

**AN EVALUATION OF THE EFFECTIVENESS OF NUTRITION EDUCATION SESSIONS TO  
INCREASE NON-NUTRITION GRADUATE RESEARCH FELLOWS'  
LEVEL OF NUTRITION KNOWLEDGE AND CONFIDENCE  
IN GIVING NUTRITION ADVICE**

A THESIS

Presented to the Department of Family and Consumer Sciences  
California State University, Long Beach

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science in Nutritional Science

Committee Members:

Gail C. Frank, Dr.P.H. (Chair)  
Rachel Blaine, D.Sc.  
Melawhy Vega-Garcia, Ph.D.

College Designee:

Wendy Reiboldt, Ph.D.

By Audrianna C. Atencio

B.S., 2014, California State University, Long Beach

August 2017

ProQuest Number: 10605201

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10605201

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code  
Microform Edition © ProQuest LLC.

ProQuest LLC.  
789 East Eisenhower Parkway  
P.O. Box 1346  
Ann Arbor, MI 48106 – 1346

Copyright 2017

Audrianna C. Atencio

ALL RIGHTS RESERVED

## ABSTRACT

# AN EVALUATION OF THE EFFECTIVENESS OF NUTRITION EDUCATION SESSIONS TO INCREASE NON-NUTRITION GRADUATE RESEARCH FELLOWS' LEVEL OF NUTRITION KNOWLEDGE AND CONFIDENCE IN GIVING NUTRITION ADVICE

By

Audrianna C. Atencio

August 2017

The purpose of this study is to conduct a secondary analysis of data from a nutrition education-training program given to one cohort of non-nutrition Graduate Research Fellows (GRFs) participating as educators in the Sanos y Fuertes (Healthy and Strong) research project. Specifically, the objective is to evaluate if seven nutrition education sessions would increase the GRFs' level of nutrition knowledge and confidence in giving nutrition advice.

The secondary analysis focused on a non-randomized, convenience sample of five GRFs from cohort five of the Sanos y Fuertes research project. Level of nutrition knowledge was measured using identical pre/post-test, while level of confidence to give nutrition-related advice was measured using a Motivational Interviewing ruler. Paired sample *t*-tests revealed that there was a statistically significant difference in both non-nutrition graduate students' level of nutrition knowledge and confidence to give nutrition advice before and after participating in the seven basic nutrition education sessions. Results from this study illustrate that nutrition knowledge and confidence in giving nutrition-related advice has the potential to increase through targeted training.

## TABLE OF CONTENTS

ABSTRACT.....	ii
LIST OF TABLES.....	iv
1. INTRODUCTION .....	1
2. REVIEW OF LITERATURE .....	6
3. METHODOLOGY .....	15
4. RESULTS .....	22
5. MANUSCRIPT.....	32
APPENDICES .....	44
A. BASIC NUTRITION EDUCATION SESSIONS AND PRE/POST-TESTS .....	45
B. DEMOGRAPHIC QUESTIONNAIRE .....	77
C. FOCUS GROUP TEMPLATE .....	79
D. FOCUS GROUP CONFIDENCE AND KNOWLEDGE LEVEL HANDOUT .....	84
E. PERMISSION REQUEST TO PERFORM SECONDARY ANALYSIS .....	87
F. PERMISSION LETTER FROM THE CO-PRINCIPAL INVESTIGATOR.....	90
G. REQUEST TO SERVE ON EXTERNAL, EXPERT REVIEW COMMITTEE .....	92
H. CONSTRUCT VALIDITY QUESTIONNAIRE FORM.....	94
REFERENCES .....	99

## LIST OF TABLES

1. Description of Sample Demographics ( $n = 5$ ) .....	23
2. Individual Participant Pre/Post-Test Scores and Percent Change.....	24
3. Calculation of I-CVI for Basic Nutrition Education Sessions Pre/Post-Test Items.....	25
4. Results of Paired Sample $t$ -Tests Difference in Level of Nutrition Knowledge.....	26
5. Results of Paired Sample $t$ -Tests Difference in Level of Confidence .....	27
6. Description of Participant Demographics ( $n = 5$ ).....	38
7. Paired Sample $t$ -Tests Difference in GRFs' Level of Nutrition Knowledge .....	40
8. Paired Sample $t$ -Tests Difference in GRFs' Level of Confidence.....	40

# CHAPTER 1

## INTRODUCTION

Chronic diseases—such as obesity, hypertension, cancer, and type II diabetes—are common morbidities in the United States, and according to the Centers for Disease Control and Prevention (CDC; 2016b), chronic diseases account for seven of the top 10 leading causes of death in the United States. Proper nutrition is necessary in both the prevention and treatment of chronic disease. Registered Dietitian Nutritionists (RDNs) are the only health care professionals qualified to provide nutrition education beyond basic concepts; however, other healthcare professionals are often tasked with the responsibility of delivering nutrition education to community members, patients, and clients (Academy of Nutrition and Dietetics, 2014; Ettienne-Gittens et al., 2012). The question remains as to whether or not these other health care professionals have received proper training in the field of nutrition to adequately provide nutrition education to community members and patients (Ettienne-Gittens et al., 2012).

In a clinical/treatment setting, nurses and physicians are often required to give nutrition advice or education to patients; however, several studies have found their nutrition knowledge to be inadequate (Parker, Steyn, Levitt, & Lombard, 2011; Yalcin, Cihan, Gundogdu, & Ocakci, 2013). Similarly, research evaluating the need for nutrition education in physician curricula found that few residents and clinicians were comfortable managing their patients' nutrition problems (Delegge, Alger-Mayer, Van Way, & Gramlich, 2010; Friedman et al., 2010). Other studies suggest that nurses may perceive their nutritional knowledge to be greater than it is in reality. Parker et al. (2011) found that 24% of nursing students perceived their nutrition knowledge as excellent, but less than 1% scored the desired 80% on a basic nutrition knowledge test. This study found that the majority of nurses achieved poor to mediocre scores on the basic

nutrition knowledge test. Conversely, in a study among 327 nurses, 98% expressed that they believe there should be more extensive nutrition education in nursing programs (Ilmonen, Isolauri, & Laitinen, 2012).

With increasing rates of obesity and chronic disease in the United States, and the passage of the Affordable Care Act of 2010, nutrition education in a preventive setting has become paramount (Tuma, 2012). Health educators are often used in a preventive setting to deliver nutrition education to community members (Ettienne-Gittens et al., 2012). Health educators typically hold either a bachelor's or master's degree from a health education program, and can become Certified Health Education Specialists (CHES; Ettienne-Gittens et al., 2012). Research has shown that there is a need for health educators and other public health professionals to be educated in general nutrition and nutrition across the life cycle; however, few studies have evaluated the impact of nutrition education trainings given to these health professionals to increase their nutrition knowledge and confidence to give nutrition education to community members (Ettienne-Gittens et al., 2012; Turner, Knol, & Meyer, 2012).

### **Statement of the Problem**

Current research assessing nutrition knowledge of health care professionals from the areas of health education and public health is lacking. Few studies have specifically evaluated nutrition knowledge among health educators and other public health professionals. Limited research exists regarding the effectiveness of any nutrition-related trainings given to members of these professions. Health care professionals agree that better nutrition preparation and training is necessary for allied health professionals, including health educators (Ettienne-Gittens et al., 2012).

### **Problem Statement**



The purpose of this study is to conduct a secondary analysis of data from a nutrition education-training program given to one cohort of non-nutrition Graduate Research Fellows (GRFs) participating as educators in the Sanos y Fuertes (Healthy and Strong) research project. Specifically, the objective is to evaluate if seven nutrition education sessions would increase the GRFs' level of nutrition knowledge and confidence in giving nutrition advice.

### **Research Question**

Can the nutrition knowledge of future health care professionals increase with targeted training? Will that knowledge/training increase their level of confidence to give nutrition-related advice to the public?

### **Hypotheses**

H<sub>0</sub>1: There is no significant difference in non-nutrition graduate students' level of nutrition knowledge before and after participating in seven basic nutrition education sessions.

H<sub>0</sub>2: There is no significant difference in non-nutrition graduate students' level of confidence to give nutrition advice before and after participating in seven basic nutrition education sessions.

### **Definition of Terms**

For the purpose of this study, the following terms are defined:

*Chronic disease:* Chronic diseases are long duration diseases typically progress slowly. The four main types include cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes (World Health Organization, 2016c).

*Confidence in giving nutrition advice:* Confidence (n.d.) is defined as “a feeling or belief that you can do something well or succeed at something.” Confidence was measured using a rating scale of 1 to 10 and open-ended questions during the focus group.

*Nutrition:* Nutrition (2016) is defined as “the process by which the body takes in and uses food, especially food that it needs to stay healthy, or the scientific study of this process.”

*Nutrition education:* Contento (2016) defines nutrition education as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviors conducive to health and well-being delivered through multiple venues, involving activities at the individual, institutional, community, and policy levels” (p. 13).

*Nutrition knowledge:* Miller and Cassady (2015) refer to nutrition knowledge as “knowledge of concepts and processes related to nutrition and health including knowledge of diet and health, diet and disease, foods representing major sources of nutrients, and dietary guidelines and recommendations” (p. 209). Knowledge was assessed using seven pre/post-tests.

*Overweight or obesity:* When a person is overweight or obese, they weigh more than what is considered healthy for a certain height (CDC, 2016a). Body Mass Index (BMI) is used to assess the weight status of individuals (CDC, 2016a). A BMI of 25.0 kg/m<sup>2</sup> to 29.9 kg/m<sup>2</sup> indicates an individual is overweight, while a BMI of greater than 30.0 indicates an individual is obese (CDC, 2016a).

### **Limitations**

Basic nutrition knowledge can be difficult to measure accurately. Only seven pre/post-tests were given with each test comprised of five questions. This limited number of questions could not fully cover every nutrition concept. The most carefully thought-out questions may still not properly assess one’s nutrition knowledge.

During the focus group, GRFs may have been hesitant to express their honest and personal opinions. The limited 1-hour time frame of the focus group may not have been sufficient for participants to express their viewpoints.

The sample population was small and limited to five GRFs. All five GRFS attended California State University, Long Beach (CSULB) and worked for the Sanos y Fuertes (Healthy and Strong) research project; thus, the results cannot be applied to students attending different universities. A control group was not used for comparison.

### **Assumptions**

This study makes several assumptions when analyzing the focus group data and the nutrition knowledge measures. First, the GRFs responded honestly to questions from the pre/post-tests and focus group. Students answered the knowledge questions to the best of their ability and did not use other sources to find answers. Next, all questions posed to the participants were written clearly to ensure they were able to understand what was being asked of them. Then, the focus group was facilitated properly through open-ended questions that did not lead participants to answer in a particular way.

## CHAPTER 2

### REVIEW OF LITERATURE

The purpose of this study is to conduct a secondary analysis of data from a nutrition education-training program given to one cohort of non-nutrition GRFs participating as educators in the Sanos y Fuertes (Healthy and Strong) research project. Specifically, the objective is to evaluate if seven nutrition education sessions would increase the GRFs' level of nutrition knowledge and confidence in giving nutrition advice.

#### **Prevalence of Obesity and Chronic Diseases**

Currently, greater than one-third (34.9%) of adults in the United States are considered obese (Ogden, Carrol, Kit, & Flegal, 2014). Obesity rates have been shown to differ between racial/ethnic groups and ages. Non-Hispanic Blacks have the highest rates of obesity at 47.8%, compared with Hispanics at 42.5%, and non-Hispanic Whites at 32.6% (Ogden et al., 2014). Middle age adults (40-59 years of age) have higher rates of obesity (39.5%) compared to younger adults (30.3%; Ogden et al., 2014). Experts predict that if the current obesity trends continue, approximately 50% of U.S. adults will be obese by the year 2030 (Wang, McPherson, Marsh, Gortmaker, & Brown, 2011).

Obesity rates have been increasing among children. In 1980, approximately 7% of children between the ages of 6 and 11 were obese (Ogden et al., 2014). As of 2012, that percentage has grown to 18% (Ogden et al., 2014). Childhood obesity rates differ between racial/ethnic groups. Among children and adolescents aged 2 through 19 years, non-Hispanic Black children have the highest rate of obesity (24%), followed by Hispanic children (21%) and non-Hispanic White children (14%; Ogden, Carroll, Kit, & Flegal, 2012).

Individuals who are overweight or obese are at a greater risk of developing chronic diseases, such as diabetes, cardiovascular disease, and certain cancers (CDC, 2015). As of 2012, roughly half of U.S. adults (117 million people) suffered from at least one chronic disease (Ward, Schiller, & Goodman, 2014). One study sampling obese children and adolescents found that 70% of these children had at least one cardiovascular disease (CVD) risk factor (Freedman, Mei, Srinivasan, Berenson, & Dietz, 2007).

According to the World Health Organization (2016b), CVD is the number one cause of death across the globe. In the year 2012, approximately 31% of all deaths globally were due to CVD. Roughly 84 million U.S. adults suffer from some form of CVD, and the percentage of U.S. adults with CVD is expected to grow to 40.5% by the year 2030 (Heidenreich et al., 2011; Johns Hopkins Medicine, n.d.). Cancer is the second leading cause of death in the United States, accounting for 1 in every 4 deaths (American Cancer Society, 2016; CDC, 2016b). As of 2014, roughly 14.5 million Americans were living with some type of cancer (American Cancer Society, 2016). Approximately 29.1 million people in the United States are diabetic, with 27.8% of diabetics being undiagnosed (CDC, 2014). The prevalence of prediabetes in U.S. adults has risen from 79 million in 2010 to 86 million in 2012 (American Diabetes Association, 2015). By the year 2050, up to 1 in 3 U.S. adults are expected to be diabetic (Boyle, Thompson, Gregg, Barker, & Williamson, 2010).

### **Nutrition in Prevention and Treatment of Chronic Disease**

Chronic diseases are one of the most preventable health problems plaguing the United States (CDC, 2015). Research shows that lifestyle factors, such as dietary habits and physical activity, play a key role in the development of chronic disease (CDC, 2015; DiMaria-Ghalili et al., 2014). Today, the typical American diet is high in calorie-dense, nutrient-poor foods (Grotto

& Zied, 2010). These foods are typically high in sodium, saturated fat, and added sugars, resulting in excessive energy intake (Grotto & Zied, 2010). Roughly 87% of U.S. adults do not consume the daily recommendation of vegetables each day, and 76% do not consume the daily recommendation for fruits (National Cancer Institute, 2015). According to Roger et al. (2012), less than 1% of U.S. adults are meeting diet recommendations set forth by the American Heart Association 2020 goals to help prevent the development of CVD. A low consumption of fruits, vegetables, and whole grains, coupled with the high intakes of calorie-dense, nutrient poor foods have been associated with obesity and obesity-related conditions, such as CVD, diabetes, and certain cancers (Grotto & Zied, 2010).

Federal agencies within the United States have begun to shift the focus of health care towards prevention and wellness (Tuma, 2012). The Academy of Nutrition and Dietetics states “primary prevention is the most effective and affordable method to prevent chronic disease, and that dietary intervention positively impacts health outcomes across the life span” (as cited in Slawson, Fitzgerald, & Morgan, 2013, p. 972). Chronic diseases may be prevented or minimized with proper dietary interventions (Slawson et al., 2013).

Studies have shown that dietary interventions have been effective in the prevention and treatment of chronic diseases. Estruch et al. (2013) assessed cardiovascular risk in participants following a traditional Mediterranean diet over 4.8 years. The Mediterranean diet is high in fruits, vegetables, nuts, legumes, and whole grains (Mayo Clinic, 2016). Eating fish at least twice per week is emphasized in the Mediterranean, while red meat is limited (Mayo Clinic, 2016). Fung et al. (2009) assessed the association between the Mediterranean diet and CVD risk in 74,886 women from the Nurses’ Health Study. Participants following the Mediterranean diet were compared with individuals who did not adhere to the Mediterranean diet. Researchers

found that participants in the Mediterranean diet group reduced their cardiovascular risk by up to 22%. Adhering to the Mediterranean diet was found to lower the risk of myocardial infarction and heart failure (HF) in a cohort of 32,921 women; RR: 0.74, 95% CI: 0.61-0.90,  $p = .007$ ; RR: 0.79, 95% CI: 0.68-0.93,  $p = .004$  (Tektonidis, Akesson, Gigante, Wolk, & Larsson, 2015).

The Dietary Approaches to Stop Hypertension (DASH) diet has been effective in lowering high blood pressure (National Institutes of Health, 2003). The DASH diet emphasizes high intakes of fruits, vegetables, whole grains, nuts, low-fat dairy products, and is low in saturated fat, sodium, and added sugars (National Institutes of Health, 2003). Appel et al. (1997) found that the 151 adults who followed the DASH diet reduced their systolic blood pressure by an average of 5.5 mm Hg and diastolic blood pressure by 3.0 mm Hg when compared to the control group ( $p < .001$ ). A systematic review by Salehi-Abargouei, Maghsoudi, Shirani, and Azadbakht (2013) concluded that the DASH diet can reduce the risk of CVD, stroke, and HF by 20%, 19%, and 29%, respectively. Hummel et al. (2013) found that the DASH diet had a positive impact on participants with hypertension and heart failure. Participants following the DASH diet had improvements in their systolic blood pressure ( $155 \pm 35$  to  $138 \pm 30$  and  $130 \pm 16$  to  $123 \pm 18$  mmHg; both  $p = .02$ ) and diastolic function ( $c = 24.3 \pm 5.3$  to  $22.7 \pm 8.1$  g/s;  $p = .03$ ).

Obesity is one of the primary predictors in the development of type II diabetes mellitus (T2DM), as obesity is associated with the initial development of insulin resistance (Gillies et al., 2007; Slawson, et al., 2013; Willett & Stampfer, 2013). Dietary interventions have been used to address the issue of obesity and prevent or delay the onset of diabetes among individuals with prediabetes (Gillies et al., 2007). A study done by Dall et al. (2015) found that lifestyle interventions among individuals with prediabetes reduced the onset of diabetes by 41% over a 10-year period. A meta-analysis performed by Chen et al. (2015) found significant

improvements in patients with T2DM who had lifestyle interventions targeting diet, exercise, and patient education. Patients in the intervention group had significant improvements in HbA1c (standardized difference in means, -0.37; 95% CL, -0.59 to -0.14,  $p < .001$ ) and BMI (standardized difference in means, -0.29; 95% CI, -0.52 to -0.06,  $p = .014$ ) when compared to the control group.

The DASH diet has not only been used to treat and prevent hypertension, but has also been used to address issues associated with T2DM (Shirani, Salehi-Abargouei, & Azadbakht, 2013). A systematic review and meta-analysis performed by Shirani et al. (2013) found that the DASH diet was able to significantly reduce fasting insulin levels (mean difference -0.15; 95% CI, -0.22 to -0.08;  $p < .001$ ). However, the analysis did not show a beneficial effect on fasting blood glucose (mean difference -0.26; 95% CI, -0.56 to 0.05;  $p = .100$ ).

Researchers have estimated that roughly 30-35% of all cancer-related deaths are linked to dietary factors (Doll & Peto, 1981). According to the World Health Organization (2016a), individuals who are overweight or obese are at an increased risk for developing certain types of cancers, including breast, kidney, and colorectal cancer. Diets high in fruits and vegetables, and low in red and processed meat may be protective against several types of cancers.

### **Importance of Educating Non-Nutrition Health Professionals on Nutrition**

The demand for health care professionals to address the epidemic of obesity and chronic disease is growing (Ettienne-Gittens et al., 2012). Unfortunately, only 89,300 RDNs are currently employed in the United States to meet the needs of a total population of approximately 323 million (Commission on Dietetic Registration, 2013; U.S Census Bureau, 2016). Comparatively, there are 105,700 health educators and community health workers, and 3,129,452 Registered Nurses (RNs) working in the United States (Bureau of Labor Statistics,



2015; Kaiser Family Foundation, 2016). Thus, the curricula for all health care professionals should include standardized nutrition education (Kris-Etherton et al., 2014). According to Turner et al. (2012), health care professionals need to understand the significance of nutrition in the prevention and treatment of disease before they can adequately educate the public.

Health educators not only receive questions related to chronic disease and nutrition from patients and the public, but are also regularly delivering nutrition education; however, there appear to be few, if any, guidelines in place regarding the basic qualifications needed by non-nutrition health professionals who are expected to deliver nutrition education (Ettienne-Gittens et al., 2012; Shirani et al., 2013). Research suggests that many of these health professionals are not adequately trained in the area of nutrition (Shirani et al., 2013). Kris-Etherton et al. (2014) state that many health care professionals have not received proper training in the areas of nutrition and physical activity to properly mitigate the development of chronic disease. This is especially concerning considering that nutrition has become a central focus of health care (Kris-Etherton et al., 2014; Tuma, 2012).

Many professionals in the field of health care recognize the need for students in the health care field to have nutrition integrated into their curricula (Ettienne-Gittens et al., 2012). Kris-Etherton et al. (2014) acknowledge that nutrition has not been properly integrated into the education and training programs of health care professionals. Fitz (1997) found that introducing health care students to nutrition at an early stage of their education could enhance the effectiveness of their professional career. DiMaria-Ghalili et al. (2014) state that nutrition is important to the practice of all professionals within the field of health. However, even though professionals recognize the importance of nutrition, some researchers have found that integrating nutrition into the training of physicians and other health professionals remains a low priority

(Kris-Etherton et al., 2014). Eisenberg and Burgess (2015) found that only 27% of medical schools within the United States are teaching 25 hours of recommended nutrition education.

Parker et al. (2011) assessed health professionals' knowledge regarding the role of lifestyle modification to manage chronic disease. They found that the majority of health professionals in their study overestimated their nutrition knowledge, as 18% of participants rated their nutrition knowledge as "excellent" and 60% rated their knowledge as "good," but only 6% of these professionals scored the desired 80% on the knowledge test. Kris-Etherton et al. (2014) emphasize the need for further research to identify effective nutrition training and education models for health care professionals. They call upon dietetic professionals to assume a leadership role in the education and training of non-nutrition health care professionals.

### **Efficacy of Nutrition Training Programs/Interventions**

Providing nutrition education training to students and professionals may help to increase their level of nutrition knowledge and ability to convey nutrition-related topics effectively. A systematic review performed by Sunguya et al. (2013) found significant improvements among health workers who received training on nutrition counseling techniques. Out of the 25 studies they evaluated, 18 showed significant improvements in the nutrition knowledge of health care workers after receiving in-service nutrition trainings. The researchers recommend the use of in-service nutrition training to help fill existing knowledge gaps that exist in healthcare professionals' education. Bistriz et al. (2015) developed a nutrition and physical activity curriculum for health science students. Pre/post-tests were given to assess participants' level of knowledge related to nutrition and physical activity. Researchers found that after participating in the intervention program, participants' knowledge scores improved pre-test to post-test (54.7% to 68.2%).

Wall-Bassett et al. (2012) developed a nutrition education curriculum that addressed nutrient classes, food groups, food safety, chronic disease, dietary guidelines, and health assessments. Dietetic students and nutrition faculty taught a total of eight modules to 10 participants (Community Health Aides). Knowledge level was assessed using pre/post-tests given before and after each of the eight modules. Researchers found a statistically significant increase in nutrition knowledge in five of the eight modules ( $p < .05$ ), specifically nutrient groups, dietary guidelines, obesity, cardiovascular disease, and sanitation and safety. Participants had a statistically significant increase in their confidence to perform dietary assessments and take anthropometric measurements ( $p < .05$ ).

Researchers have evaluated nutrition trainings given to health education teachers. One study provided 10 consecutive 50-minute trainings on nutrition to health education teachers, and found that the trainings were able to increase teachers' belief that they have the ability to teach nutrition ( $F = 6.52, p = .023$ ; Falhman, McCaughtry, Martin, & Shen, 2011). The same study found significant changes in teachers' belief that they could change unhealthy eating habits of their students ( $F = 9.43, p = .001$ ); teach students to select nutrient-dense foods ( $F = 6.57, p = .004$ ); and teach students to read food labels ( $F = 6.46, p = .026$ ). Another study implemented a nutrition education program to health education teachers in South Africa (Oldewage-Theron & Egal, 2012). Teachers who participated in the nutrition education program had significant improvement in their ability to identify components of foods correctly and classify fats and vitamins properly (Oldewage-Theron & Egal, 2012).

### Summary

This review of the literature has shown that nutrition is key in both the prevention and treatment of chronic diseases. Non-nutrition health professionals are often tasked with providing

nutrition education to community members and patients, yet evidence suggests that these professionals may not be adequately trained to give such education. Trainings and workshops offered to health professionals have increased both their level of nutrition knowledge and confidence to give nutrition-related advice. There is a clear need to provide more nutrition-related training to both students and professionals within the health field.

## **CHAPTER 3**

### **METHODOLOGY**

The purpose of this study is to conduct a secondary analysis of data from a nutrition education-training program given to one cohort of non-nutrition GRFs participating as educators in the Sanos y Fuertes (Healthy and Strong) research project. Specifically, the objective is to evaluate if seven nutrition education sessions would increase the GRFs' level of nutrition knowledge and confidence in giving nutrition advice.

#### **Sanos y Fuertes Basic Nutrition Focus Area**

The Sanos y Fuertes (Healthy and Strong) research project aimed to address childhood obesity among Latinos living in Los Angeles County. Seven graduate students from the College of Health and Human Services were chosen each year from 2011 to 2016. The majority of GRFs were from the Master of Public Health program, while at least one GRF was required to be from the Master of Science in Nutritional Science program. Graduate Research Fellows assisted in both the development and delivery of a culturally-tailored, nutrition-based curriculum taught to the Latino community. This research project aimed to increase experimental learning of GRFs through various workshops and trainings.

During the first 3 years of the project, the Co-Principal Investigator (Co-PI), who was a RDN, provided nutrition education trainings to the GRFs (G. Frank, personal communication, September 2015). The Co-PI developed a 129-item baseline nutrition exam based off literature used to teach the introductory, undergraduate class at CSULB (Nutrition 132; G. Frank, personal communication, September 2015). The baseline exam was distributed to each GRF at the beginning of each school year. Once completed, this exam was given to a separate staff member

for grading in order to reduce bias. This baseline exam allowed the Co-PI to assess areas of weakness in nutrition knowledge.

At the beginning of each cohort, GRFs were assigned to various focus areas, such as data input and social media management. In year 4 of the research project, the Co-PI and other core staff decided to create a focus area that would give one to two GRFs the opportunity to work with the Co-PI to create and deliver basic nutrition education sessions to the other GRFs (G. Frank, personal communication, September 2015). Prior to the start of the education sessions, the two responsible GRFs assigned ID numbers to each of the other five GRFs (K. Rivera, personal communication, August 2015). This ID number was used on all subsequent forms and tests given to the GRFs (K. Rivera, personal communication, August 2015). The baseline nutrition exam was distributed and the results were used to develop a list of possible topics that could be taught to the other GRFs. Literature was used to determine what topics fall under “basic nutrition” (K. Rivera, personal communication, August 2015). The two GRFs then developed a 10-item demographic questionnaire that included questions regarding prior nutrition-related experience, education background, and allowed the GRFs to voice their interest in possible topics for the basic nutrition education sessions (K. Rivera, personal communication, August 2015).

Next, seven presentations were developed in the areas of chronic disease, anatomy and disorders of the digestive system, mindful eating, infant and maternal health, and overall nutrient guidelines/recommendations. The two GRFs from year 4 then created identical pre/post-tests containing a total of five questions for each of the seven presentations (K. Rivera, personal communication, August 2015). The pre/post-tests were distributed to the other GRFs immediately before and after each of the basic nutrition education sessions.

In addition to the education sessions, the two GRFs developed and conducted a focus group to the other GRFs (K. Rivera, personal communication, August 2015). Each question was either open-ended or presented to the GRFs in the form of a Likert scale from 1 to 10. The focus group was designed to assess the GRFs perceived nutrition-related confidence, knowledge level, and to assess how much information they retained from each of the seven sessions. The focus group was recorded and transcribed by the two GRFs.

For the fifth and final year of the study, one GRF was assigned to the basic nutrition focus area. This GRF followed all steps set up by the two GRFs from year 4, with two minor differences. The GRF from year 5 altered each of the seven presentations to fit her personal presentation style. She used different pre/post-tests to ensure that other GRFs from year 5 would have no exposure to the content prior to the education session taking place. Finally, the GRF from year 5 modified the focus group questions and sent the proposed questions to the Co-PI for final approval.

### **Sample**

The secondary analysis focused on a non-randomized, convenience sample of five GRFs from cohort 5 of the Sanos y Fuertes research project. The GRFs participated in seven basic nutrition education sessions and one focus group as part of the professional development portion of the research fellowship. All GRFs from this cohort were females and between the ages of 23 and 26. All GRFs included in this study were second year Master of Public Health students at CSULB.

### **Instrumentation**

Seven basic nutrition education sessions were developed by the GRF assigned to the basic nutrition focus area. The first session provided an overview of general nutrient guidelines

and recommendations. This included information regarding the Dietary Guidelines, macronutrients, micronutrients, and common deficiencies. The second session detailed the anatomy of the digestive system, and the function of each organ in the gastrointestinal tract. Session 3 focused on digestive disorders including gastroesophageal reflux, irritable bowel syndrome, and irritable bowel disease. The fourth session examined obesity and chronic diseases, including CVD and diabetes. In the fifth session, GRFs learned how to differentiate between emotional eating and mindful eating. The sixth session presented nutritional needs and recommendations during pregnancy. In addition, this session discussed nutrition-related problems, such as pregnancy-induced hypertension, gestational diabetes, fetal alcohol syndrome, and teen pregnancy. The final nutrition education session provided nutrition recommendations for infants, toddlers, and lactating mothers. Each nutrition education session was 30 to 45 minutes long. The PowerPoints used for each session can be found in Appendix A.

Level of nutrition knowledge was measured using identical pre/post-tests given to GRFs immediately before and after each of the seven basic nutrition education sessions. Each pre/post-test contained five questions based on topic being presented. Pre/post-tests were developed by the GRF assigned to the basic nutrition focus area under the guidance of the Co-PI. Graduate Research Fellows were given 3 to 5 minutes to complete each pre/post-test. The pre-tests were collected prior to the start of the session. All pre/post-tests can be found with the corresponding PowerPoint in Appendix A.

A seven-item demographic questionnaire was given to each participating GRF prior to the start of the first basic nutrition education session. The questionnaire included three open-ended questions and four multiple-choice questions. The GRFs assigned to the basic nutrition focus area developed the questionnaire, and it took approximately five minutes to complete. The



questionnaire not only asked questions regarding age and major, but also included questions regarding prior nutrition-related experience (Appendix B).

The GRF assigned to the basic nutrition focus area developed a focus group template (Appendix C) under the guidance of the Co-PI with questions addressing confidence to give nutrition-related advice and knowledge retained from the education sessions. The focus group was 1-hour long and contained a total of 16 open-ended questions. Four questions measured GRFs' perceived level of knowledge and confidence to give nutrition-related advice using a Motivational Interviewing (MI) ruler. For these four questions, GRFs were asked to rate their confidence/knowledge level on a scale ranging from 0 to 10 (0 = not at all confident, 5 = somewhat confident, and 10 = extremely confident). These four questions were printed out and given to each GRF (Appendix D) to allow each person to have the opportunity to respond with by writing in their level of confidence or knowledge (scale of 0 to 10). The moderator provided the MI ruler to GRFs for them to reference.

For both null hypotheses, the independent variable is participation in the basic nutrition education sessions. The dependent variable for hypothesis 1 is level of nutrition knowledge (variable type: continuous, ratio). The dependent variable for hypothesis 2 is level of confidence in giving nutrition advice (variable type: continuous, ordinal).

### **Procedure**

Permission to use the basic nutrition education session data from cohort 5 of the Sanos y Fuertes (Healthy and Strong) research project was requested from the Co-PI, Dr. Gail Frank, via email (Appendix E). Once permission was granted by the Co-PI (Appendix F), the study was approved by the institutional review board of CSULB. Data collected from the cohort 5 pre/post-tests, demographic forms, and focus group recording were then accessed. The focus

group was transcribed verbatim and reviewed twice. Once the transcription process was complete, the focus group was coded by generating categorizing reoccurring patterns. Once the coding was complete, the researcher looked for repeating ideas and larger themes that connected the codes.

One tenure-track nutrition professor, Dr. Virginia Gray, as well as five nutrition lecturers, Jessica Beaudoin, Wendy Devine, Amanda Saucedo, Kristen Mahood, and Sarah Minkow, were contacted via email (Appendix G) and asked to serve as members of an external, expert review committee. This committee evaluated the content validity of the pre/post-test questions used to assess the nutrition knowledge of GRFs before and after participating in each basic nutrition education sessions. All seven basic nutrition education sessions and their corresponding pre/post-tests were provided to the committee for review. The committee was then provided with an evaluation form (Appendix H) that used a 4-point Likert scale to respond to a series of items about the pre/post-test questions from each of the seven sessions. Response options for the Likert scale ranged from “not relevant” to “very relevant,” and there was a section on the evaluation form for any additional comments the committee members may have had (Davis, 1992). Responses on the Likert scale for the content validity of each pre/post-test item were rated using the following system:

1 = not relevant

2 = somewhat relevant

3 = relevant

4 = very relevant

### **Data Analysis**

Content validity was analyzed using the content validity index of items (I-CVI), which focuses on the relevance of the items being reviewed (Lynn, 1986; Polit & Beck, 2006). The I-CVI for each item of the pre/post-tests was calculated “as the number of experts giving a rating of either 3 or 4 divided by the total number of experts” (Lynn et al., 2006). Since there were greater than five experts on the expert review committee, the content could be judged as valid at the item level if the overall I-CVIs amounted to .80 or higher (Lynn et al., 2006). Pre/Post-test data were analyzed using IBM SPSS Statistics 22 (IBM Corp., 2013). The first null hypothesis was examined using both paired sample *t*-tests and a pairwise comparison to compare the scores between pre/post-tests and overall. Data analysis included the percentage of questions answered correctly per GRF and overall for each topic. The second null hypothesis was tested using paired sample *t*-tests to compare the difference in confidence level based on the Likert scale rankings before and after participating in the seven basic nutrition education sessions. The significance for both hypotheses was set at  $p \leq 0.05$ . The focus group was transcribed and coded for themes.

## CHAPTER 4

### RESULTS

The purpose of this study is to conduct a secondary analysis of data from a nutrition education-training program given to one cohort of non-nutrition GRFs participating as educators in the Sanos y Fuertes (Healthy and Strong) research project. Specifically, the objective is to evaluate if seven nutrition education sessions would increase the GRFs' level of nutrition knowledge and confidence in giving nutrition advice.

#### Sample Demographics

The cohort consisted of five female Master of Public Health students between the ages of 23 and 26. The demographic questionnaire was confidential, administered using paper and pencil, and took approximately five minutes to complete. Responses to the demographic questionnaire showed that 60% ( $n = 3$ ) of participants had previously taken an introductory nutrition course during their undergraduate coursework, whereas two had not. When asked about the extent of nutrition being taught in their current program, all five participants reported a “mild” exposure within their program. Sample demographics are presented in Table 1. Table 2 shows the individual pre/post-test scores for each participant and their percent change from pre to post-test. Originally, a pairwise comparison was suggested comparing whether or not there was a greater change in knowledge resulting from one of the basic nutrition education sessions; however, a pairwise comparison was not feasible due to the small sample size and limited number of basic nutrition education sessions. Instead, the percent change from pre to post was calculated to see if one class appeared to have a greater effect than the others. Based on the percent change, the third education session on digestive disorders produced the greatest change in knowledge overall.

**TABLE 1. Description of Sample Demographics (*n* = 5)**

Variable		<i>n</i>	%
Gender	Male	0	0
	Female	5	100
Major	Masters of Public Health	5	100
Intro to Nutrition Course	Yes	3	60
	No	2	40
Extent of Nutrition in Program	Nonexistent	0	0
	Mild	5	100
	Moderate	0	0
	Good	0	0
	Extensive	0	0

### Content Validity

A Content Validity Questionnaire was completed by six nutrition professors from CSULB. The professors were asked to assess the relevance of each pre/post-test question using a Likert scale that ranked each item using the following system:

1 = not relevant

2 = somewhat relevant

3 = relevant

4 = very relevant

The majority of pre/post-test items were found to be relevant and valid (I-CVI greater than .79). A total of two items, item 5 from session 1 and item 2 from session 4, were found not to be relevant (I-CVI less than .79). Results from the Content Validity Questionnaire are presented in Table 3.

**TABLE 2. Individual Participant Pre/Post-Test Scores and Percent Change**

	GRF	Pre-Test Score %	Post-Test Score %	% Change
Session 1	01	60	100	40
	02	40	100	60
	03	20	80	60
	04	40	100	60
	05	80	100	20
Session 2	01	80	100	20
	02	0	100	100
	03	40	100	60
	04	20	80	60
	05	60	100	40
Session 3	01	40	100	60
	02	0	100	100
	03	40	100	60
	04	40	100	60
	05	60	100	40
Session 4	01	80	100	20
	02	40	100	60
	03	20	80	60
	04	0	100	100
	05	40	100	60
Session 5	01	40	100	60
	02	60	100	40
	03	40	80	40
	04	20	100	80
	05	40	100	60
Session 6	01	60	100	40
	02	80	100	20
	03	60	100	40
	04	60	80	20
	05	40	100	60
Session 6	01	80	100	20
	02	40	80	40
	03	40	100	60
	04	40	100	60
	05	60	100	40

**TABLE 3. Calculation of I-CVI for Basic Nutrition Education Sessions Pre/Post-Test Items**

	Items	Relevant (rating 3 or 4)	Not Relevant (rating 1 or 2)	I-CVIs	Interpretation
Session 1	1	5	1	0.833	AP
	2	5	1	0.833	AP
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	4	2	0.667	NR
Session 2	1	6	0	1.000	AP
	2	5	1	0.833	AP
	3	6	0	1.000	AP
	4	5	1	0.833	AP
	5	5	1	0.833	AP
Session 3	1	6	0	1.000	AP
	2	6	0	1.000	AP
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	5	1	0.833	AP
Session 4	1	6	0	1.000	AP
	2	4	2	0.667	NR
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	6	0	1.000	AP
Session 5	1	5	1	0.833	AP
	2	6	0	1.000	AP
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	6	0	1.000	AP
Session 6	1	6	0	1.000	AP
	2	6	0	1.000	AP
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	5	1	0.833	AP
Session 7	1	5	1	0.833	AP
	2	6	0	1.000	AP
	3	6	0	1.000	AP
	4	6	0	1.000	AP
	5	6	0	1.000	AP

Note: Items found to be relevant and appropriate are abbreviated AP, whereas items found to be not relevant and are in need of revision are abbreviated NR.

## Hypotheses

Two hypotheses were proposed and tested using paired sample *t*-tests. Overall, analysis using paired sample *t*-tests showed statistically significant differences between the participants' level of nutrition knowledge and confidence to give nutrition advice before and after participating in the basic nutrition education sessions. Tables 4 and 5 present the findings from the paired sample *t*-tests.

*Hypothesis 1:* There is no significant difference in non-nutrition graduate students' level of nutrition knowledge before and after participating in seven basic nutrition education sessions.

Paired sample *t*-tests revealed that there was a statistically significant difference between pre- and post-test scores from all seven sessions. Data are presented in Table 4. The null hypothesis was rejected.

**TABLE 4. Results of Paired Sample *t*-Tests Difference in Level of Nutrition Knowledge**

		<i>n</i>	Mean	<i>Std. Error</i>	<i>t</i>	<i>df.</i>	<i>p</i> -value
Pair 1	Session 1 Pre	5	2.400	1.140	-6.000	4	.004
	Session 1 Post		4.800	.447			
Pair 2	Session 2 Pre	5	2.000	1.580	-4.221	4	.013
	Session 2 Post		4.800	.447			
Pair 3	Session 3 Pre	5	1.800	1.090	-6.532	4	.003
	Session 3 Post		5.000	.000			
Pair 4	Session 4 Pre	5	1.800	1.480	-4.824	4	.008
	Session 4 Post		5.000	.000			
Pair 5	Session 5 Pre	5	2.000	.707	-7.483	4	.002
	Session 5 Post		4.800	.447			
Pair 6	Session 6 Pre	5	3.000	.707	-4.811	4	.009
	Session 6 Post		4.800	.447			
Pair 7	Session 7 Pre	5	2.600	.894	-5.880	4	.004
	Session 7 Post		4.800	.447			



*Hypothesis 2:* There is no significant difference in non-nutrition graduate students' level of confidence to give nutrition advice before and after participating in seven basic nutrition education sessions.

Participants were asked to rate their confidence level on a scale ranging from 0 to 10 (0 = not at all confident, 5 = somewhat confident, and 10 = extremely confident). The mean score was then calculated for participants' perceived level of confidence before and after participating in the basic nutrition education sessions. Paired sample *t*-tests revealed that there was a statistically significant difference between participants' perceived level of confidence in nutrition knowledge (pair 1) and ability to give nutrition advice (pair 2) before and after participating in the seven basic nutrition education sessions. Data are presented in Table 5. The null hypothesis was rejected.

**TABLE 5. Results of Paired Sample *t*-Tests Difference in Level of Confidence**

		<i>n</i>	Mean	<i>Std. Error</i>	<i>t</i>	<i>df</i>	<i>p</i> -value
Pair 1	Confidence Before	5	3.800	1.300	-4.824	4	.008
	Confidence After		7.000	1.220			
Pair 2	Confidence Before	5	4.600	.8940	-3.833	4	.019
	Confidence After		7.200	1.480			

### Research Question

The research questions investigated were:

1. Can the nutrition knowledge of future healthcare professionals increase with targeted training?
2. Will that knowledge/training increase their level of confidence to give nutrition-related advice to the public?

The focus group was conducted after all seven basic nutrition education sessions were completed, and responses corresponding to the research questions were evaluated. Both written

and verbal responses from a total of five focus group questions were evaluated and coded for themes. Four of the five questions asked the GRFs to discuss their level of nutrition knowledge and level of confidence in their ability to give nutrition advice before and after participating in the basic nutrition education sessions. The four emerging themes with supporting quotes are discussed below.

### **Insufficient Nutrition Knowledge**

When participants were asked to discuss their level of nutrition knowledge before participating in the seven basic nutrition education sessions, the majority of their responses (80%,  $n = 4$ ) focused on not having enough nutrition knowledge to adequately provide nutrition education to others.

In my undergrad I didn't have to take any health science courses nor nutrition classes, and so I just basically had a very general, basic understanding of how to eat right. Like I knew about MyPlate, but specifics about what certain types of food do to our bodies or different organs, like all of that stuff I didn't know.

I only knew or could share the knowledge my parents have shared with me. To give specific guidelines or advice would be difficult for me because I felt that I needed to take an actual course or workshop.

I knew nothing about nutrition, but I knew I had the skills to like google information or ask professionals for the answers in order to provide that information to the community.

I knew the basics of nutrition; however, I would not be able to answer specific/detailed questions.

After discussing their perceived level of nutrition knowledge before participating in the education sessions, participants were asked to discuss their confidence to give nutrition education prior to participating in the nutrition education sessions. The theme of insufficient nutrition knowledge appeared to correlate with participants' confidence to give nutrition education before participating in the seven basic nutrition education sessions. Insufficient

nutrition knowledge was mentioned by 60% ( $n = 3$ ) of participants in relation to their confidence to give nutrition education.

I would say self-doubt played a role in my response. If I felt I did not have the full knowledge to teach others, how would I be able to do it? I would need these basic foundation skills to do so.

I am generally a good public speaker and can easily connect with diverse populations because of my charismatic personality. However, I picked a 4 because I didn't feel that I possessed the necessary professional knowledge of nutrition.

I feel that I don't have the nutrition background or I haven't taken enough courses, so I feel my credibility is not as high to really explain in further detail or to a larger scale, so while I do know or have access to resources and can tell you briefly an overview of stuff, I don't feel that I had the ability to really go in-depth.

This theme emerged again when participants were asked to discuss challenges they had faced while giving nutrition education in the past. A few participants stated that they had a difficult time answering nutrition-related questions from community members because they did not have sufficient nutrition knowledge.

For me it was um the questions that I had come up, maybe throughout the presentation that were more personal based or really tailored to what the individual was going through. While I had all the information provided, it was kind of like a little setback, or um I couldn't really have the confidence to give them the right answer. I had to have assurance from someone else to make sure I was on the right track or saying something correct.

Sometimes the questions were very nutrition based and I just didn't know the answers. I do remember them like comparing different foods and them saying, "well which one's better?" And so I don't have like the number of like calories, and sodium, and sugar and all of that stuff within you know each food, so I couldn't really provide an answer to them.

### **Change in Level of Nutrition Knowledge**

When participants were asked to discuss their level of nutrition knowledge after participating in the seven basic nutrition education sessions, 60% ( $n = 3$ ) of participants discussed having an increase in knowledge.

I feel more knowledgeable because I know more details about how the digestive system works and about the relationship between nutrition and how our bodies function. Of course I'm no expert, but the sessions have fueled my desire to learn more on anatomy and nutrition.

I have learned a lot, but I still need refreshers and to be able to memorize the info.

I learned several new things that I wish to carry on in my own family.

### **Credibility**

After participating in the nutrition education sessions, the issue of credibility and lack of expertise was mentioned by two participants. One participant mentioned the credibility as a factor in both her perceived level of nutrition knowledge and confidence to give nutrition advice after participating in the education sessions. Another participant acknowledged that although her ability to give nutrition advice is strong, she does not know as much as someone who specializes in nutrition.

I still don't feel as credible as someone who has studied nutrition as their profession. I don't know that I am as credible to deliver nutrition material.

I feel I have received plenty of information on such topics, but again, I don't feel I am as credible to give presentations at a large scale as someone who is a nutritionist.

### **Increase in Confidence to Give Nutrition Advice**

Overall, 80% ( $n = 4$ ) of participants stated that their confidence to give nutrition advice had increased since participating in the basic nutrition education sessions. One participant stated that she felt confident to share nutrition knowledge with her family, but did not feel credible enough to give specific nutrition advice to the community. Others felt that they had the confidence to give nutrition education to the community.

I'm extremely confident that I can teach these newly acquired skills/knowledge to clients and community members because I am carrying them out in my own life. I'm putting it into action.

I have a little more confidence because I know have a little better understanding of the human body, anatomy, and nutrition, so I feel a little better prepared to answer questions that may come up during a nutrition education session.

I feel confident because I have learned how to find information on nutrition and how MyPlate.gov has personalized recommendations.

For myself and my family, I feel I am extremely confident with the nutrition knowledge.

### Summary

Overall, both hypotheses were rejected. Analysis using paired sample *t*-tests revealed there was a significant difference in non-nutrition graduate students' level of nutrition knowledge before and after participating in seven basic nutrition education sessions. Paired sample *t*-tests revealed there was a significant difference between non-nutrition graduate students' level of confidence to give nutrition advice before and after participating in seven basic nutrition education sessions. Analysis of pre/post-test items using the I-CVI showed that the majority of items were relevant and valid; however, two items were found to be invalid.

Before participating in the seven basic nutrition education sessions, 80% ( $n = 4$ ) of participants expressed not having enough nutrition knowledge to adequately provide nutrition education to others. More than half of participants (60%,  $n = 3$ ) correlated their lack of nutrition knowledge with their perceived level of confidence to give nutrition advice before participating in the nutrition education sessions. After participating in the seven basic nutrition education sessions, 60% ( $n = 3$ ) of participants discussed having an increase in nutrition knowledge. Overall, the majority of participants (80%,  $n = 4$ ) stated that their confidence to give nutrition advice had increased since participating in the basic nutrition education sessions.

## CHAPTER 5

### MANUSCRIPT

#### Introduction

This chapter was prepared in a manuscript format under the direction and approval of the Chair/Committee. This manuscript was prepared according to the author guides for the Journal of Nutrition Education and Behavior.

Chronic diseases—such as obesity, hypertension, cancer, and type II diabetes—are common morbidities in the United States, and according to the CDC (2016b), chronic diseases account for seven of the top 10 leading causes of death in the United States. Chronic diseases are one of the most preventable health problems plaguing the United States (CDC, 2015).

Research shows that lifestyle factors, such as dietary habits and physical activity, play a key role in the development of chronic disease (CDC, 2015; DiMaria-Ghalili et al., 2014). Proper nutrition is necessary in both the prevention and treatment of chronic disease.

Registered Dietitian Nutritionists (RDNs) are the only health care professionals qualified to provide nutrition education beyond basic concepts (Academy of Nutrition and Dietetics, 2014). Unfortunately, only 89,300 RDNs are currently employed in the United States to meet the needs of a total population of 323 million; therefore, other health care professionals are often tasked with the responsibility of delivering nutrition education to community members, patients, and clients (Commission on Dietetic Registration, 2013; U.S. Census Bureau, 2016; Ettienne-Gittens et al., 2012). According to Turner et al. (2012), health care professionals need to understand the significance of nutrition in the prevention and treatment of disease before they can adequately educate the public. Furthermore, Kris-Etherton et al. (2014) state that the curricula for all health care professionals should include standardized nutrition education. With

increasing rates of obesity and chronic disease in the United States, and the passage of the Affordable Care Act of 2010, nutrition education in a preventive setting has become paramount (Tuma, 2012). Federal agencies within the United States have begun to shift the focus of health care towards prevention and wellness (Tuma, 2012). The Academy of Nutrition and Dietetics states “primary prevention is the most effective and affordable method to prevent chronic disease, and that dietary intervention positively impacts health outcomes across the life span” (Slawson et al., 2013, p. 972). Health educators are often employed in a preventive setting to deliver nutrition education to community members (Ettienne-Gittens et al., 2012). Health educators typically hold either a bachelor’s or master’s degree from a health education program, and can become Certified Health Education Specialists (CHES; Ettienne-Gittens et al., 2012). Health educators receive questions related to chronic disease and nutrition from patients and the public, and regularly deliver nutrition education. However, there appear to be few, if any, guidelines in place regarding the basic qualifications needed by non-nutrition health professionals who are expected to deliver nutrition education (Ettienne-Gittens et al., 2012; Shirani, Salehi-Abargouei, & Azadbakht, 2013). Kris-Etherton et al. (2014) state that many health care professionals have not received proper training in the areas of nutrition and physical activity to properly mitigate the development of chronic disease.

Providing nutrition education training to students and professionals may help to increase their level of nutrition knowledge and ability to convey nutrition-related topics effectively. A systematic review performed by Sunguya et al. (2013) found significant improvements among health workers who received training on nutrition counseling techniques. Out of the 25 studies they evaluated, 18 showed significant improvements in the nutrition knowledge of health care workers after receiving in-service nutrition trainings. The researchers recommend the use of in-

service nutrition training to help fill knowledge gaps that exist in healthcare professionals' education. Bistriz et al. (2015) developed a nutrition and physical activity curriculum for health science students. Pre/post-tests were given to assess participants' level of knowledge related to nutrition and physical activity. Researchers found that after participating in the intervention program, participants' knowledge scores significantly improved pre-test to post-test (54.7% to 68.2%,  $p < .001$ ).

Research has shown that there is a need for health educators and other public health professionals to be educated in general nutrition and nutrition across the life cycle; however, few studies have evaluated the impact of nutrition education trainings given to these health professionals to increase their nutrition knowledge and confidence to give nutrition education to community members (Ettienne-Gittens, et al., 2012; Turner et al., 2012). Thus, this study aims to evaluate the effectiveness of nutrition education sessions given to increase non-nutrition graduate students' level of nutrition knowledge and confidence in giving nutrition advice.

### **Research Questions**

The following research questions were investigated:

1. Can the nutrition knowledge of future health care professionals increase with targeted training?
2. Will that knowledge/training increase their level of confidence to give nutrition-related advice to the public?

### **Hypotheses**

The following research hypotheses were investigated:

H<sub>01</sub>: There is no significant difference in non-nutrition graduate students' level of nutrition knowledge before and after participating in seven basic nutrition education sessions.



H<sub>0</sub>2: There is no significant difference in non-nutrition graduate students' level of confidence to give nutrition advice before and after participating in seven basic nutrition education sessions.

### **Method**

The Sanos y Fuertes (Healthy and Strong) research project aimed to address childhood obesity among Latinos living in Los Angeles County. Seven graduate students from CSULB College of Health and Human Services were chosen each year from 2011 to 2016. The majority of GRFs were from the Master of Public Health program, while at least one GRF was required to be from the Master of Science in Nutritional Science program. Graduate Research Fellows assisted in the both the development and delivery of a culturally-tailored, nutrition-based curriculum taught to the Latino community. This research project aimed to increase experimental learning of GRFs through various workshops and trainings.

### **Participants**

The secondary analysis will focus on a non-randomized, convenience sample of five Graduate Research Fellows (GRFs) from cohort 5 of the Sanos y Fuertes research project. The GRFs participated in seven basic nutrition education sessions and one focus group as part of the professional development portion of the research fellowship. All GRFs included in this study attended CSULB.

### **Measures**

**Demographics:** Age, gender, major, and prior nutrition-related experience were obtained using a seven-item demographic questionnaire.

**Nutrition knowledge:** Level of nutrition knowledge was measured using identical pre/post-tests given to GRFs immediately before and after each of the seven basic nutrition

education sessions. Each pre/post-test contained five questions based on the topic being presented. Topics for the basic education sessions included a general overview of nutrient guidelines, anatomy of the digestive system, digestive disorders, chronic diseases, intuitive and mindful eating, nutrition during pregnancy, and nutrition for infants and toddlers.

Confidence to give nutrition advice: Four questions measured GRFs perceived level of knowledge and confidence to give nutrition-related advice using a Motivational Interviewing (MI) ruler. For these four questions, GRFs were asked to rate their confidence/knowledge level on a scale ranging from 0 to 10 (0 = not at all confident, 5 = somewhat confident, and 10 = extremely confident). These four questions were printed out and given to each GRF to allow each person to have the opportunity to respond with by writing in their level of confidence or knowledge (scale of 0 to 10).

Content validity: After reviewing all seven basic nutrition education sessions and corresponding pre/post-tests, an external, expert review committee completed the Content Validity Questionnaire. This questionnaire used a 4-point Likert scale to assess the relevance of each pre/post-test item. Response options for the Likert scale ranged from “not relevant” to “very relevant” (Davis, 1992).

### **Procedure:**

Permission to use the basic nutrition education session data from cohort 5 of the Santos y Fuertes (Healthy and Strong) research project was requested via email from the Co-Principal Investigator (Co-PI). Once permission was granted, approval to conduct the secondary data analysis was received from the institutional review board of CSULB. Data collected from the cohort 5 pre/post-tests, demographic forms, and focus group recording was then accessed. Six nutritional professionals were contacted via email to ask if they would serve as members of an

external, expert review committee. This committee was responsible for evaluating the content validity of the pre/post-test questions used to assess the nutrition knowledge of GRFs before and after participating in each basic nutrition education sessions.

### **Data Analysis**

Pre/post-test data was analyzed using IBM SPSS Statistics 22 (IBM Corp., 2013). The first null hypothesis was examined using paired sample *t*-tests to compare the scores between pre/post-tests. The second null hypothesis was tested using paired sample *t*-tests to compare the difference in confidence level based on the Likert scale rankings before and after participating in the seven basic nutrition education sessions. The significance for both hypotheses was set at  $p \leq 0.05$ . Content validity was analyzed using the content validity index of items (I-CVI), which focuses on the relevance of the items being reviewed (Lynn, 1986; Polit & Beck, 2006). The I-CVI for each item of the pre/post-tests were be calculated “as the number of experts giving a rating of either 3 or 4 divided by the total number of experts” (Lynn, 1986; Polit & Beck, 2006). Since there were more than five experts on the expert review committee, the content could be judged as valid at the item level if the overall I-CVIs amounted to .80 or greater (Lynn, 1986; Polit & Beck, 2006). The focus group audiotape was transcribed and coded for themes by the researcher.

## **Results and Discussion**

### **Participant’s Characteristics**

All five participants were female, Masters of Public Health students between the ages of 23 and 26. Responses from the demographic questionnaire showed that 60% ( $n = 3$ ) of participants had previously taken an introductory nutrition course during their undergrad coursework. The remaining participants ( $n = 2$ ) had not taken an introductory nutrition course

throughout their education. When asked about the extent of nutrition being taught in their current program, 100% ( $n = 5$ ) of participants reported that the extent of nutrition being taught was “mild”. Demographics have been presented in Table 6.

**TABLE 6. Description of Participant Demographics ( $n = 5$ )**

Variable		<i>n</i>	%
Gender	Male	0	0
	Female	5	100
Major	Masters of Public Health	5	100
Intro to Nutrition Course	Yes	3	60
	No	2	40
Extent of Nutrition in Program	Nonexistent	0	0
	Mild	5	100
	Moderate	0	0
	Good	0	0
	Extensive	0	0

### Research Questions

Focus group responses that corresponded to the two research questions were examined. Three main themes emerged through this research. When GRFs were asked to discuss their level of nutrition knowledge before participating in the seven basic nutrition education sessions, *insufficient nutrition knowledge* emerged as a reoccurring theme. The majority of participant responses (80%,  $n = 4$ ) focused on not having enough nutrition knowledge to adequately provide nutrition education to the public.

After discussing their perceived level of nutrition knowledge before participating in the education sessions, participants were asked to discuss their confidence to give nutrition education prior to participating in the nutrition education sessions. The theme of insufficient

nutrition knowledge appeared to correlate with participants' confidence to give nutrition education before participating in the seven basic nutrition education sessions. Insufficient nutrition knowledge was mentioned by 60% ( $n = 3$ ) of participants in relation to their confidence to give nutrition education.

This theme emerged again when participants were asked to discuss challenges they had faced while giving nutrition education in the past. A few participants (40%,  $n = 2$ ) stated that they had a difficult time answering nutrition-related questions from community members, because they lacked sufficient nutrition knowledge.

The next main theme that emerged was a *change in level of nutrition knowledge* after participating in the seven basic nutrition education sessions. When participants were asked to discuss their level of nutrition knowledge after participating in the seven basic nutrition education sessions, 60% ( $n = 3$ ) of participants discussed having an increase in knowledge.

The final major theme that emerged was an *increase in confidence to give nutrition advice*. Overall, 80% ( $n = 4$ ) of participants stated that their confidence to give nutrition advice had increased since participating in the basic nutrition education sessions. One participant stated that she felt confident to share nutrition knowledge with her family, but did not feel credible enough to give specific nutrition advice to the community. Others felt that they had the confidence to give nutrition education to the community.

### **Difference in Non-Nutrition Graduate Students' Level of Nutrition Knowledge and Confidence to Give Nutrition Advice**

Paired sample *t*-tests were used to examine the difference in the GRFs' level of nutrition knowledge and confidence to give nutrition advice before and after participating in the seven basic nutrition education sessions. Findings from the paired sample *t*-tests are presented in Tables 7 and 8.

**Null Hypothesis 1.** Paired sample *t*-tests revealed that there was a statistically significant difference between pre- and post-test scores from all seven basic nutrition education sessions.

Data are presented in Table 7.

**Null Hypothesis 2.** Paired sample *t*-tests revealed that there was a statistically significant difference between participants' perceived level of confidence in nutrition knowledge (pair 1) and ability to give nutrition advice (pair 2) before and after participating in the seven basic nutrition education sessions. Data are presented in Table 8.

**TABLE 7. Paired Sample *t*-Tests Difference in GRFs' Level of Nutrition Knowledge**

		<i>n</i>	Mean	<i>Std. Error</i>	<i>t</i>	<i>df.</i>	<i>p</i> -value
Pair 1	Session 1 Pre	5	2.400	1.140	-6.000	4	.004
	Session 1 Post		4.800	.447			
Pair 2	Session 2 Pre	5	2.000	1.580	-4.221	4	.013
	Session 2 Post		4.800	.447			
Pair 3	Session 3 Pre	5	1.800	1.090	-6.532	4	.003
	Session 3 Post		5.000	.000			
Pair 4	Session 4 Pre	5	1.800	1.480	-4.824	4	.008
	Session 4 Post		5.000	.000			
Pair 5	Session 5 Pre	5	2.000	.707	-7.483	4	.002
	Session 5 Post		4.800	.447			
Pair 6	Session 6 Pre	5	3.000	.707	-4.811	4	.009
	Session 6 Post		4.800	.447			
Pair 7	Session 7 Pre	5	2.600	.894	-5.880	4	.004
	Session 7 Post		4.800	.447			

**TABLE 8. Paired Sample *t*-Tests Difference in GRFs' Level of Confidence**

		<i>n</i>	Mean	<i>Std. Error</i>	<i>t</i>	<i>df</i>	<i>p</i> -value
Pair 1	Confidence Before	5	3.800	1.300	-4.824	4	.008
	Confidence After		7.000	1.220			
Pair 2	Confidence Before	5	4.600	.894	-3.833	4	.019
	Confidence After		7.200	1.480			

### Content Validity

The Content Validity Questionnaire was completed by the six nutrition professors from CSULB. Overall, the majority of pre/post-test items were found to be relevant and valid (I-CVI  $\geq$  .80). A total of two items, item 5 from session 1 and item 2 from session 4, were found to not be relevant (I-CVI less than .79).

### **Limitations**

The sample population was small and limited to five GRFs. All five GRFS attended CSULB and worked for the Sanos y Fuertes (Healthy and Strong) research project; thus, the results cannot be generalized to students attending different universities. During the focus group, GRFs may have been hesitant to express their honest and personal opinions. Possible explanations for why GRFs may have been hesitant to express their honest opinions include the desire to please the interviewer and/or concern about peer opinions. The limited 1-hour time frame of the focus group may not have been sufficient for participants to express their viewpoints.

Basic nutrition knowledge can be difficult to accurately measure. Only seven basic nutrition education sessions were given to the GRFs, with each session having a corresponding pre/post-test comprised of five questions. This limited number of sessions and pre/post-test questions could not fully cover every nutrition concept. Even the most carefully considered questions may not properly assess one's level of nutrition knowledge. Although the majority of pre/post-test items were found to be relevant and valid by the external, expert review committee, a total of two items we found to be invalid. Ideally, the content validity would have been assessed prior to the start of the basic nutrition education sessions in order to revise test items that were found to be invalid.

### **Summary and Conclusion**

Current research has shown a clear need for non-nutrition health care professionals to be educated on nutrition. Unfortunately, many health care professionals who are regularly required to give nutrition education to the public have not been adequately trained in the area of nutrition (Kris-Etherton et al., 2014; Ettienne-Gittens et al., 2012). This is concerning, as health care professionals who do not receive proper training in the area of nutrition may not be providing accurate, evidenced-based information to the public. Studies have shown that providing nutrition education to non-nutrition health care professionals may help to increase their level of nutrition knowledge.

The purpose of this study was to evaluate the effectiveness of seven nutrition education sessions to increase non-nutrition graduate students' level of nutrition knowledge and confidence in giving nutrition advice. Overall, there was a significant difference in both non-nutrition graduate students' level of nutrition knowledge and confidence to give nutrition advice before and after participating in the seven basic nutrition education sessions. The pre/post-tests were given immediately before and after each basic nutrition education session; therefore, it was anticipated for there to be some level of change in nutrition knowledge. Further studies investigating the nutrition knowledge of non-nutrition health care professionals or students should investigate the participants' retention of knowledge over a longer period of time.

Responses from the focus groups showed that participants perceived that their nutrition knowledge increased with targeted training. The participants' level of nutrition knowledge appeared to correlate with their level of confidence to give nutrition advice. As the GRFs' level of nutrition knowledge increased, so did their level of confidence to give nutrition advice.

Overall, it is clear that the seven basic nutrition education sessions did positively impact the level of nutrition knowledge and confidence to give nutrition advice for the participants of



this study. However, the question remains as to whether or not the participants now have adequate nutrition knowledge to explain basic nutrition concepts to the public. The implication of this study is that targeted training has the potential to increase the nutrition knowledge of non-nutrition health care professionals. Participants from this study, as well as other health care professionals and students, would benefit from continual trainings on nutrition taught by a nutrition professional. Efforts should be made to have nutrition education standardized in the curricula of other health care professionals.

## APPENDICES

## APPENDIX A

### BASIC NUTRITION EDUCATION SESSIONS AND PRE/POST-TESTS

# Basic Nutrition Education Session 1: Nutrition Overview

## The Science Behind Calories and Nutrition Fact Label



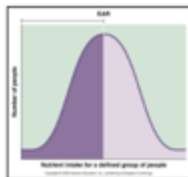
## Dietary Guidelines

Dietary Reference Intake (DRIs) are a set of reference values for energy and nutrients for healthy individuals.

- Estimated Average Requirement (EAR)
- Recommended Dietary Allowance (RDA)
- Adequate Intake (AI)
- Tolerable Upper Intake Level (UL)

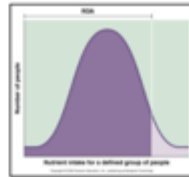


## Dietary Guidelines



**Estimated Average Intake (EAR)**

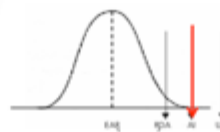
The amount of a nutrient that is estimated to meet the requirement for the nutrient in half of the people of a specific age and gender. The EAR is used in setting the RDA.



**Recommended Dietary Allowance (RDA)**

The average daily amount of a nutrient that is sufficient to meet the nutrient needs of nearly all (97-98%) healthy individuals of a specific age and gender.

## Dietary Guidelines



**Adequate Intake (AI)**

The average amount of a nutrient that appears to be adequate for individuals when there is not sufficient scientific research to calculate an RDA. The AI exceeds the EAR and possibly the RDA.



**Tolerable Upper Intake Level (UL)**

The maximum amount of a nutrient that is unlikely to pose any risk of adverse effects to most health people. The UL is not intended to be a recommended level of intake.

## Dietary Guidelines

Table 1.5 Acceptable Macronutrient Distribution Ranges (AMDR) for Healthful Diets	
Nutrient	AMDR*
Carbohydrate	45-65%
Fat	20-35%
Protein	10-35%

\*AMDR values expressed as percent of total energy or as percent of total calories.  
Source: Institute of Medicine, Food and Nutrition Board, 2005. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macromolecules). Washington, DC: National Academies Press. Reprinted by permission.

**Acceptable Macronutrient Distribution Range (AMDR)**

A range of intakes for a particular energy source (carbohydrates, fat, protein) that is associated with a reduced risk of chronic disease while providing adequate intakes of essential nutrients.

- For men 19 years and older:
  - $EER = [(662 - (9.53 \times \text{age})) + PA \times [(15.91 \times \text{wt}) + (539.6 \times \text{ht})]]$
- For women 19 years and older:
  - $EER = [(354 - (6.91 \times \text{age})) + PA \times [(9.36 \times \text{wt}) + (726 \times \text{ht})]]$

**Estimated Energy Requirement (EER)**

The average calorie intake that is predicted to maintain energy balance in a healthy adult of defined age, gender, weight, height, and level of physical activity consistent with good health.

**Calculate your DRI!**



## What happens after we eat protein?



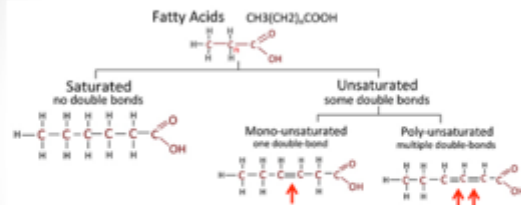
- Our body breaks down the protein into amino acids – the building blocks of proteins
- Some amino acids are essential – we need to get them from our diet
- Other amino acids are nonessential – which means our body can make them
- Protein that comes from animal sources contains all of the essential amino acids that we need
- Plant sources of protein, on the other hand, do not contain all of the essential amino acids (exception: peas)



## Why do we need fat?

- DRI: 20%-35% of total calories should come from fat sources
- We need fat for:
  - Normal growth and development
  - Energy – fat is the most concentrated source of energy
  - Absorbing certain vitamins – like vitamins A, D, E, K, and carotenoids
  - Providing cushioning for the organs
  - Maintaining cell membranes
  - Providing taste, consistency, and stability to foods

## What is fat?



## “Good” Fats

### Monounsaturated Fats

- Fat molecules that have one unsaturated carbon bond in the molecule
- Typically liquid at room temperature but can start to turn solid when chilled
- Help reduce LDL (bad) cholesterol in your blood which lowers risk for heart disease and stroke
- Provide nutrients to help develop and maintain your body's health
- Contribute vitamin E
- Are monounsaturated fats lower in calories?
- Found in olive oil, canola oil, peanut oil, safflower oil, and sesame oil



### Polyunsaturated

- Fat molecules that have more than one unsaturated carbon bond in the molecule
- Help reduce LDL (bad) cholesterol in your blood which lowers risk for heart disease and stroke
- Provide nutrients to help develop and maintain your body's health
- Contribute vitamin E
- Provides essential fats – Omega-6 and Omega-3 fatty acids
- Found in soybean oil, corn oil, sunflower oil, fatty fish such as salmon, mackerel, herring and trout



## “Bad” Fats

### Saturated Fats

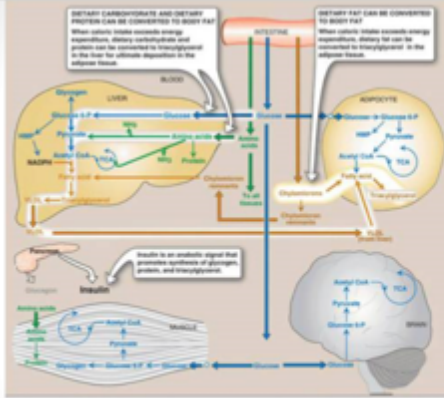
- Fat molecules that have no double bond between carbon molecules because they are saturated with hydrogen molecules
- Typically solid at room temperature
- ↑ cholesterol
- Typically high in calories
- Saturated fat occurs naturally in many foods. Majority come from animal sources including meat and dairy products
- American Heart Association recommends aiming for 5%-6% of calories from saturated fats Example: 2,000 calorie diet = 13 g/day



### Trans Fats

- Naturally occurring
- Artificial trans fats are created in an industrial process that adds hydrogen to liquid vegetable oils
- Primary dietary source for trans fats in processed food is “partially hydrogenated oils”
- Products can be labeled “0 grams of trans fats” if they contain 0g – 0.5g per serving
- Nov. 2013 the USDA removed “partially hydrogenated oils” from the GRAS list
- ↑ LDL (bad) cholesterol
- ↓ HDL (good) cholesterol
- increase risk of heart disease, stroke, and Type 2 diabetes
- American Heart Association recommends to limit trans fats





### Balance is Key: Macronutrient Interaction

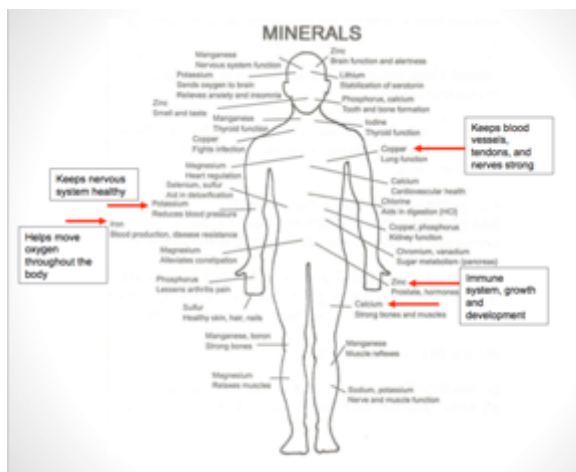
### MICRONUTRIENTS

### What are Vitamins?

- Vitamins are organic nutrients, most of which are not made in the body, or only in insufficient amounts, and are mainly obtained through food
- When intake is inadequate, vitamin deficiency disorders are the consequence
- Vitamins are vital to health
- The best way to get enough vitamins is to eat a balanced diet with a variety of foods

### What are Minerals

- Minerals are elements that originated in the Earth and cannot be made by living organisms
- Plants obtain minerals by the soil, and most of the minerals in our diet come directly from plants or indirectly from animal sources
- Minerals can also be present in the water we drink, but this varies by geographical area
- Minerals from plant sources may also vary from place to place, because soil mineral content varies geographically



### Minerals in Your Body Quiz



## Nutrition and Health

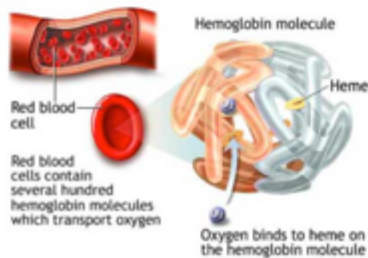
## Symptoms

- Fatigue
- Rapid heart rate
- Palpitations
- Rapid breathing and exertion
- Ability to maintain a normal body temperature on exposure to cold is impaired
- Brittle and spoon-shaped nails
- Sores at the corners of the mouth
- Sore tongue



## Iron Deficiency Anemia

- Iron as a part of hemoglobin carries oxygen from our lungs throughout our bodies
- Having too little hemoglobin is called anemia
- Iron also helps our muscles store and use oxygen



## Iron RDA & Sources

- Iron RDA: Men 8 mg/day; Women 18 mg/day
- Vegetarian: Men 14 mg/day; Women 33 mg/day
  - Due to decreased absorption from plant sources
- National survey indicate premenopausal women consume about 12 mg/day
- Sources:



Beef 3oz. Cooked  
2.32 mg



Chicken 3 oz. Cooked  
1.13 mg



Potato w/skin  
1.87 mg

## Vitamin A and Night Blindness

- Vitamin A Deficiency (VAD) is the leading cause of preventable blindness in children
- Increases the risk of disease and death from severe infections
- An estimated 250 million preschool children are vitamin A deficient
- An estimated 250,000 to 500,000 VAD children become blind every year
  - Half of them dying within 12 months of losing their sight



## Vitamin A and Night Blindness



<https://www.youtube.com/watch?v=B53de17Isnc>

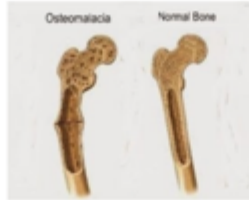


## Vitamin D



**Rickets**

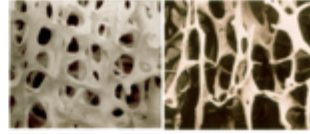
- In infant and children, severe vitamin D deficiency results in the failure of bone to mineralize
- Bone mineralization determines the hardness and strength of the bones
- Lead to arms and legs becoming bowed, delayed closure of the skull and ribs



**Osteomalacia**

- Adult bones are no longer growing, they are in a constant state of turnover or "remodeling"
- In adults with severe vitamin D deficiency the bone mineral is progressively lost resulting in softening of the bone (osteomalacia), bone pain, and increased risk of osteoporosis

## Calcium – Osteoporosis



- Calcium is a major constituent of bone and teeth
- Circulating calcium concentrations are tightly controlled by the parathyroid hormone (PTH) and vitamin D at the expense of the skeleton when dietary calcium intake are inadequate
- RDA Calcium: 1,000 – 1,200 mg/day
- Calcium is found in dairy products, tofu, beans, and vegetables of the kale family

## Define Nutrition 😊

## References

Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients). (2002/2005). Washington, DC: National Academies Press.

Interactive DRI Glossary. (2015). Retrieved from <https://fnic.nal.usda.gov/interactive-dri-glossary>

Macronutrients: the importance of Carbohydrate, Protein, and Fat. (2014). Retrieved from <http://www.mckinley.illinois.edu/handouts/macronutrients.htm>

Micronutrient Information Center. (2015). Retrieved from <http://pi.oregonstate.edu/infocenter/>

Micronutrient Deficiencies. (2015). Retrieved from <http://www.who.int/nutrition/topics/vad/en/>

Monounsaturated Fats. (2015, October). Retrieved from [http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Monounsaturated-Fats\\_UCM\\_301460\\_Article.jsp](http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Monounsaturated-Fats_UCM_301460_Article.jsp)

## References

Polyunsaturated Fats. (2015, October). Retrieved from [http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Polyunsaturated-Fats\\_UCM\\_301461\\_Article.jsp](http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Polyunsaturated-Fats_UCM_301461_Article.jsp)

Role of Nutrients in the Body. (2010). Retrieved from [http://cte.sfasu.edu/wp-content/uploads/2012/01/1\\_Role\\_of\\_Nutrients\\_in\\_the\\_Body.html](http://cte.sfasu.edu/wp-content/uploads/2012/01/1_Role_of_Nutrients_in_the_Body.html)

Saturated Fats. (2016, February). Retrieved from [http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Saturated-Fats\\_UCM\\_301110\\_Article.jsp](http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Saturated-Fats_UCM_301110_Article.jsp)

Trans Fats. (2015, October). Retrieved from [http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Trans-Fats\\_UCM\\_301120\\_Article.jsp](http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Trans-Fats_UCM_301120_Article.jsp)

## Pre/Post-Test Questionnaire: Nutrition Overview

### Nutrition Overview Pre/Post Test

1. The acceptable percentage of carbohydrates in the eating pattern of a healthy adult is...
  - a) 25-45%
  - b) 30-50%
  - c) 45-65%
  - d) 60-80%
2. How many macronutrients are there?
  - a) 2
  - b) 3
  - c) 4
  - d) 5
3. All of the tissues in our body can use glucose for energy.
  - a) True
  - b) False
4. \_\_\_\_\_ are the elements that originated in the earth and cannot be made by living organisms.
  - a) Protein
  - b) Saturated fat
  - c) Fibers
  - d) Minerals
5. A 3 oz beef patty has \_\_\_\_\_ mg of iron to meet the \_\_\_ mg of iron needed by women.
  - a) 2.32 mg; 18 mg
  - b) 5.32 mg; 25 mg
  - c) 7.32 mg; 30 mg
  - d) 9.32 mg; 50 mg

# Basic Nutrition Education Session 2: Anatomy of the Digestive System

**Digestive System:**  
The group of organs that break down food and absorb the nutrients used by the body for fuel. These include mouth, esophagus, stomach, small and large intestine, rectum, and anus.

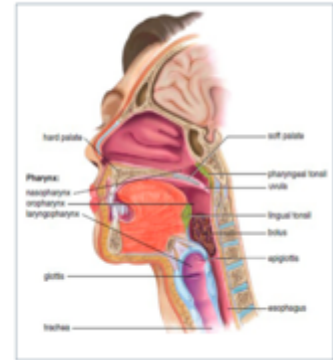
**Accessory Organs of Digestion:**  
Organs that help with digestion but are not part of the digestive tract. These include the liver, gallbladder, and pancreas.

**Digestive Tract**

- Mouth:** Breaks down food into small pieces and mixes it with saliva.
- Esophagus:** A muscular tube down which food travels from the mouth to the stomach.
- Stomach:** Secretes juices that get digestion under way.
- Liver:** Produces bile and processes nutrients obtained from food.
- Pancreas:** Secretes enzymes into the small intestine.
- Gallbladder:** Stores bile.
- Small Intestine:** Is the main site where food is digested.
- Large Intestine:** Absorbs water from digestive waste.
- Rectum:** Stores the waste until it leaves the body through the anus.

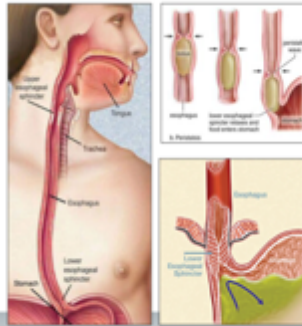
## WHERE DOES DIGESTION BEGIN?

- Digestion begins in the mouth
  - Salivary Amylase enzyme starts to break down carbohydrates in the mouth
- Chewing plus saliva result in a mixture of food particles called a **bolus**
- Bolus moves from the mouth to the esophagus through swallowing
  - Voluntary Process: Chew food and with assistance of the tongue move the bolus towards the pharynx.
  - Involuntary Process: The trachea (windpipe) closes and the pharynx propels the bolus towards the esophagus
  - These complete process occurs in less than 2 second!



## TRAVELING THROUGH THE ESOPHAGUS

- Serves as a vehicle for the food bolus to travel from the mouth to the stomach
- Upper esophageal sphincter relaxes to permit the bolus to enter
- Peristalsis: longitudinal and circular muscle layers of the esophagus rhythmically push the bolus down the length of the esophagus to the stomach
- Lower esophageal sphincter opens and allows food into stomach.
  - Normally contracted and closed
  - Plays an important role in preventing the esophagus from stomach that might otherwise splash back into the esophagus



## STOMACH

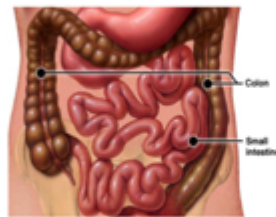
- Carries out three jobs during digestion:
1. Stores food until it can be processed
  2. Forms a mixture of food and gastric secretions, which becomes a semifluid blend called chyme
  3. Controls movements of the chyme into the small intestine at a rate suitable for proper digestion and absorption by the small intestine
- Hydrochloric Acid—helps kill bacteria and activates enzymes
  - Intrinsic Factor — B12
  - Takes about 4 hours for a meal to empty from the stomach. Carbohydrates tend to move from the stomach more quickly than proteins, and fatty foods may stay in the stomach for as long as six hours



▶ What is happening in our digestive tract when people experience heart burn?

## SMALL INTESTINE

- About 20ft. Long
- When chyme arrives, hormonal messages tell the gallbladder to send its emulsifier called bile in amounts matched to the amounts of fat present
- Other hormones tell the pancreas to release bicarbonate to neutralize the stomach acid as well as enzymes to break down large molecules that remain into units that the cells can use... glucose, glyceral, fatty acids, and amino acids
- Once the digestive system has broken food down to its nutrient components, it must deliver those nutrients to the rest of the body



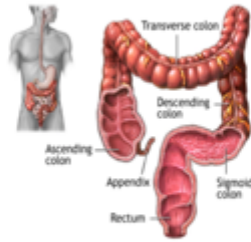
## SMALL INTESTINE

- Nutrients released early in the digestive process such as simple sugars, and those requiring no special handling such as the water-soluble vitamins are absorbed high in the small intestine
- Nutrients released more slowly are absorbed further down
- The lymphatic and circulatory system then take over the job of transporting them to the cell consumer
- The lymph at first carries most of the products of fat digestion and the fat soluble vitamins, later delivering them to the blood. The blood carries products of carbohydrate and protein digestion, water-soluble vitamins, and minerals
- By the time the remaining mixture reaches the end of the small intestine, little is left but water, indigestible residue (mostly fiber) and dissolved minerals



## LARGE INTESTINE

- Chemical digestion has been completed by the time chyme reaches the colon; therefore no digestive enzymes are secreted here
- Naturally occurring bacteria break down and digest some of the fiber left over from CHO; other colonic bacteria absorb vitamin K
- Primary function: absorb dissolved minerals and water and eliminate waste products
- Fecal material: a smooth paste of a consistency suitable to excretion is stored
- Fecal material normally consist of water, undigested fiber, bile pigment, bacteria and a small amount of salt
- Most intestinal gas is produced by bacterial fermentation and quantity and quality depends on types of food eaten and characteristics of intestinal bacteria



## LIVER

The liver determines the metabolic fate of every nutrient we digest and absorb. In addition to performing a variety of other functions, the majority of which are essential for life

- The liver produces one liter of bile each day
- Bile salts are not digestive enzymes but do play a role in the digestion of fat (bile salts are emulsifying agents, which break down large globules of fat into tiny globules of fat, this improves the efficiency of fat digestion by increasing the surface area of fat. Bile salts also play a role in absorption of fat-soluble vitamins. The bile pigment and cholesterol are waste products and eventually eliminated from the body
- Cholesterol is a precursor to bile



## GALLBLADDER & PANCREAS

### Gallbladder

• Gallbladder is a sac, attached to the liver, where bile is stored and concentrated. Bile empties from the gallbladder into the uppermost part of the small intestine via the common bile duct

• When chyme with fatty content enters the small intestine a hormone cholecystokinin stimulates the gallbladder to contract and the sphincter to open thus allowing bile to flow into the small intestine

### Pancreas

• Endocrine and Exocrine functions  
• Helps to regulate blood glucose levels through secretion of the hormones

- Insulin
- Glucagon

• The principal functions of the pancreas however are exocrine, bicarbonate and digestive enzymes that act on carbohydrates, proteins, and fats are secreted into the duodenum. [Pancreatic amylase breaks down starch and other complex carbohydrates into simple sugars called disaccharides]



## FUN FACTS

1. Make sure you consume a fat with each meal to absorb fat soluble vitamins
2. The liver is the body's largest internal organ and has over 500 functional
3. The average human has over 400 species of bacteria living in their colon
4. The surface area of the small intestine is about 2,700 feet! That's about the size of a tennis court!
5. Close to 2 liters of saliva is produced each day!

## REFERENCES

Sienkiewicz, F. & Whitney, E. (2013). Nutrition: Concepts and Controversies. Belmont, CA: Cengage Learning, pp. 81-97.

Your Digestive System and How It Works. (2013, September). Retrieved from <https://www.niddk.nih.gov/health-information/health-topics/Anatomy/your-digestive-system/Pages/anatomy.aspx>

QUESTIONS?

## Pre/Post-Test Questionnaire: Anatomy of the Digestive System

### Anatomy for Nutrition's Sake Pre/Post Test

1. Where does the majority of digestion take place?
  - e) Stomach
  - f) Small intestine
  - g) Large intestine
  - h) Liver
2. What substance produced by the stomach is necessary for the absorption of vitamin B12?
  - e) Hydrochloric acid
  - f) Cholecystokinin
  - g) Intrinsic factor
  - h) Glucagon
3. Which organ stores bile?
  - c) Gallbladder
  - d) Pancreas
  - e) Liver
  - f) Stomach
4. \_\_\_\_\_ is the enzyme that first begins to break down carbohydrates.
  - e) Pancreatic lipase
  - f) Lactase
  - g) Gastric lipase
  - h) Salivary amylase
5. When food travels from the mouth to the stomach, it is referred to as...
  - e) Chyme
  - f) Pepsin
  - g) A bolus
  - h) None of the above

# Basic Nutrition Education Session 3: Disorders of the Digestive System

## WHAT IS HEALTH?

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.



## DISEASES OF THE UPPER GI TRACT

### Heart Burn/Acid Reflux

- Burning sensation that seems to occur in the area of the heart
- Typically related to spasms of the lower esophagus or upper stomach



### Gastroesophageal Reflux (GERD)

- More serious and long-lasting form of heart burn/acid reflux
- Occurs as a result of stomach contents re-entering the esophagus



**What is GERD?**  
Gastroesophageal reflux is a chronic disease that occurs when stomach contents flow back (reflux) into the food pipe (esophagus). It is usually caused by failure of the muscle valve (called the lower esophageal sphincter) between the stomach and the esophagus to close properly. The backflow of stomach acid irritates the lining of the lower esophagus and causes the symptom of heartburn.

Heartburn, which is the most common symptom of GERD, usually feels like a burning sensation behind the breastbone, rising up to the neck and throat.

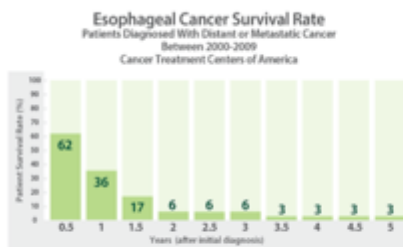
**TRIGGER FOODS**  
Some foods are known to trigger symptoms of GERD. By keeping a food diary, you can identify your trigger foods and change your diet to reduce discomfort. Below is a list of some foods recognized to trigger symptoms of GERD and how they affect the digestive tract.

- Coffee** (with or without caffeine) and caffeinated beverages relax the lower esophageal sphincter.
- Citrus fruits and juices** such as orange, grapefruit and pineapple have high acid content.
- Tomatoes and processed tomato-based products** such as tomato paste, and pasta and pizza sauces are highly acidic.
- Carbonated beverages** (fizzy drinks) cause genuine distention of the stomach (bloating) which increases pressure on the lower esophageal sphincter causing acid reflux.
- Chocolate** contains a chemical called methylxanthine from the cocoa tree, which is similar to caffeine. It relaxes the lower esophageal sphincter, which causes acid reflux.
- Peppermint, garlic and onions** relax the lower esophageal sphincter causing acid reflux.
- Fatty, spicy or fried foods** relax the lower esophageal sphincter as well as delay stomach emptying and therefore cause acid reflux.

Consult your health care provider if symptoms do not improve with diet and lifestyle changes. Initial treatment may start with over-the-counter (OTC) medications that control stomach acid.

For more information, visit [www.azgs.org](http://www.azgs.org).

Copyright © 2011 American Society for Gastrointestinal Endoscopy



GERD may be associated with an increased risk for esophageal cancer

## LET'S REVIEW!



## GERD

- Affects more than 20 million Americans
- You are more likely to suffer from GERD if...
  - Overweight/Obese
  - Pregnant
  - Taking certain medications
  - Alcoholic
  - A smoker or regularly exposed to secondhand smoke
- Symptoms include:
  - Heart burn
  - Bad breath
  - Difficulty swallowing
  - Increased salivation
  - Chest pain
  - Dry cough



## How do you treat GERD?

- Lifestyle changes!
  - Eliminate foods that may cause more problems such as spicy food, highly acidic foods, greasy foods, and alcohol
  - Eating smaller, more frequent meals
  - Weight loss
  - Smoking cessation



## DISEASES OF THE LOWER GI

IBS & IBD

## IRRITABLE BOWEL SYNDROME

Defined by abdominal pain or discomfort that occurs along side altered bowel habits over a period of at least 3 months

It is not a disease!

Can be mistaken for Irritable Bowel Disease

Colonoscopy is often used to differentiate

IBS is often a physiological reaction many people experience in relation to stress and anxiety



## IBS CONTINUED

Affects 5-7% of the population

Women are more likely to suffer from this condition compared to men

Most often found in people under 45 years of age

Symptoms

- Abdominal pain
- Cramping
- Constipation or diarrhea
- Bloating
- Gasiness



## CYCLICAL PATTERN

Stress can stimulate colon spasms in people with IBS

The colon has many nerves that connect to the brain

Nerves control normal contractions of the colon & cause abdominal discomfort at stressful times

Colon may be overly responsive to even slight conflict or stress

Stress makes the mind more aware of sensations that arise in the colon

IBS symptoms can also increase a person's stress level



## IBS TREATMENT

IBS has no cure, but symptoms can be treated with a combination of...

- Healthy, well-balanced diet & regular exercise
  - Getting adequate amounts of fiber
- Elimination of foods that trigger symptoms
  - Exclusion diet
  - Restricting FODMAPS—Foods that aren't easily digested and contribute to fermentation → Signs/symptoms of IBS
- Probiotics
- Medications
  - Anticholinergic agents (siperamide) & antispasmodics (peppermint oil)

## IRRITABLE BOWEL DISEASE

### Crohn's Disease

Abnormal immune response resulting in inflammatory damage of GI mucosa

Can occur anywhere along the GI tract (from mouth to anus)

Most often found at the end of small intestine to the beginning of the large intestine

Peak onset is 20 to 30 years

Both sexes are affected equally

### Ulcerative Colitis

Abnormal immune response resulting in inflammatory damage of GI mucosa

Confined only to the large intestine

Peak onset is from teens to early 20's

Both sexes are affected equally

## SYMPTOMS

### Crohn's Disease

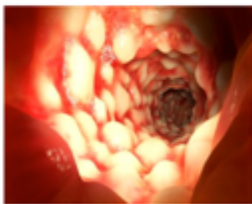
- Chronic diarrhea
- Abdominal pain & cramping
- Weight loss
- Loss of appetite
- Malnutrition
- Fever
- Bloody stool

### Ulcerative Colitis

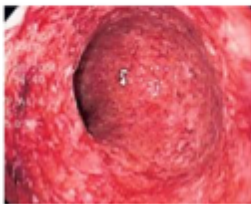
- Bloody diarrhea
- Fever
- Weight loss
- Constipation
- Abdominal/rectal pain
- Weight loss
- Anemia

## COLONOSCOPY COMPARISON

### Crohn's Disease



### Ulcerative Colitis



## HOW IS NUTRITION IMPACTED?

Poor nutrition and even malnutrition are a constant threat to individuals with IBD

Steroid medication can lead to a loss of bone density

Other medications may exacerbate nutritional deficiency

Antibiotics used to treat bacterial overgrowth may cause nausea and loss of appetite



## NUTRITION RECOMMENDATIONS

- Always consult with a dietitian
- Establish regular eating habits—eating at regular times helps to regulate your bowels
- Eat small, frequent meals
- Eat fiber-rich foods
- Probiotics
- Consume foods high in antioxidants (vitamin E, vitamin C, and selenium)
- Eat foods high in omega-3 fatty acids
  - Fish oil supplement if necessary
- Drink enough fluids



QUESTIONS?

## REFERENCES

- Crohn's Disease. (2014, August 13). Retrieved from <http://www.mayoclinic.org/diseases-conditions/crohns-disease/basics/definition/con-20022061>
- Irritable Bowel Syndrome. (2014, July 31). Retrieved from <http://www.mayoclinic.org/diseases-conditions/irritable-bowel-syndrome/basics/definition/con-20024578>
- Johson, A. (2015, June 25). What you need to know about GERD. Retrieved from <http://www.eatright.org/resource/health/wellness/digestive-health/what-you-need-to-know-about-gerd>
- Nelms, M., Sucher, K.F., Lacey, K. & Rath, S.L. (2011). Nutrition Therapy & Pathophysiology. Belmont, CA: Cengage Learning.
- Slenkiewicz, F. & Whitney, E. (2013). Nutrition: Concepts and Controversies. Belmont, CA: Cengage Learning, pp. 93-95
- Whitney, E. & Rolfes, S.R. (2015). Understanding Nutrition. Stamford, CT: Cengage Learning.



## Pre/Post-Test Questionnaire: Disorders of the Digestive System

### Digestive Disorders Pre Test

1. \_\_\_\_\_ is a more serious & long-lasting form of heart burn?
  - i) Esophageal Reflux Disease
  - j) Gastroesophageal Reflux
  - k) Acid Reflux
  - l) Irritable Bowel Syndrome
  
2. Which of the following is not a common symptom of IBS?
  - i) Abdominal pain
  - j) Constipation
  - k) Excess urination
  - l) Bloating
  
3. Irritable Bowel Disease is an umbrella term for which two conditions?
  - g) Crohn's Disease & Ulcerative Colitis
  - h) Diverticulitis & Gastroenteritis
  - i) Chagas Disease & Ulcerative Colitis
  - j) IBS & Diverticulitis
  
4. Common trigger foods for diseases of the upper GI tract include all of the following except..
  - i) Tomatoes
  - j) Spicy food
  - k) Chocolate
  - l) Corn
  
5. Ulcerative Colitis can occur anywhere along the GI tract (mouth to anus)
  - i) True
  - j) False

# Basic Nutrition Education Session 4: Chronic Disease

## TOPICS

1. Obesity
2. High Cholesterol
3. High Blood Pressure
4. Diabetes

## DEFINITION: OVERWEIGHT & OBESITY

Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height

These ranges of weight have been shown to increase the likelihood of certain disease and health problems

Determined by using weight and height to calculate "Body Mass Index" (BMI), because for most people it correlates with their amount of body fat

Height	Weight Range	BMI	Considered
5' 9"	124 lbs or less	Below 18.5	Underweight
	125 lbs to 166 lbs	18.5 to 24.9	Healthy weight
	169 lbs to 202 lbs	25.0 to 29.9	Overweight
	203 lbs or more	30 or higher	Obese

- Other Method for Estimating Body Fat
- Skinfold thickness
  - Waist circumference
  - Waist-to-hip circumference ratio
  - Computed tomography
  - Magnetic Resonance Imaging (MRI)
  - Bod Pod

## OBESITY STATISTICS

- Obesity Affects some groups more than others:
  - Non-Hispanic Blacks (47.8%)
  - Hispanics (43.2%)
  - Non-Hispanic Whites (33.4%)
  - Non-Hispanic Asians (10.4%)
- Obesity is higher among middle age adults:
  - 40 yrs (38.4%)
  - 45-59 yrs (37.2%)
  - 20-39 yrs (30.3%)
- Obesity and social economic status:
  - Higher income women are less likely to have obesity than low income women
  - There is no significant relation between obesity and education among men. Among women, whereas there is a trend - those with college degrees are less likely to have obesity compared with less educated women



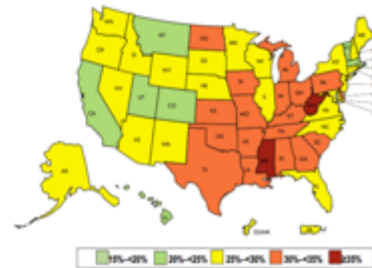
## OBESITY STATISTICS

- More than one-third (34.9% or 78.6 million) of U.S. adults are obese
- Obesity related conditions are some of the leading causes of preventable death
- Estimated annual medical cost of obesity in the U.S. was \$147 billion in 2008
- Medical cost for people who are obese were \$1,429 higher than those of normal weight



## PREVALENCE\* OF SELF-REPORTED OBESITY AMONG U.S. ADULTS BY STATE AND TERRITORY, BRFSS, 2013

\*Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.



## HYPOTHESIS FOR OBESITY

### Current

- In most people, obesity is the interaction of the environment and genetic predisposition to accumulate excess adipose tissue.
- Usually, both the genetic factor(s) and the environmental factors must be present for obesity to occur

### Previous Belief

- Obesity is simply the result of a lack of willpower and an inability to discipline eating habits
- Popular belief held by many people and health professionals

## POTENTIAL EXPLANATIONS FOR OBESITY EPIDEMIC

### 1. Reduced activity ...

- Greater affluence, more cars, less heavy labor
- Cable TV, increased channels
- Computers in workplace and home
- Computer games, handheld and desktop
- Fears of violence or kidnapping of children
- Organized sports for children, reduced outside playing time

### 2. Changes in food intake ...

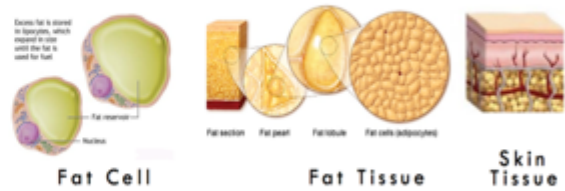
- Increasing affluence among population, food more affordable
- Easier access to food in environment
- Expansion of fast food sources and availability
- Change in character of food (high fat, refined carbohydrates)
- Larger portion sizes

### 3. Two-income families, less attention to meal preparation

## INCREASE RISK OF DISEASE

- ❖ Diabetes
- ❖ Hypertension
- ❖ Coronary Heart Disease (CHD)
- ❖ Stroke
- ❖ Dyslipidemia
- ❖ Gallbladder Disease
- ❖ Cancer
  - Prostate, uterine, cervical, ovarian, colon, kidney, gallbladder, and postmenopausal breast cancer
- ❖ Osteoarthritis
- ❖ Asthma
- ❖ Sleep apnea
- ❖ Breathing difficulties
- ❖ Complications of pregnancy
- ❖ Menstrual irregularities
- ❖ Increased surgical risk
- ❖ Psychological stress

## OBESITY

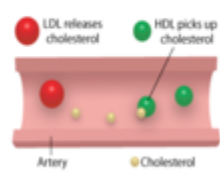


## CHOLESTEROL

## WHAT IS CHOLESTEROL

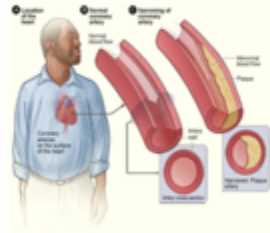
- ❖ Waxy substance that comes from your body and food
- ❖ Food Sources: meat, poultry, and full fat dairy products (animal sources)
- ❖ Body: produced by liver
  - Liver produces more cholesterol when people consume more saturated and trans fat
- ❖ Types of Cholesterol
  - HDL (Good Cholesterol)
  - LDL (Bad Cholesterol)

### Cholesterol in the Arteries



## WHY CHOLESTEROL MATTERS

- ❖ High cholesterol is one of the major controllable risk factors of coronary heart disease, heart attack, and stroke
- ❖ Cardiovascular disease is No. 1 cause of death.
  - Over 2,100 American die of CVD each day
  - Average of one death every 40 seconds
- ❖ As blood cholesterol rises so does risk of coronary heart disease
  - Risk is increased by other risk factors such as: Smoking, high blood pressure, or diabetes
- ❖ Too much LDL → plaque build up [atherosclerosis] → clot forms and blocks narrowed artery → heart attack or stroke



## PREVENTION AND TREATMENT

- ❖ Lifestyle Changes
  - Monitoring eating habits, weight, physical activity, and tobacco smoke
- ❖ Knowing what fats raise LDL cholesterol
  - Saturated and trans fat raise LDL cholesterol
  - Physical activity raises HDL cholesterol
- ❖ Cholesterol lowering statin-medicine
  - Take medication as prescribed by doctor
  - Eat a healthy diet and get 40 min. of aerobic exercise of moderate to vigorous 3-4x/week



## MISCONCEPTIONS OF CHOLESTEROL

1. Thin people don't have to worry about cholesterol
 

False
2. My choice about diet and physical activity are the only factors responsible for my cholesterol level
 

False
3. Since I started taking medication for my high cholesterol, I don't have to worry about what I eat.
 

False



## HIGH BLOOD PRESSURE

## WHAT IS HIGH BLOOD PRESSURE

- ◆ **Blood pressure:** measures the force pushing outward on your arterial walls
  - Oxygen is carried through the body by the blood
  - Heart beats creates pressure that pushes blood through arteries and veins
  - The pressure "blood pressure" is the result of the heart beating -- pumping blood and resting between heart beats

Blood pressure is the measurement of force applied to artery walls.



## BLOOD PRESSURE READINGS

- ◆ **Systolic**
  - The top number
  - The higher of the two numbers
  - Measures the pressure in the arteries when the heart beats (when the heart muscle contracts)
- ◆ **Diastolic**
  - Bottom number
  - Lower number of the two numbers
  - Measure the pressure in the arteries between heartbeats (when the heart muscle is resting between beats and refilling with blood)

**117**  
**76** mm Hg  
Read as "117 over 76 millimeters of mercury"

## RECOMMENDATIONS FOR HEALTHY BLOOD PRESSURE

This chart reflects blood pressure categories defined by the American Heart Association.

Blood Pressure Category	Systolic mm Hg (upper #)	and	Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Prehypertension	120 - 139	or	80 - 89
High Blood Pressure (Hypertension) Stage 1	140 - 159	or	90 - 99
High Blood Pressure (Hypertension) Stage 2	160 or higher	or	100 or higher
<b>Hypertensive Crisis (Emergency care needed)</b>	Higher than 180	or	Higher than 110

## WHY HIGH BLOOD PRESSURE MATTERS

- ◆ "Silent Killer" because HBP has no symptoms
- ◆ **Health consequences if untreated:**
  - Damage to the heart and coronary arteries: heart attack, heart disease, congestive heart failure, atherosclerosis
  - Stroke
  - Kidney damage
  - Vision loss
  - Erectile dysfunction



## RISK FACTORS OF HIGH BLOOD PRESSURE

- ◆ **Family history**
- ◆ **Advanced age**
- ◆ **Gender**
  - more men than women have HBP until 45 years of age
  - From 45-54 and 55-64 HBP percentages for men and women are similar
  - After 64 years more women have HBP than men
- ◆ **Lack of physical activity**
- ◆ **Overweight and obesity:** excess weight increase the strain on the heart. Losing 10-20 lbs. can help lower HBP and heart disease risk
- ◆ **Drinking too much alcohol**
- ◆ **Poor Diet**
  - Eating too much salt
  - Some people are "Salt Sensitive" meaning a high-salt food pattern can raise high blood pressure
  - Salt keeps excess fluids in the body that can add to the burden on the heart



## MANAGING BLOOD PRESSURE WITH HEART HEALTHY EATING

- ◆ **DASH Eating Plan:**
  - **Emphasizes:**
    - Fruits and Vegetables
    - Whole grain and high fiber foods
    - Fat free and low fat or 1%
    - Beans
    - Skinless poultry and lean meats
    - Fish (fatty fish that contain omega-3 fatty acids: salmon, trout, and herring)
  - **low fat**
    - Saturated and trans fat
    - Sodium
  - **Limit**
    - Added sugars



◆ According to one study DASH eating plan reduced systolic and diastolic blood pressure by 5.5 and 3.0 mm Hg compared to control diet (what the average American eats)

## WHY DIABETES MATTERS

- ◆ Diabetes can affect many organs in the body which can lead to serious complications when left untreated
- ◆ **Cardiovascular Disease or Heart Disease**
- ◆ **Renal (Kidney) Disease**
- ◆ **Blindness**
- ◆ **Nerve disease**
- ◆ **Limb amputations**

DIABETES

## SYMPTOMS

### Diabetes Symptoms

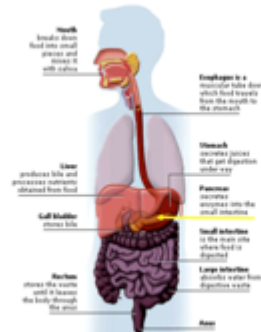
- ◆ Frequent urination
- ◆ Intense thirst and hunger
- ◆ Weight gain
- ◆ Unusual weight loss
- ◆ Fatigue, cuts and bruises that do not heal
- ◆ Male sexual dysfunction,
- ◆ Numbness and tingling in hands and feet

### Complications of badly controlled

- ◆ Mental Health: higher risk of depression, and anxiety
- ◆ Hearing loss
- ◆ Stroke
- ◆ Infections
- ◆ Healing of wounds: cuts and lesions take much longer to heal
- ◆ Eye, skin, and foot complications

## DIABETES

- ◆ "Diabetes mellitus" commonly referred to as "diabetes" is a condition that causes blood sugar to rise to dangerous levels
- ◆ Fasting blood glucose of 126 mg/dL or more
- ◆ Most of the food you eat turns into glucose or sugar and used for energy
- ◆ Pancreas produces a hormone called insulin



## RISK FACTORS FOR TYPE 2 DIABETES

### Non-Modifiable Risk Factors

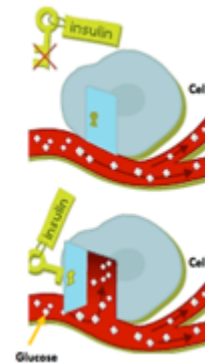
- ◆ Family history
- ◆ Race or ethnic background
  - If you are African-American, Asian-American, Latino/Hispanic-American, Native American or Pacific Islander descent greater risk
- ◆ Age
  - The older you are the higher the risk
  - Typically but now children are being diagnosed more often
- ◆ History of Gestational Diabetes

### Modifiable Risk Factors

- ◆ Overweight/obesity
  - If you are 20% or more over optimal weight you have higher risk of developing diabetes
  - Losing 5-7% of body weight can cut risk of developing diabetes in half
- ◆ Physical Inactivity
- ◆ High blood pressure
- ◆ Abnormal cholesterol levels
  - Low HDL "good" cholesterol, high LDL "bad" cholesterol and high triglycerides increase risk

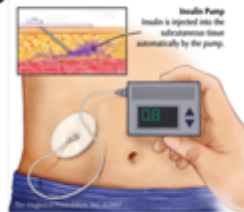
## INSULIN

- ◆ Insulin's role is to take sugar from the blood into the cell
- ◆ When your body does not produce enough insulin and/or does not efficiently use the insulin it produces sugar levels rise and build up in bloodstream
- ◆ Causes too problems:
  1. Right away cells may be starved for energy
  2. Over time high blood glucose levels may damage the eyes, kidneys, nerves, or heart



## TYPE 1 DIABETES

- ◆ Occurs when pancreas makes little or no insulin
- ◆ Without insulin the body is unable to take the glucose (blood sugar) it gets from food into cells to fuel the body
- ◆ Type 1 diabetics need daily injections of insulin to survive
- ◆ Also referred to as insulin-dependent diabetes



Insulin Injections: Syringe, Insulin pen, Insulin pump

## TYPE 2 DIABETES

- ◆ Most common form of diabetes
- ◆ Historically only diagnosed middle-aged adults now adolescents and young adults are developing Type 2 DM
- ◆ Develops when:
  - Body develops "insulin resistance" and can't make efficient use of the insulin it makes and
  - Pancreas gradually loses its capacity to produce insulin
- ◆ In a mild form, Type 2 DM can go undiagnosed for many years. If left untreated can lead to cardiovascular disease



Carbohydrate Counting to manage blood glucose

## QUESTIONS ?



## REFERENCES

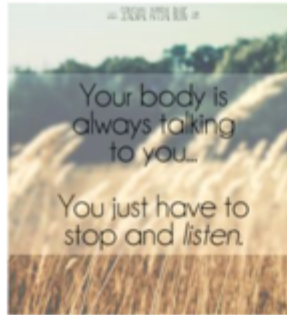
- About High Blood Pressure. (2014, August). Retrieved from [http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/About-High-Blood-Pressure\\_UCM\\_002050\\_Article.jsp#.V4VbpMdDKFI](http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/About-High-Blood-Pressure_UCM_002050_Article.jsp#.V4VbpMdDKFI)
- Adult Obesity Facts. (2015, September 21). Retrieved from <https://www.cdc.gov/obesity/data/adult.html>
- Facts About Type 2. (2015, October). Retrieved from <http://www.diabetes.org/diabetes-basics/type-2/facts-about-type-2.html>
- Nelms, M., Sucher, K.P., Lacey, K. & Roth, S.L. (2011). Nutrition Therapy & Pathophysiology. Belmont, CA: Cengage Learning.
- Sienkiewicz, F. & Whitney, E. (2013). Nutrition: Concepts and Controversies. Belmont, CA: Cengage Learning, pp. 138-144.
- Sienkiewicz, F. & Whitney, E. (2013). Nutrition: Concepts and Controversies. Belmont, CA: Cengage Learning, pp. 428-442.

## Pre/Post-Test Questionnaire: Chronic Disease

### Chronic Disease Post Test

6. Which BMI range is considered overweight?
  - m) 20.0 – 29.9
  - n) 25.0 – 29.9
  - o) 25.0 – 34.9
  - p) 30.0 – 39.9
  
7. Which of the following is a food source of cholesterol?
  - m) Avocado
  - n) Chicken
  - o) Olive oil
  - p) Yogurt
  - q) Both b & d
  
8. If left untreated, High Blood Pressure (HBP) can lead to all of the following except...
  - k) Stroke
  - l) Kidney damage
  - m) Erectile dysfunction
  - n) Obesity
  
9. Which of the following is true regarding Type 1 Diabetes?
  - m) It is the most common form of diabetes
  - n) The body develops “insulin resistance” & can no longer make efficient use of the insulin it makes
  - o) It occurs when the pancreas makes little or no insulin
  - p) All of the above
  
10. Which of the following is a research based diet designed to help lower blood pressure?
  - k) DASH Diet
  - l) Atkins Diet
  - m) The Eat Right Diet
  - n) The HBP Diet

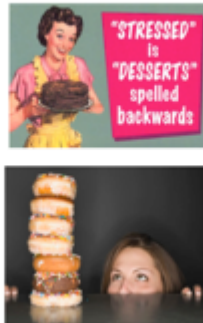
## Basic Nutrition Education Session 5: Mindful Eating



## EMOTIONAL EATING

### EMOTIONAL EATING

- Turning to food in order to soothe negative thoughts or feelings
- Using eating as a coping mechanism or even as a reward
- Emotions may become so tied to your eating habits that you automatically reach for food in times of stress without even thinking about it
- Food can also serve as a distraction



### CONSEQUENCES OF EMOTIONAL EATING

- May lead to even more feelings of guilt
- Often leads to mindless eating
- Can lead to disordered eating patterns
  - In extreme cases can lead to an eating disorder
  - Complex conditions that arise from long-standing factors including behavioral, emotional, interpersonal, and social factors
  - Binge eating disorder, Bulimia Nervosa, Anorexia Nervosa
  - In the US, 20 million women & 10 million men suffer from an eating disorder



### PHYSICAL VS. EMOTIONAL HUNGER

- |   |  |
|---|--|
| • Emotional hunger comes on suddenly                                    | • Physical hunger comes on gradually   |
| • Emotional hunger feels like it needs to be instantly satisfied        | • Physical hunger can wait   |
| • Emotional hunger craves specific comfort foods                        | • Physical hunger is open to options   |
| • Emotional hunger is NOT satisfied with a full stomach                 | • Physical hunger stops when you are full                                    |
| • Emotional eating triggers feelings of guilt, powerlessness, and shame | • Eating to satisfy physical hunger doesn't make you feel bad about yourself |

### TIPS FOR EMOTIONAL EATING

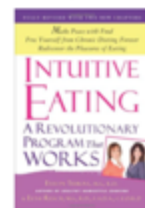
- Identify your triggers
  - Keep a food diary
- Find other ways to feed your feelings
  - Call friends or family for support
  - Take a warm bath
  - Read, explore the outdoors, do an activity you enjoy
- Pause when cravings hit
  - TAKE 5—What is really causing this craving?
  - Learn to accept your feelings
- Support yourself with healthy lifestyle habits
  - You are better able to handle stress when you are physically strong, relaxed, and well-rested!



## INTUITIVE & MINDFUL EATING

### WHAT IS INTUITIVE EATING?

- An approach that teaches you how to create a healthy relationship with your food, mind, & body
- Helps to distinguish physical hunger from emotional
- Making peace with food
- Process of learning how to respond to your body's inner cues
  - Eat when you're hungry and stop when you're full





## PRINCIPLES OF INTUITIVE EATING

- Reject the diet mentality
- Honor your hunger
- Make peace with food
- Challenge the food police
- Respect your fullness
- Discover the satisfaction factor
- Honor your feelings without using food
- Respect your body
- Exercise—Feel the difference
- Honor your health



The Hunger Scale



## MINDFUL EATING

- Eating with intention & attention
- Moment-to-moment eating
  - Experiencing each bite from start to finish
  - Living in the now—being present in the moment
- Paying attention to every aspect of your inner & outer body
- Many people who struggle with food react mindlessly to their unrecognized or unexamined triggers, thoughts, and feelings
- Mindfulness increases your awareness of these patterns without judgment and creates space between your triggers and your actions



QUESTIONS?

## REFERENCES

Albers, S. (2003). *Eating Mindfully*. Oakland, CA: Susan Albers

Eating Disorders. (2016, February). Retrieved from <http://www.nlm.nih.gov/health/topics/eating-disorders/index.html>

Tribole, E. & Resch, E. (2012). *Intuitive Eating*. New York, NY: Evelyn Tribole.

Weight loss: Gain control of emotional eating. (2015, October). Retrieved from <http://www.mayoclinic.org/healthy-lifestyle/weight-loss/in-depth/weight-loss/art-20047342>

## Pre/Post-Test Questionnaire: Chronic Disease

### Mindful Eating Post Test

11. In the U.S., \_\_\_\_\_ women & \_\_\_\_\_ men suffer from an eating disorder.
- q) 8 million, 2 million
  - r) 15 million, 5 million
  - s) 20 million, 10 million
  - t) 50 million, 20 million
12. Which of the following is **not** true regarding emotional hunger?
- r) Emotional hunger comes on suddenly
  - s) Emotional hunger feels like it needs to be satisfied instantly
  - t) Emotional hunger triggers feelings of guilt, powerlessness, & shame
  - u) Emotional hunger is satisfied with a full stomach
  - v) Both a & d
13. Which of the following is a principle of Intuitive Eating?
- o) Exercise—Feel the difference
  - p) Calorie counting
  - q) Honor your feelings without using food
  - r) Both a & c
14. Mindful eating is when someone eats with both intention & attention.
- q) True
  - r) False
15. Which of the following is **not** part of the Mindful Eating **Plate**?
- o) Savor
  - p) In-the-Moment
  - q) Observe
  - r) Nonjudgment
  - s) Meditation

# Basic Nutrition Education Session 6: Nutrition During Pregnancy

## Nutrition During Pregnancy

Audrianna Atencio

### Topics

- Weight Gain
- Key Nutrients for a Healthy Pregnancy
- Nutrition Related Problems of Pregnancy
- Alcohol and Pregnancy



### Weight Gain During Pregnancy


- Risk of problems during pregnancy & delivery is lowest when weight gain is kept within a healthy range
- Typically gain 2-4 lbs during the 1st trimester & 1 lb a week for the rest of the pregnancy
- Weight gain for twins:
  - Normal weight: 37-54 lbs
  - Overweight: 31-50 lbs
  - Obese: 25-42 lbs

Pre-pregnancy weight	Recommended weight gain	Recommended rate of weight gain after first trimester
Underweight (BMI < 18.5 kg/m <sup>2</sup> )	28-40 lbs	5.0 lbs/month
Normal weight (BMI 18.5-24.9 kg/m <sup>2</sup> )	25-35 lbs	4.0 lbs/month
Overweight (BMI 25-29.9 kg/m <sup>2</sup> )	15-25 lbs	2.0 lbs/month
Obese (BMI ≥ 30 kg/m <sup>2</sup> )	11-20 lbs	2.0 lbs/month

[www.ohsuwomenshealth.com/healthline](http://www.ohsuwomenshealth.com/healthline)

### Causes of Weight Gain

- An infant at birth weighs only about 6 to 8 lbs
- Mother's body tissues provide a healthful environment for the fetus and weighs more than 20 lbs




### Nutritional Needs

- Amount of food a woman needs depends on a number of factors
  - BMI before pregnancy
  - Rate at which you gain weight
  - Age & appetite
- A balanced, nutrient-rich diet, along with exercise, is the basis for a healthy pregnancy. For most pregnant women the right amount of calories is:
  - 1st trimester → 1,800 calories/day
  - 2nd trimester → 2,200 calories/day
  - 3rd trimester → 2,400 calories/day



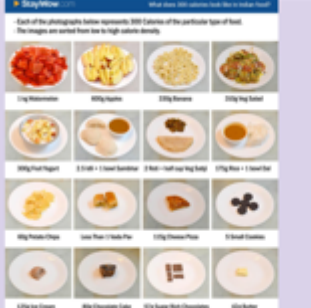
### Some things to keep in mind...

- Most women only need 300 calories more per day than they did before they were pregnant
- Not all calories were created equal
  - Choose nutrient-rich foods instead of "empty" calorie foods



### Food Examples

Each of the photographs below represents 100 Calories of the particular type of food. The images are sorted from low to high calorie density.



### My Pregnancy Plate



### Key Nutrients


- Protein
  - 20g more
- Iron
- Calcium
- Folic Acid



https://www.istockphoto.com/stock-photo-1234567890

### Iron

- Maternal iron deficiency is the most common deficiency during pregnancy
- Fetus draws on mother's iron stores to create stores of its own to carry it through the first 3 to 6 months of life
- Recommendation increases to 27 mg each day
- Food sources
  - Red meat, chicken, fish, fort. cereals, spinach
- Vegetarians should pair plant sources of iron with vitamin C-rich foods




### Calcium

- Necessary for healthy development of baby's teeth, bones, heart, nerves & muscles
- Intestinal absorption of calcium doubles early in pregnancy & stored in mother's bones
- If mother doesn't consume enough, it's taken from her bones for the baby
- Recommendation:
  - 1,300 mg
- Sources:
  - Dairy, canned salmon & sardines, kale, collard greens, bok choy
  - Fortified foods: tofu, orange juice, almond milk, cereal, oatmeal



### Folic Acid

- Reduces risk of birth defects affecting the spinal cord
- All women of childbearing age should consume at least 400 mg per day
  - During 1st trimester → 600 mg
- Sources:
  - Dark leafy vegetables, nuts, beans, peas, fruits & fruit juices, brussels sprouts, asparagus
  - Enriched breads, cereals, flours, cornmeals, pastas, rice, etc.




### Nutrition Related Problems of Pregnancy

- Pregnancy Induced Hypertension
- Gestational Diabetes



### Hypertension in Pregnancy

- Women with preexisting hypertension should have her blood pressure under control before becoming pregnant
  - Increases risk of baby having a low birthweight
- Some women may develop a transient hypertension of pregnancy during the second half of their pregnancy



### Pregnancy Induced Hypertension (PIH)

#### Preeclampsia


- Hypertensive condition induced by pregnancy
- High blood pressure, protein in the urine, and generalized edema that may cause sudden large weight gain from retained water
- Symptoms:
  - Severe and constant headaches
  - Sudden weight gain
  - Swelling of face, hands, and feet, dizziness, and blurred vision

#### Eclampsia

- Also induced by pregnancy
- Most severe form of PIH
- Characterized by:
  - Convulsions that may result in coma
  - PIH can restrict fetal growth and cause the placenta to separate from the uterus, resulting in stillbirth

### Gestational Diabetes

- Pregnant women who have never had diabetes prior to pregnancy, but experience high blood glucose levels during pregnancy
- Normally occurs around the 24th week of pregnancy, but the exact cause is unknown
- Prevalence → 9.2%
- Often disappears after delivery
  - Leads to greater chance of having Type II Diabetes later in life



https://www.istockphoto.com/stock-photo-1234567890



### Gestational Diabetes Cont.

- Risk factors:
  - Previous history of gestational diabetes
  - Glucose in the urine
  - Obesity
  - Strong family history of diabetes
- Symptoms
  - Increased thirst, hunger, or urination
  - Weakness
- Some women may have no warning signs

### Diabetes & Pregnancy

- Infants born to women with diabetes prior to pregnancy are at a greater risk for:
  - Premature birth
  - Congenital defects
    - Can involve many different parts of the body (brain, heart, lungs, bones, etc.)
    - Leading cause of infant mortality in US
    - Examples: cleft lip and palate, heart defects, spina bifida, limb defects
  - Very high birthweight
  - Respiratory distress syndrome

### Teen Pregnancy

**TEEN PREGNANCY FACTS & STATISTICS**

- Complexity of social, emotional, and physical factors makes teen pregnancy one of the most challenging situations for meeting nutritional needs
- Pregnant adolescents are nutritionally at risk & require early intervention & special care
  - Higher rates of PIH, iron-deficiency anemia, premature birth, stillbirth, low-birthweight, and prolonged labor

### Pregnancy & Alcohol

- There is no known safe amount of alcohol use during pregnancy or while trying to get pregnant
  - Also no safe time during pregnancy to drink
- All types of alcohol are equally harmful
- The CDC advises that women should not drink alcohol if they are sexually active and do not use effective contraception

### Pregnancy & Alcohol

- Alcohol in the mother's blood passes to the baby through the umbilical cord
- May lead to:
  - Miscarriage, stillbirth
  - Lifelong physical, behavioral, and intellectual disabilities-- Fetal Alcohol Spectrum Disorders (FASDs)
- Signs/Symptoms of FASDs
  - Abnormal facial features, such as smooth ridge between nose & upper lip
  - Small head size, poor coordination, hyperactive behavior, poor memory
  - Speech & language delays, poor reasoning, vision or hearing problems
  - Problems with heart, kidney, or bones
  - Learning disabilities, low IQ
  - Sleep and sucking problems as a baby

### Questions?

### References

Alcohol Use in Pregnancy. (2014, April 17). Retrieved from <http://www.cdc.gov/ncbddd/fasd/alcohol-use.html>

Alcohol & Breast Milk. (2015, November 21). Retrieved from <https://healthychildren.org/itsages/stages/Pages/Breastfeeding/Pages/Alcohol-Breast-Milk.aspx>

Demy, S. (2016, February). Healthy weight during pregnancy. Retrieved from <http://www.eatright.org/resources/health-topics/for-pregnant-women/healthy-weight-during-pregnancy>

Diabetes and Pregnancy. (2015, September 18). Retrieved from <http://www.cdc.gov/pregnancy/diabetes.html>

Drake, V. (2011). Micronutrient needs during pregnancy and lactation. Retrieved from: <http://ajpi.wiscstate.edu/ajpi/life-stages/pregnancy-lactation/micronutrient-needs/pregnancy-lactation>

## Pre/Post-Test Questionnaire: Nutrition During Pregnancy

### Nutrition During Pregnancy Pre/Post Test

1. The recommended amount of weight gain during pregnancy for a normal weight individual is \_\_\_\_\_.
  - u) 15-25 lbs.
  - v) 25-35 lbs.
  - w) 28-40 lbs.
  - x) 31-50 lbs.
  
2. Most women need \_\_\_\_ calories more per day than they did before they were pregnant.
  - w) 300
  - x) 550
  - y) 700
  - z) 1,000
  
3. If a mother does not consume enough calcium during pregnancy, it is taken from her bones for the baby.
  - s) True
  - t) False
  
4. Pregnant teens are at a higher risk for which of the following conditions?
  - s) Pregnancy Induced Hypertension
  - t) Premature birth
  - u) Iron-deficiency anemia
  - v) All of the above
  
5. Which of the following conditions may cause convulsions during pregnancy that may result in a coma?
  - t) Gestational Diabetes
  - u) Preeclampsia
  - v) Eclampsia
  - w) All of the above

## Basic Nutrition Education Session 7: Nutrition for Infants & Toddlers



**TOPICS**

- Infant's nutrient needs
- Nutrition during lactation
- Breastfeeding
- Infant nutrition
- Toddler nutrition

### INFANT'S NUTRIENT NEEDS

- A baby grows faster during the first year of life than ever again
- Infant's birthweight doubles by 5 months of age & triples by the 1st year
- Nutrients of special importance are energy nutrients & vitamin A, vitamin D, & calcium
- General indicator of whether an infant is consuming enough calories/day is the infant's growth rate in length, weight, & head circumference

The proportions of energy-yielding nutrients in human breast milk differ from those recommended for adults.\*

Component	Breast milk	Recommended adult diets
Protein	8%	21%
Fat	51%	26%
Carbohydrate	39%	53%

\*The values listed for adults represent approximate midpoints of the recommended ranges for protein (10 to 30 percent), fat (20 to 35 percent), and carbohydrate (45 to 65 percent).

### NUTRITION DURING LACTATION

- A nursing mother produces about 25 ounces of milk per day
  - Varies from woman to woman
  - Volume of milk produced depends on the infant's demand for milk
- Producing milk costs women almost 500 calories per day
  - Protein needs: extra 20-25 g/ day
- Calcium: 1,000 mg/day
- Fluid needs increase to 13 cups of water per day
- Iron drops to 9-10 mg/day
- Limit or avoid alcohol, caffeine, & certain seafood

### BREASTFEEDING

- The AAP & Academy of Nutrition & Dietetics recommend **exclusive** breastfeeding for the 1st 6 months, & breastfeeding with complementary foods for at least 12 months
- More easily & completely digested than infant formula

### BREAST MILK

- Colostrum
  - Produced during first 2 or 3 days of lactation
  - Contains antibodies from the mother
  - Thick, yellow-colored
  - Replaced with mature breast milk after 2-3 weeks
- Foremilk
  - High in volume but low in fat
- Hindmilk
  - Low in volume but high in fat

### BENEFITS OF BREASTFEEDING

<p><b>For the Infant:</b></p> <ul style="list-style-type: none"> <li>• Provides the right balance of nutrients</li> <li>• Composition changes over time to meet an infant's needs</li> <li>• Contains antibodies</li> <li>• Provides hormones that promote physiological development</li> <li>• Sanitary &amp; always the correct temperature</li> <li>• Reduces risk of gastrointestinal diseases, respiratory diseases, &amp; ear infections</li> <li>• May protect against some chronic diseases later in life</li> </ul>	<p><b>For the Mother:</b></p> <ul style="list-style-type: none"> <li>• FREE</li> <li>• Contracts the uterus</li> <li>• Conserves iron stores</li> <li>• Delays the return of regular ovulation</li> <li>• May protect against breast &amp; ovarian cancer</li> <li>• Stimulates prolactin</li> <li>• Promotes bonding</li> </ul>
--	--

### WHAT'S CURRENTLY HAPPENING IN THE U.S.?

- In 2011, 79% of newborns started to breastfeed
  - 49% were breastfeeding at 6 months (only 16.4% exclusively) & 27% at 12 months
- In 2012, 24.2% of infants in the U.S. were given formula before 2 days of age
- Only 7.15% of all U.S. births were at baby-friendly hospitals
- 54.4% of infants receive skin-to-skin contact immediately after birth

## 10 Steps to Successful Breastfeeding

The longer a baby is breastfed, the greater the benefits.


- 1 Have a written breastfeeding policy that is routinely communicated to all health care staff
- 2 Train all health care staff in skills necessary to implement the policy
- 3 Inform all pregnant women about the benefits and management of breastfeeding
- 4 Help mothers initiate breastfeeding within an hour of birth
- 5 Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants
- 6 Give mothers infants on demand or drink rather than formula, unless medically indicated
- 7 Practice "rooming-in" by allowing mothers and infants to remain together in their rooms
- 8 Encourage breastfeeding on demand (based on infant's feeding cues)
- 9 Give no artificial teats, pacifiers, dummies, or soothers to breastfeeding infants
- 10 Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birthing center

St. Mary's Hospital | Maternal Care

## INTRODUCING SOLIDS TO YOUR INFANT

### WHEN TO INTRODUCE SOLID FOOD

- Normally between 4-6 months of age
- Infants must show physical readiness
  - Able to swallow non-liquid foods
  - Able to hold head up
- Solid foods can provide needed nutrients that are no longer adequately supplied by breast milk or formula alone
- Foods to start with:
  - Single-grain, iron fortified cereal
  - Variety of pureed fruits & vegetables



Age (mo)	Feeding Skill	Food Introduced into the Diet
0-4	Turns head toward any object that brushes cheek. Initially swallows using back of tongue; gradually begins to swallow using front of tongue as well. Strong reflex (extrusion) to push food out during first 2 to 3 months.	Feed breast milk or infant formula.
4-6	Extrusion reflex diminishes, and the ability to swallow nonliquid foods develops. Indicates desire for food by opening mouth and leaning forward. Indicates satiety or discomfort by turning away and leaning back. Sits erect with support at 6 months. Begins chewing action. Brings hand to mouth. Grasps objects with palm of hand.	Begin iron-fortified cereal mixed with breast milk, formula, or water. Begin pureed meats, legumes, vegetables, and fruits.
6-8	Able to feed self with fingers. Develops pincer (finger to thumb) grasp. Begins to drink from cup.	Begin textured vegetables and fruits. Begin plain, unsweetened fruit juices from cup.
8-10	Begins to hold own bottle. Reaches for and grabs food and spoon. Sits unsupported.	Begin breads and cereals from table. Begin yogurt. Begin pieces of soft, cooked vegetables and fruit from table. Gradually begin finely cut meats, fish, casseroles, cheese, eggs, and legumes.
10-12	Begins to master spoon, but still spills some.	Add variety. Gradually increase portion sizes.*

### STRATEGIES FOR INTRODUCING SOLID FOODS

- Offer the 1st solid food when an infant is neither full nor very hungry
- Offer solid food during the morning or early afternoon
- Avoid offering food when the infant is upset
- Keep trying!



### FOODS TO AVOID

- Honey or corn syrup
- Nuts
- Adult cereals
- Eggs
- Citrus fruits
- Cow's milk





## TODDLER NUTRITION

### AGE: 12 TO 24 MONTHS

- Offer toddlers a variety of nutritious foods at each setting & let them choose what, when, & how much they eat
- Whole milk is recommended until age 2
- Divide food into 3 small meals & 2-3 snacks a day
  - Note: They won't always follow this pattern, & that is okay!
- How much to feed them:
  - 2 C dairy, 3 oz grains, 1 C fruit, 1 C vegetables, 2 oz protein
- Avoid foods that could a choking hazard
  - Whole grapes, uncut hot dogs
  - Nuts, whole raw carrots, marshmallows
  - Round, hard candies or gum





## AGE: 2-3 YEARS

- Toddlers should be feeding themselves & eager to make their own choices
- Slight increase in portions
- Serving size for a toddler should be approximately one-quarter of an adult's

### Calories Needed Each Day for Girls and Women

Age	Not Active	Somewhat Active	Very Active
2-3 years	1,000 calories	1,000-1,200 calories	1,000-1,400 calories

### Calories Needed Each Day for Boys and Men

Age	Not Active	Somewhat Active	Very Active
2-3 years	1,000-1,200 calories	1,000-1,400 calories	1,000-1,400 calories



EXAMPLE MEALS FOR TODDLERS

QUESTIONS?

## REFERENCES

- Baby-friendly Hospital Initiative (2016). Retrieved from <https://www.who.int/nutrition/topics/bfhi/en/>
- Benefits of Breastfeeding for Mom. (2015, November 21). Retrieved from <https://healthychildren.org/English/age-stages/baby/breastfeeding/Pages/Benefits-of-Breastfeeding-for-Mom.aspx>
- Drake, V. (2011). Micronutrient needs during pregnancy and lactation. Retrieved from: <http://lpi.oregonstate.edu/life-stages/pregnancy/lactation/micronutrient-requirements/lactation>
- Feeding and Nutrition: Your One-Year-Old. (2015, November 21). Retrieved from <https://healthychildren.org/English/age-stages/toddler/nutrition/Pages/Feeding-and-Nutrition-Year-One-Year-Old.aspx>
- Feeding and Nutrition: Your Three-Year-Old. (2015, November 21). Retrieved from <https://healthychildren.org/English/age-stages/toddler/nutrition/Pages/Feeding-and-Nutrition-Year-Three-Year-Old.aspx>

- Serbinski, K. (2015, October 7). Dos and don'ts for baby's first foods. Retrieved from <http://www.eatright.org/resource/food/nutrition/eating-as-a-family/dos-and-donts-for-babys-first-foods>
- Stankiewicz, F., & Whitney, E. (2013). Nutrition: Concepts and Controversies. Belmont, CA: Cengage Learning, pp. 339 - 342.
- Starting Solid Foods. (2012, February 11). Retrieved from <https://www.healthychildren.org/English/age-stages/baby/feeding-nutrition/Pages/Switching-to-Solid-Foods.aspx>
- Hayes, D. (2014, January 31). Introducing solid foods to your toddlers. Retrieved from <https://www.eatright.org/resource/food/nutrition/infants-guinea-pigs-and-nylats/introducing-solid-foods-to-toddlers>
- Kuo, A.A., Imkeas, M., Slusser, W.M., Waldenberg, M., & Halfon, N. (2011). Introduction of solid food to young infants. *Maternal Child Health Journal*, 25, 1385 - 1394.

## Pre/Post-Test Questionnaire: Nutrition for Infants and Toddlers

### Nutrition for Infants & Toddlers Pre Test

1. Breastfeeding mothers should consume \_\_\_ cups of water each day.
  - y) 6
  - z) 8
  - aa) 11
  - bb) 13
2. The American Academy of Pediatrics & Academy of Nutrition & Dietetics recommends **exclusive** breastfeeding for \_\_\_ months.
  - aa) 3
  - bb) 6
  - cc) 9
  - dd) 12
3. Which of the following types of breast milk is produced during the first 2 or 3 days of lactation?
  - u) Foremilk
  - v) Colostrum
  - w) Hindmilk
  - x) All of the above
4. Which of the following foods should not be given to an infant under 1 year of age?
  - w) Honey
  - x) Citrus fruits
  - y) Eggs
  - z) Both A & C
  - aa) All of the above
5. The serving size for a toddler should be approximately \_\_\_\_\_ of an adult's.
  - x) One-quarter
  - y) One-third
  - z) Half
  - aa) Three-quarters

**APPENDIX B**  
**DEMOGRAPHIC QUESTIONNAIRE**

ID Number: \_\_\_\_\_ Date: \_\_\_\_\_

## Demographic Form

Please answer the following questions

1. Age: \_\_\_\_\_
2. Major: \_\_\_\_\_
3. Gender:
  - 1A. Female
  - 2B. Male
  - 3C. Transgender
  - 4D. Prefer not to respond
4. Degrees/Certifications currently held:
  - 1A. Bachelor's Degree
  - 2B. CHES
  - 3C. MFT
  - 4D. CSW
  - 5E. Other: \_\_\_\_\_
5. Have you taken an intro to nutrition college course?
  - 1A. Yes
  - 2B. No
6. To what extent does your academic program include nutrition education?
  - 1A. Nonexistent
  - 2B. Mild
  - 3C. Moderate
  - 4D. Good
  - 5E. Extensive
7. Two Nutrition topics you would like to know more about:
  - A. \_\_\_\_\_
  - B. \_\_\_\_\_

**APPENDIX C**  
**FOCUS GROUP TEMPLATE**

## Nutrition Education

# Focus Group Outline

<b>Project Name:</b> Basic Nutrition Knowledge among Graduate Research Fellows	<b>Total Meeting Time/Location:</b> 1 hour/Centro Salud es Cultura
<b>Focus Group Objectives:</b> <ol style="list-style-type: none"><li>1. To assess the amount of knowledge participants retained from nutrition education sessions.</li><li>2. To assess participants' confidence level to give nutrition-related advice</li><li>3. To understand the preference of nutrition education delivery style</li><li>4. To identify any barriers to understanding the basic nutrition topics presented</li></ol>	
<b># of Participants:</b> 5	
<b>Meeting Materials:</b> We will need refreshments, paper/pens, a voice recorder, the list of names of the participants and the focus group questions, notebook for focus group questions.	
<b>Logistics Issues:</b> The day prior to the focus group we will check with the venue and ensure we have the spot. Purchase all refreshments and other materials like pens/paper/marker. We will confirm with the participants and print/copy all forms.  We will consent all participants verbally. Shortly after that we will collect participant demographic forms and the moderator will give the introduction. Once everyone is seated, we will complete the table map. Then the moderator will begin with the focus group questions. During this time the note-taker will be taking notes and controlling the audio recorder. At the end of the discussion, the moderator will debrief everyone and answer any additional questions. The note taker will then thank all participants for coming.	

### **Introduction:**

Hello ladies, I would like to welcome you all to our focus group. This focus group is part of our research to understand attitudes, beliefs, and knowledge regarding the need of basic nutrition in your personal and professional environments. I have a variety of questions that we will be discussing today. Please turn off your phones and if you need to use the restroom you may go now. I need you engaged for the entire session. I want to hear from each person, so please stay tuned-in. Contribute as often as you can to the conversation. It is easiest if you speak one at a time and please do not speak over each other. We will be starting in about 5 minutes so if anyone needs to use the restroom, please do so now. Thank you all for being here.

### **Focus Group Questions**

<b>Opening Questions 1-2</b>	
Moderator Notes	Time
1. Let's go around the room and have everyone give a brief description of your educational background and future professional goals.	
<b>Introductory Questions 2-3</b>	
Moderator Notes	Time
1. So some of you mentioned you wanted to do....., how does nutrition play a role in that job? 2. What role does nutrition play in your personal life? 3. Before you participated in our nutrition sessions, how confident did you feel about your level of nutrition knowledge if you had been required to give nutrition education to a client/community member? (Use MI Ruler) 4. Before you participated in our nutrition sessions, how confident did you feel about your ability to explain/educate client/community members about nutrition? (Use MI Ruler)	
<b>Transition Questions 1-2</b>	

Moderator Notes	Time
<ol style="list-style-type: none"> <li>1. Think back to a time when you were giving nutrition education. What was the biggest challenge you encountered?</li> <li>2. From all of the nutrition sessions delivered, what key points stood out to you most?</li> </ol>	
<b>Key Questions 2-5</b>	
Moderator Notes	Time
<ol style="list-style-type: none"> <li>1. Think back to the digestion and absorption session. What do you remember from that session?</li> <li>2. Think back to the digestive disorder session what do you remember from that session?</li> <li>3. Think back to the chronic disease session what do you remember from that session?</li> <li>4. Think back to the mindful eating session what do you remember from that session?</li> <li>5. Think back to the maternal and child health sessions what do you remember from that session?</li> <li>6. Now that the sessions are over how do you feel now about your knowledge to give reliable nutrition information to clients/community members? (Use MI Ruler)</li> <li>7. Now that the sessions are over how do you feel now about your ability to give reliable nutrition information to clients/community members? (Use MI Ruler)</li> <li>8. How do you feel (confidence level) now about your knowledge of nutrition for yourself and your family? (Use MI Ruler)</li> </ol>	
<b>Ending Questions 2-3</b>	
Moderator Notes	Time



1. What style of delivery for the nutrition sessions would you have preferred to have received? What deliver format do you think is the best for delivering nutrition education?
2. What have I missed? What else would you like to share about the nutrition education sessions?

Thank you so much for sharing. I appreciate your time and feedback.

## **APPENDIX D**

### **FOCUS GROUP CONFIDENCE AND KNOWLEDGE LEVEL HANDOUT**

1. **Before** you participated in our nutrition sessions, how confident did you feel about your level of nutrition knowledge if you had been required to give nutrition education to a client/community member?

**Confidence Level:**

**Please provide a brief explanation as to why you chose this level:**

2. **Before** you participated in our nutrition sessions, how confident did you feel about your ability to explain/educate client/community members about nutrition?

**Confidence Level:**

**Please provide a brief explanation as to why you chose this level:**

3. Now that the sessions are over, how do you feel about your **knowledge** to give reliable nutrition information to clients/community members?

**Knowledge Level:**

**Please provide a brief explanation as to why you chose this level:**

4. Now that the sessions are over, how confident do you feel about your **ability** to give reliable nutrition information to clients/community members?

**Confidence Level:**

**Please provide a brief explanation as to why you chose this level:**

5. How do you feel (confidence level) now about your knowledge of nutrition for yourself and your family?

**Confidence Level:**

**Please provide a brief explanation as to why you chose this level:**

## APPENDIX E

### PERMISSION REQUEST TO PERFORM SECONDARY ANALYSIS

December 10, 2016

Dr. Gail Frank, RD, CHES  
Professor of Nutrition/Co-Project Director, *Sanos y Fuertes*  
Department of Family and Consumer Sciences  
1250 Bellflower Boulevard  
Long Beach, CA 90840-0501

Dear Dr. Frank,

As a graduate student in the Nutritional Science program at California State University, Long Beach, I am preparing to begin work on my thesis. I am writing to request permission to perform secondary data analysis on data collected for Graduate Research Fellows (GRFs) from the *Sanos y Fuertes* (Healthy and Strong) research project. The data I am requesting comes from the seven basic nutrition education sessions given to the non-nutrition GRFs who were part of the fifth and final cohort of GRFs. These data were collected from October 2015 to March 2016 by the GRF in the Master of Science in Nutritional Science program who was assigned to the basic nutrition focus area. I will work with the Intervention Supervisor, Erika Bonilla, and Project Coordinator, Natalia Gatdula, from the *Sanos y Fuertes* research project to acquire the data. The following material would be used as the basis of my research:

1. Seven pre/post-tests from the basic nutrition education sessions
2. Demographic questionnaire
3. Recorded focus group audiotape

The work will be used in my thesis to evaluate the effectiveness of the basic nutrition education sessions in increasing non-nutrition GRFs level of nutrition knowledge and confidence to give nutrition-related advice. This work will add to the limited body of scientific research evaluating the impact of such trainings given to non-nutrition healthcare professionals and/or students.

I have carefully evaluated the possible risks involved with this data analysis. I will take all precautions necessary to minimize the possible risk of a breach of confidentiality. Physical forms (pre/post-tests and demographic questionnaire) and the recorded focus group audiotape will be kept private and be stored at my residence in a secure and locked file cabinet. Data will be primarily analyzed at my residence or on the California State University, Long Beach campus. I will not use any identifiable information throughout the analysis of the data. GRFs will only be referred to by subject number (i.e. 001, 002, 003, 004, 005).

After transcription of the focus group has been completed, the audiotape will be destroyed. After the completion of my study, I will return all physical data to you as the Co-PI of the *Sanos y Fuertes* research project. This data would be kept on file for the three-years before being destroyed. Any digital data would be completely removed from

my personal laptop to also be stored with you for the three-year minimum. After that time, digital data will be destroyed.

Please indicate your approval of this request by signing the letter where indicated below and returning it to me as soon as possible. Your signing of this letter will also confirm that the project under your leadership and the leadership at the Center for the research own the rights to the above-described material. Thank you for your time.

Respectfully,

Audrianna Atencio, MS (c)  
Dietetic Intern – California State University, Long Beach  
8162 Cape Hope Circle #202  
Huntington Beach, CA 92646

**PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:**

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **APPENDIX F**

### **PERMISSION LETTER FROM THE CO-PRINCIPAL INVESTIGATOR**





## CALIFORNIA STATE UNIVERSITY, LONG BEACH

FAMILY AND CONSUMER SCIENCES  
NUTRITION AND DIETETICS, HOSPITALITY FOODSERVICE AND HOTEL MANAGEMENT, AND FOOD SCIENCE,  
FASHION MERCHANDISING AND DESIGN, CHILD DEVELOPMENT AND FAMILY STUDIES,  
COMMUNICATION/EDUCATION, CONSUMER AFFAIRS, AND GERONTOLOGY

January 11, 2017

Audrianna Atencio, BS  
M.S. Nutritional Science Graduate Student  
California State University Long Beach

Dear Audrianna:


This letter acknowledges that I have read your letter requesting permission to perform secondary analysis on data collected for Graduate Research Fellows (GRFs) from the *Sanos y Fuertes* (Healthy and Strong) research project. I give you permission to work with the Intervention Supervisor, Erika Bonilla, and Project Coordinator, Natalia Gatdula, from the *Sanos y Fuertes* research project to acquire and to analyze the necessary data.

I support your research endeavor titled, "*An Evaluation of the Effectiveness of Nutrition Education Sessions to Increase Non-Nutrition Graduate Research Fellows' Level of Nutrition Knowledge and Confidence in Giving Nutrition Advice.*" I believe the analysis will increase our knowledge about the level of influence trainings with non-nutrition healthcare professionals have on the abilities of those future professionals to teach accurate nutrition concepts.

Please employ the highest levels of confidentiality in the management of your thesis research.

My signature below indicates my approval of this request and acknowledges my leadership in analysis of the data for *Sanos y Fuertes* maintained at the Center.

Regards,

  
Dr. Gail Frank, RD, CHES  
Professor of Nutrition/Co-Project Director, *Sanos y Fuertes*  
Department of Family and Consumer Sciences  
1250 Bellflower Boulevard  
Long Beach, CA 90840-0501

Department of Family and Consumer Sciences  
Office 562-985-4484 Fax 562-985-4414  
1250 Bellflower Boulevard  
Long Beach, California 90840-0501

## APPENDIX G

### REQUEST TO SERVE ON EXTERNAL, EXPERT REVIEW COMMITTEE

February 3<sup>rd</sup>, 2017

Dear Instructors,

I am writing to you to see if you would be willing to serve on an external expert review committee for part of my thesis work. For my thesis, I am performing secondary analysis on data from a nutrition education-training program given to non-nutrition Graduate Research Fellows (GRFs) from the *Sanos y Fuertes* (Healthy and Strong) research project during the 2015-20176 school year. This review committee will be responsible for evaluating the content validity of pre/post-tests given to the GRFs before and after each of the seven basic nutrition education sessions. If you accept, I will send you a file with the seven PowerPoint files and a Content Validity Questionnaire asking you to rank the relevance of each pre/post-test item based off the information taught in the PowerPoints.

All responses would be kept confidential and the review would take approximately 1-2 hours of your time. Please let me know at your earliest convenience if you would be willing to be a part of this committee. This project has been approved by IRB and the approval letter has been attached to this email. Thank you for your time.

Sincerely,

**Audrianna Atencio, MS (c)**

Dietetic Intern 2016 - 2017

California State University, Long Beach

**APPENDIX H**  
**CONSTRUCT VALIDITY QUESTIONNAIRE FORM**

## CONTENT VALIDITY INDEX QUESTIONNAIRE

ID #

### Instructions:

Thank you for assisting me with my thesis research by agreeing to evaluate the content validity of pre/post-tests used to assess the nutrition knowledge of Graduate Research Fellows from the *Sanos y Fuertes* research project. Please review the PowerPoints from each of the nutrition education sessions, then begin the questionnaire by choosing one response for each line.

You are being asked to indicate how relevant each item is for assessing important information on the topic presented in the PowerPoint. Place an "X" mark in the box for your answer; choose only one response per item.

Please do not sign this document as responses will be tallied as confidential. Once you have completed the questionnaire, please save and e-mail it back to me after attaching the file.

Pre/Post-Test #1: Nutrition Overview	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> The acceptable percentage of carbohydrates in the eating pattern of a healthy adult is...(Answer: 45 – 65%)				
<b>Item #2:</b> How many macronutrients are there? (Answer: 3)				
<b>Item #3:</b> All of the tissues in our body can use glucose for energy. (Answer: True)				
<b>Item #4:</b> ___ are the elements that originated in the earth and cannot be made by living organisms. (Answer: Minerals)				
<b>Item #5:</b> A 3 oz. beef patty has __ mg of iron to meet the __ mg of iron needed by women daily. (Answer: 2.32 mg; 18 mg)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #2: Anatomy for Nutrition's Sake	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> Where does the majority of digestion take place? (Answer: Small Intestine)				
<b>Item #2:</b> What substance produced by the stomach is necessary for the absorption of vitamin B12? (Answer: Intrinsic factor)				
<b>Item #3:</b> Which organ stores bile? (Answer: Gallbladder)				

<b>Item #4:</b> ____ is the enzyme that first begins to break down carbohydrates. (Answer: Salivary amylase)				
<b>Item #5:</b> When food travels from the mouth to the stomach, it is referred to as... (Answer: A bolus)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #3: Digestive Disorders	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1</b> ____ is a more serious & long-lasting form of heart burn. (Answer: Gastroesophageal Reflux)				
<b>Item #2:</b> Which of the following is <b>not</b> a common symptom of IBS? (Answer: Excess urination)				
<b>Item #3:</b> Irritable Bowel Disease is an umbrella term for which two conditions? (Answer: Crohn's Disease & Ulcerative Colitis)				
<b>Item #4</b> Common trigger foods for diseases of the upper GI tract include all of the following except... (Answer: Corn)				
<b>Item #5:</b> Ulcerative Colitis can occur anywhere along the GI tract (mouth to anus). (Answer: False)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #4: Chronic Disease	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> Which BMI range is considered overweight? (Answer: 25.0 – 29.9)				
<b>Item #2:</b> Which of the following is a food source of cholesterol? (Answer: Both b & d - chicken & yogurt)				
<b>Item #3:</b> If left untreated, high blood pressure can lead to all of the following				

except... (Answer: Obesity)				
<b>Item #4:</b> Which of the following is true regarding Type I Diabetes? (Answer: It occurs when the pancreas makes little or no insulin)				
<b>Item #5:</b> Which of the following is a research based diet designed to help lower blood pressure? (Answer: DASH Diet)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #5: Mindful Eating	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> In the U.S., ___ women & ___ men suffer from an eating disorder. (Answer: 20 million; 10 million)				
<b>Item #2:</b> Which of the following is <b>not</b> true regarding emotional hunger? (Answer: Emotional hunger is satisfied with a full stomach)				
<b>Item #3:</b> Which of the following is a principle of Intuitive Eating? (Answer: Both a & c - Exercise—Feel the difference and honor your feelings without using food)				
<b>Item #4:</b> Mindful eating is when someone eats with both intention & attention. (Answer: True)				
<b>Item #5:</b> Which of the following is <b>not</b> part of the Mindful Eating Plate? (Answer: Meditation)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #6: Nutrition During Pregnancy	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> The recommended amount of weight gain during pregnancy for a normal weight individual is ___. (Answer: 25-35 lbs.)				
<b>Item #2:</b> Most women need ___ calories more per day than they did before they				

were pregnant. (Answer: 300)				
<b>Item #3:</b> If a mother does not consume enough calcium during pregnancy, it is taken from her bones for the baby. (Answer: True)				
<b>Item #4:</b> Pregnant teens are at a higher risk for which of the following conditions. (Answer: All of the above – Pregnancy Induced Hypertension, Premature birth, Iron-deficiency anemia).				
<b>Item #5:</b> Which of the following conditions may cause convulsions during pregnancy that may result in a coma? (Answer: Eclampsia)				
Overall pre/post-test rating				

Additional Comment:

Pre/Post-Test #7: Nutrition for Infants & Toddlers	Not Relevant	Somewhat Relevant	Relevant	Very Relevant
<b>Item #1:</b> Breastfeeding mothers should consume __ cups of water each day. (Answer: 13)				
<b>Item #2:</b> The American Academy of Pediatrics & Academy of Nutrition & Dietetics recommends <b>exclusive</b> breastfeeding for __ months. (Answer: 6)				
<b>Item #3:</b> Which of the following types of breast milk is produced during the first 2 or 3 days of lactation? (Answer: Colostrum)				
<b>Item #4:</b> Which of the following foods should <b>not</b> be given to an infant under 1 year of age? (Answer: All of the above – Honey, Citrus fruits, Eggs)				
<b>Item #5:</b> The serving size for a toddler should be approximately __ of an adult's. (Answer: One-quarter)				
Overall pre/post-test rating				

Additional Comment:



## REFERENCES

## REFERENCES

- Academy of Nutrition and Dietetics. (2014, January). *Qualifications of a registered dietitian nutritionist*. Retrieved from <http://www.eatright.org/resource/food/resources/learn-more-about-rdns/qualifications-of-a-registered-dietitian-nutritionist>
- American Cancer Society. (2016). *Cancer facts & figures 2016*. Retrieved from <http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-047079.pdf>
- American Diabetes Association. (2015, May 18). *Overall numbers, diabetes and prediabetes*. Retrieved from <http://www.diabetes.org/diabetes-basics/statistics/>
- Appel, L.J., Moore, T.J., Obarzanek, E., Vollmer, W.M., Svetkey, L.P., Sacks, F.M....Harsha, D.W. (1997). A clinical trial of the effects of dietary patterns on blood pressure. *New England Journal of Medicine*, 336, 1117-1124. doi: 10.1056/NEJM199704173361601
- Bistrutz, L., Kovacs-Burns, K., Avdagovska, M., McCargar, L., Olsen, K., & Gramlich, L. (2015). WellnessRx education initiative: development and pilot study of nutrition and physical activity education for health sciences students. *Pedagogy in Health Promotion*, 1(1), 24-36.
- Boyle, J.P., Thompson, T.J., Gregg, E.W., Barker, L.E., & Williamson, D.F. (2010). Projection of the year 2050 burden of diabetes in the US adult population: Dynamic modeling of incidence, mortality, and prediabetes prevalence. *Population Health Metrics*, 8, 29. <http://doi.org/10.1186/1478-7954-8-29>
- Bureau of Labor Statistics. (2015, May). *Occupational employment statistics*. Retrieved from <http://www.bls.gov/oes/current/oes211091.htm>
- Centers for Disease Control and Prevention. (2014). *2014 national diabetes statistics report*. Retrieved from <http://www.cdc.gov/diabetes/data/statistics/2014statisticsreport.html>
- Centers for Disease Control and Prevention. (2015). *Adult obesity causes & consequences*. Retrieved from <https://www.cdc.gov/obesity/adult/causes.html>
- Centers for Disease Control and Prevention (2016a, June). *Defining adult overweight and obesity*. Retrieved from <https://www.cdc.gov/obesity/adult/defining.html>
- Centers for Disease Control and Prevention. (2016b). *Health, United States, 2015: With special feature on racial and ethnic health disparities*. Retrieved from [https://www.cdc.gov/nchs/data/15.pdf#019](https://www.cdc.gov/nchs/data/hus/15.pdf#019)
- Chen, L., Pei, J., Kuang, J., Chen, H., Chen, Z., Li, Z., & Yang, H. (2015). Effect of lifestyle intervention in patients with type 2 diabetes: A meta-analysis. *Metabolism*, 64(2), 338-347. doi:10.1016/j.metabol.2014.10.018

- Commission on Dietetic Registration. (2013). *Number of registered dietitians by state*. Retrieved from <https://www.cdrnet.org/certifications/number-of-registered-dietitians-by-state>
- Confidence. (n.d.). In Merriam-Webster website. Retrieved from <http://www.merriam-webster.com/dictionary/confidence>
- Contento, I.R. (2016). *Nutrition education: Linking theory, research, and practice*. Burlington, MA: Jones & Bartlett Learning.
- Dall, T.M., Storm, M.V., Semilla, A.P., Wintfeld, N., O'Grady, M., & Narayan, V. (2015). Value of lifestyle intervention to prevent diabetes and sequelae. *Preventative Medicine, 48*(3), 271-280.
- Davis, L.L. (1992). Instrument review: Getting the most from your panel of experts. *Applied Nursing Research, 5*, 194-197.
- Delegge, M.H., Alger-Mayer, S., Van Way, C.W., & Gramlich, L. (2010). Specialty residency training in medical nutrition education: History and proposal for improvement. *Journal of Parenteral and Enteral Nutrition, 34*, 47S-56S.
- DiMaria-Ghalili, A., Mirtallo, J.M., Tobin, B.W., Hark, L., Van Horn, L., & Palmer, C.A. (2014). Challenges and opportunities for nutrition education and training in the health care professions: Intraprofessional and interprofessional call to action. *American Journal of Clinical Nutrition, 99*, 1184S-1193S.
- Doll, R., & Peto, R. (1981). The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute, 66*(6), 1191-1308.
- Eisenberg, D.M., & Burgess, J.D. (2015). Nutrition education in an era of global obesity and diabetes: Thinking outside the box. *Academic Medicine, 90*, 854-860.
- Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M., Corella, D., Arós, F....Martinez-González, M.A. (2013). Primary prevention of cardiovascular disease with a Mediterranean diet. *The New England Journal of Medicine, 368*(14), 1279-1290.
- Ettienne-Gittens, R., Lisako, E., McKyer, J., Goodson, P., Guidry, J., & Outley, C. (2012). What about health educators? Nutrition education for allied health professionals. *American Journal of Health Education, 43*(5), 288-309.
- Fahlman, M., McCaughtry, N., Martin, J., & Shen, B. (2011). Efficacy, intent to teach, and implementation of nutrition education increases after training for health educators. *American Journal of Health Education, 42*(3), 181-190.
- Fitz, P.A. (1997). Nutrition education of health care professionals and paraprofessionals. *Topics in Clinical Nutrition, 12*(3), 1-3.

- Freedman, D.S., Mei, Z., Srinivasan, S.R., Berenson, G.S., & Dietz, W.H. (2007). Cardiovascular risk factors and the excess adiposity among overweight children and adolescents: The Bogalusa Heart Study. *The Journal of Pediatrics*, 150(1), 12-17.
- Friedman, G., Kushner, R., Alger-Mayer, S., Bistran, B., Gramlich, L., & Marik, P.E. (2010). Proposal for medical school nutrition education: Topics and recommendations. *American Journal of Health Education*, 34, 40S-60S.
- Fung, T., Rexrode, K., Mantzoros, C., Manson, J., Willett, W., & Hu, F. (2009). Mediterranean diet and incidence of and mortality from coronary heart disease and stroke in women. *Circulation*, 119, 1093-1100.
- Gillies, C.L., Abrams, K.R, Lambert, P.C., Cooper, N.J., Sutton, A.J., Hsu, R.T., & Khunti, K. (2007). Pharmacological and lifestyle interventions to prevent or delay type 2 diabetes in people with impaired glucose tolerance: Systematic review and meta-analysis. *British Medical Journal*, 334(299). doi: <http://doi.org/10.1136/bmj.39063.689375.55>
- Grotto, D., & Zied, E. (2010). The Standard American Diet and its relationship to the health status of Americans. *Nutrition in Clinical Practice*, 25(6), 603-612.
- Heidenreich, P.A., Trogon, J.G., Khavjou, O.A., Butler, J., Dracup, K., Ezekowitz, M.D...Woo, J. (2011). Forecasting the future of cardiovascular disease in the United States: A policy statement from the American Heart Association. *Circulation*, 123, 933-944. doi:10.1161/CIR.0B013e31820a55f5
- Hummel, S.L., Seymour, E.M., Brook, R.D., Sheth, S.S., Ghosh, E., Zhu, S...Kolias, T.J. (2013). Low-sodium DASH diet improves diastolic function and ventricular-arterial coupling in hypertensive heart failure with preserved ejection fraction. *Circulation: Heart Failure*, 6, 1165-1171. doi:10.1161/CIRCHEARTFAILURE.113.000481
- Ilmonen, J., Isolauri, E., & Laitinen, K. (2012). Nutrition education and counseling practices in mother and child health clinics: Study amongst nurses. *Journal of Clinical Nursing*, 21, 2985-2994.
- Johns Hopkins Medicine. (n.d.). *Cardiovascular disease statistics*. Retrieved from [http://www.hopkinsmedicine.org/healthlibrary/conditions/cardiovascular\\_diseases/cardiovascular\\_disease\\_statistics\\_85,P00243/](http://www.hopkinsmedicine.org/healthlibrary/conditions/cardiovascular_diseases/cardiovascular_disease_statistics_85,P00243/)
- Kaiser Family Foundation. (2016, April). *Total number of professionally active nurses*. Retrieved from <http://kff.org/other/state-indicator/total-registered-nurses/>
- Kris-Etherton, P.M., Akabas, S., Bales, C.W., Bistran, B., Braun, L., Edwards, M.S...Van Horn, L. (2014). The need to advance nutrition education in the training of health care professionals and recommended research to evaluate implementation and effectiveness. *American Journal of Clinical Nutrition*, 99, 1153S-1166S.

- Lynn, M.R. (1986). Determination and quantification of content validity. *Nursing Research*, 35, 382-385.
- Maher, S., Lopez, P., McKee, M.D., Deen, D., Fornari, A., Fletcher, J., & Blank, A. (2010). Evaluation of health educator consults in primary care. *Health Education*, 110(3), 209-224.
- Mayo Clinic. (2016, May 3). *Mediterranean diet: A heart-healthy eating plan*. Retrieved from <http://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/mediterranean-diet/art-20047801>
- National Cancer Institute. (2015, May 20). *Usual dietary intakes: Food intakes, U.S. population, 2007-10*. Retrieved from <http://epi.grants.cancer.gov/diet/usualintakes/pop/2007-10/>
- National Institutes of Health. (2003, May). *Your guide to lowering blood pressure*. Retrieved from [https://www.nhlbi.nih.gov/files/docs/public/heart/hbp\\_low.pdf](https://www.nhlbi.nih.gov/files/docs/public/heart/hbp_low.pdf)
- Nutrition. (2016). In Cambridge Academic Content Dictionary. Retrieved from <http://dictionary.cambridge.org/us/dictionary/english/nutrition>
- Miller, L.M., & Cassady, D.L. (2015). The effects of nutrition knowledge on food label use: A review of the literature. *Appetite*, 92, 207-216.
- Mowe, M., Bosaeus, I., Rasmussen, H.H., Kondrup, J., Unosson, M., Rothenberg, E., & Irtun, O. (2008). Insufficient nutritional knowledge among health care workers? *Clinical Nutrition*, 27, 196-202.
- Ogden, C.L., Carroll, M.D., Kit, B.K., & Flegal, K.M. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *Journal of the American Medical Association*, 307, 483-90.
- 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). doi:10.1001/jama.2014.732
- Oldewage-Theron, W.H., & Egal, A. (2012). Impact of nutrition education on nutrition knowledge of public school educators in South Africa: A pilot study. *Journal of Interdisciplinary Health Sciences*, 17(1). doi:10.4102/hsag.v17i1.602
- O'Rourke, T., & Iammarino, N. (2012). Health educators and nutrition education. *American Journal of Health Education*, 43(5), 313-316.
- Parker, W., Steyn, N.P., Levitt, N.S., & Lombard, C.J. (2011). They think they know but do they? Misalignment of perceptions of lifestyle modification knowledge among health professionals. *Public Health Nutrition*, 14(8), 1429-1438.

- Polit, D.F., & Beck, C.T. (2006). The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, 29, 489-497.
- Roger, V.L., Go, A.S., Lloyd-Jones, D.M, Benjamin, E.J., Berry, J.D., Borden, W.B....Turner, M.B. (2012). Heart disease and stroke statistics—2012 update: A report from the American Heart Association. *Circulation*, 125, e2-e220.
- Salehi-Abargouei, A., Maghsoudi, Z., Shirani, F., & Azadbakht, L. (2013). Effects of dietary approaches to stop hypertension (DASH)-style diet on fatal or nonfatal cardiovascular disease—incidence: A systematic review and meta-analysis on observational prospective studies. *Nutrition*, 29(4), 611-618. doi:10.1016/j.nut.2012.12.018
- Shirani, F., Salehi-Abargouei, A., & Azadbakht, L. (2013). Effects of Dietary Approaches to Stop Hypertension (DASH) diet on some risk for developing type 2 diabetes: A systematic review and meta-analysis on controlled clinical trials. *Nutrition*, 29(7-8), 939-947.
- Slawson, D.L., Fitzgerald, N., & Morgan, K.T. (2013). Position of the Academy of Nutrition and Dietetics: The role of nutrition in health promotion and chronic disease prevention. *Journal of the Academy of Nutrition and Dietetics*, 113(7), 972-979.
- Sunguya, B.F., Poudel, K.C., Mlunde, L.B., Urassa, D.P., Yasuoka, J., & Jimba, (2013). Nutrition training improves health workers' nutrition knowledge and competence to manage child undernutrition: A systematic review. *Frontiers in Public Health*, 1, 1-21. doi:10.3389/fpubh.2013.00037
- Tektonidis, T.G., Akesson, A., Gigante, B., Wolk, A., & Larsson, S.C. (2015). A Mediterranean diet and risk of myocardial infarction, heart failure and stroke: A population-based cohort study. *Atherosclerosis*, 243(1), 93-98. doi:10.1016/j.atherosclerosis.2015.08.039
- Tuma, P.A. (2012). An overview of the intentions of health care reform. *Journal of the Academy of Nutrition and Dietetics*, 112(3), S56-S63.
- Turner, L.W., Knol, L., & Meyer, M.K. (2012). A reaction to: What about health educators? Nutrition education for allied health professionals. *American Journal of Health Education*, 43(5), 317-319.
- U.S. Census Bureau. (2016). *QuickFacts United States*. Retrieved from <https://www.census.gov/quickfacts/table/PST045216/00>
- Wall-Bassett, E.D., Gantt, L., Fang, X., Harris, N.G., Hopkins, J., Donnelly, S....Titre, M. (2012). Evaluating knowledge and self-efficacy among Caribbean healthcare workers through a community engagement nutrition education program. *Journal of Community Nutrition & Health*, 1(2), 52-59.

- Wang, Y.C., McPherson, K., Marsh, T., Gortmaker, S.L., & Brown, M. (2011). Health and economic burden of the projected obesity trends in the USA and the UK. *The Lancet*, 378(9793), 815-825.
- Ward, B.W., Schiller, J.S., & Goodman, R.A. (2014). Multiple chronic conditions among US adults: A 2012 update. *Preventing Chronic Disease*, 11. doi: <http://dx.doi.org/10.5888/pcd11.130389>
- Willett, W.C., & Stampfer, M.J. (2013). Current evidence on healthy eating. *Annual Review of Public Health*, 34, 77-95. doi:10.1146/annurev-publhealth-031811-124646.Epub2013Jan 7
- World Health Organization. (2016a). *Cancer prevention*. Retrieved from <http://www.who.int/cancer/prevention/en/>
- World Health Organization. (2016b, June). *Cardiovascular diseases*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs317/en/>
- World Health Organization. (2016c). *Noncommunicable diseases*. Retrieved from [http://www.who.int/topics/noncommunicable\\_diseases/en/](http://www.who.int/topics/noncommunicable_diseases/en/)
- Yalcin, N., Cihan, A., Gundogdu, H., & Ocakci, A. (2013). Nutrition knowledge level of nurses. *Health Science Journal*, 7(1), 99-108.