand, H.A., Linstrom, T. A., Dizdar, B. A., Bunjaku, B. A., Ostren, C. A, Nystrom, F. A., & Bachrach-Lindstrom, M. (2014). Randomization to a low-carbohydrate diet advice improves health related quality of life compared with a low-fat diet at similar weight-loss in type 2 diabetes mellitus. *Diabetes Research and Clinical Practice, 106*(2), 221-227. doi:10.1016/j.diabres.2014.08.032

Haarhoff, B., Thwaites, R. & Bennett-Levy, J. (2015). Engagement with self-practice/self-reflection as a professional development activity: The role of therapist beliefs. *Australian Psychologist, 50*(5), 322-328. doi:10.1111.ap.12152

Hassanzadeh, J., Asadi-Lari, M., Baghbanian, A., Ghaem, H. Kassani, A., & Rezaianzadeh, A. (2016). Association between social capital, health-related quality of life, and mental health: a structural-equation modeling approach. *Croatian Medical Journal, 57*(1), 58-65. doi:10 3325/cmj.2016.57.58

Haesebrouck, T. (2016). The added value of multi-value qualitative comparative

analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *17*(1), Art. 12, http://nbn-resolving.de/urn:nbn:de:0114-fqs1601129.

Hayes, C. (2015). Approaches to continuing professional development: Putting theory into practice. *British Journal of Nursing, 25*(15), 860-864. doi: 10.12968/bjon.2016.25.15.860

Health Resources & Services Administration. (2015). *2015 health center profile.* Retrieved from https://bphc.hrsa.gov/uds/datacenter.aspx?q=d&bid=100790&state=OR&year=2015.

Hivert, M. F., McNeil, A., Lavie, C. J. & Arena, R. (2017). Training health professionals to deliver healthy living medicine. *Progress in Cardiovascular Disease, 59*(5), 471-478. doi:10.1016 /pcad.2017.02.004

Ho, A. S. L., Soh, N. L., Walter, G. & Touyz, S. (2011). Comparison of nutrition knowledge among health professionals, patients with eating disorders and the general population. *Nutrition & Dietetics, 68,* 267-272. Retrieved from http://eds.b.ebscohost.com.proxy1.ncu.edu/eds/pdfviewer/pdfviewer?sid=3e561c56-8f77-44d4-b56d-439377f415f7%40sessionmgr110&vid=3&hid=104.

Hope, S. W. & Kulkarni, K. (2011). *The complete guide to carb counting* (3rd ed.). Alexandria, VA: American Diabetes Association.

Hopkinson, J., Brown, J., Okamoto, I., & Addington-Hall, J. (2012). The effectiveness of patient- family career (couple) intervention for the management of symptoms and other health related problems

in people affected by cancer: A systematic literature search and narrative review. *Journal of Pain and Symptom Management*, *43*(1), 111–142. doi:10.1016/j.jpainsymman.2011.03.013

Housing Assistance Council. (2015). Veterans in the United States. *Veterans Data Central.* Retrieved from http://www.veteransdata.info/.

Hu, F. B. (2013). Resolved: There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases. *Obesity Reviews, 14*(8), 606-619. doi:10.1111/obr.12040

Hu, T., Yao, L., Reynolds, K., Whelton, P. K., Niu, T., Li, S., &….Bazzano, L. A. (2015). The effects of a low-carbohydrate diet vs. a low-fat diet on novel cardiovascular risk factors: A randomized controlled trial. *Nutrients, 7*(9), 7978-7994. doi:10.3390/nu7095377

Institute for Health Metrics and Evaluation. (2015). *U.S. County Profile.* Retrieved from http://www.healthdata.org/sites/default/files/files/county_profiles/US/County_Report_Jackson_County_Oregon.pdf.

James, M., Gee, S., Ewbank, K, Vaggalis, N., Armstrong, A., Black, L...& Driscoll, M. (2016). Introduction to Boolean logic. *iProgrammer.* Retrieved from http://www.i-programmer.info/babbages-bag/235-logic-logic-everything-is-logic.html.

Jarvis, C. (2012). Learning to lose weight: Weight-loss classes and personal transformation. *Studies in the Education of Adults, 44*(2), 136-154. Retrieved from http://eric.ed.gov/?id=EJ986464.

Johnson, M.W., Prescott, D., & Lyon, S. (2017). Learning in online continuing professional development: An institutionalist view on the personal learning environment. *Journal of New Approaches in Educational Research, 6*(1), 20-27. doi:10.7821/naer.2017.1.189

Jovanovik, M., Bogojeska, A., Trajanov, D., & Kocarev, L. (2015). Inferring cuisine - drug interactions using the linked data approach. *Scientific Reports (Nature Publisher Group), 5*, 9346. Retrieved from http://dx.doi.org.ezp.waldenulibrary.org/10.1038/srep09346

Juraschek, S. P., Chang, A. R., Appel, L. J., Anderson, C. M., Crews, D. C., Thomas, L., &…Miller, E., III. (2016). Effect of glycemic index and carbohydrate intake on kidney function in healthy adults. *BioMed Central Nephrology, 17*(70), 1-10. doi: 10.1186/s12882-016-0288-5

Kaartinen, N. E., Knekt, P. Kanerva, N., Valsta, L. M., Eriksson, J. G., Risanen, H…& Mannisto, S. (2016). Dietary carbohydrate quantity and quality in relation to obesity: A pooled analysis of three Finnish population-based studies. *Scandinavian Journal of Public Health, 44,* 385-393. doi: 10.1177/1403494815622860

Kahihofer, J. Lagerpusch, M., Enderle, J., Eggeling, B., Braun, W., Pape, D., &…Bosy-Westphal, A. (2014). Carbohydrate intake and glycemic index affect substrate oxidation during a controlled weight cycle in health men. *European Journal of Clinical Nutrition, 68,* 1060-1066. doi:10.1038/ejcn.2014.132

Kashyap, S. R., Louis, E. S., & Kirwan, J. P. (2011). Weight loss as a cure for type 2 diabetes: Fact or fantasy? *Expert Review of Endocrinology & Metabolism, 6*(4), 557-561. Retrieved from http://www.medscape.com/viewarticle/746806.

Kalyuga, S. & Hanham, J. (2011). Instructing in generalized knowledge structures to develop flexible problem-solving skills. *Computers in Human Behavior, 27,* 63-68. doi:10.1016/j.chb.2010.05.024

Kawamura, T. Takamura, C., Hirose, M., Hashimoto, T, Higashide, T., Kashihara, Y., Hashimura, K. & Shintaku, Haruo. (2015). The factors affecting an estimation of carbohydrate content of meals in carbohydrate counting. *Clinical Pediatric Endocrinology, 24*(4), 153-165. doi:10.1297/cpe.24.153

Kneale, D., Thomas, J., & Harris, K. (2015). Developing and optimising the use of logic models in systematic reviews: Exploring practice and good practice in the use of programme theory in reviews. *PLoS One, 10*(11) doi: 10.1371/journal.pone.0142187

Laerd Dissertation. (2012). Purposive sampling. *Lund Research Ltd.* Retrieved from http://dissertation.laerd.com/purposive-sampling.php#homogenous.

Laird, J. D. (2007). *Feelings: The perceptions of self*. New York, NY: Oxford University Press.

Lawson, L., Knudson-Martin, C. Hernandez, B. C., Lough, A., Benesh, S., & Douglas, A. (2017). Student health care clinicians' illness narratives: Professional identity development and relational practice. *American Journal of Family Therapy, 45*(3), 149-162. doi:10.1080/01926187.2017.1322926

Lazarus, E. (2017). Do you know the difference between a registered dietitian nutritionist (RDN) and a nutritionist? *Denver Medical Weight Loss Clinical Nutrition Center*. Retrieved from http://www.clinicalnutritioncenter.com/meet-our-medical-weight-loss-professionals/registered-dietitians-nutritionists/registered-dietitian-vs-nutritionist.

Legewie, N. (2013). An introduction to applied data analysis with qualitative comparative analysis (QCA). *Forum: Qualitative Social Research, 14*(3), Art.15. Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/1961/3594.

Lewegie, N. (2017). Anchored calibration: From qualitative data to fuzzy sets. *Forum Qualitative Social Research, 18*(3), e1-e24. doi:10.17169/fqs-18.3.2790

Lenders, C. M., Deen, D. D., Bistrian, B., Edwards, M. S., Seidner, D. L., McMahon, M. M., Kohlmeier, M., & Krebs, N. F. (2014). *American Journal of Clinical Nutrition, 99*, 1174S-1183S. Retrieved from http://ajcn.nutrition.org/content/99/5/1174S.full.pdf+html.

Lennerz, B. S., Alsop, D. C., Holse, L. M, Stern, E., Rohas. R., Ebbeling, C. B., & Gower, B. A. (2014). Effects of dietary glycemic index on brain regions related to reward and craving in men. *The American Journal of Clinical Nutrition, 98*(3), 641-647. doi: 10.3945/ajcn.113.064113

Leppink, J., Paas, F., Van der Vleuten, C. P. M., Van Gog, T., & Van Merriëboer. (2013). Development of an instrument for measuring different types of cognitive load. *Behavior Research Methods, 45*(4), 1058-1072. Retrieved from http://link.springer.com/article/10.3758%2Fs13428-013-0334-1.

Live Science. (2012, June). *What's the difference between a fruit and a vegetable?* Retrieved from http://www.livescience.com/33991-difference-fruits-vegetables.html.

Lowman, J. J. (2016). A comparison of three professional development mechanisms for improving the quality of standards-based IEP objectives. *Communication Disorders Quarterly, 37*(4), 211-224. doi:10.1177/1525740115595338

Lyons, B. P. (2014). Nutrition intervention education with community-dwelling older adults: Research challenges and opportunities. *Journal of Community Health, 39,* 810-818. doi: 10.1007/s10900-013-9810-x

Mahan, L. K., Escott-Stump, S., & Raymond, J. L. (2012). *Krause's food and the nutrition care process* (13th ed.). St. Louis, MO: Elsevier Saunders.

Mahdizadehl, M., Heydaril, A. & Moonahi, H. K. (2015). Interdisciplinary collaboration modeld and frameworks from similarities to differences: A systematic review. *Global Journal of Health Science, 7*(6), 170-180. doi:10.5539/gjhs.v7n6p170

Maher, B., Faruqui, A., Horgan, M., Bergin, C., Tuathaigh, C. O., & Bennett, D. (2017). Continuing professional development and Irish hospital doctors: A survey of current use and future needs. *Clinical Medicine, 17*(4), 307-315. doi: 10.7861/clinmedicine.17-4-307

Marcason, W. (2012). What is the appropriate distribution of macronutrients for a patient with diabetes? *Journal of the Academy of Nutrition and Dietetics, 112*(5), 776. doi:10.1016/j.jand.2012.03.014

Marewski, J. N. & Gigerenzer, G. (2012). Heuristic decision making in medicine.

Dialogues of Clinical Neuroscience, 14, 77-89. Retrieved from http://www.dialogues-cns.org/wp-content/uploads/2012/04/DialoguesClinNeurosci-14-77.pdf.

Mckinnon, L., Giskes, K., & Turrell, G. (2014). The contribution of three components of nutrition knowledge to socio-economic differences in food purchasing choices. *Public Health Nutrition, 17*(8), 1814-1824. doi:10.1017/S1368980013002036

Meeting Room Manager. (2013). *SharePoint.* Retrieved from http://moss.white-city.med.va.gov/Lists/Links/DispForm.aspx?ID=2.

Miller, S. T., Oates, V. J., Brooks, M. A., Shintani, A., Gebrasadik, T. & Jenkins, D. M. (2014). Preliminary efficacy of group medical nutrition therapy and motivational interviewing among obese African American women with type 2 diabetes: A pilot study. *Journal of Obesity, 345941,* 1-7. doi:10.1155/2014/345941

Mills, E. A. (2013). *Testing the reliability and validity of the Adult Carb Quiz in inpatients with type 2 diabetes* (Master's thesis). Retrieved from the ProQuest Dissertation and Theses database.

Mogre, V., Stevens, F., Aryee, P. A., & Scherpbier, A. J. J. A. (2017). *Health Professions Education,* e1-e8. Retrieved from https://ac.els-cdn.com/S2452301116301109/1-s2.0-S2452301116301109-main.pdf?_tid=cb54f318-b120-11e7-9c95-00000aab0f27&acdnat=1508014186_823e1525b788830db2f410b0e5ee24e2.

Moreno-Dominguez, S., Rodriguez-Ruiz, S., Martin, M. & Warren, C. S. (2012).

Experimental effects of chocolate deprivation on cravings, mood, and consumption in high and low chocolate-cravers. *Appetite, 58*(1), 111-116. doi:10.1016/j.appet.2011.09.013

Mozaffarian, R. S., Lee, R. M., Kennedy, M. A., Ludwig, D. S., Mozaffarian, D., & Gortmaker, S. L. (2013). Identifying whole grain foods: A comparison of different approaches for selecting more healthful whole grain products. *Public Health Nutrition, 16*(2), 2255-2264. doi:10.1017/S1368980012005447

Nafukho, F. M., Alfred, M., Chakraborty, M., Johnson, M., & Cherrstrom, C. A. (2017). Predicting workplace transfer of learning: A study of adult learners enrolled in a continuing professional education training program. *European Journal of training and Development, 41*(4), 327-353. doi:10.1108/EJTD-10-2016-0079

Nakstad, P. H. (2014). Gender differences in the human brain. *Acta Radiologica, 56*(2), 131-132. doi: 10.1177/0284185114562993

National Board of Physician Nutrition Specialists. (2017). *What is a physician nutrition specialist?* Retrieved from http://nbpns.org/about/.

National Center for Chronic Disease Prevention. (2015, June 16). *Adult Obesity Causes & Consequences*. Retrieved from http://www.cdc.gov/obesity/adult/causes.html

Ndumele, C. E., Matsushita, K., Lazo, M., Bello, N., Blumenthal, R. S., Gerstenblith, G., &…Coresh, J. (2016). Obesity and subtypes of incident cardiovascular disease. *Journal of the American Heart Association 5,* e003921. doi:10.1161/JAHA.116.003921

Noakes, T. D. (2013). Low-carbohydrate and high-fat intake can manage obesity and

associated conditions: Occasional survey. *South African Medical Journal, 103*(11), 826-830. doi:10.7196/samj.7302

Noone, J. (2015). *Jackson county health equity assessment: Phase 1 racial and ethnic disparities.* Retrieved from https://www.oregon.gov/oha/oei/Documents/Jackson%20County%20Health%20Equity%20Phase%201%20Report%20-Final.pdf.

Northwest Center for Public Health Practices. (2012). Effective adult learning: A toolkit for teaching adults. *University of Washington School of Public Health.* Retrieved from https://www.nwcphp.org/documents/training/Adult_Education_Toolkit.pdf.

Office of Disease Prevention and Health Promotion. (2017). *2015-2020 dietary guidelines for Americans* (8th ed.). Washington, DC: U.S. Department of Health and Human Services. Retrieved from https://health.gov/dietaryguidelines/2015/.

Office of Economic Analysis. (2016). *Your community in focus.* Retrieved from https://www.oregon.gov/DHS/SENIORS-DISABILITIES/LTC/LTC30/LTC30/jackson.pdf.

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association, 311*(8), 806-814. doi:10.1001/jama.2014.732

O'Leary, O. F., O'Brien, F. E., O'Connor, R. M., & Cryan, J. F. (2014). Review: Drugs, genes and the blues: Pharmacogenetics of the antidepressant response from mouse to man. *Pharmacology, Biochemistry and Behavior, 123,* 55-76. doi:10.1016/j.pbb.2013.10.015

Oregon Health Authority. (2013). Diabetes, heart disease, and stroke in Oregon. *Health Promotion and Chronic Disease Prevention.* Retrieved from http://public.health.oregon.gov/DiseasesConditions/ChronicDisease/Documents/OHA8582_AllVolumes.pdf.

Oregon Medical Association. (2016). *Obesity*. Retrieved from http://www.theoma.org/media/public-health-fact-sheets-3.

Peckmezian, T. & Hay, P. (2017). A systematic review and narrative synthesis of interventions for uncomplicated obesity: Weight loss, well-being and impact on eating disorders. *Journal of Eating Disorders, 15*(5), 1-15. doi:10.1186/s40337-017-0143-5

Piskurich, G. M. (2015). *Rapid instructional design: Learning ID fast and right* (3rd. ed.). Hoboken, NJ: John Wiley & Sons.

Plowright, S. (2015). *Learning logic: Critical thinking with intuitive notation.* London, UK: Lulu Press.

Powers, M. M., Bardsley, J., Cypress, M., Duker, P., Funnell, M. M., Hess-Fischl, A., . . . Vivian, E. (2015). Diabetes self-management education and support in type 2 diabetes: A joint position statement of the American Diabetes Association, the American Association of Diabetes educators, and the Academy of Nutrition and Dietetics. *Journal of the Academy of Nutrition & Dietetics, 115*(8), 1323-1334. doi:10.1016/j.jand.2015.05.012

Precision Consulting. (2017). *Quantitative, Qualitative, and Strategic Consulting.* Retrieved from http://precisionconsultingcompany.com/.

Quirk, S. E., Williams, L. J., O'Neil, A., Pasco, J. A., Jacka, F. N., Housden, S. Berk, M., & Brennan, S. L. (2013). The association between diet quality, dietary patterns and depression in adults: A systematic review. *Biomedical Central Psychiatry, 13*(175), 1-22.

QSR International. (2016). *NVivo: The #1 software for qualitative data analysis.* Retrieved from http://www.qsrinternational.com/product.

Radford, J., Bosanquet, P., Webster, R., Blatchford, P., & Rubie-Davies, C. (2014). Fostering learner independence through heuristic scaffolding: A valuable role for teaching assistants. *International Journal of Educational Research, 63,* 116-126. doi:10.1016/j.ijer.2013.02.010

Ragin, C. C. (2014). *The comparative method: Moving beyond qualitative and quantitative strategies.* Oakland, CA: University of California Press.

Ragin, C. & Davey, S. (2014). *FS/QCA [computer programme], version 2.5.* Irvine, CA: University of California. Retrieved from http://www.compasss.org/software.htm.

Reinhold, I. M., Otieno, S., & Bacon-Baugley, T. (2017). Integrating interprofessional experience throughout a first-year physician assistant curriculum improves perceptions of health care providers. *Journal of Interprofessional Education & Practice, 6*, 37-43. doi: 10.1016/j.xjep.2016.12.001

Renault, K. M., Carlsen, E. M., Norgaard, K., Nilas, L., Pryds, O. Secher, N. J., &…Halldorsson, T. I. (2015). Intake of carbohydrates during pregnancy in obese women is associated with fat mass in newborn offspring. *The American Journal of Clinical Nutrition, 102*(6), 1475-1481. doi:10.3845/ajcn.115.110551

Richard, L., Torres, S. Tremblay, M. C., Chiocchio, F., Litvake, E., Fortin-Pellerin, L., & Beaudet, N. (2015). An analysis of the adaptability of a professional development program in public health: Results from the ALPS study. *BMC Health Services Research, 15*, e1-e13. doi:10.1186/s12913-015-0903-3

Roberts, C. J., Campbell, I. C., & Troop, N. (2013). Increase in weight during chronic stress are partially associated with a switch in food choice towards increased carbohydrate and saturated fat intake. *European Eating Disorders Review: The Journal of the Eating Disorders Association, 22*(1), 77-82. doi:10.1002/erv.2264

Robert Wood Johnson Foundation. (2016). *New report finds adult obesity rates increased in six states.* Retrieved from http://www.rwjf.org/en/library/articles-and-news/2014/09/report-adult-obesity-rates-increased-in-six-states.html.

Rondinelli, L. (2015). The plate method. *Life Med Media.* Retrieved from http://www.dlife.com/diabetes-food-and-fitness/weight_management/tips_and_tools/rondinelli_jan06.

Ross, J. A. (2013). Obesity, the epidemic of type 2 diabetes. *Podiatry Management, 32*(9). 113-116. Retrieved from http://connection.ebscohost.com/c/articles/95798351/obesity-epidemic-type-2-diabetes.

Ruiz-Moral, R., Perula de Torres, L., Monge, D., Garcia-Leorando, C., & Caballero, F. (2017). Teaching medical students to express empathy by exploring patient emotions and experiences in standardized medical encounters. *Patient Education and Counseling, 100*(9), 1694-1700. doi:10.1016/j.pec.2017.04.018

Rustad, C. & Smith, C. (2013). Nutrition knowledge and associated behavior changes in a holistic, short-term nutrition education intervention with low-income women. *Journal of Nutrition Education and Behavior, 45,* 490-498. doi: 10.1016/j.jneb.2013.06.009

Saldana, J. (2012). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage Publishing.

Salvia, R., D'Amore, S., Graziano, G., Capobianco, C., Sangineto, M., Pararella, D., &…Vacca, M. (2017). Short-term benefits of an unrestricted-calorie traditional Mediterranean diet, modified with reduced consumption of carbohydrates at evening, in overweight-obese patients. *International Journal of Food Sciences & Nutrition, 68*(2), 234-248. doi:10.1080/09637486.2016.1228100

Schechter, S. R. & Lynch, J. (2011). Health learning and adult education: In search of a theory of practice. *Adult Education Quarterly: A Journal of Research and Theory, 61*(3), 207-224. Retrieved from http://sagepub.com/content/61/3/207.

Schumacher, J. R. (2014). Critical-thinking dispositions among dietetic interns at the completion of their internship. *Journal of Family and Consumer Sciences, 106*(2), 55-57. Retrieved from https://eric.ed.gov/?id=EJ1049603.

Schunk, D. (2012). *Learning theories: An educational perspective* (6th ed.). Upper Saddle River, NJ: Pearson.

Sehrin, J., Korhonen-Kurki, K., & Brockhaus, M. (2013). Qualitative comparative analysis (QCA): An application to compare national REDD+ policy processes. *Center for International Forestry Research, 121*, 1-25. Retrieved from http://www.cifor.org/publications/pdf_files/WPapers/WP121Sehring.pdf.

Siegelbaum, D. (2014, August). What does America have for breakfast? *BBC News Magazine.* Retrieved from http://www.bbc.com/news/magazine-28761333.

Smith, M. (2015). *Narrowing the mathematical achievement gap among African American and Latino students* (Doctoral Dissertation). Walden University, Minneapolis, Minnesota.

Smith, M. & Segal, J. (2015, February). Emotional eating. *Help Guide.* Retrieved from http://www.helpguide.org/articles/diet-weight-loss/emotional-eating.htm.

Springvloet, L., Lechner, L., de Vries, H., & Oenema, A. (2015). Long-term efficacy of a web-based computer-tailored nutrition education intervention for adults including cognitive and environmental feedback: A randomized controlled trial. *Biomed Central Public Health, 15*(372)*,* 1-16. doi:10.1186/s12889-015-1707-4

Standards of Practice & Professional Performance. (2013). Academy of Nutrition and Dietetics: Revised 2012 standards of practice in nutrition care and standards of professional performance for registered dietitians. *Journal of the Academy of Nutrition and Dietetics, 113*(6), S29-S45. doi:10.1016/j.jand.2012.12.007

Sterbenz, C. (2013, December). The Supreme Court says the tomato is a vegetable—not a

fruit. *Business Insider.* Retrieved from http://www.businessinsider.com/supreme-court-tomato-is-vegetable-2013-12.

Tasky, K. A. (2013). *Testing the reliability and validity of the adult carb quiz in inpatients with Type 2 Diabetes* (Master's thesis). Retrieved from http://search.proquest.com.ezp.waldenulibrary.org/pqdtglobal/docview/1687758958/fulltextPDF/8DE4F0B13A51400FPQ/1?accountid=14872.

Taylor, D. C. M. & Hamdy, H. (2013). Adult learning theories: Implications for learning and teaching in medical education: AMEE guide no. 83. *Medical Teacher, 35,* e1561-e1572. doi:10.3109/0142159X.2013.828153

Tchicaya, A., Lorentz, N., Demarest, S., Beissel, J., & Wagner, D. R. (2015). Relationship between self-reported weight change, educational status, and health-related quality of life in patients with diabetes in Luxembourg. *Health and Quality of Life Outcomes, 13,* 149. doi:10.1186/s12955-015-0348-8

Thomson, S. B. (2011). Qualitative research: Validity. *Journal of Administration & Governance, 6*(1), 77-82. Retrieved from http://www.joaag.com/uploads/6_1_-7_Research_Method_Thomson.pdf.

Tonstad, S., Malik, N., & Haddad, E. (2014). A high-fiber bean-rich diet versus a low-carbohydrate diet for obesity. *Journal of Human Nutrition and Dietetics, 27*, 109-116. doi: 10.1111/jhn.12118

Torres, S., Richard, L., Guichard, A., Chiocchio, F., Litvak, E., & Beaudet, N. (2017). Professional development programs in health promotion: tools and processes to favor new practices. *Health Promotion International, 32,* 587-598.

doi:10.1093/heapro/dav097

United Health Foundation. (2016). *America's health Rankings: A call to action for individuals and their communities*. Retrieved from http://assets.americashealthrankings.org/app/uploads/ahr16-complete-v2.pdf.

United States Census Bureau. (2010). *State & county quick facts.* Retrieved from http://quickfacts.census.gov/qfd/states/41/4147000.html.

University of Florida/Center for Instructional Technology and Training. (2012). *Case Studies.* Retrieved from http://citt.ufl.edu/tools/case-studies/.

University of Surrey. (2011). *CAQDAS QUIC: Qualitative innovations in CAQDAS.* Retrieved from http://www.surrey.ac.uk/sociology/research/researchcentres/caqdas/support/teamworking/

U.S. Departments of Health, Human Services, and Agriculture. (2015). *2015–2020 Dietary Guidelines for Americans* (8th ed). Washington, DC: U.S. Dairy Association. Retrieved from http://health.gov/dietaryguidelines/2015/guidelines/.

U.S. Department of Health and Human Services. (2016). Program performance and evaluation office (PPEO). *Centers for Disease Control and Prevention.* Retrieved from https://www.cdc.gov/prc/pdf/prc-logic-model.pdf.

Van Vuuren, S., & Nel, M. (2013). A clinical skills unit: Addressing the need for continued professional development (CPD) in allied health professions. *South African Journal of Occupational Therapy*, *43*(3), 41-46. Retrieved, from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2310-

38332013000300007&lng=en&tlng=en.

Viljoen, M. (2017). Critical care nurses' reasons for poor attendance at a continuous professional development program. *American Journal of Critical Care,26*(1), 70-76. doi:10.4037/ajcc2017412

Visek, J., Lacigova, S., Cechurova, D., & Rusavy, Z. (2014). Comparison of a low-glycemic index vs standard diabetic diet. *Biomedical Papers, 158*(1), 112-116. doi:10.5507/bp.2012.103

Volkow, N. D., Wang, G., Tomasi, D., & Baler, R. D. (2013). Obesity and addiction: Neurobiological overlaps. *Obesity Reviews, 14*(1), 2-18. doi:10.1111/j.1467-789X.2012.01031.x

Walden University Research Center. (2014). Institutional Review Board for Ethical Standards in Research. Retrieved from http://academicguides.waldenu.edu/researchcenter/orec.

Walden University IRB for Ethical Standards in Research. (2015). Retrieved from http://academicguides.waldenu.edu/researchcenter/orec

Warshaw, H. S. & Kulkarni, K. (2011). *The complete guide to carb counting* (3rd ed.). Alexandria, VA: American Diabetes Association.

Watts, S. A., Anselmo, J. M., & Kern, E. (2011). Validating the adult carb quiz: A test of carbohydrate-counting knowledge for adults with diabetes. *Diabetes Spectrum, 24*(3), 154-160. doi:10.2337/diaspect.24.3.154

Weglicki, R. S., Reynold, J., & Rivers, P. H. (2015). Continuing professional development needs of nursing and allied health professionals with responsibility

for Prescribing. *Nurse Education Today, 35*(1), 227-231. doi:10.1016/j.nedt.2014.08.009

Wheeler, M. L. (2014). *Choose your foods: Food lists for diabetes.* Alexandria, VA: American Diabetes Association.

W. K. Kellogg Foundation. (2006). *Evaluation handbook.* Retrieved from http://www.wkkf.org/resource-directory/resource/2010/w-k-kellogg-foundation-evaluation-handbook.

Wylie-Rosett, J., Aebersold, K., Conlon, B., Isasi, C. R., & Ostrovsky, N. W. (2013). Health effects of low-carbohydrate diets: Where should new research go? *Current Diabetes Reports, 13*(2), 271-278. doi: http://dx.doi.org/10.1007/s11892-012-0357-5

Wirth, R. Smoliner, C., Spamer, C., Marburger, C., Schreiber, F. S., Willschrei, H. P.,…& Volker, D. (2014). Do doctors know how much nutrition patients need—survey from Germany? *European Journal of Clinical Nutrition* 68, 840-843. Retrieved from http://eds.b.ebscohost.com.proxy1.ncu.edu/eds/pdfviewer/pdfviewer?sid=3e561c56-8f77-44d4-b56d-439377f415f7%40sessionmgr110&vid=5&hid=104.

World Health Organization. (2016). *Physical inactivity and diabetes.* Retrieved from http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/news/news/2015/11/physical-inactivity-and-diabetes.

Xu, M. A. & Storr, G. B. (2012). Learning the concept of researcher as instrument in qualitative research. *The Qualitative Report 17*(21), 1-18. Retrieved from

http://nsuworks.nova.edu/tqr/vol17/iss21/2.

Yarbrough, S., Martin, P., Alfred, D., & McNeill, C. (2017). Professional values, job satisfaction, career development and intent to stay. *Nursing Ethics, 24*(6), 675-685. doi:10.1177/0969733015623098

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA: Sage Publications, Inc.

Zipp, C., Roehr, J. T., Weiss, L. B., & Filipetto, F. (2011). Impact of intensive nutritional education with carbohydrate counting on diabetes control in type 2 diabetic patients. *Journal of Patient Preference and Adherence, 5,* 7-12. doi:10.2147/PPA.S13907

Appendix A: The Project

Purpose

The purpose of the professional development program is to instruct medical, allied health, and public health practitioners about methods for teaching adults regarding dietary carbohydrate and weight control. Workshop attendees will learn about the ADA plate method as a paradigm for teaching consumers about the carbohydrate and caloric content of five major food groups, while also considering how the biopsychological factors of disease, pharmaceutical therapies, and affective conditions influence eating habits. Therefore, those attending the training will first learn about theoretical concepts of nutrition for controlling blood sugar and weight, then apply these theoretical schemata to practice through the ADA plate method paradigm. After the attendees understand diet therapy practices for controlling carbohydrate intake and weight, they will be introduced to the way physiological and psychological influences contribute to the intrinsic struggles that adults may experience in managing their dietary intake.

Goals

The goals of this professional development program will be the following:

1. Learners will understand the model of the plate method for calculating calories and grams of carbohydrate for individual foods and for entire meals.
2. Learners will understand the biopsychological influences on the eating habits of adults created by affective experiences, drug therapies, and other factors.

Outline of Components

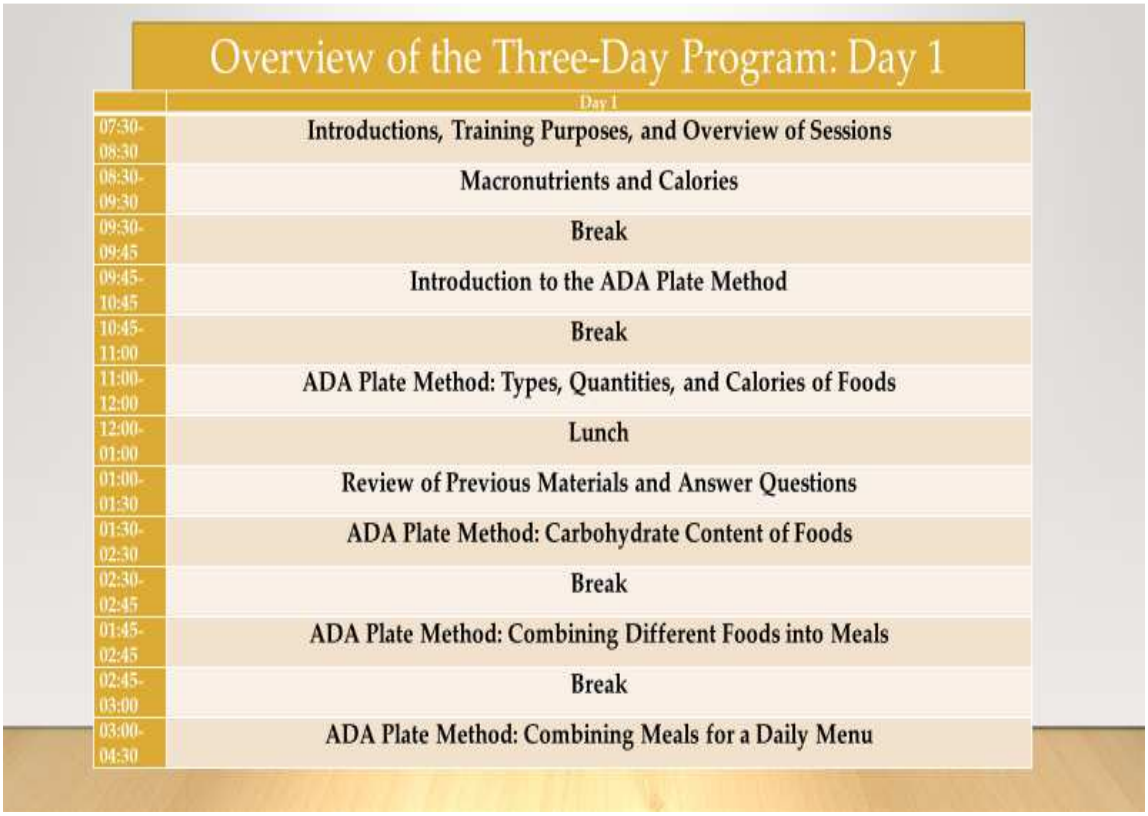
The professional development program will occur over three consecutive, 8-hour days. The attendees will learn about nutrition protocols for modifying carbohydrate and calories, for utilizing the ADA plate method to apply theoretical concepts to practice, and for conceptualizing the biopsychological factors that influence food intake. The training will follow the Logic Model which is a constructivist paradigm promoted by the CDC (2013). Assumptions are established in the initial phase of the logic model paradigm. The assumptions for the professional development program are the following: (1) the attendees are health care educators who have a knowledge of human biology, disease processes, and basic nutrition, (2) the program's purpose is to teach health care educators how to instruct adults about controlling dietary carbohydrate and weight, and (3) the program will integrate the attendees' knowledge of human biology, disease processes, and basic nutrition with diet therapy education for controlling carbohydrate intake and weight. Once the assumptions have been determined, a sequential combination of inputs, activities, outputs, and outcomes will occur. *Inputs* are information provided by an instructor, *activities* are the experiences of the learners, *outputs* are the ways learners apply the knowledge they have received, and *outcomes* are the benefits of the knowledge received (CDC, 2013). The following diagram illustrates how the inputs, activities, outputs, and outcomes of the logic model can be applied to the professional development program:

The stated five outcomes mentioned in the foregoing diagram are that the attendees will be able to do the following:

1. Estimate carbohydrate and caloric content for foods in five major food groups and for adults.
2. Combine food groups to create healthy meals.
3. Relate the carbohydrate and caloric content of healthy meals to specific diagnoses (e.g., diabetes or obesity).

4. Adjust the carbohydrate and caloric content of meals to meet ethnic and therapeutic eating practices.
5. Understand the effects of drug therapies, affective experiences, and biopsychological conditions on eating habits and therapeutic dietary needs.

Schedule and Description of Activities



Overview of the Three-Day Program: Day 1

	Day 1
07:30-08:30	Introductions, Training Purposes, and Overview of Sessions
08:30-09:30	Macronutrients and Calories
09:30-09:45	Break
09:45-10:45	Introduction to the ADA Plate Method
10:45-11:00	Break
11:00-12:00	ADA Plate Method: Types, Quantities, and Calories of Foods
12:00-01:00	Lunch
01:00-01:30	Review of Previous Materials and Answer Questions
01:30-02:30	ADA Plate Method: Carbohydrate Content of Foods
02:30-02:45	Break
01:45-02:45	ADA Plate Method: Combining Different Foods into Meals
02:45-03:00	Break
03:00-04:30	ADA Plate Method: Combining Meals for a Daily Menu

Overview of the Three-Day Program: Day 2

	Day 2
07:30-08:30	Questions, Answers, and Review of Day 1
08:30-09:30	Part I: Dietary Adjustments for the ADA Plate Method
09:30-09:45	Break
09:45-10:45	Part II: Dietary Adjustments for the ADA Plate Method
10:45-11:00	Break
11:00-12:00	Menu Planning and Adjustments for the ADA Plate Method
12:00-01:00	Lunch
01:00-02:00	Physiological Influences on Eating Habits
02:00-02:15	Break
02:15-03:15	Psychological Influences on Eating Habits
03:15-03:30	Break
03:30-04:30	Applying the Plate Method to Biopsychological Factors

Overview of the Three-Day Program: Day 3

	Day 3
07:30-08:30	Questions, Answers, and Review of Day 2
08:30-09:30	Calorie and Carbohydrate Estimates for Adults
09:30-09:45	Break
09:45-10:45	Estimated Nutrient Needs and Diet
10:45-11:00	Break
11:00-12:00	An Adult Learning Theory
12:00-01:00	Lunch
01:00-01:30	Review and Answer Questions
01:30-03:30	Nutrition Jeopardy Game
02:30-02:45	Break
02:45-04:30	Reflections, Discussions, and Evaluations

Day 1

The first training day focuses on understanding applied nutrition through the paradigm of the ADA plate method. Attendees learn basic concepts about carbohydrate and calories, then they learn how to apply these concepts to managing blood sugar and weight through the ADA plate method. The program participants are taught about the organization of the food groups and the nutrient content per food group. Once food groups are understood, then the attendees can begin to organize meals with the specific types and quantities of foods. By the end of the first day of training, participants should be able to combine meals into a daily menu with specified amounts of carbohydrates and calories. Day 1 includes frequent reviews of the ADA plate method information because understanding this paradigm is essential in applying therapeutic nutrition to clinical practice.

07:30-08:30, Introductions, Training purposes, and Overview of Sessions. Attendees are introduced to the topic of the program, the presenters, the purpose and goals of the program, and an outline of the entire three-day seminar. The participants are told that the program is geared towards health care providers who deal with patients that require nutrition interventions for controlling dietary carbohydrate intake and weight. Questions are solicited from the participants.

08:30-09:30. Macronutrients and Calories. The attendees are instructed about how macronutrients (carbohydrate, protein, and fat) provide calories in the diet. Then, the relationship of calorie intake to weight and blood sugar levels is described. Questions are

solicited from the participants. A review of the session ideas will include the following handout:

Let's Discuss! Choose the best Answer:

1. Which is a macronutrient?
a. vitamin b. mineral c. carbohydrate d. water

2. A calorie is…
a. Energy from macronutrients we consume
b. Energy from the protein, fat, and carbohydrate we consume
c. Energy from the vitamins, mineral, and water we consume
d. both a & b

3. Blood sugar levels may be affected by
a. Excess weight
b. Starch and sugar intake
c. Different physiological conditions and physical activity
d. a, b, and c

A 15-minute break occurs after this session.

09:45-10:45, Introduction to the ADA Plate Method. The attendees are introduced to the ADA plate method as a practice tool for teaching adults about carbohydrate and calories. The session's focus is to help the participants understand how the dietary paradigm is organized. The attendees discuss the main points of the session through completing the following written exercise:

Let's Discuss! Let's review the information by answering the following questions:

1. How many food groups comprise the ADA plate method? What is the name of each food group?

2. True or False: Are fats (margarine, oil) or sugars identified in the ADA plate method?

3. What are the high carbohydrate food groups in the ADA plate method?

4. You are teaching a person who is diabetic. Tell the individual which food groups will contribute carbohydrate to his or her diet. Which foods are lowest in carbohydrate?

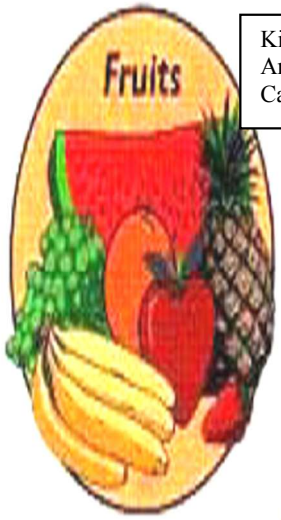
5. Are foods low in carbohydrate always low in calories? Explain.

The session ends with a 15-minute break.

11:00-1200. ADA Plate Method: Types, Quantities, and Calories of Foods.

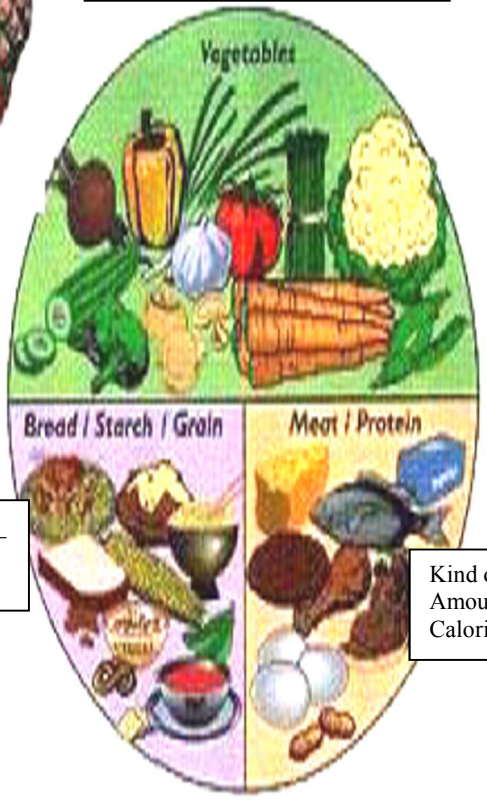
The participants are introduced to more details about the ADA plate method. This session acquaints attendees with the kinds, amounts, and energy content of foods in each food group. Applications are made to disease states such as diabetes or obesity.

The following handout is used to help attendees evaluate how well they understand the concepts of the session:



Kind of Fruit: _____
Amount:_____
Calories/Serving:_____

Kind of Vegetable: _____
Amount:_____
Calories/Serving:_____



Kind of Dairy: _____
Amount:_____
Calories/Serving:_____

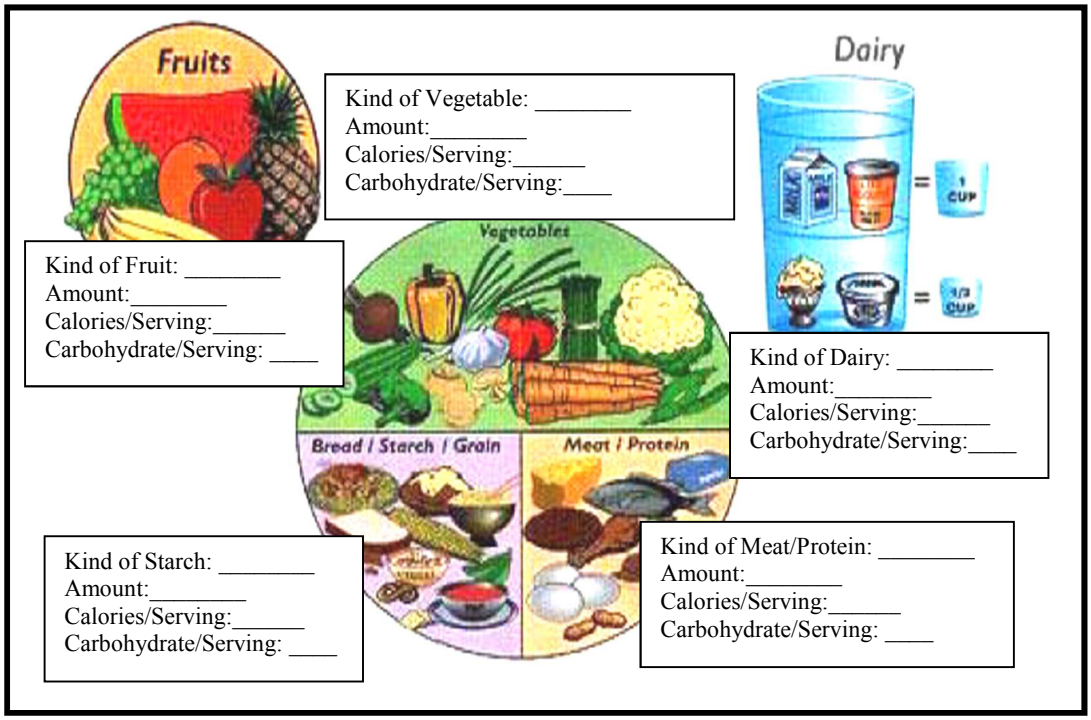
Kind of Starch: _____
Amount:_____
Calories/Serving:_____

Kind of Meat/Protein: _____
Amount:_____
Calories/Serving:_____

A one-hour lunch period (12:00–01:00) occurs at the end of this session.

01:00-01:30. Review of Previous Materials and Answer Questions. Attendees ask questions about the information covered during the morning sessions, and the instructors provide answers.

01:30-02:30. ADA Plate Method: Carbohydrate Content of Foods. Now that the attendees are familiar with the types, quantities, and calories of the foods in the different food groups, they are now prepared to learn about the amount of carbohydrate per food group. Applications are made to disease states such as diabetes or obesity. The participants learn that just because a food is low in carbohydrate does not mean that it is low in calories. The attendees use a similar handout from the 11:00–12:00 session, except they must write in the amount of carbohydrate.



A 15-minute break occurs after this session.

01:45-02:45. ADA Plate Method: Combining Different Foods into Meals. The attendees learn how to estimate portions of different types of foods and build on their abilities to calculate the amounts of carbohydrate and calories per food groups. The participants are taught how to estimate portions using common objects.

A 15-minute break occurs after this session.

03:00-04:30. ADA Plate Method: Combining Meals for a Daily Menu. The attendees now plan a 1-day menu of three meals: breakfast, lunch, and dinner. The total daily estimated carbohydrate and calories are calculated. The participants are

encouraged to work in groups and they receive feedback from the instructors as they plan each meal. The participants will use the following form to complete the exercise:

Food Group	Kind of Food	Serving Size	Calories/Serving	Carbohydrate/Serving
Fruit				
Dairy				
Vegetable				
Meat/Protein				
Starch				
Fruit				
Dairy				
Vegetable				
Meat/Protein				
Starch				
Fruit				
Dairy				
Vegetable				
Meat/Protein				
Starch				
TOTALS				

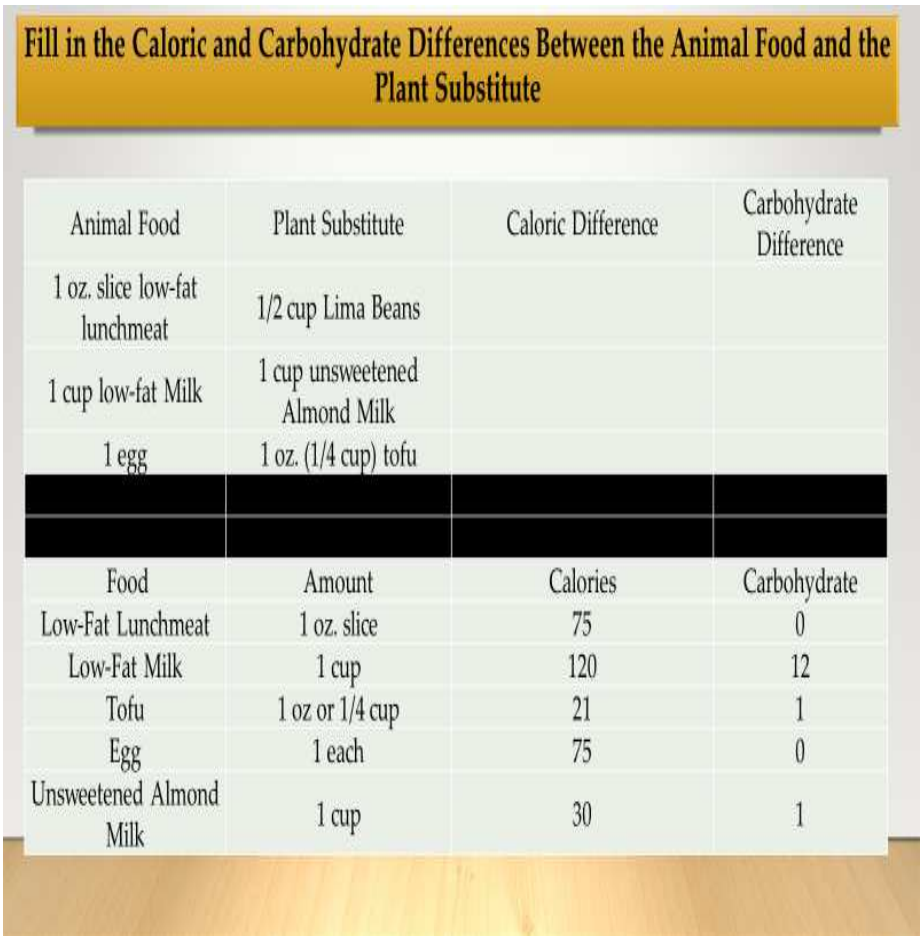
Day 2

The second day of training begins with a review of concepts discussed for Day 1. During the first day of training, the attendees were taught the plate method using a variety of foods for adults who consume animal and plant products. Consequently, the participants should be able to estimate carbohydrate and calories for meals applying the

plate method. They should also be able to compose meals and combine meals into a one-day menu. Day 2 introduces learners to adapting the plate method to types of cuisines that may preclude certain animal products or that may require modifications due to diagnoses and prescribed pharmaceutical regimens. Biopsychological influences on food consumption and nutrient requirements are also discussed on the second day of training.

07:30-08:30. Questions, Answers, and Review of Day 1. The instructor will take approximately 30 minutes to review the information from Day 1. This review will allow the participants to ask questions to appraise their knowledge of the materials that were presented on the previous day.

08:30-0930. Part I: Dietary Adjustments for the ADA Plate Method. This session covers how adjustments are made for people who preclude or limit animal products in their diets (e.g., ova lactovegetarians, lactovegetarians, ova vegetarians, and vegans). The participants learn how substituting plant foods for animal products will affect the carbohydrate and caloric load of meals. The following study tool is used at the end of the session to help participants evaluate their knowledge of plant food substitutions for animal products:



Fill in the Caloric and Carbohydrate Differences Between the Animal Food and the Plant Substitute

Animal Food	Plant Substitute	Caloric Difference	Carbohydrate Difference
1 oz. slice low-fat lunchmeat	1/2 cup Lima Beans		
1 cup low-fat Milk	1 cup unsweetened Almond Milk		
1 egg	1 oz. (1/4 cup) tofu		

Food	Amount	Calories	Carbohydrate
Low-Fat Lunchmeat	1 oz. slice	75	0
Low-Fat Milk	1 cup	120	12
Tofu	1 oz or 1/4 cup	21	1
Egg	1 each	75	0
Unsweetened Almond Milk	1 cup	30	1

A 15-minute break occurs after this session.

09:45-10:45. Part II: Dietary Adjustments for the ADA Plate Method. The second part of the discussion helps attendees understand foods that are good sources of iron, calcium, fiber, and other nutrients for treating certain types of conditions. For example, using foods high in iron to treat anemia and prescribing high fiber foods for treating diverticulosis. Foods high in sodium and saturated-fat will also be identified. The following exercise will help attendees evaluate their knowledge of the ideas discussed in the respective session:

Let's Discuss!

1. Both green peas and beef are high in iron, but which would be your first choice for a person who has iron-deficiency anemia? Why?

2. A non-vegetarian wants to increase her calcium intake. Name some foods high in calcium. Which of these foods have the most absorbable form of calcium?

3. Which has fiber: Egg or Spinach? Why?

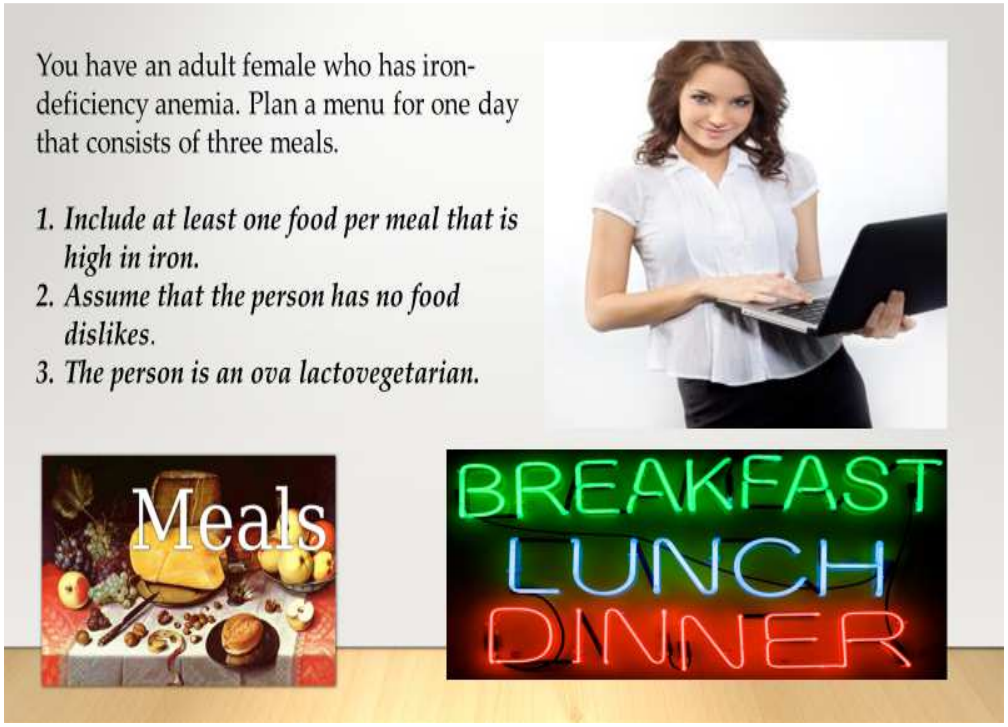
4. Which food/food groups would you recommend for a person who wants to increase her fiber? How does fiber affect fluid intake?

5. Which is more detrimental to your health: Dietary cholesterol or saturated fat? Why?

6. Which is highest in sodium: Canned vegetables or frozen vegetables?

A 15-minute break occurs after this session.

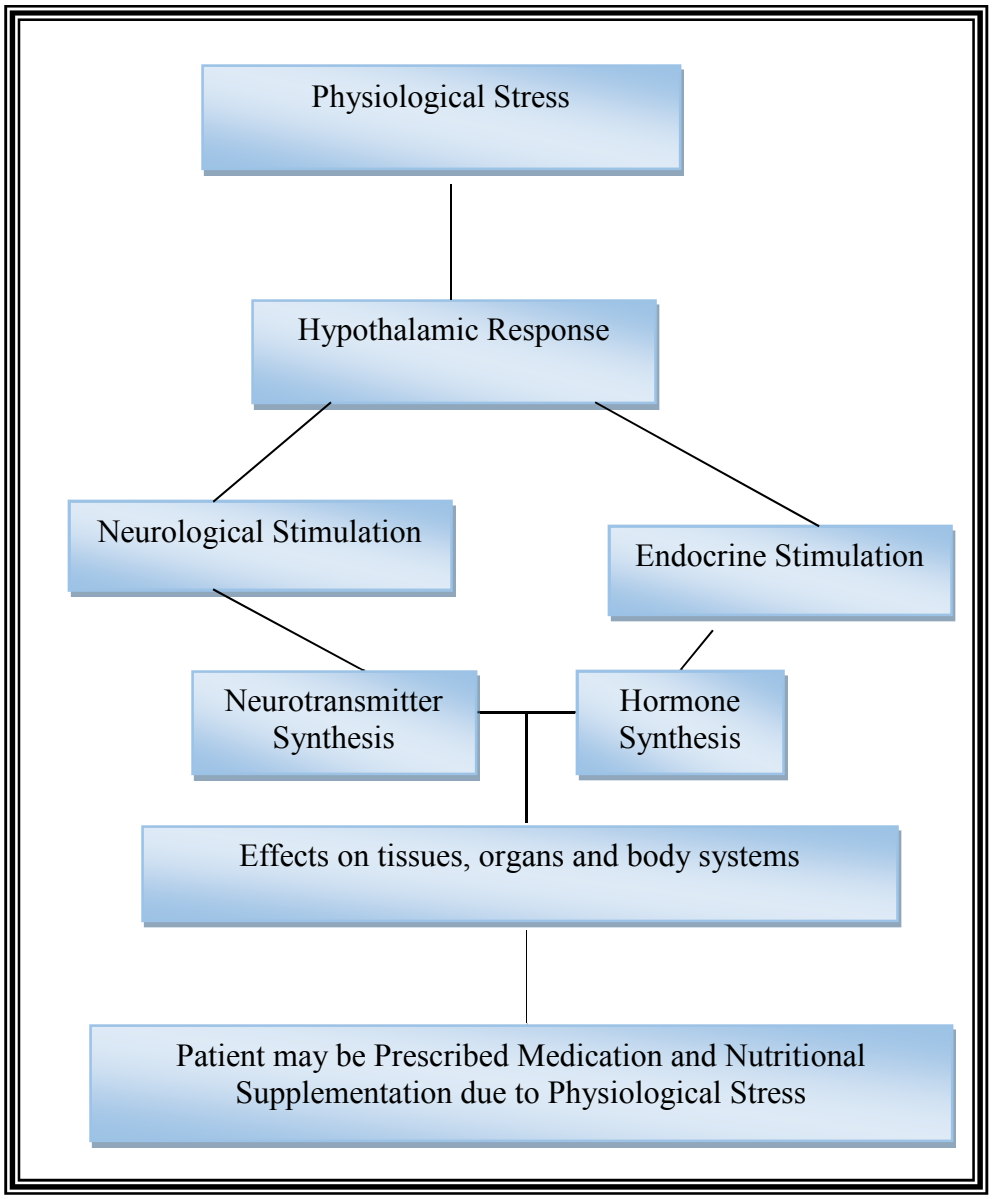
011:00-12:00. Menu Planning and Adjustments for the ADA Plate Method. The participants will used their knowledge of the previous sessions to plan a menu for one day. The menu will consist of three meals for an ova lactovegetarian who has iron-deficiency anemia. Attendees will work in groups to develop an adequate eating plan. The following handout will be used to guide the activity:



A 1-hour lunch period occurs at the end of this session.

01:00-02:00. Physiological Influences on Eating Habits. The attendees are introduced to phsyiological mechanisms that affect hunger and biological homeostasis. This includes endocrine functions and hormonal response, brain constituents that play a role in satiety and hunger, and basic metabolic mechanisms that influence blood sugar levels, weight, and health. Basic food and medication interactions are also explored (e.g.,

antacids for reflux and high-fat foods). The following flow chart is one example of how affective homeostasis is influenced by physiological factors:



A 15-minute break occurs after this session.

02:15-03:15. Psychological Influences on Eating Habits. The attendees are introduced to psychological and affective conditions that may influence hunger. Because

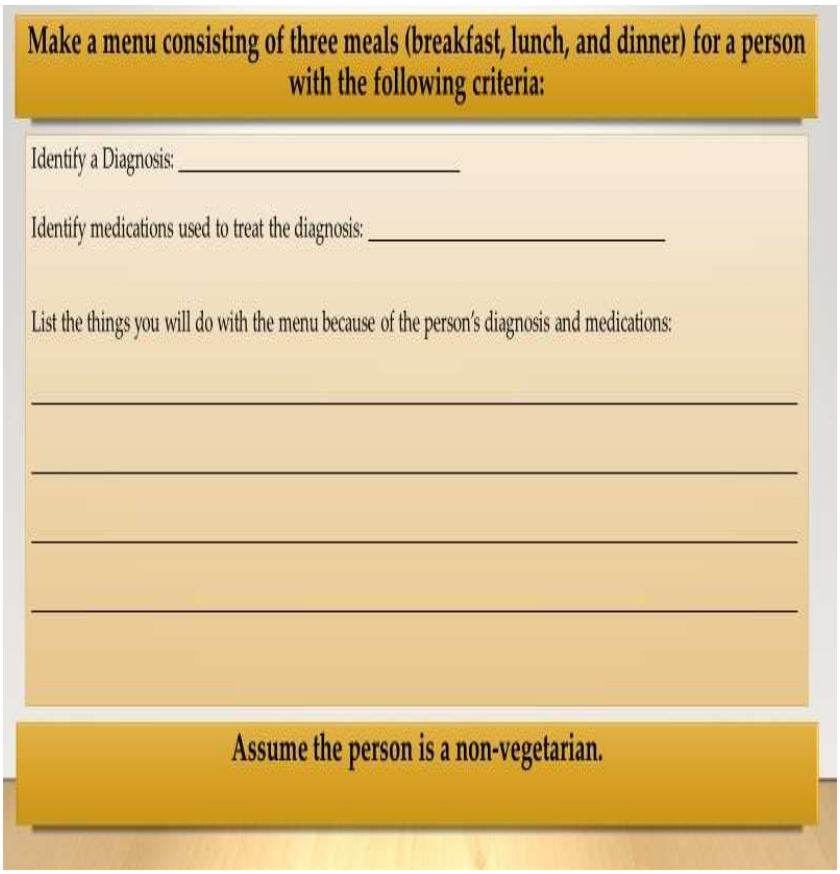
psychotherapy often requires differents types of psychotherapeutic drugs, the food-medication inteactions of these treatments are emphasized. The following handout is one example of the information discussed in the session:

Medication Class	Drug Examples of the Medication Class	Side Effects	Nutrition Interventions
Tricyclics	amitriptyline (Elavil), doxepin (Sinequan)	Increased appetite for concentrated sweets; weight gain.	High fiber diet decreases drug effects; increased need for Riboflavin (Vitamin B-2); calorie-restricted diet if excessive weight gain occurs.
Selective Serotonin Reuptake Inhibitors	fluoxetine (Prozac); Sertraline Hydrochloride (Zoloft); Paroxetine (Paxil)	May cause polyphagia or anorexia resulting in increased weight or weight loss, respectively; Increased somnolence (Zoloft) or insomnia (Prozac)	Increase B-vitamins to enhance salubrious drug effects and actions; calorie-restricted diet if excessive weight gain occurs.
Selective Norepinephrine Reuptake Inhibitors	fenlafaxine (Effexor); duloxetine (Cymbalta)	Anorexia and weight loss; Insomnia.	Increase caloric intake if excessive weight loss occurs.

A 15-minute break occurs after this session.

03:30-04:30. Applying the ADA Plate Method to Biopsychological Factors. In this session, a culmination of the two days of training occurs. The attendees have been taught how to use the ADA plate method for creating nutritious meals and how to alter the paradigm for different cuisines and disease states. Now, the participants must make a one-day menu that considers physiological and psychological conditions that require pharmaceutical treatments. Attendees will separate into groups, then create a scenario

with the following criteria:



During this 1-hour session, the participants should have enough time to plan menus for at least two different scenarios (each having a different diagnosis that is treated with medications). Furthermore, there should be adequate time for discussions.

Day 3

The third day of training begins with a review of concepts discussed for Day 2. By the third day of training, attendees should understand how to estimate carbohydrate and caloric content of foods, meals, and menus using the plate method, and know how to adjust the plate method for individuals with different cuisines, diagnoses, and medications. They should be familiar with physiological and psychological factors that

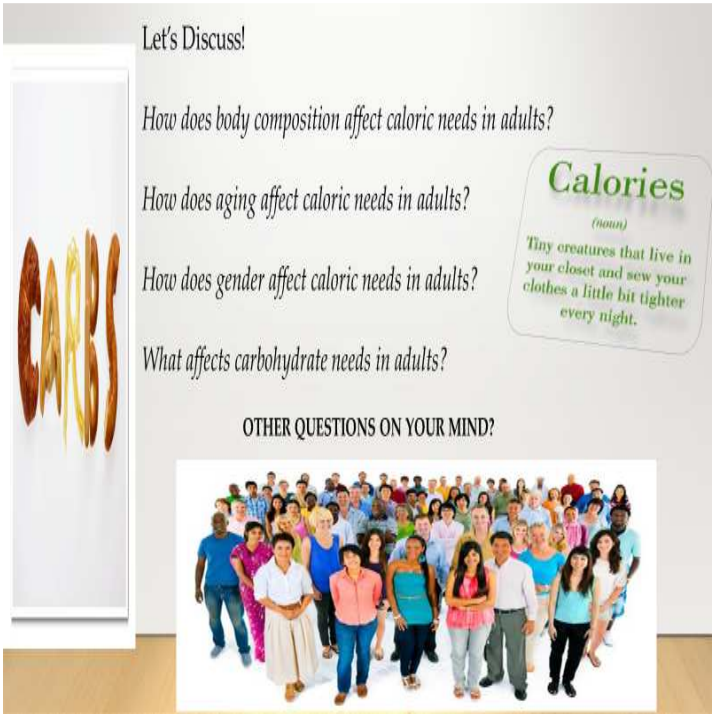
affect food intake. Day 3 introduces participants to estimating caloric and carbohydrate needs for adults. Once these nutrient calculations are learned, the attendees can compare the estimated carbohydrate and caloric composition of meals consumed daily with the approximated caloric requirements for adults to maintain healthy weights. Adult learning theory is also introduced during Day 3 in which the participants are introduced to the research of Taylor and Hamdy (2014) and Taylor and Marienau (2016) who discussed instructional models for adults that attenuate anxiety and encourage curiosity. The final learning activities of Day 3 involve adapting the popular television game known as *Jeopardy* to a review of all material presented in the professional development program. This learning activity presents an answer to a query under a category and requires the player to develop the appropriate question for the answer. For instance, a player may choose a category entitled *Carbs and Calories* with an answer that states *a food with no carbohydrate per serving.* The player would then have to come up with a question for the answer (e.g., *What is a meat).*

During the final session of training for Day 3, the attendees will review and reflect on what they have learned through discussions among themselves and with the instructors. They will also complete the final evaluation for all three days of training. Completing this evaluation will be mandatory if the attendees want to receive continuing education credit for their licensing requirements or to receive a certificate of training completion. The evaluation will follow prototypical guidelines for developing an IDI into a RDI (Clark, 2015; Nafukho et al., 2017). Consequently, the assessment will include

the attendees' evaluation of the weaknesses and strengths of the program while identifying specific ideas for improving the training for future sessions.

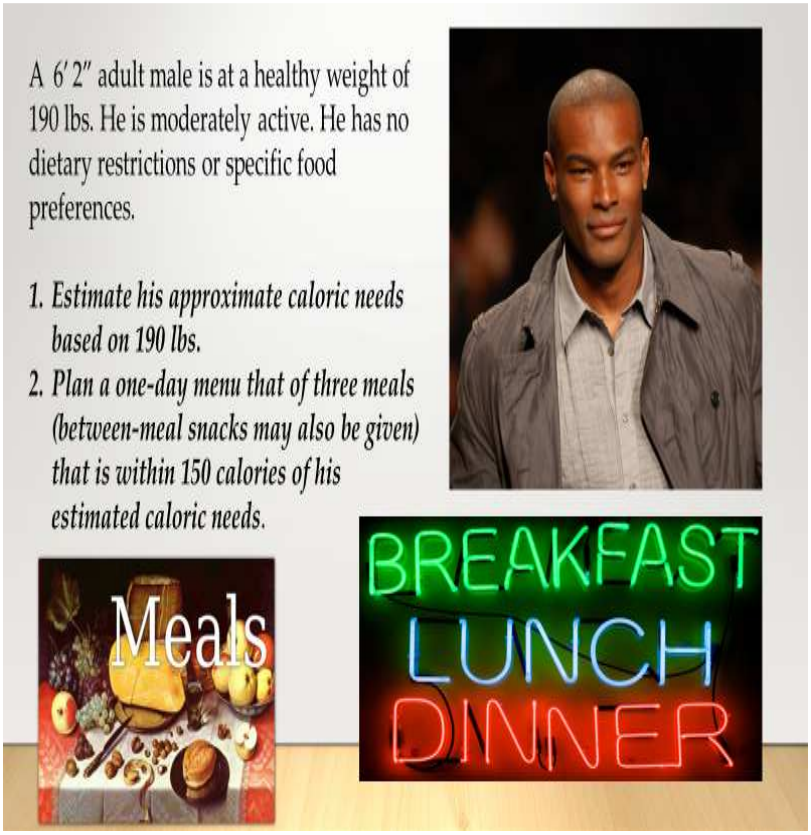
07:30-08:30. Questions, Answers, and Review. A review of the information of Day 2 will be presented. The instructors will entertain questions from the participants about the materials discussed in the previous day's sessions.

08:30-09:30. Calorie and Carbohydrate Estimates for Adults. The participants will be instructed on how to approximate the energy and carbohydrate needs of adults. Factors that affect these nutrient calculations will also be discussed (e.g., certain disease states, medication therapy, body composition, pregnancy, gender, and activity). The following handout is used to help the participants evaluate their understanding of the session's topics:



A 15-minute break occurs at the end of the session.

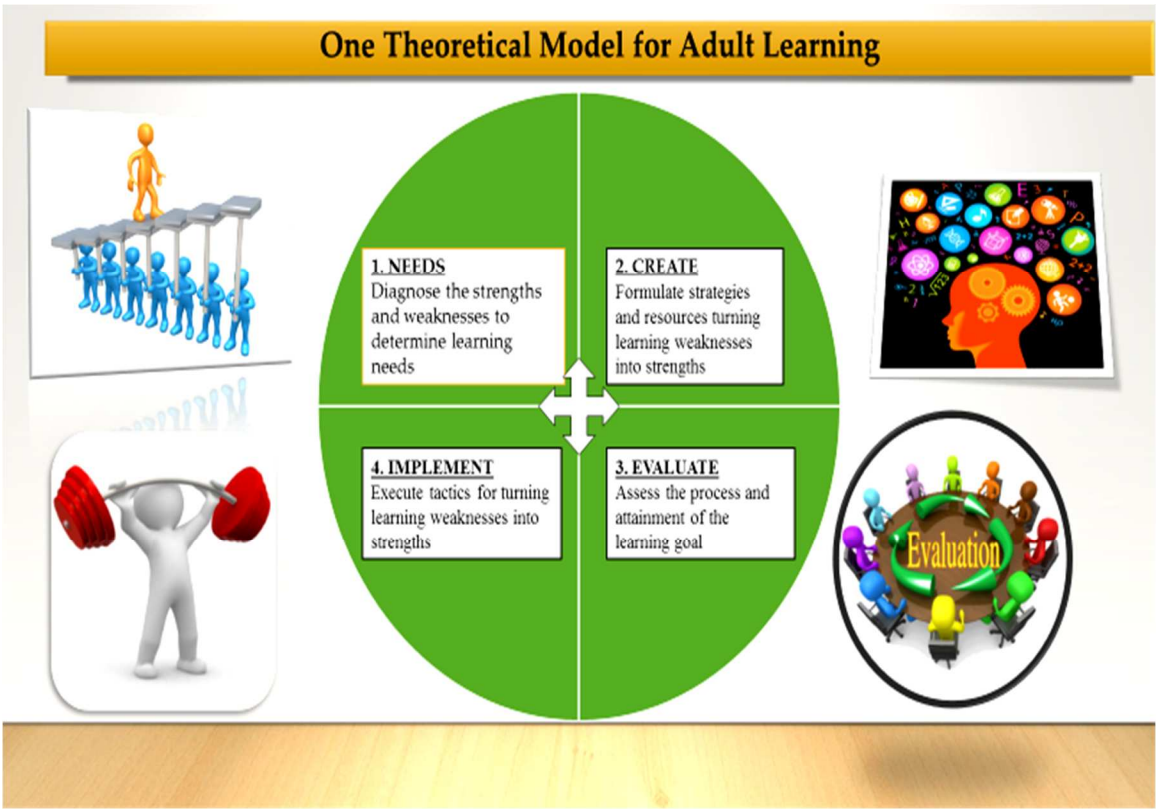
09:45-10:45. Estimated Nutrient Needs and Diet. In this session, the participants learn how to integrate individual nutrient needs with the nutrients supplied by the food groups of the ADA plate method. For instance, if an individual requires 1,800 calories per day to maintain a healthy weight, then the attendees must be able meet these energy needs through the creation of a daily menu. The following handout illustrates an activity during this session:



A 15-minute break occurs at the end of the session.

11:00-12:00. An Adult Learning Theory. The attendees are introduced to a simple, theoretical adult learning strategy. The participants learn about a four-phased teaching tactic that assesses the learning strengths and deficits of adult learners, while

also establishing methods for evaluating erudition. The following handout establishes the framework for the session:



A 1-hour lunch break occurs at the end of the session.

01:00-01:30. Review and Answer Questions. The instructors summarize the main points of the material presented in the morning sessions of Day 3, while also responding to the queries voiced by the attendees.

01:30-03:00. Nutrition Jeopardy Game. The attendees are introduced to the Jeopardy game. In this session, participants and instructors discuss the general rules of the game and how it is played. A test session is held so that all attendees will experience a "practice run." Then the participants will separate into enclaves and give the question to each answer through consensus as a group (the time limits for responses will not be as

strict as the television show Jeopardy). The following is an example of how the Nutrition Jeopardy categories for the first round:

A 15-minute break occurs at the end of the session.

03:15-04:30. Reflections, Discussions, and Evaluations. The instructors and participants discuss their reflections about the information presented in the 3-day professional development program. Topics that need further clarification will also be

considered (e.g., workplace applications). The instructors will ensure that the attendees have at least 15 minutes to complete the evaluation of the training.

Training Evaluation Form

The training evaluation includes rating scales and queries that require written responses. The following form will be used to evaluate the program:

Evaluation Form

Training Title: _____Date Attended:_____

Please select the rating for each section based on the following criteria:
5=excellent 4=good 3=average 2=fair 1=poor

How well did the training accomplish the following:

1. Improved my knowledge of the subject.	☐5	☐4	☐3	☐2	☐1
2. Explained and illustrated concepts.	☐5	☐4	☐3	☐2	☐1
3. Answered my questions adequately.	☐5	☐4	☐3	☐2	☐1

Please rate the content and structure of the training:

4. The usefulness of the information received in training.	☐5	☐4	☐3	☐2	☐1
5. The structure of the training session(s).	☐5	☐4	☐3	☐2	☐1
6. The pace of the training session(s).	☐5	☐4	☐3	☐2	☐1
7. The convenience of the training schedule.	☐5	☐4	☐3	☐2	☐1
8. The usefulness of the training materials.	☐5	☐4	☐3	☐2	☐1

9. Was this training appropriate for your level of experience? ☐Yes ☐No
If you said "No" to #9, please explain on the back of this form.

10. What did you most like about the training? What did you like least?

11. How can we improve the structure, format, and/or materials?

Appendix B: The Local Academy of Nutrition and Dietetics Contact Letter

April 14, 2017

[redacted]

Dear Mrs. Dodd,

I am completing a doctorate of education degree at Walden University. The culmination of the respective degree includes a doctoral study. My proposed doctoral study is entitled "Evaluating Education Models for Teaching Adults about Modifying Dietary Carbohydrate for Controlling Weight" and I am requesting your assistance in finding five registered dietitians nutritionists to participate in the study. The potential candidates should have had at least six months of experience in teaching adults about dietary carbohydrate modifications for proper weight maintenance or weight loss.

Because the proposed doctoral study has not yet been approved by Walden's Institutional Review Board (IRB), no solicitation of participants should be performed presently. This letter is simply a proactive measure on my part to request your assistance in the endeavor once IRB approval for the doctoral study has been accomplished. I can be contacted by cell phone at [redacted] or via e-mail at [redacted].

Thank you in advance for your help in this matter. I look forward to hearing from you.

Sincerely,

Vincient M. Cleamons, Ed.S., R.D.N.

Appendix C: Letter for Participant Involvement in the Study (E-mail Text)

Dear RDN Practitioner,

You are invited to participate in a study that investigates the types of methods health care professionals use to teach adults about weight maintenance through modifying their dietary carbohydrate intake of starches and sugars. If you decide to participate, you will be asked to respond to the following questions via e-mail: What are your perceptions regarding the current American Diabetes Association methods for teaching adults about modifying dietary carbohydrate (starches and sugars) for controlling weight? What methods do you use to teach adults about modifying dietary carbohydrate (starches and sugars) for controlling weight? A semistructured telephone interview will occur after I receive your initial e-mailed responses to the respective questions. This follow-up session should not take more than 15 minutes.

As a doctoral student in the Ed.D. Program at Walden University, I hope to include your valuable insights in a qualitative case study about teaching models that help adults to maintain a healthy weight by modifying the calories obtained from starches and sugars. Your participation in this study is completely confidential. Any information related to your identity will not be shared with anyone. Consequently, anything that relates to your personal identity will not be included in the data of the study and will not be shared with other participants. Furthermore, your participation in the study is completely voluntary. No one other than you and I will know about your decision to participate or to abstain from participating in the study. If you decide to participate, you may withdraw your participation at any time during the study for any reason.

Ideal candidates for this study are RDNs who have had at least six months of experience in teaching adults how to maintain a healthy weight through dietary carbohydrate modification. I sincerely hope you will join the study! Should you have any questions, please contact me at [redacted] or by cell at [redacted].

Sincerely,

Vincient M. Cleamons, Ed.S., R.D.N.

Appendix D: Electronic Questionnaire

Please respond truthfully, and as comprehensive as possible to the following questions, while avoiding the disclosure of any specific and personal information of patients:

1. What are your perceptions regarding the current American Diabetes Association methods for teaching adults about modifying dietary carbohydrate (starches and sugars) for controlling weight?

2. What would you change regarding the current methods for teaching adults about modifying dietary carbohydrate for controlling weight?

3. Do you feel that the current American Diabetes Association methods for teaching adults about modifying dietary carbohydrate for controlling weight is lacking in any way, if yes, how are they lacking?

4. What methods do you use to teach adults about modifying dietary carbohydrate (starches and sugars) for controlling weight?

5. Do you perceive your methods to be successful or unsuccessful? Why?

6. What challenges have you encountered in teaching adults about modifying dietary carbohydrate for controlling weight?

Please e-mail your responses to [redacted] if you have any questions, you may contact me by cell at [redacted] (a text message is preferred).
Thank you for your participation.
Sincerely,

Vincient M. Cleamons, Ed.S., R.D.N.

Appendix E: Telephone Interview Protocols (Considerations of Distance)

Steps	Examples
1. To mitigate structural distance, begin the interview with semistructured questions that require closed-ended responses.	1. "You mentioned that you only use traditional ADA materials to teach adults. Is that true?"
2. Clarify the closed-ended responses by probing for more information through restating the original question to elicit an open-ended response.	2. "What are your reasons for only using traditional ADA materials to teach adults?"
3. If it appears that the interview may exceed 15 minutes, ask the participant if she is willing to continue the telephone interview for more than 15 minutes or if she would prefer to continue the interview through other forms of telecommunications (e.g., e-mail or text messages via cell phone). This scenario attempts to ameliorate the complications of status distance.	3. "I see that our 15-minute interview time has drawn to a close, but I would be happy to continue this conversation by phone if you wish. Otherwise, I would be happy to continue our conversation by e-mail or cell-phone texts if that is most convenient for you."
4. Conclude the interview by attenuating shortcomings in the dimensions of psychological distance.	4. "Thank you again for participating in this study. I value your expertise and insights. If you should have any concerns or questions about what we have discussed, please contact me immediately. I will e-mail a summarization of all your responses to the interview questions. Once you receive this e-mail, please make any corrections you feel are necessary and reply to [redacted] If no corrections are needed, please respond to the respective e-mail address with the statement 'no corrections needed.'"