NUTRITION EDUCATION FOR OLDER ADULTS IN CONGREGATE AND HOME-DELIVERED MEAL SITES: WHAT IS TAUGHT, WHAT DO WE KNOW, AND WHERE DO WE GO?

by

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ABSTRACT

NUTRITION EDUCATION FOR OLDER ADULTS IN CONGREGATE AND HOME-DELIVERED MEAL SITES: WHAT IS TAUGHT, WHAT DO WE KNOW, AND WHERE DO WE GO?

Christina Riccardo

It is expected that by 2030, nearly 21% of the population will consist of older adults, aged 65 years and older. Those who reach 65 have an average life expectancy of an additional 19 years. Adequate nutrition is essential to health and quality of life, especially for older adults. Congregate and home-delivered meal programs are an ideal setting in which to provide nutrition education for older adults that can lead to increases in successful aging.

This cross-sectional study involved development and distribution of a novel survey for nutrition educators working with congregate and home-delivered meal programs. The purpose of this study was to describe the type and frequency of nutrition education provided by nutrition educators at congregate and home-delivered meal sites, whether lessons are behaviorally focused and theory-based, and which educator factors influence theory-based, behaviorally focused nutrition education score. The researcher
also sought to examine if education sessions were being evaluated for effectiveness, if malnutrition was playing a role in nutrition education, whether state policies impact nutrition education, and if differences in nutrition education exist between dietetic and non-dietetic health professionals.

Dietetic professionals (n = 122) are conducting more theory-based, behaviorally focused nutrition education (TB-BF-NE) than non-dietetic professionals (n = 139) (p < 0.001). A regression analysis showed that the educator factors predicting TB-BF-NE were number of topics taught, group size, length of session, and conducting evaluation (R^2 = .518, p < 0.001). State policies on dietetic oversight did not appear to have an impact. Educators reported malnutrition was a major issue for older adults but did not feel they had the tools to screen for or address malnutrition. The most common topics for nutrition education were food safety, healthy eating, and diabetes; the most common delivery method was handouts.

Because this is the first study of its kind, further exploration is indicated. Nutrition educators working with congregate and home-delivered meal participants need to be better trained on providing theory-based and behaviorally focused nutrition education, conducting evaluations, and finding materials and evidence-based lessons for older adults. Better training can also help educators implement more interactive lessons that will maintain the attention of the older adults they serve.
DEDICATION

This dissertation is dedicated to my parents, in memory of my dad who once upon a time said I lacked “stick-to-it-ness” and for my mom who has always believed in me even when I didn’t believe in myself. This is for you. Xoxo.

I would also like to dedicate this dissertation to my children, Cole, Caylie, and Caden. Always believe in yourself, work hard, and fight for yourself, but don’t forget to have some fun along the way. Never stop dreaming. You are capable of far more than you think. I will always be your number one fan. Xoxo.
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Chapter I
INTRODUCTION

This chapter provides a brief introduction and overview of the older adult population, the congregate and home-delivered meal programs, and curricula and educational frameworks that currently exist for this population. This study sought to understand the practices and needs of those who provide nutrition education to older adults. The following sections describe the background, rationale, purpose, and significance of the study.

1.1 Background: Older Population Statistics

As the “Baby Boom” generation ages and as Americans in general are living longer, the older adult population, defined as those 65 years of age and older, is increasing quickly. In 2014, 46 million people in the United States were older adults, accounting for about 15% of the population (Older Americans, 2016). Because the “Baby Boomers” started turning 65 in 2011, it is expected that by 2030, nearly 21% of the population will consist of older adults (Older Americans, 2016). Adults who reach 65 have an average life expectancy of an additional 19.3 years (Older Americans, 2016). In addition, the older population is also becoming older; those 85 years of age and more are expected to grow from 6 million in 2014 to 20 million by 2060 (Older Americans, 2016).
A 65-year-old is much different than an 85-year-old in terms of health, mobility, and functioning, and as such, the older adult population can be divided into young old (age 65-74), middle old (ages 75-84), and oldest old (age 85+), with each group having its own varying needs. We often think a large proportion of older adults live in institutionalized settings like nursing homes, but in truth, as of 2012, only 3.5% of the 65 and older population lived in such settings (Administration on Aging [AoA], 2016). A vast majority of the rest are community-dwelling.

Adequate nutrition is essential to health and quality of life, especially for older adults. According to the U.S. Department of Health and Human Services (1988). Diet and nutrition contribute to the development of many chronic diseases that affect older adults, such as osteoporosis, cardiovascular disease, diabetes, hypertension, and certain types of cancer (National Research Council [NRC], 1989b). Most older adults have at least one chronic condition and some have quite a few conditions that are often nutrition-related. These conditions can affect the economic growth of our country, increase societal costs, and decrease the quality of life for these individuals. According to the World Health Organization (WHO, 2011), reducing severe disability from disease and health conditions is one of the means by which health and social costs can be held down.

The position of the Academy of Nutrition and Dietetics (2005) is that:

Older Americans receive appropriate care; have broadened access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies across the spectrum of aging. (p.616)

Nutrition is a key factor in successful aging as food is not only essential to physiological well-being but also contributes to social, cultural, and psychological quality of life (Journal of the American Dietetic Association, 2005). A shift is ongoing to not only
emphasize prevention but also to move away from nursing homes and instead move toward home and community-based services, so to that end:

It is also the position of the American Dietetic Association, the American Society for Nutrition Education, and the Society for Nutrition Education that all older adults should have access to food and nutrition programs that ensure the availability of safe, adequate food to promoted nutrition status. Appropriate food and nutrition programs include adequately funded food assistance and meal programs, nutrition education, screening, assessment, counseling, therapy, monitoring, evaluation, and outcomes documentation to ensure more healthful aging. (Kamp et al., 2010, p. 72)

Congregate and home-delivered meal programs are ideal settings in which to provide nutrition education for older adults that can lead to increases in successful aging among some of the population’s most vulnerable older adults. While attention to nutrition and nutrition education in this population has been increasing, overall recognition of the importance of nutrition for healthful aging and the underfunding of programs for older adults are still important issues (Kamp et al., 2010).

1.2 History and Purpose of Congregate and Home-Delivered Meal Programs

The Older Americans Act (OAA) was passed in 1965 due to concerns over the lack of community social services for older adults (AoA, 2016). Among the benefits this legislation provided was the law that established the Administration on Aging, which would administer grant programs and deal with matters concerning older adults (AoA, 2016). The OAA authorizes service programs, including nutrition programs, via 56 state units on aging (SUA), 629 area agencies on aging (AAAs), 244 tribal organizations, and two Native Hawaiian organizations (AoA, 2016). The nutrition programs are authorized under Title IIIC of the OAA and provide access to healthy meals, nutrition education, and nutrition counseling (AoA, 2016). About 5,000 service providers serve 900,000 meals per
day in the United States via funding by the AoA which is part of the Administration for Community Living (ACL) as well as state and local governments, foundations, direct payment for services, fundraising, participant contributions, and other sources (AoA, 2016). In 2014, 80 million meals were served to 1.6 million older adults in the congregate meal program and 138 million meals were served to 836,000 homebound older adults (ACL, 2014). The OAA Reauthorization Act of 2016 reauthorizes programs from 2017 to 2019, including congregate and home-delivered meal programs (AoA, 2016). Among other provisions, it encourages the delivery of evidence-based programs such as chronic disease self-management programs (ACL, 2016).

The purpose of the OAA Nutrition Program, according to the Administration on Community Living (ACL) (2018), is to:

- reduce hunger and food insecurity, promote socialization of older adults, and to promote the health and well-being of older adults and delay adverse health conditions through access to nutrition and other disease prevention and health promotion services. (Retrieved from https://www.acl.gov/programs/health-wellness/nutrition-services)

Meals and nutrition services in congregate settings help keep older adults healthy and can prevent the need for medical interventions. While the term older adult applies to those 65 years of age and older, in order to qualify for congregate meals, one only needs to be 60 years of age or older; spouses of those aged 60 and older are also eligible regardless of age. There are no income guidelines for eligibility. Participants are not charged for meals but are encouraged to contribute towards the meal costs, and no one will be denied a meal because of inability or unwillingness to contribute. As of 2010, 1.7 million older adults participated in the congregate meal program (AoA, 2016).
Congregate nutrition services, Title III C1 of the Older Americans Act (OAA), began in 1972 to provide meals and nutrition services to older adults, in part to help them remain independent in their community. It focuses on those with low incomes, minorities, those in rural communities, those with limited proficiency in English, and those at risk of institutional care (AoA, 2016). As of 2013, 2.4 million older adults received 219 million meals (62% in homes and 38% in congregate meal settings) (ACL, 2013). Congregate meal sites must offer at least one meal per day for 5 or more days of the week, except in rural areas. Meals must be provided in congregate settings, like adult day care facilities and senior centers (AoA, 2016). Each meal must provide at least one-third of the daily Recommended Dietary Allowances (RDAs) and must also follow the Dietary Guidelines for Americans. Along with meals, nutrition services such as nutrition education and screening, shopping assistance, and health promotion activities are provided. Section 339 of the OAA states that meal providers must seek the expertise of a dietitian or individual with equivalent education and training in nutrition to ensure the above requirements are met.

Also, under the OAA is the Home-delivered Nutrition Services program. The purpose of this program is to provide meals and related nutrition services for older adults who are homebound (AoA, 2016). Targeted older adults for this program are the same as listed above for congregate meals and include those with low income, minorities, those in rural communities, those with limited English proficiency, and those at risk of institutional care (AoA, 2016). In addition to the provision of a healthy meal, this program also provides a safety check for homebound older adults and might provide the only face-to-face contact for that person for that day. The nutritional expectations and
requirements for home-delivered meals are the same as those cited above for congregate meals.

1.3 Characteristics of Title III Elderly Nutrition Program (ENP) Participants

According to the AoA (2016), a significant percentage of individuals participating in congregate meals have low incomes, are racial/ethnic minorities, and have one or more chronic health conditions and impairments. More than half of all congregate and home-delivered meal participants are 75 years or older, with an average age of 76 (AoA, 2016). Fourteen percent of congregate meal participants and 26% of home-delivered meal participants are 85 years of age and older (AoA, 2014). The average age of congregate meal participants in 1981 was 73 years, so the increase in average age is a reflection of the general aging of the population and aging in place (AoA, 2014). Interestingly, the average age of home-delivered meal participants has not changed much since 1981 (AoA, 2014).

Congregate meals provide half or more of total food for the day for 58% of participants and 77% reported they eat healthier because of the program (AoA, 2016). Most participants are women, with a 2:1 female-to-male ratio (AoA, 2014). One-third of congregate meal participants and half of home-delivered meal participants are low income and most of the rest are the near-poor. Participants in these meal programs are mostly non-Hispanic Whites, with overall racial and ethnic minorities comprising about 25% of congregate meal and home-delivered meal participants (AoA, 2014). More than half of home-delivered and congregate meal participants live alone, with more home-delivered participants living alone than congregate meal participants (AoA, 2014).
Roughly one-quarter of congregate meal participants and 15% of home-delivered meal participants live in rural areas, which is a target of the Title III-C meal programs (AoA, 2014). While there are many similarities between participants in the two-meal programs, it is important to note that home-delivered meal participants tend to be older, poorer, and less likely to live in rural areas than their congregate meal counterparts (AoA, 2014).

When comparing participants of these two-meal programs to all older people living in the United States, program participants are more likely to be older females who live alone, have low income, and belong to a racial or ethnic minority group (AoA, 2014). This demonstrates that the programs are reaching their targeted participants if the benchmark is the overall older adult population.

In terms of chronic conditions, congregate meal participants self-reported being diagnosed with an average of 2.4 chronic conditions, while home-delivered meal participants reported 3 (AoA, 2014). About 41% of congregate meal participants and 59% of home-delivered meal participants reported having three or more chronic conditions (AoA, 2014). The most common conditions cited were arthritis, hypertension, heart disease, lung or breathing problems, elevated blood cholesterol, and diabetes (AoA, 2014). Eighteen percent of congregate meal participants and 30% of home-delivered meal participants reported they recently involuntarily lost or gained 10 pounds, according to the Nutrition Screening Initiative in 1991 (AoA, 2014). This has been associated with an increased risk of poor nutritional status and health problems (AoA, 2014). Approximately one-third of home-delivered and congregate meal participants have a Body Mass Index (BMI) in the “ideal” range, which is defined as between 22-27; most are either overweight or underweight, which places them at risk for nutrition and health problems.
(AoA, 2014). In fact, 42% of congregate meal participants are estimated to have a BMI over 27, which places them at risk for problems related to obesity and nutritional excess (AoA, 2014). The opposite is true for home-delivered meal participants, in which 32% are estimated to have a BMI less than 22, indicating underweight and risk for health and nutrition-related issues (AoA, 2014). As shown above, home-delivered meal participants are more likely to report being in poor or fair health, have multiple chronic health conditions, be underweight, and have had hospital or nursing home stays in the past year (AoA, 2014). Additionally, home-delivered meal participants are more likely to be functionally impaired, with 65% unable to perform one or more activity of daily living without the help of another person or device (AoA, 2014). Compared to the overall older adult population, however, both groups are less healthy.

A large portion of congregate meal participants who received a meal on a given day go to the meal site frequently. According to the AoA (2016), almost 60% of these participants attended 4 or more days per week, and most reported spending a significant amount of time at the congregate site when they attend, which means greater continuity and more contact time for nutrition educators and participants. Additionally, approximately 85% of enrolled participants have been attending for over 1 year. Ninety percent of participants reported spending more than 1 hour at the site and almost half spend 3 or more hours there, which enables nutrition educators time to implement nutrition programs effectively (AoA, 2014). For home-delivered meal participants, about 65% have been participating for more than 1 year (AoA, 2014).
Approximately 50% of congregate meal participants and almost two-thirds of home-delivered meal participants eat alone when they are home. Most (95%) of congregate meal participants are able to prepare hot meals for themselves, although 22% do not consume three meals a day (AoA, 2016). Only 67% of home-delivered meal participants can prepare hot meals for themselves if they absolutely must, but 30% are fully unable to do so (AoA, 2014). Appetite is often a concern for proper nutrition when it comes to older adults. More than 20% of congregate meal participants and 30% of home-delivered meal participants are on special diets, mostly to help lower cholesterol levels (AoA, 2014). About 30% of meal program participants reported having an illness or condition that has changed eating habits (AoA, 2014). This information would lead one to believe that older adults participating in congregate meals are able to manage more complicated diets at home and might also greatly benefit from nutrition education. Dietary areas that show need for improvement include fruits, vegetables, and dairy products, with 24%, 17%, and 32%, respectively, reporting they do not consume enough (AoA, 2014).

Malnutrition is a major concern for older adults. Approximately 64% of congregate meal participants are assessed to be at moderate to high nutritional risk, as per the Nutrition Screening Initiative (NSI) Checklist. While older adults in the meal programs reported having enough food to eat, 16% of home-delivered meal participants and 10% of congregate meal participants indicated experiencing food insecurity within the past month (AoA, 2014). While this number seems small, it equates to about 236,000
congregate meal participants and about 127,000 home-delivered meal participants (AoA, 2014). Older adults in these meal programs are more likely to experience food insecurity than older adults in the general U.S. population (AoA, 2014).

On average, participants in the Title III-C meal programs have daily nutrient intakes that meet or exceed the RDAs for most nutrients, but a significant number fail to reach the recommendations (AoA, 2014). Via a 24-diet intake analysis, it was determined that intake of total fat, saturated fat as a percent of total calories, and sodium intake are higher than recommendations, while intake of carbohydrates are slightly lower (AoA, 2014). With respect to micronutrients, it was determined that participants in these meal programs meet or exceed RDAs for protein, vitamin A, vitamin C, Vitamin D, thiamin, riboflavin, niacin, folate, B12, iron, phosphorus, and potassium (AoA, 2014). Caloric intake was found to be below recommendations for both congregate meal and home-delivered meal participants, as were vitamin E, vitamin B6, calcium, magnesium, and zinc (AoA, 2014). It is important to note that significant numbers of participants are not meeting 100% of the RDAs. Additionally, the RDAs are meant to meet the needs of most healthy adults and could underestimate the needs for those with multiple chronic health conditions, as seen in these meal program participants (AoA, 2014).

1.5 Nutrition Education Provided at Congregate and Home-Delivered Meal Sites

Almost all (98%) of AAAs have nutrition education services, which is defined as “a program to promote better health by providing nutrition, physical fitness, and nutrition-related health information and instruction in a group or individual setting,” available to participants (Process Evaluation of Older Americans Act, 2015). AAAs that
offer nutrition education do so at about 93% of congregate meal sites. Home-delivered meal nutrition education is a little less straightforward, with 87% of AAAs offering it to all home-delivered meal participants, 9% offering it to segments of home-delivered participant, and 3% not offering nutrition education at all (Process Evaluation of Older Americans Act, 2015). Eighty-nine percent of AAAs provide nutrition screening and 63% have nutrition counseling available (Process Evaluation of Older Americans Act, 2015). With respect to nutrition education, 53% is provided by AAAs, 50% through a contract between an AAA and another organization (such as a service provider), and 8% through grants provided by the AAA to another organization (Process Evaluation of Older Americans Act, 2015).

Each State Unit on Aging (SUA) plays a critical role in the development and execution of nutrition education by specifying how frequently nutrition education should be provided, by influencing the development of the AAA and service provider education plans, and by implementing various policies and guidelines that can impact different areas of the plans (Process Evaluation of Older Americans Act, 2015). AAAs or their service providers are required by 46% of SUAs to offer nutrition education at least quarterly, and 23% require nutrition education semi-annually or annually (Process Evaluation of Older Americans Act, 2015). Surprisingly, 21% of SUAs do not have any policy that specifies how frequently nutrition education must be offered. Table 1.1 shows the breakdown for required frequency of nutrition education.
Table 1.1

*Breakdown for Required Frequency of Nutrition Education*

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td>30%</td>
</tr>
<tr>
<td>Quarterly</td>
<td>16%</td>
</tr>
<tr>
<td>Semiannually</td>
<td>16%</td>
</tr>
<tr>
<td>Annually</td>
<td>7%</td>
</tr>
<tr>
<td>No policy</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: Process Evaluation of Older Americans Act, 2015

Of the State Units on Aging (SUAs) that require Area Agencies on Aging (AAAs) or their service providers to develop a nutrition education plan, 45% provide guidance on its development and 55% monitor the extent to which the plan is being followed (Process Evaluation of Older Americans Act, 2015). Only 18% of SUAs that require a nutrition education plan must actually approve the AAA and service provider plans (Process Evaluation of Older Americans Act, 2015). Only 59% of SUAs have formal policy, guidance, or regulation on the qualifications of those who provide nutrition education (Process Evaluation of Older Americans Act, 2015).

Typically, nutrition education is provided immediately before lunch is served at congregate meal sites because this is when the most participants are present. Lunch is a time for socialization, so nutrition education is usually not provided while participants are eating. Many participants leave the site immediately after lunch, making before lunch an ideal time to provide nutrition education. Nutrition education for home-delivered meals is often provided in written format on the back of the menu along with the meal and is delivered to a participant by a volunteer. Telephone counseling and/or in-person nutrition education is not provided to home-delivered meal participants on a regular basis.
1.6 Rationale of Study

An unpublished thesis by Bojrab (2013) sought to identify the type and amount of nutrition education provided to Title III-C recipients of congregate and home-delivered meals in six states in the midwestern United States via survey. About 4% of respondents said that nutrition education was not available for congregate or home-delivered meal participants. Approximately 75% of participants said that nutrition education was available quarterly, monthly, or more than monthly. Each state has different requirements for how often nutrition education is to be carried out, from as needed to twice per month. Most states were meeting state requirements, according to the survey. Bojrab also examined which methods were being used to present nutrition education and found that the most commonly used method at congregate meal sites was printed material (83%), followed by lectures (63%), visual displays (40%), cooking classes (36%), workshops (13%), and trips to the grocery store (6%). The most commonly used methods for home-delivered nutrition education was printed material (96%), phone education (3%), supermarket trips (3%), and workshops (3%). This study did not examine what the printed materials being used were or if any of the education methods used included behavioral theory or other components from the framework for nutrition education for older adults, designed by Sahyoun, Pratt, and Anderson (2004) (described below). This framework outlines components of nutrition education that are deemed most successful when providing education to older adults. Bojrab did not define the population she was surveying nor did she report on any demographics which would enable one to learn more about who was providing what types of nutrition education. It also did not appear that she inquired about whether evaluations of nutrition education were being done to determine
their effectiveness. To the present researcher’s knowledge, this dissertation is the first of its kind to not only gather information on the amount and type of nutrition education being provided to congregate and home-delivered meal participants, but also ascertain where nutrition educators are obtaining their nutrition education information and materials, as well as if the nutrition education is theory-based and behaviorally focused and follows the framework for designing nutrition education for older adults; whether evaluations of nutrition education efforts are being conducted; if/what resources might be needed to improve nutrition education efforts, and if/what resources might be needed to improve nutrition education overall as well as for identifying and addressing malnutrition. Additionally, while Bojrab (2013) conducted a survey involving only six states, the survey conducted for this present dissertation was a nationwide survey. The collection of these data will help determine how to improve nutrition education efforts among this nutritionally vulnerable population.

1.7 Framework for Designing Nutrition Education Interventions for Older Adults

Most nutrition prevention and education programs have traditionally focused on young adults and children to decrease the risk of chronic disease. Due to demographic changes, the fact that people are now living longer, and the increase in medical expenses that result from chronic disease in the older adult population, researchers have begun focusing more on the older adult population. Sahyoun et al. (2004) performed a literature review to examine the effectiveness of published nutrition education interventions targeting older adults between January 1990 and April 2003; as a result, they were able to
develop a framework based on the social-ecological model for designing effective nutrition education interventions for older adults. This framework (see Figure 1.1) indicates that interventions should not only focus on the individual level, but also incorporate the social and environmental levels as well for increased effectiveness. Community-based programs that can increase socialization for those who might be living alone are beneficial, as are programs that improve accessibility and affordability to healthy foods. Additionally, community-based programs with multiple sessions that can provide reinforcement include small groups, hands-on activities, and incentives; targeted, simple, and practical messages are highly desired. Because of the wide range of age groups in the older population, nutrition education interventions should be tailored to different age groups, demographics, education levels, socioeconomic status, functional levels, and disease states. While it might be more difficult to incorporate each component of the framework for home-based individuals, the inclusion of as many as possible might help improve nutrition education outcomes. Dietitians and other nutrition educators can play a large role in the development and implementation of nutrition education interventions. Appropriate nutrition interventions can help improve healthcare costs by focusing on prevention and better control of existing health conditions, but existing curricula and materials for nutrition educators working with older adults are limited.
1.8 Purpose of Study

The purpose of this study was to describe the type and frequency of nutrition education provided by dietetics and non-dietetics health professionals at congregate and home-delivered meal sites and whether lessons are behaviorally focused and based on theory. More specifically, are educators are conducting theory-based, behaviorally focused nutrition education (Contento, 2007, 2015) and using the proposed framework by Sahyoun et al. (2004) when developing or delivering nutrition education lessons? Ultimately, this study sought to uncover what types of materials and resources nutrition educators of this older adult population need to provide more effective lessons and programs.
1.9 Research Questions

RQ1: What is the state of nutrition education for older adults?

RQ1a: What topics do educators feel are important?

RQ1b: What criteria do educators use to choose materials?

RQ1c: What materials are being used to deliver nutrition education and how satisfied are educators with these materials?

RQ1d: How are educators delivering nutrition topics?

RQ1e: What do educators see as the barriers and facilitators to conducting education with older adults?

RQ1f: What are educators’ interest in and available funding for evidence-based programs?

RQ1g: What are state policies for nutrition education for congregate and home-delivered meal sites?

RQ2: Is nutrition education at congregate and home-delivered meal sites being conducted in a way that is theory-based and behaviorally focused?

RQ2a: How do dietetic professionals differ from non-dietetic professionals in their degree of conducting theory-based and behaviorally focused nutrition education?

RQ2b: How do dietetic professionals from states with a policy that requires nutrition professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition education from dietetic professional from states without such a policy?
RQ2c: How do non-dietetic professionals from states with a policy that requires nutrition professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition education from non-dietetic professional from states without such a policy?

RQ2d: What educator factors influence theory-based, behaviorally focused nutrition education score?

RQ3: Is nutrition education at congregate and home-delivered meal sites being evaluated for effectiveness?

RQ3a: How do dietetic professionals differ from non-dietetic professionals with respect to evaluation efforts?

RQ4: Is malnutrition of older adults playing a role in nutrition education at congregate and home-delivered meal sites?

RQ4a: How much is malnutrition being perceived as a problem by nutrition educators and does this differ between dietetic and non-dietetic professionals?

RQ4b: Do educators feel they have the tools to assess and screen for malnutrition and how does this differ between dietetic and non-dietetic professionals?

RQ4c: How much is malnutrition being addressed in nutrition education sessions and does this differ between dietetic and non-dietetic professionals?
1.10 Significance

Currently, there is little understanding of nutrition education at congregate and home-delivered meal sites. Also, there is no standard curriculum and only a limited number of evidence-based lessons exist for nutrition education at congregate and home-delivered meal sites, yet these programs offer an important opportunity to provide effective nutrition education to older adults to keep them independent and in the community for as long as possible, to help control and prevent nutrition-related chronic diseases, and ultimately to help control healthcare costs.

1.11 Scope and Delimitations

This study involved a nationwide survey of nutrition educators who develop, oversee, or provide nutrition education to older adults at congregate or home-delivered meal sites. Despite efforts to have every state represented in the survey, some states are without representation. Because each state can determine how to utilize funds for congregate and home-delivered meal nutrition education, no one list of nutrition educators for this population exists. Survey invitations went out to listservs, administrators, state nutritionists, and others, with the hope that the invitation would be forwarded along to the appropriate people for increased participation.

1.12 Definition of Terms

Administration for Community Living (ACL): The organization that brings together the efforts of the AoA, Administration on Intellectual and Developmental Disabilities, and the Health and Human Services Offices on Disability to serve as the
federal agency responsible for increasing access to community supports while focusing on older adults and those with disabilities (ACL, 2015).

*Administration on Aging (AoA):* The main agency of the U.S. Department of Health and Human Services (HHS) designated to carry out provisions of the Older Americans Act (OAA) of 1965 (AoA, 2015).

*Area Agency on Aging (AAA):* Created under the Older Americans Act (OAA), a network of state and local programs that help older adults plan and care for their needs; provides social services and nutrition services for older adults with the goal of keeping them living independently.

*Congregate Meal Nutrition Service Program:* Section of the OAA that authorizes meals and related nutrition services in congregate settings (AoA, 2016).

*Home-Delivered Nutrition Service Program:* Section of the OAA that authorizes meals and related nutrition services for older adults who are homebound (AoA, 2016).

*Older Americans Act (OAA):* Promotes the well-being of older adults by providing services and programs designed to help them live independently in their homes and communities (AoA, 2015).

*State Unit on Aging (SUA):* Agencies at the state level responsible for developing and managing the state plan that advocates and provides assistance to older adults.

*Title III-C: Part of the OAA:* Contains two parts: congregate services and home-delivered meal services; meals are the main service, but other services include nutrition screening, education, counseling, and outreach.
Chapter II
LITERATURE REVIEW

2.1 A Closer Look at the Growing Older Adult Population

In 2014, 46.2 million people were 65 years of age and older, which is an increase of 28% or 10 million in the past decade (Profile of Older Americans, 2015). This number is expected to increase to 98 million by 2060 (Profile of Older Americans, 2015). About 14% of the population, or about one in seven, is an older American (Profile of Older Americans, 2015). In addition, those who reach 65 years of age have an average life expectancy of another 19.3 years (Profile of Older Americans, 2015). The oldest old population, those 85 years of age and older, are expected to increase from 6 million in 2014 to almost 15 million in 2040 (Profile of Older Americans, 2015). We know that women have a longer life expectancy than men, and the statistics have demonstrated this, with 25.9 million older women compared to 20.4 million older men (Profile of Older Americans, 2015). During the 1900s, growth slowed due to a smaller number of babies born during the Great Depression, but as the “Baby Boom” generation begins to turn 65, growth is climbing.

In 2014, 22% of those 65 and older were of racial or ethnic minorities (Profile of Older Americans, 2015). This is expected to continue to increase to 28.5% by 2030 (Profile of Older Americans, 2015). According to the State of Aging and Health in
America 2013 report by the Centers for Disease Prevention and Control (CDC), by 2030, older non-Hispanic Whites will make up 71% of the older adult population; Hispanics will make up 12%; non-Hispanic Blacks, 10%; and Asians, 5%. Thus, the tailoring of community nutrition education efforts to various cultural backgrounds is paramount with respect to increasing effectiveness.

Contrary to popular belief, only a small number of older adults live in institutional settings. In 2015, about 3% of the 65+ population lived in institutional setting such as nursing homes (Profile for Older Americans, 2015). The percentage of institutionalized older adults, however, does increase with age, with 10% of those who are 85 years of age and older living in nursing homes (Profile of Older Americans, 2015). This means that the majority of older adults are living in the community. In 2015, more than half of non-institutionalized older adults lived with their spouse and almost 30% lived alone (Profile of Older Americans, 2015). This situation, of course, decreases with age, especially for women. Figures estimate that about 70% of older men and 45% of older women lived with their spouse, but this decreases to about 32% of women aged 75 and older (Profile of Older Americans, 2015). Almost half of all women 75 years of age and older live alone (Profile of Older Americans, 2015). Because so many older adults are living on their own, programs and services directed toward this population are warranted and should be closely examined for maximum effectiveness.

Certain states have had a much greater growth in the older adult population than others. For example, in 2014, over half (61%) of those 65+ lived in California, Florida, New York, Texas, Pennsylvania, Ohio, Illinois, Michigan, and North Carolina (Profile of Older Americans, 2015). In 2014, 81% of older adults lived in metropolitan areas with
about 25% living in the actual principal cities (Profile of Older Americans, 2015), thereby increasing their access to the various programs available to them versus those who live in rural areas.

As older adults transition to fixed incomes, some experience poverty. In 2014, about 4.5 million (10%) of those 65 years of age and older were below the poverty level, and 2.4 million or about 5% were considered near-poor (defined as income levels between poverty and 125% of that level) (Profile of Older Americans, 2015). Minorities such as African Americans, Asians, and Hispanics were more likely to be poor, compared to their White counterparts, while those who lived inside principal cities and in the South were also more likely to be poor (Profile of Older Americans, 2015). Older women have been shown to have higher poverty rates than older men, and those living alone are more likely to be poor than those who live with families, with the highest rates of poverty experienced by older Hispanic women who lived alone (35%) (Profile of Older Americans, 2015). Title III-C nutrition programs are geared toward low-income older adults, and this population would benefit from participating in such programs as the home-delivered meal and congregate meal programs.

The education level of this population has also been increasing. Between 1970 and 2015, the percentage of older adults who held high school diplomas increased from 28% to 84% (Profile of Older Americans, 2015). These percentages do vary among racial and ethnic groups, with Whites having the highest completion rates, followed by Asians, African Americans, Native Indian/Alaska Natives, and Hispanics at the tail end—with just a 54% completion rate (Profile of Older Americans, 2015). In 2015, more than 25% held bachelor’s degrees or higher (Profile of Older Americans, 2015). Much of the
previous nutrition education efforts aimed at the older adult population assumed lower education and literacy levels, and some questioned the ability of those with lower educational levels to learn new dietary habits. While largely disproved, current and future nutrition education efforts might be more effective if properly geared toward specific education and literacy levels.

### 2.2 Major Health Issues for the Older Adult Population

Almost half of noninstitutionalized older adults aged 65 and older rated their health as excellent or very good between 2012 and 2014 (Profile of Older Americans, 2015). It is known that self-reported health status can be an indicator of an individual’s perceived quality of life (Position paper of the American Dietetic Association, 2005). While there was not much difference between males and females, African Americans, American Indians/Alaska Natives, Asians, and Hispanics were less likely than Whites to rate their health as excellent or very good (Profile of Older Americans, 2015). Among older adults who typically have at least one chronic health condition, the health conditions occurring most frequently from 2012-2014 were: arthritis (49%), heart disease (30%), cancer (24%), diabetes (21% in 2009-2012), and hypertension (71% in 2009-2012) (Profile of Older Americans, 2015). According to the Older Americans Key Indicators of Well-Being (2016), in 2014, the leading cause of death in those aged 65 years of age and older was heart disease, followed by cancer, chronic lower respiratory diseases, stroke, Alzheimer’s, diabetes, unintentional injuries, and flu and pneumonia. Between 1999 and 2014, age-adjusted death rates for all causes of death in this age group decreased by 20% (Older Americans Key Indicators of Well-Being, 2016). Diabetes was
a more frequent cause of death among non-Hispanic Blacks and Hispanics in 2014 than it
was for non-Hispanic Whites, while rates of death for heart disease and stroke were
higher in non-Hispanic Blacks than among non-Hispanic Whites and Hispanics (Older
Americans Key Indicators of Well-Being, 2016). Many of these chronic conditions, such
as heart disease, hypertension, stroke, diabetes, and some cancers, are related to
nutritional status, and nutrition education efforts should be directed toward the prevention
and management of these diseases in this population. Additionally, overweight and
obesity can play a role in arthritis and respiratory diseases, with weight loss helping to
alleviate some of the symptoms. The rates of overweight and obesity have increased
throughout the years, with about 35% of older adults having obesity in 2011-2014
compared to just 22% in 1988-1994 (Older Americans Key Indicators of Well-Being,
2016). Therefore, nutrition education efforts to address weight status are also appropriate.

Based on evaluation by the Healthy Eating Index (HEI), which assesses 12
components of the diet (9 adequacy and 3 moderation), older adults are meeting the
dietary recommendations for whole fruits and total protein foods, but are falling short on
whole grains, vegetables and legumes, and low-fat or fat-free dairy products (Older
Americans Key Indicators of Well-Being, 2016). Additionally, with respect to dietary
moderation components, it has been found that this population needs to consume food
and drinks that are lower in sodium and have smaller amounts of solid fats and added
sugars (Older Americans Key Indicators of Well-Being, 2016). Various nutrition
intervention studies, reviewed in this chapter, have focused on increasing fruit and
vegetable intake in this population and have not had the effect intended by the
investigators in part because the population was already consuming adequate amounts
of fruit. Thus, nutrition education that focuses on fruit intake might not be a good use of time and resources; rather, nutrition education should instead focus on vegetables, whole grains, and dairy as well as overall healthy eating to prevent or manage the chronic health conditions noted above, including overweight and obesity.

2.2.1 Malnutrition

Maintaining adequate nutrition has major implications for the older adult population by helping to delay and decrease the risk of disease and by helping to maintain functional independence which allows for continued independent living (Leslie & Hankey, 2015). Malnutrition is defined in multiple ways, but is generally related to a diet that is excessive, imbalanced, or lacks essential nutrients, and/or is related to impaired absorption and utilization of nutrients due to some underlying clinical condition (Defeat Malnutrition Today Coalition, 2017). Malnutrition, especially low protein-energy malnutrition, is a major concern for older adults in the United States, as it is linked to increased falls, hospital admissions and readmissions, chronic disease, co-morbid health conditions, and even psychological stress (Defeat Malnutrition Today Coalition, 2015).

The etiology of malnutrition is complicated and multifactorial, and can be related to any of the following risk factors: dementia, dysgeusia (lack of taste), dysphagia, diarrhea, depression, disease, poor dentition, and medications (Eddington, Boorman, & Durrant, 2000). It is estimated that about 44% of congregate meal participants and 62% of home-delivered meal participants take over five medications daily, with more than 250 medications known to impact smell or taste (Kowlessar et al; 2015; Seiberling et al., 2004). Additionally, cardiac disease, renal impairment, and cancer can contribute to inflammation which can lead to a loss of muscle mass (Jensen, 2006). Overly restrictive
diets or diets that might not be necessary might not be palatable or easy to follow, which could lead to decreases in nutritional intake and eventually malnutrition (Zeanandin et al., 2012). Advanced aging alone is a risk factor for this debilitating disease (Profiles of an Aging Society, 2015). Inability to cook or shop for oneself due to decreased functional or financial status can impact nutritional intake, as can loss of spouse or having to eat alone. Almost 15% of older adults are at risk for food insecurity, which equates to about 9.8 million older adults (Ziliak & Gundersen, 2017). Older adults most at risk for food insecurity are those living in the south and southwest parts of the country, those who are of racial or ethnic minorities, those with lower income, and those who are younger (60-69 years) (Ziliak & Gundersen, 2017). On the other side, it is important to note that while older adults might gain weight and body fat with age, a decline in food intake—particularly of high-protein foods—makes older adults more vulnerable to malnutrition (Profiles of an Aging Society, 2015).

Malnutrition is not only detrimental to the health and well-being of older adults, but it also has serious financial implications. Because no national prevalence rates for malnutrition across healthcare settings in older adults exist, much of what is known about the prevalence of malnutrition comes from research studies that have variations in methodology. It is thought that about one in three patients is malnourished when admitted to the hospital and that another one-third experience a deterioration of nutritional status while hospitalized (Defeat Malnutrition Today Coalition, 2017). This increases the cost of care by up to 300% (Nutrition = Solutions to Healthy Aging and Long-Term Services and Supports, 2015). Estimates are that the annual burden of disease associated malnutrition in U.S. older adults is about $51.3 billion (Profiles of an Aging Society,
In 2010, almost 39% of hospital discharges and almost 45% of days of hospital care were older adults (CDC, 2012). Approximately 17% of congregate meal participants and 38% of home-delivered meal participants were hospitalized in 2015, thereby making Title III-C participants an important population to target when it comes to risk for malnutrition (Kowlesar et al., 2015). With the expected growth of this population, it is also expected that costs related to malnutrition will increase.

Various malnutrition screening and assessment tools as well as interventions do exist, but they are not consistently or always appropriately applied. Limitations do exist within the clinical setting with respect to practitioners being able to identify accurately and describe the degree of malnutrition in older adults (Defeat Malnutrition Today Coalition, 2017). This is because the screening and assessment tools currently available are not routinely used and are not always validated and reliable in different care settings (Defeat Malnutrition Today Coalition, 2017). Additionally, while malnutrition screening is required by The Joint Commission to be performed upon hospital admission, it is not routinely performed at discharge. Additionally, there is no directive for use of a standardized tool, so even if a patient is malnourished, he/she might not be appropriately coded in the medical record (Corkins et al., 2014). In fact, while between 20% to 50% of older adults are at risk for malnutrition upon hospital admission, only 7% are diagnosed (Advancing Policies for Quality Malnutrition Care in Older Adults, 2017). The Malnutrition Quality Collaborative (2017) has indicated that across the healthcare institution and community spectrum, they recommend the community:

promote Standardization of a validated national community nutritional screening tool, such as the Malnutrition Screening Tool (MST), the Malnutrition Universal Screening Tool (MUST), the Mini Nutrition Assessment (MNA) or the Short Nutrition Assessment Questionnaire (SNAQ). (National Blueprint, p.41)
Each of the screening tools mentioned is survey-based and asks older adults whether they have experienced unintentional weight loss; moreover, each tool assesses current BMI. The MST, MNA, and SNAQ tools each ask if the older adult has experienced a decreased appetite, and the MUST asks if the individual is acutely ill and if no nutritional intake is likely to occur or has occurred for more than 5 days. The MNA and SNAQ tools also ask individuals about mobility, with the SNAQ tool specifically asking if the older adult can walk up 15 steps without resting. The MNA tool appears to be the most comprehensive of the four tools mentioned because it also asks whether the individual has experienced psychological stress or acute disease which would impact food intake and whether any neuropsychiatric conditions like dementia or depression are present.

Diagnosis of malnutrition or risk for malnutrition might not be included on discharge summaries, which decreases the likelihood of continued services or support for the older adult upon re-entry to independent living. Potential effective malnutrition interventions that are not consistently or appropriately applied include: identifying and treating any underlying disease or other cause, referring to a registered dietitian for an assessment and care plan, connecting older adults with social and community supports such as congregate meal or home-delivered meal programs, and/or using oral nutrition supplements (Defeat Malnutrition Today Coalition, 2017). In 2015, the Gerontological Society of America’s National Academy on an Aging Society commissioned a national study about older adult malnutrition with 1,035 non-paid family caregivers of an older adult as well as self-identified adults. Results found that only 17% of survey participants’ healthcare providers had offered any specific diet or nutrition information during the past
year (Profiles of an Aging Society, 2015). Less than 10% of participants said they received referrals to a dietitian or diabetes educator, the supplemental nutrition assistance program (SNAP), or the home-delivered or congregate meal programs (Profiles of an Aging Society, 2015). This indicates how important it is to incorporate regular malnutrition screening and intervention skills into healthcare professionals’ training and education as well as their practice (Profiles of an Aging Society, 2015).

Currently, malnutrition is not a key health indicator for older adults, despite evidence to the contrary. In fact, malnutrition care is known by the Centers for Medicare and Medicaid Services (CMS) to be a gap area (National Blueprint, 2017). Malnutrition, however, has not been incorporated into national health objectives and, in fact, has been left off from most prevention and wellness, care transitions, and population health strategies (National Blueprint, 2017). Neither enacted nor proposed legislation has mentioned the term *malnutrition* or increasing malnutrition screening and interventions, although some laws do address the nutritional needs of older adults and could be changed to incorporate malnutrition care (Defeat Malnutrition Today, 2017). Services for older adults are funded and authorized through the Older Americans Act (OAA), but significant cuts have been made to program services because funding has not kept up with the growth of this population (Defeat Malnutrition Today, 2017). Currently, Title III-C of the OAA, which provides funding for home-delivered and congregate meals, does not include any specific or validated procedures for screening and intervening for malnutrition (Defeat Malnutrition Today, 2017). Additionally, while Medicare Part B covers preventive screenings and interventions including medical nutrition therapy (MNT), MNT is currently only available to those with diabetes or kidney disease (Defeat
Malnutrition Today, 2017). Medicare does also include screening and counseling for obesity but not malnutrition (Defeat Malnutrition Today, 2017). With respect to the Affordable Care Act, no initiatives currently tackle the health indicator of malnutrition specifically. Even though nutrition counseling is mentioned, there are no allowances for malnutrition screening or coverage (Defeat Malnutrition Today, 2017).

2.3 Nutrition Programs for Older Adults

In 1965, Congress passed the OAA due to concern that a lack of community social services for older persons existed. According to the AoA, the OAA promotes the well-being of older individuals by providing services and programs designed to help them live independently in their homes and communities (AoA, 2015). The Act also empowers the federal government to distribute funds to the states for supportive services for individuals over the age of 60. The OAA is now considered to be the main means for delivery of nutrition services to older adults. Many programs are authorized by the OAA through a national network of 56 state agencies on aging, 629 area agencies on aging, almost 20,000 service providers, 244 tribal organizations, and two Native Hawaiian organizations (AOA, 2015). Congregate Nutrition Services and Home-Delivered Nutrition Services are two services programs of the OAA.

The Congregate Nutrition Services section of the OAA authorizes meals and nutrition services in congregate settings to help keep older Americans healthy and prevent the need for medical interventions, which would most likely be more costly (AOA, 2015). The purpose of Congregate Nutrition Services, as stated in Section. 300 of the OAA Amendments of 2006, is
to reduce hunger and food insecurity, to promote socialization of older individuals, and to promote the health and well-being of older individuals by assisting such individuals to gain access to nutrition and other disease prevention and health promotion services to delay the onset of adverse health conditions resulting from poor nutritional health or sedentary behavior.

The program serves healthy meals and provides opportunities for socializing as well as information on healthy aging, such as nutrition education. Individuals who are 60 years of age and older can participate in congregate meals, which are intended to target those with low income, minorities, those in rural communities, those with limited English proficiency, and those at risk of institutional care. According to the AoA, recent data from the National Survey of Older Americans Act Participants showed that Congregate Nutrition Programs are successfully targeting its services, as evidenced by: more than half of congregate meal site participants being 75 years of age and older, 58% of participants specifying that one congregate meal provides one-half or more of their total food for the day, 75% saying they eat healthier due to the program, and 76% saying their health has improved as a result of the Congregate Meal Program (AoA, 2015).

Meals must be provided at least 5 days per week, except in rural areas where this might not be possible. At least one hot or other appropriate meal must be provided per day in congregate settings that include adult day care facilities and multigenerational meal sites. Nutrition education, nutrition counseling, and other nutrition services based on the needs of the meal participants must be provided (AoA, 2015).

The Home-Delivered Nutrition Services program of the OAA authorizes meals and nutrition services for homebound older adults. This program is important as it is usually the first in-home services that an older adult receives and is an entrance point for other home-based and community-based services because it serves frail, homebound, or
isolated older adults 60 years of age and older. This program is directed toward those in the greatest social and economic need, with specific focus on: low income, minority individuals, those with limited English proficiency, those at risk for institutional care, and those living in rural communities (AoA, 2015). Recent data from the National Survey of Older Americans Act Participants showed that home-delivered meals are successfully targeting services as evidenced by: 76% of those served by the program being over 75 years of age, more than 60% of participants stating the single home-delivered meal provides one-half or more of their total food for the day, 91% stating that the home-delivered nutrition program helps them stay in their own home, and more than half saying they live alone (AoA, 2015). Like congregate meals, home-delivered meals must be provided at least 5 days a week, except in rural areas where this might not be possible. At least one home-delivered meal is provided per day and this may be hot, cold, frozen, dried, canned, fresh, or supplemental foods. Additionally, nutrition education, nutrition counseling, and other nutrition services must be provided based on the needs of meal participants (AoA, 2015).

All meals served using OAA funding must adhere to the current Dietary Guidelines for Americans, provide at least one-third of the Dietary Reference Intakes (DRI), meet state and local food safety and sanitation requirements, and be appealing to older adults (AoA, 2015). Each state administers its own nutrition programs, so each SUA has the responsibility to implement the nutritional standards that will meet the needs of the older adults they serve. This could be done by determining that menus must use nutrient analysis or meal patterns, or that nutrient standards could focus on prevalent statewide chronic diseases or health issues.
Title III under the OAA authorizes grants to SUAs for delivery of nutrition services for those 60 years of age and older. Each SUA then awards the funds to each of the AAAs. The number of AAAs varies widely by state, with some states having over 50 while others having as few as five. Each state also determines the frequency of nutrition education provided to their older adults in congregate meal settings. This will be covered in more detail in another section.

The Child and Adult Care Food Program (CACFP) is administered through the USDA’s Food and Nutrition Service (FNS) via state grants. CACFP serves nutritious meals and snacks to eligible children and adults who are enrolled at participating child care centers, day care homes, and adult day care centers (USDA, 2017). Any adult day care facilities that provide structured and comprehensive services to community-dwelling adults who are functionally impaired, or aged 60 and older, may participate in CACFP (USDA, 2017). Meals served to these adults are reimbursed based on a participant’s eligibility for free, reduced price, or paid meals. The adult component to the CACFP is directed towards those who continue to live in the community and reside with family members. Those in institutions are not eligible.

The Senior Farmers’ Market Nutrition Program (SFMNP) provides low-income older adults with coupons that can be used for eligible foods at farmers’ markets, roadside stands, and community-supported agriculture programs (CSAs). The purpose of this program is to provide fresh, nutritious, unprepared, locally grown produce to low-income older adults. Fresh, unprepared fruits, vegetables, herbs, and honey may be purchased with SFMNP coupons. Older adults who are 60 years of age and older and who have household incomes of no more than 185% of the federal poverty income
guidelines are eligible for this program. Most but not all states operate a SFMNP. In addition to providing coupons for eligible foods, nutrition education and information are provided to participants by the state agency, with the goal of improving and expanding their diets by adding fresh produce and educating them on how to choose, store, and prepare the fresh fruits and vegetables they purchase with their coupons (USDA, 2015).

2.4 Characteristics of Congregate Meal Site Participants

According to the AoA, a significant percentage of individuals participating in congregate meals have low incomes, are racial/ethnic minorities, and have one or more chronic health conditions and impairments. The average age of congregate meal participants is 76 and 14% are 85 or older. Most participants are women. One-third of congregate meal participants are low income and most of the rest are near-poor. Participants are mostly non-Hispanic Whites, with overall racial and ethnic minorities comprising 27% of congregate meal participants (AoA, 2015). One-third of congregate meal participants reported their health as either poor or fair, while 42% of non-institutionalized adults 65 years of age and older rated their health as excellent or very good. Congregate meal participants self-reported being diagnosed with an average of 2.4 chronic health conditions. Forty-one percent of congregate meal participants reported three or more chronic conditions, with the most common health conditions being arthritis, hypertension, heart disease, lung or breathing problems, elevated blood cholesterol, and diabetes. Eighteen percent of congregate meal participants reported they recently involuntarily lost or gained 10 pounds, and according to the Nutrition Screening Initiative (NSI) in 1991, this has been associated with an increased risk of poor nutritional status.
and health problems. Approximately one-third of congregate meal participants have a BMI in the “ideal” range, which is defined as between 22-27; most are either overweight or underweight, which places them at risk for nutrition and health problems. In fact, 42% of congregate meal participants are estimated to have a BMI over 27, which places them at risk for problems related to obesity and nutritional excess (AoA, 2015).

A large portion of congregate meal participants who received a meal on a given day go to the meal site frequently. According to the AoA, almost 60% of these participants attended 4 or more days per week, and most reported spending a significant amount of time at the congregate site when they attended, which means greater continuity for nutrition educators and participants. Additionally, approximately 85% of enrolled participants have been attending for over 1 year. Ninety percent of participants reported spending more than 1 hour at the site and almost half spend 3 or more hours there, which allows nutrition educators time to implement nutrition programs effectively (AoA, 2015).

Dietary characteristics and behaviors of congregate meal programs are also interesting to note. Approximately 50% of congregate meal participants eat alone when they are home and about 22% consume fewer than three meals a day (AoA, 2015). The congregate meal program offers a way to eat with others and can increase dietary intake in these participants. More than 20% of participants are on special diets, mostly to help lower cholesterol levels; approximately half of those on special diets are on two or more “diets” and about 30% stated they have a condition that has changed their eating habits (AoA, 2015).

The NSI is a national effort to identify and address nutrition issues in older adults. A questionnaire, called the DETERMINE checklist, is used to identify those at nutritional
risk and is based on common signs of poor nutrition. The DETERMINE checklist stands for Disease, Eating poorly, Tooth problems, Economic issues, Reduced social contact, Multiple medications, Involuntary weight loss/gain, Needs assistance, and Elderly over the age of 80. With this tool, approximately 64% of congregate meal participants have been assessed to be at moderate to high nutritional risk.

2.5 Nutrition Education Provided at Congregate Meal Sites

Eighty-nine percent of Title III congregate meal sites reported offering nutrition education, with registered dietitians providing the education at 55% of congregate meal sites (62% of sites that provide nutrition education), according to the AoA (2015). Other nutrition educators include certified dietary managers, graduates of 4-year nutrition programs (not registered, certified or licensed), diet technicians, home economists, public health nurses, SNAP educators, and others (AoA, 2015). Typically, congregate meal sites make nutrition education available to participants almost once a month, with almost one-third of the sites providing nutrition education more than once a month. Lectures and printed materials are the most commonly used methods of providing education. Visual displays, personal discussions, and group discussions are also frequently used, but few sites use workshops, shopping trips, and cooking classes (AoA, 2015).

2.6 State Unit on Aging and Area Agency on Aging Nutrition Professionals and Their Roles

As previously mentioned, each SUA develops its own guidelines for the nutrition education provided at congregate meal sites and determines the frequency of nutrition education provided as well as who oversees the development and delivery of the nutrition
education. In 1992, amendments to the OAA included stipulations about agency functions that should be executed with advice from registered dietitians or those with comparable expertise in nutrition and older people. This is stated in Section 307(a)(13)(L) of the OAA as follows: “SUAs should plan, coordinate, and monitor nutrition services under their state plans with the advice of a dietitian or comparable individual” (AoA, 2015). According to the AoA (2015), about 69% of SUAs have one or more registered dietitians on staff. The registered dietitians at the SUA level provide technical assistance and training to AAA or nutrition provider staff. Each state might have as few as five to as many as 50+ AAAs. Registered dietitians at 89% of SUAs are used to monitor and/or assess the nutrition services delivered by the AAAs. Only 61% of AAAs have a dietitian on staff, which is a slightly smaller number than the SUAs. Half of all AAAs have at least one registered dietitian and 11% have two or more. These dietitians have many roles, including but not limited to providing nutrition education, counseling, technical assistance and training to nutrition projects or meal sites, conducting menu planning, promoting community relations, developing procedure or standards, and/or monitoring service delivery (AoA, 2015).

2.7 Congregate and Home-Delivered Meal Sites as an Ideal Setting for Nutrition Education

Older adults account for a large percentage, more than 30%, of total healthcare expenditures in this country (Millen, 2002). In 2011, the total health care expenses for older adults reached $414.3 billion (Mirel, C.B., Carper, K., 2014). This population represents a large number of hospital discharges, hospital days, physician contacts, and most nursing home beds, thus illustrating the need for community and home-based
services that emphasize prevention. The 2000 Institute of Medicine (IOM) report, *The Role of Nutrition in Maintaining Health in the Nation’s Elderly*, emphasized the importance of best possible nutritional status in maintaining health in the older population and recommends the development of preventive and clinical nutrition services for not just institutionalized and homebound older adults, but also those who are ambulatory (Millen, 2002). The Elderly Nutrition Program (ENP) emphasizes preventive nutrition intervention, particularly in congregate meal settings, and is an ideal place for the provision of nutrition education services. Despite the proven effectiveness and efficiency of the ENP, it continues to receive little attention in healthy policy discussions and funding (Millen, 2002). Developing a low-cost, theory-based nutrition education program for use at congregate and home-delivered meal programs provides an ideal opportunity to promote dietary changes that could lead to decreased nutritional risk in older adults (Francis, MacNab, & Shelley, 2014).

### 2.8 Proposed Education Framework for Older Adults

Various components of nutrition education have been isolated and evaluated for effectiveness, but still outcomes have been variable and largely less than impressive. Sahyoun et al. (2004) developed a framework for designing successful nutrition education interventions for older adults based on some of the more successful components of various studies as well as suggestions made by the IOM. Sahyoun et al. performed a literature search of articles published between 1990 and 2003 to determine the number, design, and outcome of nutrition education programs directed at older adults. Included in the review were community-based intervention articles delivered to those
aged 55 and older with measurable outcomes or evaluation pieces. Successful components of the studies were examined and the features of each study that might have contributed to its success were isolated, although the actual content of the educational materials used were not evaluated. In the end, only 25 studies of 128 screened fit the inclusion criteria. Articles that were excluded did not have an intervention or evaluation piece or were review articles, or else the participants were not 55 and older. Additionally, pilot studies for which there were no follow-up studies were not included. Most of the studies included a small number of participants, with 40% including less than 100 participants. Four studies were aimed towards a specific ethnicity, racial background, educational level, or socioeconomic status. Eight of the 25 studies targeted those who were at risk for or had a chronic disease, while the rest focused on a generally healthy population. Analysis of attrition rates for those who did not complete the program only occurred in 53% of the studies.

This literature review found that nutrition education interventions were more likely to be effective when nutrition messages were limited to one or two and were simple, practical, and targeted to specific needs. Participants with a specific health condition were more successful in making the dietary change(s), and studies that addressed older adults’ health concerns were overall more successful as well. The more recent studies reviewed used several theories of behavior modification in their design interventions, such as the Health Belief Model. This model involves using a person’s perception of his/her chance of developing a condition and how serious the condition and consequences would be as motivating influences for behavior change. It is appropriate for older adults because of the amplified possibility of ill health. The theories used in the
reviewed studies were most successful when participants were required to assess their readiness for change (trans-theoretical model or stages of change) and set their own goals, or when hands-on activities were incorporated into the intervention, allowing participants to have control when incorporating change into their lifestyles. Also noted was an increase in the likelihood of accomplishing behavior change when there was an active interaction between participants and a healthcare professional. Incentives were not used as much as motivational tools in the studies reviewed, but when they were used, they seemed to be elements of success. Additionally, when incentives were used, attrition rates were lower. A report released by the IOM in 2001 urged the use of an ecological approach when trying to sustain behavior change and to use a conceptual model to frame interacting factors and practices (IOM, 2003).

Based on the results from the IOM and the information obtained in the literature review, Sahyoun et al. concluded that intervention at the individual level is not sufficient to result in sustainable behavior change. They suggested that a proposed framework for nutrition interventions aimed at older adults be used. This model is based on the principle that a combination of individual and environmental-level interventions might be more likely to be effective, which is congruent with the social-ecological model (SEM). The individual-level components of the proposed framework include: nutrition messages that are limited in number, targeted, practical, and reinforced; the use of incentives; regular contact with healthcare professionals; hands-on activities; participation in setting program goals; and remaining active in assessing those goals throughout the intervention. This framework also suggests division of the group based on the idea that dietary habits are complicated behaviors influenced by individual factors such as socioeconomic status,
health status, cultural background, level of education, and current nutrition knowledge. The framework emphasizes that interventions to modify a person’s environment are important for achieving behavior change since people are an integral part of their social and physical environments. These interventions involve changes in the social, physical, and community environments that influence how a person might make dietary decisions. It was suggested that dietetic professionals use the features in this framework to plan interventions (for convenience, Sahyoun et al.’s figure, which appeared in Chapter I, is repeated below; see Figure 2.1).

![Proposed framework (Sahyoun et al., 2004)](image)

**Figure 2.1.** Proposed framework (Sahyoun et al., 2004)

Although this article and framework are a bit dated, a more recent literature review conducted by Lyons (2013) concurred with the underlying SEM framework of
Sahyoun et al. In this more current literature review, Lyons examined nutrition intervention studies with community-dwelling older adults from 2003-2012, with the purpose of determining the number of studies conducted to evaluate the research designs and describe the outcomes of the interventions. Seventy-four studies were found, but only 15 that focused on adults 65 years of age and older were chosen. Ages ranged from 50 to 98 years, with the mean age being the 70s. Most participants in these studies were White females, although one study involved all Black participants. Excluded from this number were all international studies, as Lyons wanted U.S. studies only because participants in international studies might have different food habits, sociocultural factors, and racial and ethnic factors than the United States. Ultimately, only six articles met the criteria for this review. Of the six articles, five involved participants with chronic health conditions and only one reported on cultural relevance. Sample sizes were small and ranged from 25 to 720, which is typical for studies conducted with this population. Three of the studies reported the length of the intervention sessions and four stated the number of sessions used for evaluation. Only two of the studies reported completion, one reported attendance, and one reported class size. Each of the six nutrition interventions reviewed recruited from and conducted interventions at various community settings, including congregate meal sites, health education classes, community centers, churches, and other community-based organizations. Only three of the six studies used pre- and posttesting to evaluate outcomes. Theory-based strategies to predict behavior change were noted and described in four of the six studies; they included: the Revised Health Belief Model, the theory of planned behavior, the health belief theoretical model, and social-cognitive theory.
Lyons (2013) found that positive outcomes were associated with the same characteristics found by Sahyoun et al. (2004), namely: interventions that had limited their messages to one or two; reinforced and personalized messages; hands-on activities and incentives; access to health professionals; and using theories and behavior change. Building on the framework set forth by Sahyoun et al., Lyons added a few components, one of which was “grouping participants within age cohorts” since a 60-year-old adult is very different from someone who is 90 years old. Therefore, interventions should be tailored to meet the needs of the specific age cohort. Grouping participants with similar socioeconomic statuses is also important when planning nutrition education interventions, according to Lyons, since interventions must take factors such as education level, race/ethnicity, living arrangements, availability of support networks, and geographic location into consideration to have positive outcomes. Additionally, Lyons believed health literacy and the use of physiologic measures when possible are also important when planning nutrition interventions. In her conclusion, she “echoe[d] the sentiments of other scholars and encourage[d] the use of the framework developed by Sahyoun et al.” (p. 816).

While nutrition intervention studies in the older adult population are sparse and come with their own host of limitations, both Sahyoun et al. and Lyons in their review of 31 studies over 13 years came to the same conclusion, with both suggesting that the SEM was the most effective theoretical model for designing and implementing nutrition education interventions in older adults.
2.9 Social-Ecological Model (SEM)

The social-ecological model is based on the premise that no one factor can explain or influence health behaviors. Instead, this model indicates that factors on multiple levels can influence health behaviors. These multiple levels include intrapersonal, interpersonal, organizational, community, and public policy. Including all these levels of influence is what separates this model from other theories that usually focus on one or two levels. At the individual level, personal history, biological factors, education, income, food preferences, beliefs, attitudes, values, knowledge, and life experience (Contento, 2007, 2015) influence food choices and dietary behaviors. Family, friends, intimate partners, peers, health professionals, social and cultural norms, and social networks form the interpersonal aspect of the SEM, all of which can influence dietary behaviors. The community level (physical environment) involves the contexts in which social relationships occur and includes settings such as schools, neighborhoods, work places, churches, and grocery stores. The SEM tries to identify the characteristics of settings such as these that affect health. For example, one could work with corner stores in urban settings to help them increase the number of fruits and vegetables they have available. Environmental changes, however, need to be supported by communication, education, and motivational campaigns to be effective and have greater impact, which again illustrates the multilevel approach of the SEM (Glanz & Mullis, 2008).

Research has shown that the SEM is most effective when interventions are modified to specific behaviors of individuals and community practices. Likewise, if the nutrition education intervention identifies factors that influence behavior and makes modifying these factors the main objective of the nutrition education instead of just
disseminating general nutrition information, the intervention will be more effective (Contecco, 2007, 2015).

2.10 Review of Nutrition Education Interventions

A total of 31 studies that involved nutrition interventions with community-dwelling older adults were reviewed in total by Sahyoun et al. and Lyons from 1990 to 2012 and are discussed in this section. An additional eight studies were reviewed, mostly occurring after 2012, where the Lyons review left off. Some interventions focused on evaluating the effectiveness of programs on participants’ dietary behaviors in general as well as nutrition knowledge. Other interventions focused on specific disease states such as hypertension, diabetes, and cardiovascular disease, while yet others focused on increasing fruit and vegetable intake and lowering weight. The goal of this literature review was not only to explore the results of the various nutrition interventions, but also to determine if they contain components of the framework outlined by Sahyoun et al. (2004) and, if they do, how many components and do they contribute to the success of the interventions. Because the Sahyoun et al. framework is somewhat dated, it is important to also review current studies to determine if any other components that increase the effectiveness of nutrition education interventions in older adults can be identified.

2.10.1 Home-based Nutrition Interventions

As previously mentioned, older adults who participate in the Elderly Nutrition Program are often at nutritional risk, which can quickly lead to a decline in nutritional status and a variety of health problems. Nutrition education and counseling for older adults are thus very important. Older adults who attend congregate meal programs have
access to nutrition education programs, while those receiving home-delivered meals often miss out on in-person education, thereby possibly leaving them at high nutritional risk. One study sought to emphasize the importance of delivering nutrition education in person to home-delivered meal participants as well as to congregate meal participants by reviewing nutrition risk factor scores and nutrition behaviors in these two groups after a nutrition intervention (Wunderlich, Bai, & Piemonte, 2011). Participants included older adults in 22 congregate meal sites in a northern New Jersey county as well as home-delivered meal participants throughout that county. Home-delivered meal participants are generally more limited physically and economically, so it was not surprising that more home-delivered meal participants were below poverty than congregate meal participants in this study. While just 22% of those in congregate meals in this intervention had two or more physical conditions, this percent rose to about 40% in home-delivered meal participants. The intervention for congregate meal participants was conducted every quarter for 2 years and was led by nutritionists. Topics discussed in each session included hypertension and salt intake as well as meal management for diabetes and other common physical conditions in older adults. Each lesson was 30-40 minutes long and included interactive activities such as cooking demonstrations and tips for shopping. Handouts that summarized the main points of the lesson and reinforced messages were provided after each session and were written at the fifth-grade level. Participants were also encouraged to call and request additional counseling and instruction if needed. Home-delivered meal participants received the same nutrition education materials, but via mail or with the meal, but they did not have the group interaction experienced by the congregate meal participants. They did, however, receive phone counseling on topics of interest and could
ask questions on handouts (Wunderlich et al., 2011). Improvement in nutrition risk factor scores was significant for home-delivered meal participants but not for congregate meal participants post-intervention, although nutrition risk factor scores did still improve for congregate meal site participants (Wunderlich et al., 2011). Though improved, nutrition risk factor scores for home-delivered meal participants were still higher than for congregate meal participant scores. Small improvements in nutrition behaviors were found in participants of both meal programs, but these were not significant. For home-delivered meal participants, eating two or more meals per day increased slightly (Wunderlich et al., 2011). Congregate meal participants showed a decrease in the amount of alcohol consumed and an increased intake of five servings of fruits and vegetables a day, but again, these were not significant (Wunderlich et al., 2011). Perhaps more consistent and long-term nutrition education and evaluation would yield more promising results, but even in the short term, it appears that nutrition education and counseling can improve nutrition behaviors, thereby decreasing risk of chronic disease in ENP participants. Additional counseling services or in-person education to home-delivered meal participants might be more effective in this group (Wunderlich et al., 2011).

Mayeda and Anderson (1993) wanted to determine if a self-paced program called “Self-Care for a Healthy Heart” improved dietary habits and also wanted to establish how it could be better tailored for older adults. This intervention was 14 weeks in duration and involved older adults participating in congregate meals at eight meal sites. This program was developed using the Health Belief Model and involves the use of printed materials that cover four steps on heart disease risk factors, lowering fat and cholesterol intake, reducing calories, and making healthier food choices. Each step has sections that ask the
participant “What can I do?”, “How can I do it?”, and “More that I can do”—all of which are meant to increase or create awareness, compare participants’ diets to healthier choices, and allow the participants to try the diet. Another section provides reinforcement through “Facts for Self-Care.” Pre- and posttests 1 and 2 months post-intervention along with food records 2 months post-intervention served as assessment tools. Results were less than optimal, showing that the intervention group did not significantly improve dietary behavior more than the control group (Mayeda & Anderson, 1993). Feedback from participants found that a 15- to 20-minute individual counseling session to review the nutrient analysis of their food records would have helped them understand how they could improve. They also did not like the written materials and 39% said they felt they already knew the material in the packet (Mayeda & Anderson, 1993). When used with dietary counseling, this program could be more effective at inciting behavior change and reinforcing those behaviors, which was a similar sentiment expressed by Wunderlich et al. (2011).

Though some studies suggested the importance of in-person or telephone contact for older adults receiving nutrition education (Mayeda & Anderson, 1993; Wunderlich et al., 2011), little research has examined the impact of peers to improve nutrition behaviors in home-based nutrition interventions, particularly at meals. McHugh et al. (2016) set out to assess the effects of a mealtime intervention on self-efficacy, food enjoyment, and energy intakes of older adults living alone and at risk for social isolation. Eating alone is thought to be a risk factor for malnutrition because it is associated with decreased energy intakes. One study found that men who lived alone were more likely to have not eaten for at least 1 day and were at high nutritional risk (Frongillo et al., 1992), while older women
who no longer have anyone to cook for might be less likely to cook for themselves and therefore have less than optimal diets (Quandt et al., 2000). Homebound older adults might be positively influenced by having others eat with them because it might increase caloric intake (McHugh et al., 2016). In his randomized control trial (RCT), McHugh et al. (2016) recruited volunteers over the age of 55 who were matched with a homebound older adult. During this 8-week intervention, the participant-volunteer duo chose a meal to prepare and eat together at the participant’s home. Each session was 90 minutes. The volunteer was given a budget and obtained the ingredients for the meal. A guidebook was provided to the pair that included nutrition and culinary information and tips and recipes designed to be quick and cost-effective. This intervention was based on the social-cognitive theory, so volunteers were asked to allow the participant to watch them cook, provide social support for cooking and nutrition behaviors, and let the participant cook with the volunteer. Volunteers also encouraged participants to engage in goal setting when possible. Participants in the control group received the guidebook containing the recipes, nutrition, and culinary information but did not have a volunteer. Self-efficacy, food enjoyment, and energy intakes were measured at the completion of the intervention. Of all the effects, only the difference in food enjoyment remained significant after correction for multiple comparisons, but perhaps this was because the study was underpowered (McHugh et al., 2016). Since the control group received the guidebook, that in and of itself might have acted as an intervention, or it is possible that the intervention intensity might not have been adequate. The authors concluded that to improve energy intake and food enjoyment in older adults, multimodal nutrition interventions that include social elements might be successful (McHugh et al., 2016).
Another home-based nutrition education intervention sought to examine the effectiveness of the program in increasing fruit, vegetable, and calcium-rich food consumption in community-living, physically impaired older adults (Bernstein et al., 2002). Participants in this intervention were randomly assigned to a nutrition education or exercise group. The nutrition program was provided through eight home visits, biweekly home visits, and monthly letters over 6 months. Participants were also provided with an educational book designed for the program. This in-depth, personalized program stressed increasing intake of fruits and vegetables to at least five servings daily and calcium-rich foods to at least three servings daily (Bernstein et al., 2002). The nutrition topics also included information on portion sizes, grocery shopping tips, and recipes. Goal setting was incorporated as were rewards in the form of mugs, baseball hats, magnets, and t-shirts. Additionally, food log recording, role-playing games, and addressing barriers were included in home visits to help modify behavior. The exercise group did not receive any nutrition information but did receive home visits, letters, and phone calls. Not only were food frequency questionnaires used to assess outcomes, but fasting blood measures of nutrients and carotenoids were performed. Few nutrition interventions involving older adults use biochemical measures, which is an important part of evaluation because it does not rely on self-reported intake that is often flawed. Results revealed significant increases in self-reported intakes of fruits, vegetables, and milk/dairy servings in the nutrition group, compared to the exercise group (Bernstein et al., 2002). Increases in β-carotene and α-carotene in the nutrition group correlated with increases in blood concentrations (P ≤ 0.02) (Bernstein et al., 2002). The results of this study demonstrated that dietary recommendations should be individualized and specific, and that the use of logs for
compliance should be encouraged. Providing positive reinforcement can also improve the diets of older adults in a home-based setting.

As in previous studies (Wunderlich et al., 2011), written materials are frequently used to convey information to older adults receiving home-delivered meals. Newsletters are often used as a vehicle for providing nutrition education to older adults receiving home-delivered meals, but their impact has not been widely reviewed. Taylor-Davis et al. (2000) sought to evaluate the usefulness of a nutrition newsletter that was designed for older adults using components of the nutrition communication model and adult learning theory. Unlike most other studies involving older adults, in this study more than half of participants were males rather than females, and all participants were White. Over the course of 10 weeks, the intervention group received five eight-page biweekly newsletters via mail. Dietary fat was the main focus of the newsletters. Each article consisted of two feature articles, self-assessment quizzes, a science corner, tips, definitions, food label information, recipes, a Q&A section, and nutrition and history trivia. To help determine the impact of personal contact, one of the intervention groups participated in 10-minute evaluation interviews 10-14 days after newsletter distribution. During these calls, participants were not provided with information or clarification regarding newsletter content, but rather answered questions about the newsletter and preferences for its components. Participants were also asked questions to ascertain short-term knowledge gain during these interviews. Assessment of the program was conducted via pre- and post-intervention surveys to determine cognitive, affective (perceived nutrition knowledge and interest in nutrition), and behavioral areas. The behavioral areas included food behavior related to dietary fat and stages of change for dietary fat and fiber. At
posttest, significant changes were seen for cognitive, affective, stages of change for fat, and “avoid fat food” behavior variables. Participants who received the follow-up phone calls scored significantly higher than those who received just the newsletters for both cognitive variables and perceived nutrition knowledge. The posttest also showed that both intervention groups also noted significant improvements for stages of change for dietary fiber. For the “avoid fats” variable, post-hoc analysis showed a significant difference for stages of change only for those who received the newsletters when compared to the controls. No differences for the behavioral area were noted between the two intervention groups, suggesting that the phone call contacts did not improve the newsletter intervention and home-delivered nutrition newsletters based on this model can effectively communicate health and nutrition information to older adults—possibly those receiving home-delivered meals as well. This is a slightly different finding than those presented by Wunderlich et al. (2011), who felt phone counseling and additional contacts with home-delivered meal participants might be more effective at providing nutrition education.

Higgins and Barkley (2004) performed a literature review of studies that focused on using written nutrition education materials with older adults. These written materials included newsletters, brochures, handouts, and booklets. Overall, it was determined that older adults can increase their knowledge, at least over the short term, by reading printed materials. It was concluded that print materials might be ideal for those who cannot or do not want to attend group nutrition education or those with chronic diseases since these materials can be read at the older adult’s own pace and serve as a reference if an individual needs to review materials.
As a result of their literature review, Higgins and Barkley (2004) designed 10 suggestions for selecting or developing nutrition education resources for older adults. Some suggestions paralleled those posed by Sahyoun et al. (2004), such as providing quizzes and self-assessments for reinforcement, presenting only one or two messages at a time, providing materials in multiple languages to increase cultural relevance, using interactive formats, and targeting educational materials based on interests, needs, and cultural relevance. It was also concluded that providing “how to” information is important, such as related to recipes for one or two servings that limited the number of ingredients, nutrition label information, and tips for changing dietary habits. Similar to other interventions reviewed in this section, Higgins and Barkley also concluded that multiple contacts via multiple newsletters and even follow-up phone calls were more likely to result in behavior change. Multiple interventions reviewed in this dissertation involved printed materials either used alone or in combination with in-person interventions and were written at a simpler reading level to accommodate less educated individuals. Higgins and Barkley concluded that materials written at the fifth- to eighth-grade levels, and even lower than the fifth-grade level, are recommended because those with higher reading levels do not appear to be offended by and even sometimes prefer easy-to-read education materials. Concrete graphics and the use of colors with high-contrast materials also seem to be preferred by older adults and can even help them improve recall. These suggestions are important to keep in mind not only for home-delivered meal participants who often receive written education materials, but also for congregate meal participants since written materials are often used to reinforce nutrition education lessons.
2.10.2 General Nutrition Education Interventions That Assess Changes in Knowledge

An important part of nutrition education in older adults is determining how capable they are of being motivated to learn new skills or increase awareness in order to change long-term eating habits, which are notoriously difficult to change. Two studies examined the impact of nutrition education on the nutrition knowledge of older adults attending congregate meals. One study used materials associated with the Nutrition and Health for Older Americans Campaign to present three nutrition education sessions on the revised Food Guide Pyramid, dietary protein, and fiber for older adults at six senior centers in Georgia (Rosenbloom, Kicklighter, Patacca, & Keya, 2004). The other intervention was developed specifically for congregate meal participants at 50 congregate meal sites in Indiana and focused on providing participants with information that made them aware of the prevalence and severity of four common chronic diseases—cancer, heart disease, obesity, and diabetes—and discussed foods that might improve or help prevent or manage these conditions (Thomas, Almanza, & Ghiselli, 2010).

The AoA’s You Can! Steps to Healthier Aging campaign, launched in 2003, was developed to increase physical activity and improve food choices among older adults. It was based on the premise that even small changes in diet and physical activity can promote healthier aging (Loughrey, 2004). The You Can! Messages are meant to offer encouragement and inspiration to older adults who are interested in making healthy lifestyle changes but need help getting started (Loughrey, 2004). Partners of the campaign, which includes SUAs, AAAs, large national organizations, hospitals, senior centers, and others who work with older adults, received a free kit with a guidebook containing week-by-week activities and tools and incentives for participants.
The two aforementioned studies varied in their approach and topics emphasized, but both incorporated components of the nutrition education framework for older adults developed by Sahyoun et al. (2004). Three 20-minute lessons were provided to participants in the Rosenbloom et al. (2004) study and included self-assessment of current eating habits, a goal-setting activity, food tasting, take-home handouts, and a question-and-answer session. These characteristics represented various components of the nutrition education framework designed by Sahyoun et al. (2004): messages that are limited in number, simple, targeted, practical, and reinforced (take-home handouts and question-and-answer session); involvement of participants in determining the goals of the intervention, and the incorporation of a hands-on activity (taste testing). Additionally, it was noted that incentives were provided. In Thomas et al.’s (2010) intervention, one chronic health condition was discussed each week and a nutrition booklet that included clear, quantifiable, and applicable recommendations was provided to participants, demonstrating the incorporation of messages that are limited in number, targeted, practical, and reinforced. Because these interventions focused solely on nutrition knowledge, additional components of the framework, such as a focus on behavior modification models and involvement of family and friends or the physical environment, were not part of the interventions.

Results varied between the two studies. One showed a significant difference in knowledge after the three lessons, particularly in the importance of consuming a variety of foods, proper portion sizes, the need for dietary protein and fiber, and food choices to increase variety, protein, and fiber in their diets (Rosenbloom et al., 2004). The other (Thomas et al., 2010) showed more mixed results. Post-intervention, more than 90% of
participants showed basic nutrition knowledge with respect to proper intake of vegetables, sugary foods, fatty foods, fiber, fruit, and salty foods, and 83% correctly identified six out of seven statements to expert recommendations. The participants fell short in identifying meat recommendations, with only 57% correctly identifying recommendations. With respect to whether participants understood dietary precautions to help prevent or maintain chronic disease, they performed just as poorly as they did prior to the intervention overall. This showed that the older adults in this intervention could recognize general dietary recommendations, but were unable to apply them to specific chronic diseases (Thomas et al., 2010). It is important to note, however, that participation in this intervention was low, and many only participated 1 to 5 days out of a possible 20-day intervention.

It is also possible that the disease states did not apply to all participants, therefore decreasing interest. Other studies have found that when individuals received nutrition messages that pertained to their own health, they were more likely to consume or not consume certain foods based on the perception of their own health risk (Burton & Creyer, 2004). The nutrition education framework outlines the importance of grouping older adults with specific health, socioeconomic, or other status together, but this was not done for this study and may have impacted results.

Klinedinst (2005) designed the Eat and Learn Program which incorporated components of the Health Belief Model and focused on the benefits and barriers to healthy eating in order to reduce heart disease risk. Each of three lessons focused on only four main points, which kept messages limited in number and simple. The goal was to keep the lessons short so that participants’ information-processing capacity was
maximized (Klinedinst, 2005). Messages were reinforced with a poster presentation and discussion following the lesson. Evaluation of this intervention was knowledge-based only and involved four questions pre- and posttests after each session. Posttests on average revealed a one-point increase in knowledge in each of the three sessions (Klinedinst, 2005). This intervention took place in a high-rise building for older adults in an urban setting and observations indicated that the participants stayed after the program, conversing with neighbors. Some participants also began making suggestions to others on how to make food tasty while cooking with less fat, salt, or sugar (Klinedinst, 2005). Some participants, particularly African American and Hispanic participants, shared culturally relevant methods of cooking. Not only did this increase the cultural relevance of the program, but it also involved the social environment of those living together in the same community.

2.10.3 Nutrition Education Interventions Addressing Behavior Change

Many articles in the research literature are about the development of effective cooperative extension nutrition education interventions for older adults. These programs are often developed and evaluated via extensive research and planning, which make them useful tools for the community. Chef Charles, now known as Fresh Conversations, is one such program that has been used for many years. It was developed in Iowa and is a once-monthly newsletter group nutrition education program that is used in congregate meal sites; it encourages and promotes fruit, vegetable, and calcium-rich food intake, physical activity, safe food handling, and food security (Francis et al., 2014). Before the start of the 30-minute session, the newsletter and sample of the monthly recipe are handed out to participants. The educator then discusses the content of the newsletter. Though well-
received, the program was noted to have numerous flaws and areas for improvement, such as using a theory-based approach in the development of the newsletter, including goal setting, reducing the amount of information in the newsletter, and using more lists to convey messages—all of which are part of the framework for nutrition education for older adults. As a result, the Chef Charles program was revised to include the social marketing theory and the Health Belief Model. The revised newsletter provided background information on why the recommendations are important, which are cues to action in the Health Belief Model, targeted perceived susceptibility and severity, and addressed perceived benefits. Additionally, the revised newsletter also included a section intended to facilitate discussions during the session on goal setting, identifying barriers to achieving the goals, and strategies for overcoming barriers (Francis et al., 2014).

Francis et al. (2014) set out to determine the extent to which the revised Chef Charles Program, compared with the traditional program, was capable of lowering nutritional risk and improving dietary intake, food security, and nutrition self-efficacy in older adults at congregate meal sites who were already receiving the Chef Charles program. In this RCT, the control group received the traditional program and the treatment group received the revised program. Differences between the two groups included the type and amount of information presented in the newsletter, newsletter design, and the presentation method of the educator-led session. The traditional program group received comprehensive discussion of topics, didactic discussions, and a review of the entire newsletter, whereas those in the revised program reviewed key points of the newsletter, participated in facilitated discussions, and reviewed the main topic of the newsletter instead of the newsletter in its entirety.
Results were mostly promising for the revised program. Post-intervention results showed that the decrease in nutritional risk for the revised program participants was significantly greater than for those who received the traditional program, as was frequency of vegetable and dairy intake. Although the revised program appeared more effective than the traditional program at promoting dietary changes and decreasing nutritional risk, no changes in self-efficacy were noted (Francis et al., 2014). The revised Chef Charles program incorporated many components of the framework developed by Sahyoun et al. (2004), such as the use of incentives, focused and repetitive messages, and involvement in determining goals of the intervention.

Oklahoma has some of the highest rates in the country for various chronic diseases which are linked to poverty, limited access to healthcare, obesity, nutrition, and sedentary lifestyle. Also, the Oklahoma population, compared with the rest of the country, has a larger percentage of its population living in rural areas where healthcare is limited; they tend to be poorer and older (Oklahoma State Department of Health, 2014), which has helped drive the development of the two programs mentioned in this literature review. A Cooperative Extension in Oklahoma developed both of the programs noted in this section—the first being a nutrition and fitness program for older adults called “Healthy Aging,” which was then evaluated for its impact on the nutritional knowledge and status of its participants (Hermann et al., 1990). This program included 12 weekly 1-hour nutrition and fitness sessions conducted by Oklahoma Extension nutrition education specialists who used verbal presentations, written handouts, and training tapes on various nutrition topics. Results showed this program was effective in significantly lowering cholesterol, LDL cholesterol, and triglycerides while increasing HDL.
Significant decreases in body weight and blood pressure were observed and increases in the number of days per week exercised, time exercised, and exercise intensity were also found to be significant. Nutrition knowledge scores increased significantly from pre- to post-intervention. Although average percent of total calories from carbohydrates, protein, and fat did not change, there was a significant change in the type of fat consumed.

Participants decreased saturated fat intake and increased polyunsaturated fat intake. The decrease in saturated fats was due to a decrease in the intake of snack foods, chips and desserts. While these results are positive, it is important to note that dietary intake of vitamins and minerals did not change significantly and many participants consumed less than two-thirds of the RDAs for many nutrients. Therefore, further education for this age group might be needed when it comes to maintaining adequate dietary intake for micronutrients (Hermann et al., 1990). Health professionals were involved in this intervention and the program was developed using nutrition education theory, both which are part the framework for older adults.

Another program developed by the Oklahoma Cooperative Extension Service is the “Healthy Living” program, an eight-session food and nutrition program for Oklahomans over 55 years old. The goal of this program was to provide the knowledge and skills to apply the Food Guide Pyramid, Dietary Guidelines for Americans, and Nutrition Facts Label to dietary behaviors that would encourage improved dietary intake. Each education session included specific objectives, handouts, visuals, activities, resources, and recipes. At each lesson, one of the recipes (which reduced either fat, sodium, cholesterol, or sugar, or increased fiber) was demonstrated and then sampled by the participants. In addition to the lessons, a supermarket tour was also included in the
program. Hermann et al. (2000) sought to evaluate the effectiveness of this program on participants’ dietary behaviors related to food selection, food preparation and safety, dietary intakes from the Food Guide Pyramid food groups, and health measures on total body weight, BMI, and fasting total serum cholesterol. Results showed significant increases in food and nutrition behavior scores, dietary intake, and health measures. Based on a 24-hour recall, increases were seen for the number of servings consumed from the Food Guide Pyramid food groups and were significant for grains, dairy, and vegetables but not for fruit or protein. Fruit intake prior to the intervention was already high, at 2.4 servings per day, not leaving much room for improvement. The average number of servings from fats, oils, and sweets decreased significantly. Total body weight and BMI decreased but not significantly. An average of four pounds was lost during the 8-week intervention, which falls within weight loss recommendations, but long-term follow-up was not conducted to determine if the weight loss trend continued. Cholesterol in all participants decreased but was only significant for those with total cholesterol at or above 200 at baseline. These changes have the potential to decrease the risk of diet-related diseases and might help lower healthcare costs (Hermann et al., 2000).

The Eat Better & Move More (EBMM) program is a well-known community-based program developed for OAA Nutrition Program sites and the AoA’s national You Can! campaign. The purpose of the EBMM program is to encourage older adults currently participating in community-based programs to take modest steps to improve health (Wellman et al., 2007). EBMM incorporates both healthy eating and physical activity in a simple, ready-to-use format and consists of 12 weekly sessions that include mini-talks and activities for group nutrition and physical activity sessions. The nutrition
sessions emphasize benefits of eating more fruits and vegetables, calcium-rich foods, and dietary fiber as well as portion sizes. Nutrition topics are introduced during certain weekly sessions and then expanded upon in the next session. These nutrition topics address serious diet deficiencies or excesses. Benefits of walking are emphasized during the physical activity mini-talks and participants learn how to use step counters, walk more at home, and stay hydrated. Step goals are personalized to each participant’s ability and a new goal of a 10% increase is set if the participant reached the earlier week’s goal. A handout is also provided to participants that reviews the week’s nutrition and physical activity talks, thus reinforcing messages—a construct of the framework for nutrition education for older adults. Wellman et al. assessed the outcomes of the EBMM program via a multisite nationwide approach that included 10 sites.

Results were impressive for both the nutrition piece as well as the physical activity component. Each of the following results was significant (P < 0.001): 31% of participants increased the number of servings of fruit by one or more servings, 37% increased vegetable intake by one or more serving, 33% increased fiber intake, 42% increased intake of calcium-rich foods by one or more servings, and 31% increased fluid intake by one to three glasses. By week 11, participants significantly increased their steps per day and blocks walked. Days walked per week also increased significantly (Wellman et al., 2007). Also promising was that 99% of participants recommended the program to others, 93% said it helped them “eat better,” and 90% said it helped them “move more.” Stage of change status was also measured, and results found that 67% of participants increased by one or more stages while 75% of those in the preparation phase moved to action and maintenance (Wellman et al., 2007).
Interventions involving older adults are notoriously small, and while this study cannot be considered large, it is one of the larger interventions discussed in this section (final N = 620) (Wellman et al., 2007). It is important to note some limitations for this study, as these impact generalizability of the results. Attrition was a bit high, with just 62% of participants completing the intervention. There were also significant differences between completers and non-completers. Completers had significantly fewer health conditions than non-completers, fewer completers were at nutritional risk than non-completers (15% vs. 30%; P < 0.001), and fewer completers were at or below poverty level (12% vs. 23%; P = 0.004) (Wellman et al., 2007). Therefore, this intervention might have missed some of the most at-risk participants. Despite these limitations, the EBMM program is easy to execute and improves the diets and physical activity levels of participants. Many components of the framework for nutrition education for older adults were incorporated into the EBMM program: theory-based, limited messages, messages that are reinforced and personalized, hands-on activities, goal setting, and access to health professionals because registered dietitians led the program at eight of the sites and a nurse led at the other two sites. The success of this program does indeed show the importance of incorporating these components into nutrition interventions for older adults.

Many studies and interventions used gains in knowledge or dietary and behavioral changes to evaluate the success of the nutrition intervention, particularly with respect to studies involving older adults. The above intervention used the EBBM program and outcomes measured were in the form of behavioral changes. Another nutrition education intervention involving older adults adapted and implemented the EBMM at six senior centers in a low socioeconomic, diverse population, and collected information not only
on behavioral variables but also physiological variables like BMI, weight, blood pressure, and functional mobility (Turk, Elci, Resick, & Kalarchian, 2016). Findings echoed those found by Wellman et al. (2007) in that significant increases were found for fruit, vegetable, and high-fiber food intake; however, increases in milk, yogurt, and cheese did not increase significantly. Significant increases in walking, similar to the findings of Wellman et al. (2007), were also noted. For physiologic measures, Turk et al. (2016) found an overall main effect for body weight \((P = 0.01)\) and functional mobility \((P = 0.008)\), but no overall main effect was noted for BMI, systolic, or diastolic blood pressure after the 12-week program. Additionally, participants significantly increased their rating of their general health from baseline to follow-up (Turk et al., 2016). This group was pulled from more disadvantaged communities than the prior intervention, but results were very similar, showing that well-designed nutrition interventions promoting healthy eating and physical activity can lead to meaningful changes for older adults of diverse and underprivileged groups.

2.10.4 Gardening Intervention With Social Support Focus

Few studies have incorporated social supports, as outlined by the nutrition framework for older adults by Sahyoun et al. (2004). One study did incorporate social supports as well as a gardening program as part of the nutrition education intervention, making it truly unique. Not only does family play an important role in the social support of older adults, but peers do as well. Social support aids in psychological well-being and helps yield enduring behavior changes related to health (Pilsuk & Minkler, 1980). Because older adults rank gardening as a top hobby, one of the best ways to incorporate social support into a nutrition intervention aimed at older adults is via gardening.
Many studies that included gardening with older adults have focused on using it as a means of increasing availability of fruits and vegetables in the diet rather than using it to zero in on dietary behaviors. The study by Hackman and Wagner (1990) aimed to impart the dietary behavior change and psychological well-being of older adults in three different locations: an economically depressed area, an urban area, and a medium-sized metropolitan area in Oregon. Every other week for 5 months, 90-minute meetings were held at senior centers, with the first week of the month dedicated to seven general nutrition topics and the second week dedicated to gardening topics. During the 90 minutes for nutrition education, 30 minutes were allotted to three areas: providing information, developing an action plan to implement dietary changes, and sharing successes and brainstorming how to help each other eat well. The lessons addressed why certain nutrient/food is important to health and what practical changes can be made to incorporate the food or nutrient. Gardening classes provided technical information and were mostly taught in an informative style. Staff members visited participant homes twice a month to provide social support to eat foods from the seven categories that were emphasized and help as needed with the garden. At the final group meeting, the participants shared a potluck meal that included ingredients from their gardens. One or more nutrition principles presented in the intervention were mirrored in 90% of the potluck dishes (Hackman & Wagner, 1990). Participants also created personal nutrition goals and identified whom they would ask for help. Follow-up for this study was longer than most studies involving older adults and lasted 2 years. Results for each site differed and it is difficult to know if the differences were due to population or varied execution of the program. The population at the Oregon site was all White, the population
at the economically depressed area was 60% Black and 40% White, and the population at urban senior center was 31% Black and 69% White. Each group consisted of mostly women and the average age was 64-68 years for the three sites. Education levels were not disclosed for the groups. At the Oregon site, significant changes were seen in water, whole grains and starchy fruit and vegetable, fruit and vegetable, iron-rich foods, vitamin C-rich fruits and vegetables, and folic acid-rich fruit and vegetable intake but not dairy intake. The economically disadvantaged area produced significant changes in water, dairy, and whole grain fruit and vegetable intake. Although dairy intake increased to 0.85 servings per day, intake was still well below recommendations of four servings a day. The urban area participants significantly increased water intake and dairy intake, but again, dairy intake was still below recommendations. A significant decrease was seen in whole grain and starchy vegetable intake, but no rationale was provided. No other significant increases were noted for this group, but intake of all fruits and vegetables and vitamin C-rich fruits and vegetables was high at baseline and remained so for the remainder of the study. All sites showed a significant increase in nutrition-related attitudes, but only two of the three sites showed significant improvements in gardening-related attitudes. The participants from the economically depressed site did not show improvements in the gardening attitudes area, possibly because they felt their ability to garden stayed the same during the program and that the bench box provided during the intervention let them use their already established skills (Hackman & Wagner, 1990). This intervention was multifaceted and used the psychosocial theories of perceived control and social support. Lessons were developed to help increase self-efficacy; these were led by registered dietitians and used simple messages and goal setting. Using
multiple components of the nutrition framework for older adults, including introducing social support, made this a successful intervention in three diverse populations.

2.10.5 Interventions With Novel Components

The use of behavioral theory in the development of nutrition interventions has been shown to increase effectiveness, especially when participants are able to set their own goals and can assess their own readiness for change (Sahyoun et al., 2004). Many studies published discussed overall outcomes of the intervention, while few focused on how the use of specific theories impacted efficacy of the nutrition intervention. One older nutrition intervention focused entirely on the effectiveness of Mitic’s Nutrition Instruction Model on inducing behavior change in older adults (Kupka-Schutt & Mitchell, 1992). Part of this nutrition instruction model involves conducting a needs assessment and incorporating problem solving into the intervention (Mitic, 1985). It is thought that decision-making styles might impact the level of behavior change that can be achieved because some decision-making styles are associated with instigating or reacting to change (humanistic style and traditional style), while others are associated with resisting change (organizational style) (Price, 1973). When developing nutrition interventions, consideration of decision making might therefore be an important aspect to consider. In this 4-week RCT, the intervention group was divided into two smaller groups for smaller group discussions and more individualized care, and they received four 1-hour lectures. One control group received no educational intervention, while the other control group received four 1-hour lessons that covered the seven dietary guidelines (Kupka-Schutt & Mitchell, 1992). During the intervention, participants evaluated current intake, received instruction based on the needs and nutrient intake of the group, and then
set individual goals and developed a plan for improving their diets. Results showed significant improvements for the experimental group with respect to dairy and cereal intake but not for fruit and vegetable or protein intake. It is important to note that most participants were meeting goals for protein prior to the intervention and almost half were meeting the goals for fruit and vegetable intake. No significant changes in any food group were noted for either control group, and the group that received no nutrition education ate even fewer servings. Mean nutrient intakes were also observed at baseline and at follow-up to determine if any changes in intake occurred. Prior to the intervention, mean nutrient intakes without supplements were more than 66% of the RDA, with the exception of calories which was more than that (Kupka-Schutt & Mitchell, 1992). Nutrients examined via food logs included calories, protein, iron, vitamin A, thiamine, niacin, vitamin C, riboflavin, calcium, fiber, cholesterol, and fat, which was expressed as a percent of calories. At follow-up, the intervention group demonstrated a significant decrease in fat intake, while those in the control group with no intervention showed an increase. At follow-up, it appears that those with the resistant decision-making style (organizational) had significantly higher intakes of fat and cholesterol than those with the style described as instigating change (humanistic). It is important to note that only a small number of participants were categorized as having organizational decision-making style and that the intervention group tended to show the humanistic decision-making style, predisposing them to a positive reaction to the intervention because they were more likely to make behavior changes.

As the world becomes more computerized, one question is: Does nutrition education combined with the use of computer programs for older adults improve nutrition
education interventions? The goal of one study was to determine whether the impact of a nutrition education program with or without microcomputer interaction enabled older adults to improve their diets (Dennison, Dennison, & Ward, 1991). This was a small study with only 10 participants in each group: an intervention group that received nutrition education with microcomputer interaction, an intervention group that received the same program but without the microcomputer interaction, and the control group that received neither the nutrition program nor the microcomputer interaction. The nutrition program consisted of four 60-minute classes conducted over the course of 2 weeks. The goal of the program was to teach older adults to record, analyze, and improve food choices (Dennison et al., 1991). Only one of the intervention groups used a nutrition analysis software program, while research staff entered the data for participants in the other intervention group. For each class, participants received nutrition analysis printouts for 3-day food records and then used those to compare their intakes with recommended intakes and food choices. Participants used these comparisons to substitute some food choices with healthier ones, with the goal of making small rather than major changes. Eight nutrients were assessed, but significant differences were only found for two of these: for mean monounsaturated fat intake, there was a significant effect for time but no significant effect for time and group or group; for saturated fat intake, significant effects were found for group and time. No significant differences for saturated fat were found at follow-up between the two intervention groups, but significant differences were found between the microcomputer group and the control group as well as the intervention group without the microcomputer and the control group. Thus, while there does not appear to be an advantage for use of the computer program, participants in that group were
significantly more satisfied with the program than the group who did not use the microcomputer. Computer programs, which can be considered as providing a hands-on activity, still have a place in nutrition education, by decreasing costs and providing individualization and immediate feedback. Allowing older adults to analyze their own diets might help maintain interest and motivate them to make dietary changes.

The nutrition research also extends to dementia, the name used for various brain maladies—the most common being Alzheimer’s disease (Prince et al., 2014). It impacts about 44 million people worldwide and with the aging of Baby Boomers and older adults living longer, this number is predicted to double by 2030 (Prince et al., 2014). The cost of dementia worldwide is a staggering $604 billion and is expected to grow (Prince et al., 2014). Because there is no cure for dementia, there is increasing pressure at the primary care and community level for interventions focusing on prevention (Prince et al., 2014). While research is ongoing, current evidence has suggested some possible modifiable risk factors for dementia, including hypertension, obesity, diabetes, smoking, low education, physical inactivity, and depression (Barnes et al., 2011; Norton et al., 2014). Education for lifestyle modifications and prevention of vascular disease are therefore important factors in the prevention of dementia. Only one dementia-specific nutrition education intervention for older adults was found in the literature, making this a unique study (Wallace, Lo, & Devine, 2016). The goal of this study was to evaluate the intervention to determine long-term knowledge and healthy dietary behavior changes. Subjects who did not have dementia but were interested in the topic self-selected to participate in the study. About two-thirds of the participants had a non-communicable disease, with about 34% having cardiovascular disease—a risk factor for dementia. The 4-week intervention was
based on social-cognitive theory (SCT) and each session was 3 hours long. A component of SCT involves social support, which is part of the nutrition framework for educating older adults (Sahyoun et al., 2004). The nutrition education sessions included vascular and neurocognitive health as they related to nutrition, information on dietary changes to reduce risk factors for chronic disease, ingredient and recipe selection, planning and preparation of a two-course meal, and meal sharing (Wallace et al., 2016). The importance of variety in the diet via fruit, vegetable, herb, and spice intake to reduce the risk of chronic disease factors was a main recurring theme and lessons provided strategies to handle the complicated food system, which can be considered part of the physical environment component of the Sahyoun et al. (2004) framework. Social support in this intervention was emphasized by the group approach to learning and cooking and meal sharing, which allowed for the development of social norms (Wallace et al., 2016). Furthermore, cooking and meal sharing helped involve family members who were part of the social environment. Questionnaires to evaluate learning outcomes were collected at baseline and post-intervention, and a follow-up visit was conducted 3 months after the intervention, which was one of the longer follow-ups of the studies reviewed in this section. Additionally, focus groups which included a smaller subset of participants were conducted to assess the value of the program and its influence on continued behavior change. Because participants were self-selected, it was not surprising that at baseline, almost 16% rated themselves as being at the action stage and almost 80% rated themselves as being at the maintenance stage of change (Wallace et al., 2016). Attitudes about healthy eating and cooking were also unaffected at follow-up because about 80% still considered eating and healthy cooking to be very important (Wallace et al., 2016).
Baseline confidence in cooking, shopping, and meal planning were high (97.5%, 92.5%, and 72.5%, respectively) and no difference in confidence was reported during the program. Eighty-one percent of participants remained confident in each of the three areas (Wallace et al., 2016). Knowledge about risk factors for vascular disease and dementia, the role of herbs and spices in dementia prevention, and sources of polyphenols or the difference between energy and nutrient density in foods were assessed at baseline and showed that participants knew little about these areas. At follow-up, total knowledge score increased significantly (a 43% increase), and this was maintained more than 3 months later (Wallace et al., 2016). The intervention led to a significantly increased variety of vegetables but not fruit and did not impact actual servings of fruits or vegetables. This is an important finding because at baseline, one in four participants did not consume the recommended amounts of fruit a day and almost 75% did not consume the recommended amounts of vegetables. Increased use of spices was noted ($p < 0.001$), as was decreased salt use ($p = 0.006$). Most participants (90%) trimmed fat from meat prior to the intervention and this was not changed by the program. Regarding participant opinions of the intervention, many found the entire program to be helpful, but specific activities that improved skills were practical, like food label reading, and were preferred (Wallace et al., 2016). This intervention seemed to produce greater changes in knowledge than behavior, but participants seemed to value and continue with behavior changes. It is important to note that in this study, confounding factors like education level and socioeconomic status were not determined.
2.10.6 Interventions Focusing on Fruit and Vegetable Intake in the General Older Adult Population

While many studies evaluated the impact of the nutrition education interventions on fruit and vegetable intake, this was not always the main objective of the study or else it was lumped with other objectives as well. A few studies, some of which have already been mentioned, focused solely on fruit and vegetable intake. One of these studies involved older adults from senior centers in Georgia (Hendrix et al., 2008), one examined maintenance of change 18 months after a fruit and vegetable intervention ended (Neville et al., 2015), and two others were culturally specific to Black and Chinese American populations (Campbell et al., 1999; Jih et al., 2016). Each of the studies, though different in their approach and population, were successful at inducing behavior change and one demonstrated that behavior change can be sustained.

One large (final N = 558) fruit and vegetable intervention was based on the Health Belief Model and addressed barriers to fruit and vegetable intake (Hendrix et al., 2008). Results of this study not only revealed significantly increased fruit and vegetable intake but also found that three barriers to intake decreased significantly: difficulties with digestion, too many recommended, and too much trouble which included cost (Hendrix et al., 2008). This study also found that being Black vs. White and having higher education, physical activity, overall health, and knowledge of intake recommendations were significantly and positively associated with total fruit and vegetable intake (Hendrix et al., 2008). Whether or not these changes are sustained long-term is an important question to ask and cannot always be easily assessed after interventions are complete. Neville et al. (2015) set out to do just that: examine the maintenance of change in fruit and vegetable intake 18 months after completion of a 16-week fruit and vegetable intervention as well
as to study the effect of participating in such an intervention on barriers to intake. At
follow-up, it was found that an intervention that provides individualized support,
reinforces the Five-a-Day message, and provides solutions to barriers is able to increase
sustainable fruit and vegetable intake and can help decrease perceived barriers (Neville
et al., 2015).

A large 2-year study (final N = 2519) focused solely on increasing fruit and
vegetable intake by at least 0.5 servings daily in a Black rural population in eastern North
Carolina (Campbell et al., 1999). While this study did not focus solely on older adults
(average age was 54 years), methods and results can still apply to older adult populations.
This intervention recruited from 50 Black churches and each pastor selected three to
seven members to form the Nutrition Action Team. This team was responsible for
organizing and implementing program activities and thus was not only culturally tailored
but also involved participants’ social environment, both of which are components of
Sahyoun et al.’s (2004) nutrition framework for older adults. The intervention group
received the Five-a-Day intervention program, whereas the control group did not receive
the program until after the 2-year follow-up survey. This program lasted 20 months and
used concepts from the trans-theoretical model, social-cognitive theory, and social
support models (Campbell et al., 1999). These concepts were then organized into a
framework that used the PRECEDE-PROCEED model, where predisposing, enabling,
and reinforcing factors related to increases in fruit and vegetable intake and cancer
prevention were ascertained (Campbell et al., 1999). To target predisposing factors, each
participant received personalized, tailored messages and feedback based on survey
information about fruit and vegetable intake, stages of change, barriers, beliefs, and social
support. Gardening and educational sessions that included modifying cooking methods to meet the Five-a-Day guidelines, classes on canning and freezing produce, cookbook and recipe tasting, and serving more fruit and vegetables at church functions were used to target enabling factors (Campbell et al., 1999). Increasing fruit and vegetable availability at church functions was a way to incorporate the physical environment, part of the nutrition education framework, into this intervention (Sahyoun et al., 2004). According to Glanz and Mullis (1988), environmental approaches remove barriers to healthy eating by creating opportunities for action. To target reinforcing factors, church members who were identified as natural helpers attended training sessions on providing social support and helping church members advance in stages of change. Community coalitions met regularly to plan community events, the pastor promoted the project from the pulpit and helped write and review tailored messages, and the church initiated activities like Five-a-Day Sundays (Campbell et al., 1999). Additionally, grocers and vendors were involved by providing recipe cards and coupons and allowed farmers’ market posters to be distributed to grocery stores (Campbell et al., 1999). This is another example of how to incorporate the environment into a nutrition education intervention. To make the program more culturally appropriate, focus groups were conducted early on in the planning process and ongoing feedback from church members was collected during the study. The development of the Nutrition Action Team and involvement of the pastor in incorporating messages into his sermons were not only ways to help make the program more culturally specific, but also drew upon church members’ social network (Campbell et al., 1999).

Overall, this program was successful for prompting dietary changes in rural African Americans (Campbell et al., 1999). A random subsample of participants
completed a follow-up survey at 1 year revealed a one-serving increase in fruit and vegetable intake, which was about half a serving more than the original goal of the intervention. At the 2-year follow-up, it appeared that these behaviors were maintained. The largest increases in fruit and vegetable intake were found in women 66 years of age and older, those who had at least a high school education, and those who were widowed or divorced, while those in the 18-37-year-old group and those who were single showed no significant increases (Campbell et al., 1999). These results suggested this intervention was successful at reaching older adults, even though they were not the main target of the intervention. This echoed the sentiments by Glanz and Mullis (1988) who found that older adults, specifically, are impacted by social networks and the physical environment. Because of this study’s great success with using an ecologic approach, it was encouraged in a report by the Institute of Medicine (2003) which emphasized the need for interventions at multiple levels because these are the most likely to lead to sustained behavior changes.

Another culturally tailored program involving Chinese Americans was designed to evaluate the effectiveness of an in-language (Cantonese, Mandarin, or English) intervention of two lectures plus printed materials, compared to printed materials alone on knowledge and adherence to nutrition and physical activity guidelines in this population (Jih et al., 2016). As in the previous study (Campbell et al., 1999), the average age of participants was 50 and lower than reported in other studies involving older adults. Main outcomes for this study were knowledge, increased fruit and vegetable intake, and increased moderate physical activity (Jih et al., 2016). Similar to previous studies that focused on fruit and vegetable intake, results were promising. Knowledge of
recommended vegetable intake increased significantly in both the intervention and control groups (2.8% to 35.7% and 5% to 8.4%, respectively). Knowledge of fruit intake recommendations was significant for the intervention group (2.8% to 36.3%), but not for the control group (3.1% to 3.95%) (Jih et al., 2016). Self-reported intake of at least four servings of fruit a day increased significantly for both groups (9.1% to 22.4% and 7.3% to 11.5%, respectively), but intake of at least five vegetables a day increased significantly for the intervention group but not the control group (2.2% to 15.2% and 3.4% to 4.8%, respectively) (Jih et al., 2016). Both the knowledge of physical activity recommendations as well as increases in physical activity increased significantly for both groups. When the between-group differences were compared, the intervention group had significantly greater knowledge than the control group as well as greater increases in fruit and vegetable intake (Jih et al., 2016). A rice bowl was used to show appropriate serving sizes and foods commonly eaten by Chinese Americans were also included in the intervention, increasing cultural relevance. Additionally, tips for cooking included how to decrease some items commonly used in Chinese cooking, such as soy sauce.

Sjoberg, Kyungwon, and Reicks (2004) used the theory of planned behavior to identify predictors of fruit and vegetable intake, and found that attitudes toward consuming fruit and vegetable intake as well as perceived behavioral control were significant predictors of intention to consume fruits and vegetables, while subjective norms were not as predictive. This might be especially true for those living alone. Perceived behavioral control was twice as important in explaining variance in intention to consume fruits and vegetables compared to attitudes. Important control beliefs were related to convenience, preferences, time, and availability when eating out. The authors
concluded that these beliefs should be addressed when planning nutrition education for increasing fruits and vegetables in older adults, along with “how to” information on incorporating more fruits and vegetables into their diets (Sjoberg et al., 2004). Many of the above studies did just that, which contributed to the success of their interventions.

2.10.7 Disease-Specific Interventions in the General Older Adult Population

In general, it is surmised that nutrition interventions targeting specific disease states or health conditions are more likely to be successful in helping participants make behavior changes (Sahyoun et al., 2004), which leads to this section on interventions for specific diseases or health conditions of older adults.

Two studies were found that focused on hypertension and sodium reduction in older adults (Colson & Green, 1991; Whelton et al., 1998). The larger of the two studies (final N = 975) also included a weight loss component and sought to determine whether weight loss or decreased sodium intake is effective in the treatment of hypertension in older adults (Whelton et al., 1998). Both studies were RCTs and both provided a series of lessons to their participants, but they differed in design and length. One study (TONE), which examined sodium reduction and weight loss in relation to hypertension, not only included small group lessons but also individual meetings with nutritionists and exercise counselors who had experience with lifestyle change techniques (Whelton et al., 1998). These counselors monitored participants regularly and helped them adapt the program’s recommendations to their individual lifestyles. Each of the three phases of this intervention had a different goal: the goal of the intensive phase was to provide participants with the knowledge and behavior skills needed to reduce sodium intake and weight; the goal of the extended phase was to focus on problem solving and the
prevention of relapse; and the goal of the maintenance phase was to maintain participant interest in the program and reach out to those who were not very active in the practicing behavior change to encourage them to become more involved (Whelton et al., 1998). Contact with participants varied from weekly to biweekly to monthly, depending on the phase of the program. As time went on and more participant contact was made, increased efforts were made to individualize the program.

The second study that focused on sodium reduction in hypertensive older adults lasted 14 weeks and included weekly nutrition classes for 8 weeks (Colson & Green, 1991). The program was developed by nutritionists with Trials of Antihypertensive Intervention and Management (TAIM) and was modified for older adults. Lessons were presented as an informal group discussion that included visuals and handouts, food samples that were related to the topic, and group discussion on adherence meant to provide social support.

Overall, both programs appear to be successful at promoting dietary changes, and one (Colson & Green, 1991) that measured changes in knowledge was able to show significant changes. Weight loss and decreases in sodium intake seem to be an achievable and effective treatment of hypertension in older adults (Whelton et al., 1998). The intervention designed by Colson and Green (1998) involved two treatment groups—hypertensive as well as normotensive groups—and found that the program was more effective in the hypertensive group suggesting, as Sahyoun et al. (2004) mentioned, that older adults with a need for dietary changes are more likely to respond positively to an education program than those without that need.
Multiple interventions examined impacts of programs on dietary habits associated with heart disease risk, one of which was discussed previously (Mayeda & Anderson, 1993). Another of these studies was culturally tailored to Black older adults and was held at a local church; it was similar in those respects to the study done by Campbell et al. (1999), which was discussed previously (Doshi et al., 1994). The goals of this intervention were to develop and carry out a culturally-specific, multidisciplinary nutrition and physical fitness training program for Black older adults living in an urban community (Doshi et al., 1994). The goals of the intervention were to encourage decreased fat, salt, and caloric intake and include daily exercise as a means of improving blood lipid levels, thus decreasing heart disease risk (Doshi et al., 1994). Nutrition information in these 10-week, biweekly sessions included classes on calories, fat, cholesterol, polyunsaturated fats, saturated fats, and sodium content in foods. The classes included demonstrations on culturally-specific cooking aimed at improving dietary cholesterol and fat (Doshi et al., 1994). Possibly due to the short duration of the intervention, results were mostly disappointing. Intake of calories, carbohydrates, protein, fat, dietary cholesterol, percent total calories from saturated fat, monounsaturated fat, and polyunsaturated fats after the intervention did not change significantly, nor did triglycerides or HDL levels (Doshi et al., 1994). Total cholesterol and LDL cholesterol did, however, decrease significantly, as did waist circumference. Body weight, BMI, percent body fat, hip circumference, and waist-hip ratio did not change significantly either (Doshi et al., 1994). Although participants enjoyed the program and learned new information about food and exercise that they said would change their eating behaviors
and increase exercise habits, this was not reflected in the results. Perhaps a long-term extension of this intervention would lead to more significant results in this population.

Three studies did just that, however, describing the long-term outcomes of interventions designed to lower factors related to heart disease risk (Dornealas, Wylie-Rosett, & Swencionis, 1998; Patterson et al., 2003; Wylie-Rosett et al., 1994). Participants in two studies received the intervention for 2 years (Dornealas et al., 1998) and 40 weeks (Wylie-Rosett et al., 1994), while those in the other study were followed for 2 years (Patterson et al., 2003). Another difference of these programs was that two studies assessed program success via mostly biological measures (Dornealas et al., 1998; Wylie-Rosett et al., 1994), while the other measured dietary intakes of fat and saturated fat intake (Patterson et al., 2003). Dornealas et al. (2003) found that BMI of participants at 2 years was significantly different from BMI at baseline. BMI was ≥ 28 at baseline, indicating overweight which is a risk factor for heart disease. Blood glucose levels, another risk factor for heart disease, also decreased significantly over the 2 years. HDL, but not LDL or total cholesterol, was measured in this study and results found no significant changes for HDL levels at 2 years, even though these levels initially increased at 40 weeks post-baseline (Dornealas et al., 2003). Successful components of this study were the use of a theory in the program, use of health professionals such as registered dietitians, and guiding participants to set goals. Wylie-Rosett et al. (1994) reported significant differences in glucose and HDL at 40 weeks between the control and experimental groups, but no differences in LDL or triglycerides. Weight loss was also significantly greater in the intervention group compared to the control group as was change in BMI (Wylie-Rosett et al., 1994), similar to the results reported by Dornealas
et al. (2003). Successful components of this intervention were the use of cognitive-behavioral therapy, individual counseling sessions, reinforced messages, and additional access to health professionals as needed. These studies showed that weight loss can be achieved in older adults, as can improvement of other cardiovascular risk factors like increasing HDL. More needs to be done to develop nutrition education interventions that might lead to greater improvements in LDL and triglycerides in this population.

The intervention studied by Patterson et al. (2003) was a very large study that included participants from the Women’s Health Initiative Low-Fat Dietary Modification Trial. This intervention included 18 lessons that were delivered over 12 months, which were then followed by quarterly maintenance lessons. The objective of this study was to evaluate changes in food sources of dietary fat made by participants with the goal of decreasing total fat to 20% of total calories and saturated fat to 7%. Outcomes were assessed via the use of a Food Frequency Questionnaire (FFQ). Results were encouraging and illustrated that fat intake decreased to 24.3% for the intervention group and 35.7% for controls at 1 year, which was maintained at year 2 (intervention group decreased fat intake to 25.4%) (Patterson et al., 2003). From baseline to 1 year, when compared to the control group, the intervention group decreased fat intake by 24g/day mostly from added fats, meats, and desserts (Patterson et al., 2003). Although the study population was mostly White, impacts of the intervention on various races and ethnicities were teased out. It was established that when compared to controls, Whites decreased total fat significantly more than African Americans at 1 year. At 2 years, White and Hispanic participants decreased total fat significantly more than African Americans and Asians. With respect to added fats, Whites significantly decreased their intake more than other
races/ethnicities (Patterson et al., 2003). Hispanics significantly reduced fat from mixed
dishes significantly more than other groups (Patterson et al., 2003). Successful
components of this intervention were that it was based in theory and provided
opportunities for reinforcement and goal setting. Because of the differences in results of
the different races and ethnicities, perhaps a more culturally tailored program would yield
even better results. The results of these two studies (Dornealas et al., 1998; Patterson et
al., 2003) indicated that community-based programs targeting older adults can lead to
behavioral changes that improve cardiovascular risk profiles and that these changes can
be sustained over the long term.

A unique intervention involved increased milk consumption without any dietary
advice on cardiovascular risk factors as well as energy and nutrient intake and weight
(Barr et al., 2000). To be considered for the study, participants had to have low intake of
dairy products (1.5 servings or less daily) and be willing to consume three additional
servings of milk a day. Compared to other studies using the older adult population, this
was one of the more larger studies, involving 200 participants (final N). The intervention
involved instructing participants to add three 8-ounce servings of skin or 1% milk to their
usual dairy intake and to otherwise follow their normal diet for 12 weeks; no other
instructions were given. The control group was told to continue consuming their regular
diet. Results showed intake of calories, protein, and cholesterol increased significantly in
the milk group, whereas energy from carbohydrates and monounsaturated fats decreased
significantly (Barr et al., 2000). The milk group also exhibited significant increases in
vitamin A, D, riboflavin, B12, pantothenate, calcium, phosphorus, magnesium, zinc, and
potassium, and lower intakes of vitamin C and iron. Body weight increased significantly
in both groups over time. Interaction by time revealed the milk group gained 0.6 kg more than the control group ($P < 0.005$) (Barr et al., 2000). No differences were found between groups for blood pressure, total cholesterol or LDL cholesterol, or ratio of total cholesterol to HDL. Triglyceride levels did increase significantly in the milk group, but were still within the normal range. Older adults in this intervention tolerated increases in dairy consumption well, as shown by high compliance to the intervention and low attrition ($n = 101$ for milk group at baseline and 98 at end of the study), although those with lactose intolerance might have no enrolled in the study. Increasing dairy intake seems to be an effective way to improve nutrient intake in older adults without increasing cardiovascular disease risk. It is important to note that investigators did receive funding from a grant from the International Dairy Foods Association, possibly introducing bias.

The last study discussed in this section involved an intervention for older adults who had established peripheral vascular disease (Grace, Crosby, & Ventura, 1994), which makes it unique from the other studies in that it targeted those already with disease. The purpose of this 18-month study was for participants to make positive changes with respect to dietary cholesterol and saturated fat intake, balanced with mono- and polyunsaturated fats, complex carbohydrates and fiber, and weight loss. The intervention consisted of two levels: one that provided general nutrition information via monthly newsletters and one that provided a more in-depth, personalized method including dietary counseling and follow-up. Results for the in-depth nutrition education intervention were presented in vague terms. Of the 18 participants, 13 met their goal for dietary changes or dietary and exercise changes. Thirteen participants listed weight loss as a goal and 11 reached that goal by decreasing weight by an average of 8.4 pounds.
Nine participants stated decreased serum cholesterol was a goal and seven were able to achieve that goal (Grace et al., 1994). Results for participants in the newsletter intervention group were not reported.

Six studies directly pertaining to older adults with diabetes were identified. Two focused on improving hemoglobin A1c levels and self-management of diabetes (Gough, McCann, & Seal, 1992; Redmond et al., 2006), one study was culturally specific to Mexican Americans with diabetes (Elshaw et al., 1994), one compared a conventional educational approach to a more intensive one based on cognitive motivational theory (Campbell et al., 1990), and two were conducted by the same investigators and reported on one intervention but with different purposes: one was to implement and evaluate a food label and nutrition education program and assessed changes in knowledge and blood glucose levels, while the other evaluated the impact of the nutrition intervention on blood glucose and lipoprotein levels and assessed mostly biochemical measures (Miller, Edwards, Kissling, & Sanville, 2002a, 2002b).

One of these studies, termed “Eat Well, Live Well-Diabetes,” was developed using the Self-Management Education (DSME) guidelines which have been shown to be effective in helping older adults manage their diabetes (Redmond et al., 2006). Eight lessons over a 3-5-month period were delivered to older adults attending senior centers on various diabetes-related topics, including carbohydrate counting, portion control, meal spacing, physical activity, foot care, diabetes complications, and monitoring of blood glucose and A1C. Self-management and pre- and posttests along with A1C were used to assess the efficacy of the program. Prior to intervention initiation, mean A1C levels were 7.3, which is above recommendations. After the intervention, A1C levels decreased
significantly with a greater decrease in those with higher A1C ($P = 0.01$). Decreases in A1C were significantly associated with participation in at least 30 minutes of physical activity a day. Interestingly, changes in A1C were not significantly associated with changes in knowledge for A1C. A significant increase in overall A1C knowledge was noted post-intervention ($P = 0.0001$) (Redmond et al., 2006). Self-management areas of significant improvement included: following an eating plan, spacing carbohydrates, participating in 30 minutes of physical activity, testing blood sugar based on recommendations from healthcare professionals, and foot care (Redmond et al., 2006). This study illustrated that older adults can benefit from interventions aimed at managing diabetes by helping lower A1C and also improving self-management activities.

Gough et al. (1992) conducted a similar but shorter intervention that involved three 2.5-hour small group lessons. This study found no significant changes in A1C levels, unlike the study conducted by Redmond et al. (2006), but did find a small but significant improvement in blood glucose, loss in weight, and decreased BMI. Changes in weight, BMI, and blood glucose levels, however, were not maintained at the 12-month follow-up (Gough et al., 1992). Similar to the reporting in the above study, total knowledge scores increased significantly after the intervention and continued at 12 months. No correlation was found between age and knowledge scores at pre- and posttest or follow-up, corroborating previous information that age does not appear to impact gains in knowledge or retention of knowledge.

Only one culturally relevant study involving diabetes education interventions for older adults was found (Elshaw et al., 1994). Mexican Americans are more likely to develop diabetes than non-Hispanic Whites and also have a higher prevalence of
complications related to their diabetes (Beard et al., 2009). Therefore, the purpose of this study was to assess the impact of a culturally-specific diabetes education program on dietary patterns and to assess nutrient intake in comparison to the Recommended Dietary Allowances (Elshaw et al., 1994). The duration of the intervention was 8 weeks and was comprised of weekly 2-hour sessions with small groups. During each lesson, an 8-15-minute video in both English and Spanish was shown, which was then followed by group discussion. Topics other than nutrition were also covered but included nutrition information. The nutrition sessions included topics on food choices; food preparation techniques to decrease saturated fat and cholesterol intake; and the importance of consuming fruits, vegetables, and whole grains (Elshaw et al., 1994). Assessment tools used to determine weight, calorie intake, percent intake from carbohydrates, fats and protein, and intake of cholesterol, calcium, ascorbic acid and vitamin A included weight and 24-hour recalls at baseline, with follow-up at 10 and 14 weeks (Elshaw et al., 1994).

Results were not optimal. All groups experienced significant weight loss except for females in the treatment group. Surprisingly, the greatest weight loss was seen in the male control group. A non-significant trend in calorie intake was noted, except for the in-control males where a significant decrease in intake was found (Elshaw et al., 1994). Females in the control group consumed significantly less dietary cholesterol at follow-up, but no other group showed any significant decreases. Additionally, no significant changes were found in any group for macronutrients. This study, though culturally tailored, was most likely not rigorous enough or long enough to produce dietary changes that met recommendations set forth by the American Diabetes Association in this population.
Individualized counseling was also not utilized, and this population might have benefited from a more personalized approach (Elshaw et al., 1994).

A study completed by Campbell et al. (1990) did investigate the effectiveness of a more rigorous nutrition education intervention for diabetics. In their study, Campbell et al. compared the effects of a more rigorous educational approach that incorporated longer time, more simplicity, repetition, and cognitive motivational techniques with a conventional intervention in subjects with uncontrolled diabetes. The goal was to improve glycemic control and serum lipids in this population. The conventional group received information on what is diabetes, complications, and diet for over 5 hours total. The intensive group received information on both dietary and podiatry topics that lasted over 22 hours total. The approach for the intensive group was based on cognitive motivational theory, in which the program attempted to help the participants through steps that lead to action (Campbell et al., 1990). Blood lipids, blood glucose, A1C, weight, 4-day food logs, and diet knowledge questionnaires were used to assess the effectiveness of the program before the intervention, and at 1-month, 3-month, and 6-month follow-ups. Results found improvements in complex carbohydrates that were significantly greater in the intensive group, although both groups improved significantly. While both groups had significant improvements in total fat intake, the intensive group had significantly greater improvements than the conventional group. The intensive group achieved a mean level of fat intake within recommendations, while the conventional group did not. Although the intensive group decreased dietary cholesterol intake, there was no significant difference between the two groups. With respect to serum cholesterol, the intensive group experienced a significant decrease by the 1-month follow-up which
was greater than for the conventional group. Decreases in energy intake and BMI between the two groups were not significant at follow-up. Additionally, blood glucose levels did not change significantly in either group. When knowledge was assessed, it was determined that diet knowledge was not related to changes in carbohydrate, fat, or fiber intake (Campbell et al., 1990). Although the intensive program was successful in some of its components, improved glycemic control was still not achieved.

Miller et al. published two studies following the same intervention, but with different objectives. This diabetic intervention for adults 65 years and older included 10 weekly 1.5- to 2-hour sessions and was led by a dietitian. The intervention was grounded in theory and included social-cognitive theory, theory of meaningful learning, and the information-processing model. Food label nutrient information like total carbohydrates and serving sizes was the main focus of the lessons, which also involved modeling the process of comparing foods and selecting the brand that met their needs. The control group received no intervention. The objective of one study was to implement and evaluate this nutrition program by assessing changes in knowledge (Miller et al., 2002a), while the other study evaluated the impact of the intervention on blood glucose and lipoprotein levels (Miller et al., 2002b). Knowledge was measured by testing both declarative (knowledge of facts, objects, and events) and procedural knowledge (how to apply the declarative knowledge). It was found that the experimental group showed greater gains in declarative, procedural, and total knowledge scores (71% vs. 41%), which was significant. With respect to self-efficacy, those in the experimental group had significantly greater increases than the control group as promoters of diabetes self-management (Miller et al., 2002a). When evaluating decision-making scores at follow-
up, investigators found that the experimental group participants showed significantly greater improvements in the use of sensible criteria to make food selections, including information from the Nutrition Facts panel, when compared to the control group (Miller et al., 2002a). When biochemical parameters were measured, significant improvements were seen in the experimental group for A1C and fasting blood glucose, while results for the control group were not significant (Miller et al., 2002b). Additionally, the number of participants in the experimental group who met the guidelines for A1C was significantly higher than the control group. For fasting blood glucose, there were no significant findings for those meeting the guidelines. Changes in serum lipids were not significant for either group at follow-up, although it is important to note that a significantly larger percent of those in the experimental group than the control group had ideal total cholesterol levels (Miller et al., 2002b). While A1C improvements were significant, less than half of the participants met the clinical guidelines, indicating older adults need additional nutrition education along with more effective methods to achieve metabolic control.

2.10.8 Interventions Involving Micronutrients (Calcium)

Only two studies that evaluated the effects of nutrition interventions designed to improve calcium intakes in older adults were found (Babatunde et al., 2011; Constans et al., 1994). One of these programs was culturally tailored to older Black adults and involved a theory-driven program (revised health belief model) to determine its impacts not only on calcium intake, but also osteoporosis knowledge and self-efficacy (Babatunde et al., 2011). This 6-session weekly education program was conducted at churches and senior centers and involved short presentations, hands-on activities, and
demonstrations designed to increase self-efficacy. Each session was 30-45 minutes in small groups. Reinforcement of lessons was provided via handouts after each session. The control group was wait-listed. Outcomes assessments took place via questionnaires that were designed to evaluate dietary calcium intake, osteoporosis knowledge, health beliefs, and self-efficacy. Post-intervention data found that the intervention group increased calcium intake on average by 556 mg, from 874mg to 1430 mg, which was a significant finding. The relationship between changes in knowledge, health beliefs, and self-efficacy on changes in calcium intake were also significant. While changes in self-efficacy and knowledge of osteoporosis were significantly related to calcium intake, after controlling for possible confounders, only the assigned group was the major predictor in the change in calcium intake (Babatunde et al., 2011).

The second study was smaller (final n = 54) and participants were followed for 2 years to determine the effects of a focused nutrition education intervention on dietary calcium intake only in older adults (Constans et al., 1994). Participants in this intervention were divided into groups based on calcium intake which was assessed via food records. The intervention group consumed less than 800 mg calcium daily, while the non-intervention group consumed 800 mg or more daily. A registered dietitian provided information to the intervention group participants on increasing milk and dairy intake, which was tailored to individual taste preferences. In addition to counseling, participants received a list of dairy products with calcium amounts and information on osteoporosis. At the end of the 2 years, mean calcium intake in the intervention group increased significantly from an average of 586 mg to 705 mg daily, with significantly greater increases in women than men. In year 2, dietary calcium intake was significantly higher
than 75% of the RDA in 46% of men and 70% of women and was 800 mg or more in 23% of men and 39% of women in the intervention group (Constans et al., 1994).

Average calcium intake in the non-intervention group did not change significantly over the 2 years. The increase in calcium intake was due to an increase in milk intake but not in other dairy products. No significant increases in energy intake related to increased calcium intake were found in the intervention group. This intervention demonstrated that a brief, individualized nutrition education intervention can lead to increased dietary calcium intake in older adults. Participants in this study were noted to be highly motivated and, as stated previously, when disease states and topics directly pertain to an older adult, dietary changes are more likely to be made.

2.10.9 Interventions That Focus on Congregate and Home-Delivered Meal Participants

Nutrition education intervention studies that focus on congregate and home-delivered meal participants are limited. Most interventions that involve older adults take place in the community and do not specifically target participants in the OAA nutrition programs. One of these nutrition interventions was discussed previously in this literature review (Mayeda & Anderson, 1993). Two other interventions involved a series of 5-6 lessons on general nutrition topics at congregate meal sites in the southern United States (Bobroff et al., 2003; Sharpe et al., 1996), and one intervention focused on dietary supplements (Mitchell, Ash, & McClelland, 2006). Bobroff et al. (2003) sought to assess the effectiveness of a theory-driven, five-lesson nutrition program on knowledge and behavior changes. The five lessons occurred over 6 weeks and focused on cues for behavior change, such as perceived susceptibility and severity, strategies for behavior
change, and tips for decreasing barriers to change. Information for participants included information that targeted clients at various stages of readiness to change. To reinforce concepts discussed, games and other activities followed the lesson and a snack associated with the lesson was provided to participants. Sharpe et al. (1996) wanted to examine the effects of nutrition education on knowledge, attitudes, and behaviors of participants at seven congregate meal sites. Their six lessons were each 1 hour long and used food models and products to illustrate serving sizes, food labeling, and nutrition content. Samples were then distributed and recipes were provided to participants. Post-intervention data for this intervention were collected 2 months after the final class was held, whereas Bobroff et al. (2003) collected data via questionnaires after each lesson. Significant increases in fruit intake and knowledge of the Five-a-Day fruit and vegetable recommendation were found in the intervention group, but knowledge of which food in a list of foods had the most calories was not significant nor was any difference in attitude (Sharpe et al., 1996). This program and the gains in both knowledge and behavior demonstrated that nutrition education at congregate meal sites were beneficial to participants and might play an integral role in the approach to healthy eating and nutrition for older adults (Sharpe et al., 1996). Outcomes for Bobroff et al. (2003) did not explore actual dietary or behavior changes, but rather knowledge gained and participants’ planned behavior change. Results found that at least 61% of participants planned on making changes in eating behaviors as a result of the nutrition education lessons. More than three-quarters of participants said they learned a lot from three of the five sessions: Food Guide Pyramid, fluids, and vitamins and minerals, but not fiber, calcium, and vitamin D. For three out of five lessons, between 70-80% of participants checked a specific behavior
changed they planned on making and some even wrote in their own behavior change goals (11%). For this intervention, five participants were selected for follow-up, but one could not remember the lessons and was excluded. All four said they enjoyed the lessons and felt the topics pertained to them; three of the four said they learned something new; but only two said what they learned would lead them to change a behavior. Barriers to implementing behavior change listed by the four participants included lack of control over intake because they did not do the cooking or long-term eating habits that were difficult to change. All four showed interested in lessons on diet and disease and more about general nutrition (Bobroff et al., 2003). Both of these studies showed that nutrition education has the possibility to improve nutritional status and health of congregate meal site participants and therefore also has the capacity to reduce healthcare costs.

Another study that also focused on older adults participating in the congregate meal nutrition program focused specifically on fruit and vegetable intake (Brewer, Dickens, Humphrey, & Stephenson, 2016). The purpose of this study was to determine if the amount and variety of fruits and vegetables consumed increased in this population, following a series of five nutrition education lessons (Brewer et al., 2016). This intervention was adapted from another program and involved five 15-minute nutrition lessons that focused on fruit and vegetable intake. Serving size, phytochemicals, shopping tips, and tips to overcome barriers were included in the lessons. Recipe cards were provided and participants were offered samples of the recipes. The control group received only the guide on phytochemicals, recipe cards, and phytochemical information cards. Like most other studies involving nutrition interventions in older adults, this study evaluated outcomes via questionnaires, but differed from all other studies in that it also
used the technique of plate waste to evaluate outcomes (Brewer et al., 2016). The plate-waste component measured averages of participant intake of the total meal, meal components, and the phytochemical index score (Brewer et al., 2016). Analysis of plate-waste data post-intervention showed that the intervention group significantly increased intake of fruits and vegetables from pre- to post-questionnaire. The intervention group also reported including more fruits and vegetables into their evening meal ($p = 0.0035$) and all meals combined ($p = 0.002$) from pre- to post-intervention. The number of days that at least 4.5 cups of fruits and vegetables were eaten throughout the week also increased for the intervention group ($p = 0.004$) (Brewer et al., 2016). No difference in knowledge was noted in the intervention or control groups with respect to labeling plants as the food source of phytochemicals. Even though this program was short, it still led to an increase in fruit and vegetable intake. This intervention was theory-based and included the use of incentives, which may have increased its effectiveness.

As mentioned previously in this chapter, older adults often reported inadequate intakes of various micronutrients, and dietary supplements could help this population come closer to meeting recommendations. Only one study in this literature review involved the use of supplements and this was a large RCT (Final $N = 703$) involving participants from congregate meal programs in 17 counties throughout North Carolina (Mitchell et al., 2006). The intervention was developed from social-cognitive theory and was delivered by cooperative extension employees. Five sessions were included in the intervention and included information on micronutrients of concern for older adults, appropriate use, and risks associated with supplement intake, along with other practical information; in the last session, participants were able to develop a personal action plan.
The control group received information on weight management and exercise. As a result of the program, participants in the experimental group showed significantly more positive change than those in the control, as evidenced by increased multivitamin use, calcium use, reading dietary supplement labels, keeping and updating medication lists, and talking with their doctor or pharmacist about dietary supplement use (Mitchell et al., 2006).

These studies showed that congregate meal participants, who are at greater nutritional risk than other older adults living in the community, have the potential to benefit greatly from well-designed nutrition education interventions and programs. These benefits can decrease costs for healthcare and possible need for institutionalization because this at-risk group can improve health and functional status with proper nutrition which will enable them to stay in the community setting. As the older adult population grows and the population continues to live longer, these nutrition interventions can play an integral role in contributing to their overall well-being.

2.10.10 The Dillman Method

It is suggested that sending multiple contacts to participants is an effective way to increase response rates (Cook, Heath, & Thompson, 2000). The sequence for web surveys outlined by Dillman et al. (2014) suggested starting with a survey invitation, followed by reminder emails. This method left the determination of how many follow-ups to send up to the researcher based on evaluation of the gains made after each follow-up. For example, if the first two reminders led to positive results, a third might be helpful, but if the reminders were not helpful, unless a different approach is used, continued follow-ups are not indicated (Dillman et al., 2014). The authors suggested spacing the emails but do not provide specific guidelines for doing so. It was suggested
that content in each email should be varied to appeal in different ways to potential participants (Dillman et al., 2014). The first email should introduce the study, explain why it is being conducted and who is conducting it along, and provide contact information for questions. It should tell potential participants why they were selected and what is being asked of them, and also explain that data will be kept confidential (Dillman et al., 2014). A link or information on how to access the survey should also be included. The first reminder email should explain that the survey invitation was sent, thank participants for responding to the survey, and ask those who have not yet participated to do so (Dillman et al., 2014). Further follow-ups should be individualized when possible and should only include those who have not yet responded, emphasizing the importance of their participation (Dillman et al., 2014).

2.11 Conclusion

After review of the literature, it becomes apparent that successful nutrition education interventions are comprised of various parts of the framework for nutrition education for older adults, as proposed by Sahyoun et al. (2004). Only one study included every element of the framework (Hackman & Wagner, 1990), and it involved a gardening program that resulted in not only dietary changes but attitudinal changes as well. It does appear also that interventions including the social and physical environment were more successful than those that did not, although only 12 out of 39 interventions involved the social environment, such as family or peer support, and four out of 39 involved the physical environment, such as providing more fruits and vegetables at church functions to increase availability and intake (Campbell et al., 1999). Campbell et al. (1999) was
specifically mentioned by Sahyoun et al. (2004) as using an ecologic approach that is encouraged by the IOM (2001) because it is more likely to lead to sustained behavior change. It appears that the closer to the social-ecological model the intervention is, along with the specific components outlined by Sahyoun et al. (2004), the more successful the intervention.

All interventions attempted to provide messages that are limited, simple, targeted, and reinforced, and most interventions grouped participants by health, socioeconomic, or other status. As mentioned by Lyons (2014), few interventions divided the groups according to age, which may have added benefits. More than half of all interventions included hands-on activities like games, cooking demos, or taste testing. Twenty-six interventions specifically mentioned use of theoretical models for behavior change. The most commonly used models were the Health Belief Model and social-cognitive theory. A meta-analysis of interventions using the Health Belief Model found that perceived barriers and susceptibility were the most important features leading to behavior change (Janz & Becker, 1984). Hands-on activities and goal setting can help decrease barriers and increase an older adult’s sense of control. Many studies examined in this literature review, particularly those targeting fruit and vegetable intake, addressed barriers to intake, which appeared to be effective in leading to behavior change. Other studies, particularly those that addressed specific disease states, included aspects about susceptibility, which also seemed to help drive behavior change. Fewer than half of the interventions reviewed above allowed participants to be involved in determining the goals of the intervention, but when allowed to do so, participants appeared more motivated to reach their goals. Eleven studies used incentives such as magnets, t-shirts,
money, pedometers, and so on to retain participants and seemed effective in lowering attrition. Finances are often a barrier in being able to provide incentives and might not be a viable option for some nutrition educators. More than half of the reviewed studies involved regular contact with health professionals such as dietitians or nurses. Many interventions used graduate students, such as nursing graduate students, to provide the contacts and nutrition education for participants. A few interventions were home-based and provided only written nutrition education; therefore, no contact with health professionals was made.

Each intervention was reviewed for the components of the framework developed by Sahyoun et al. (2004). It is important to note that some of the studies reviewed did not detail the specifics of their nutrition education intervention, so accurate determination of framework components was not always possible.

In addition to the major components included in the proposed framework by Sahyoun et al. (2004), other features also seemed effective. Nutrition education interventions that occurred over multiple sessions seemed more successful as this allowed for reinforcement of education and more opportunity to provide nutrition education. Smaller class size also seemed to increase success of nutrition interventions, particularly when group discussions were encouraged. This allowed for increased peer support (social environment) and reinforcement of lessons, although at times this might have inhibited individuals from divulging sensitive information. Individualizing messages via one-on-one contact or through review of food logs and diet analyses also seemed to increase the success of nutrition interventions because this enabled educators to truly tailor the program to participant needs. Multiple short sessions, 15-40 minutes in length, seemed to
be sufficient for providing effective nutrition education, and this might be particularly important for congregate meal site educators since time is often a limiting factor. Multiple short bursts of education might be better than fewer longer ones, as these can serve to reinforce education concepts and hold attention better than longer education sessions that are held less frequently. Participants in the reviewed studies seemed to enjoy taste tests, cooking demonstrations, and simple recipes that made one to two servings because these were applicable to their home environment and helped decrease barriers and increase control by demonstrating ease of preparation, reasonable cost, and access to ingredients. Participants also seemed receptive to written materials and handouts that could be used as a reference and serve as reinforcement to the education interventions. It was noted in multiple studies that written materials at a fifth-grade level seemed well received as even participants who are able readers were not offended by simpler text.

While multiple successful components could be pulled from the studies reviewed, it is important to note the many limitations. Many interventions were too short to lead to sustained behavior changes. Although some nutrition interventions did perform needs assessments and determined the needs of the population before designing the nutrition education intervention, many did not. Many also did not determine level of motivation in participants. It is known that motivated individuals are more receptive and willing to change than are unmotivated individuals. The trans-theoretical model which assesses stages of change would be important to use when designing nutrition education interventions for older adults (Sahyoun et al., 2004). In many of the reviewed studies, participants were self-selected and may have been highly motivated and interested in the topic. Other participants were convenience samples and results might not be
generalizable to other older adult populations. Many of the studies involved mostly White women, but some did not report on demographics at all. As Sahyoun et al. (2004) noted, some interventions were not designed based on the demographics of the population used, which may have impacted effectiveness. The few studies that target certain races/ethnicities did make an effort to tailor their program culturally, which seemed to improve the success of the intervention. Most of the studies were small and did not include power calculations, thus limiting generalizability and the ability to determine intervention effectiveness (Sahyoun et al., 2004). Other interventions had very high attrition rates. Not all interventions were randomized controlled trials and did not have control groups, making it difficult to determine how effective the intervention truly was. Additionally, for some of the more general nutrition education interventions and fruit and vegetable interventions, participants had good nutritional status and were meeting the recommendations, leaving little room for improvement post-intervention and decreasing ability to evaluate program success.
Chapter III

METHODS

3.1 Overview and Study Design

This cross-sectional study involved a one-time online survey of nutrition educators who work at congregate and home-delivered meal sites. The purpose of this study was to determine the current state of nutrition education at congregate and home-delivered meal sites with respect to what topics educators feel are important, how educators are delivering their nutrition education, what materials are being used to deliver nutrition education, how satisfied educators are with these materials, what criteria are being used when choosing education materials and topics, whether evaluations of education sessions are being conducted, if evidence-based programming is desired by educators, whether educators feel they have the tools to screen for and address malnutrition, and if dietetic professional oversight policies affect how nutrition education is being delivered. The answers of nutrition professionals were compared with those of non-nutrition professionals.

Also examined was the extent to which nutrition education at congregate and home-delivered meal sites are being conducted in a way that is theory-based and behaviorally focused. If it is, in what ways and how does this differ with nutrition professionals versus non-nutrition professionals? Additionally, to what extent are
nutrition educators evaluating their nutrition education sessions for effectiveness? Again, the answers of nutrition professionals were compared with non-nutrition professionals. Moreover, nutrition education policies for each state were reviewed to determine whether having a policy stating that a nutrition professional must develop, oversee, or approve nutrition education positively impacts the amount of theory-based and behaviorally focused education is provided at congregate and home-delivered meal sites. Finally, the study explored how much malnutrition is perceived as a problem by nutrition educators, how much malnutrition is addressed, and whether educators feel they have the tools to assess and screen for malnutrition; answered were compared for both nutrition professionals and non-nutrition professionals.

This chapter describes the development of the survey, a pilot study, and methods for data collection, data coding, and data analysis for this study.

### 3.2 Institutional Review Board

Approval from the Institutional Review Board (IRB) of Teachers College, Columbia University was received (Appendix A). Informed consent was obtained by sending an email/letter to participants that was attached to and preceded the online survey. This letter also provided general information about the survey. The first question of the survey also asked for consent. If a participant did not consent, the survey software did not allow them to continue to the survey and the survey ended.
3.3 Instrument

The final survey used in this dissertation (Appendix B) was developed solely for this study because no known validated instrument would have fulfilled its objectives. Ultimately, after multiple revisions based on expert review and feedback, 48 questions were included in the survey. The survey took about 10 to 15 minutes to complete and was conducted and compiled via the Qualtrics online survey program. Once the survey was complete, the Qualtrics software saved the data for analysis. All data were coded in Microsoft Excel and then transported to SPSS Version 24 for analysis.

3.3.1 Survey Question Development and Breakdown

The development of the survey instrument was largely based on a combination of the elements of the Sahyoun et al. (2004) framework for nutrition education for older adults as well as Contento’s (2016) nutrition education model. According to Contento, the three essential components of theory-based, behaviorally focused nutrition education are efforts that enhance motivation, facilitate action, and include environmental supports. In the enhanced motivation components, the goal is to increase awareness and inspire behavior change by concentrating on beliefs and attitudes, while the goal of the facilitate action component is to increase confidence, knowledge, and skills via goal setting (Contento, 2016). The goal of the environmental supports component is to promote physical, social, and information environments that make healthful behaviors the easy behaviors by working with policymakers and others such as families and communities (Contento, 2016).
General characteristics of survey participants were ascertained as well, such as length of time in profession; whether the educator worked with congregate meals, home-delivered meals, or both; employment type (congregate, home, or both); number of sessions conducted per year and per month; and the state where the educator practiced. Participants were also asked about the characteristics of nutrition education sessions, which included typical group size and length of the education session. Questions included what topics the educators felt were important; what criteria were used to choose materials; and whether these were theory-based considerations, topic-based considerations, and/or practical considerations. Additionally, participants were asked what materials were being used to deliver nutrition education and how satisfied they were with these materials. It was important to know how educators were delivering their nutrition education sessions, so one question was asked on this topic. Nutrition educators were also asked about barriers and facilitators to conducting nutrition education for older adults because this impacts the quality of nutrition education provided. Finally, nutrition educators were asked if and how they were conducting evaluations of their nutrition education sessions for effectiveness.

3.3.2 Pilot Testing

The pilot study involved registered dietitians from Wisconsin who worked with congregate meal sites. The list of emails for these dietitians was obtained with the help of the National Nutritionist for the Administration for Community Living (ACL). An email with a link to the survey was sent to participants that described the study and asked for consent. On August 29, 2016, 54 surveys were sent via email, but eight bounced back due to unrecognized email addresses. On September 7, 2016, a reminder email was sent to the
46 participants with valid emails, and on September 15, 2016, another reminder email was sent to 40 participants who had not yet responded to the survey. This followed a modified “Dillman method” (Dillman et al., 2014), which is designed to maximize response rates for research involving surveys and is described below. Two weeks after the initial email, another reminder email was sent. Finally, the last point of contact was on September 28, which included a thank-you note to all participants who completed the survey.

On this version of the survey (Appendix C), 53 questions were asked. Overall response rates were less than optimal. Of the 46 possible participants, 19 participants started the survey, but eight were not dietitians so the survey ended \( n = 11 \). Two of the remaining 11 participants did not work at congregate meal sites, so the survey ended \( n = 9 \). By Question 8, only six participants responded \( n = 6 \), and by Question 28, only five remained. Ultimately, only five participants completed the survey, which was an 11% response rate. This number, however, did not include those who started the survey or who would have completed the survey had they been a dietitian and eligible for the study. Based on the low number of responses obtained and the difficulty obtaining registered dietitians who work with congregate meal sites, the researcher decided to open the survey to non-dietitians as well. This was also based on expert feedback from the National Nutritionist for the ACL, who suggested including a variety of nutrition educators such as licensed dietitians, dietetic interns, health and human science degree holders, certified dietary managers, registered nurses, licensed practical nurses, social workers, and licensed clinical social workers because they too regularly provide nutrition education for this population. She also suggested including nutrition educators who
worked with the home-delivered meal program since nutrition education is a component of this program as well. Additionally, the survey was originally only going to include dietitians from the Northeastern part of the United States, but because this study is the first of its kind and it was important to understand nutrition education better in the congregate and home-delivered meal programs, the researcher decided to open the survey to a national level. Based on additional piloting with other experts in the field, it was also decided that the survey was too long and was subsequently shortened to 48 questions. Some entire questions were eliminated while, for other questions, only the short-answer options were eliminated to decrease participant burden. Originally survey questions were kept more general, but because malnutrition is a major concern for the older adult population, particularly those who participate in Title III-C meal programs, the researcher, after speaking with the ACL National Nutritionist, decided that questions involving malnutrition should be included. As a result, three such questions were added that asked how much malnutrition was being perceived as a problem by the nutrition educator, how much malnutrition was being addressed, and did educators have the tools to assess and screen for malnutrition. Because evidence-based programming is encouraged when providing nutrition education, two questions were added to the survey that asked nutrition educators if they would use evidence-based programs and, if interested, did they think they had funding to implement them.

Originally, participants were required to answer each question before being able to advance to the next question, but Dillman (2014) suggested allowing participants to skip questions when possible. The rationale is that forcing responses could lead to early termination of the survey if the participant becomes frustrated, does not want to answer
the question, or does not know how to answer the question. Forcing responses could also force participants to make a choice randomly or make a choice not applicable to them, thus invalidating responses. This survey was revised to only force responses for the questions that determined participant eligibility.

3.3.3 Main Study Survey Question Breakdown

Table 3.1 shows the breakdown of survey questions:

Table 3.1

Survey Questions for Nutrition Education at Congregate and Home-Delivered Meal Sites

<table>
<thead>
<tr>
<th>Question Category</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>General characteristics of survey participants</td>
<td>15</td>
</tr>
<tr>
<td>Characteristics of nutrition education sessions</td>
<td>2</td>
</tr>
<tr>
<td>Nutrition topics educators feel are important</td>
<td>2</td>
</tr>
<tr>
<td>Criteria used to choose materials (theory-based, topic-based, practical considerations)/Delivery considerations</td>
<td>3</td>
</tr>
<tr>
<td>Materials being used to deliver nutrition education and how satisfied are educators with these materials</td>
<td>3</td>
</tr>
<tr>
<td>How educators deliver nutrition topics</td>
<td>1</td>
</tr>
<tr>
<td>Barriers and facilitators to conducting nutrition education</td>
<td>2</td>
</tr>
<tr>
<td>Educator interest in and available funding for evidence-based programs</td>
<td>2</td>
</tr>
<tr>
<td>Extent that nutrition education is being delivered in a way that is theory-based and behaviorally focused</td>
<td>11</td>
</tr>
<tr>
<td>Evaluation of nutrition education sessions for effectiveness</td>
<td>5</td>
</tr>
<tr>
<td>If malnutrition is perceived to be a problem, how much is it being addressed, do educators have the tools to assess and screen for malnutrition?</td>
<td>3</td>
</tr>
<tr>
<td>Given unlimited resources, what changes would educators like to see in their nutrition education for congregate/home-delivered meal sites</td>
<td>1</td>
</tr>
<tr>
<td>Additional comments</td>
<td>1</td>
</tr>
</tbody>
</table>
3.4 Main Study Participants and Recruitment

Survey participants were recruited via multiple listservs and contact information from a variety of agencies and organizations who work with congregate and home-delivered meal participants, such as Administration for Community Living Title VI, National Resource Center on Nutrition and Aging’s State Unit on Aging Listserv, Meals on Wheels, National Association of Area Agencies on Aging, National Association of Nutrition and Aging Services Program, National Association of States United for Aging and Disabilities, National Council on Aging, Society for Nutrition Education and Behavior, USDA, and SNAP-Ed. The emails, which were sent on April 19, 2017, targeted dietitians and other nutrition educators who develop and provide nutrition education to participants in congregate and/or home-delivered meal sites for older adults. On the day of survey distribution, a letter explaining the study was sent via this email, explaining the study and inviting nutrition educators to participate (Appendix D). An online link to the survey was included and the email indicated that no personal identifying information would be collected. Due to limited access to the lists of 5,000 potential participants, the National Nutritionist for the ACL offered to send the survey. A modified version of the Dillman method was used to decrease the burden to the ACL National Nutritionist as she was sending emails to multiple organizations and listservs. For this reason, only a survey invitation and one follow-up email were sent. The survey invitation that was sent on April 19, 2017, resulted in responses from 131 participants. It is not known how many participants received the invitation as email recipients were asked to forward the invitation link along to others. A reminder email was sent to a smaller subset of the original recipients on May 18, 2017, but a poor response rate was
noted, with only an additional six participants responding by May 23, 2017. On May 23, 2017, a separate email (Appendix E) was sent by the researcher of this study to emails previously acquired through contacts with SUAs as well as emails on a published list of administrators and nutritionists for all 50 states. An additional 66 participants completed the survey after this email (n = 203).

To clarify, 203 participants initiated the study by consenting to participate, but only 84 actually followed through to completion of the study. Participants were deemed ineligible if they did not hold one of the nine credentials listed; this eliminated 63 participants (n = 140). Participants were also deemed ineligible if they did not currently work with a congregate or home-delivered meal site/program; this eliminated 24 participants (n = 116). Question 7 asked what state/territory the nutrition educator worked for, and only 97 participants responded. Question 12 asked participants if clients were encouraged to set behavior change goals and only 90 responded. Up through Question 25, 89 participants were still responding, but by Question 36, there were only 86 participants. Questions 38-48 asked general questions about education requirements, number of meal sites covered, frequency of nutrition education, size of groups, and demographic information; the final participant number was 84.

Due to low response rates, additional emails (Appendix F) were sent to State Unit on Aging administrators and nutritionists in an attempt to recruit additional participants. A list of contacts for each state was found online and all were emailed and contacted with a follow-up phone call. In some instances, additional contact information was provided for AAAs or cooperative extensions. With this method, additional participants were recruited, thus increasing the sample (final n = 264). All but five states were represented
in the survey, with at least one participant response. States without representation were Indiana, Louisiana, Michigan, Tennessee, and Utah.

Figure 3.1 presents the timeline followed for this study to contact the participants.

The National Nutritionist for the Administration on Community Living obtained 84 participants from the original outreach effort. We conducted t-tests to determine if differences existed in the first group of participants obtained vs. the participants obtained after the initial outreach on credential, length of credential, and where educators work (home vs. congregate sites), and no significant differences were found.

3.5 Measures

The data from the survey were downloaded from Qualtrics and uploaded into SPSS Version 24 for analysis. To determine the overall prevalence of specific survey responses, descriptive statistics and frequency counts were used for all variables. Data
were then split into grouping variables based on professional credential, and descriptive statistics were run on these variables to determine if there was a difference between dietetic professionals and other professionals (see Table 3.2).

Table 3.2

*Professionals Categorized as Dietetic Professionals and Non-dietetic Professionals*

<table>
<thead>
<tr>
<th>Dietetic professionals (n =122)</th>
<th>Non-Dietetic Professionals (n =139)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Dietitian</td>
<td>Health and Human Services degree</td>
</tr>
<tr>
<td>Licensed Dietitian</td>
<td>Certified Dietary Manager</td>
</tr>
<tr>
<td>Dietetic Intern</td>
<td>Registered Nurse</td>
</tr>
<tr>
<td></td>
<td>Licensed Practical Nurse</td>
</tr>
<tr>
<td></td>
<td>Social Worker</td>
</tr>
<tr>
<td></td>
<td>Licensed Social Worker</td>
</tr>
</tbody>
</table>

3.6 Creating a Combined Model Theory-based, Behaviorally Focused Nutrition Education

This research focused on how nutrition education for older adults is conducted and evaluated in a way that is theory-based and behaviorally focused. This necessitated creating a model that operationalized conducting and evaluating theory-based and behaviorally focused nutrition education for older adults. This model combined Sahyoun et al.’s (2004) and Contento’s (2007, 2015) models. The four components of conducting theory-based, behaviorally focused nutrition education for older adults are: enhance motivation, facilitate action, create a supportive environment, and delivery considerations. Evaluation of this education can include outcome measures (dietary, enhance motivation, and facilitate action) and process measures (see Figure 3.2).
3.7 Creating Scales for the Four Components for Conducting Theory-based, Behaviorally Focused Nutrition Education

For RQ2a, b, c, and d, twelve survey questions, three with several parts, were used to create the scales for conducting theory-based, behaviorally focused nutrition education. The four scales are enhanced motivation, facilitate action, supportive environment, and delivery considerations. See Table 3.3 for the breakdown of specific survey questions for these scales.
Table 3.3

Questions Used to Create Variables for the Components of the Theory-based, Behaviorally Focused Nutrition Education

<table>
<thead>
<tr>
<th>Component</th>
<th>Survey Question</th>
<th>Response Option</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enhanced Motivation (4 questions)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q21a: Promote positive attitudes to behavior change (e.g., promote positive feelings about decreasing salty foods in the diet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q21b: Discuss health benefits of behavior change (e.g., discussing how decreasing salty foods will lower blood pressure)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q21f: Reduce perceived barriers (e.g., providing examples/samples of low sodium foods that taste good)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q21g: Establish risk/susceptibility to health conditions (e.g., provide self-assessment of salt intake compared to recommendations)</td>
<td></td>
</tr>
<tr>
<td><strong>Facilitate Action (7 questions)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q12: Are participants encouraged to set behavior change goals during nutrition education sessions? (for example, participants state that they will increase intake of calcium rich foods)</td>
<td>0=never, 1=rarely, 2=sometimes, 3=usually, 4=always</td>
</tr>
<tr>
<td></td>
<td>• Q13: Do lessons provide opportunities for participants to create action plans for how they will carry out their stated behavior change goal(s)? (for example, participant will state what fruit they will add to breakfast and how often)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q16: Are lessons tailored to common disease states of the participants at your congregate meal sites or home-delivered meal sites? (for example, osteoporosis, diabetes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q17: Are lessons culturally tailored to participants at your congregate meal or home-delivered meal sites? (for example, do you make recommendations about meal planning based on ethnicity of the group?)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q20: Are follow-up lessons provided to reinforce behaviors?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Q21c: Provide information/knowledge (e.g., providing handout on foods that contain a lot of salt)</td>
<td></td>
</tr>
</tbody>
</table>
- Q21d: Increase confidence (e.g., enhance individual’s feelings that they have the ability to decrease intake of salty foods)
- Q21e: Increase skills (e.g., demonstrating how to reduce salt while cooking)

Environmental Supports
(2 questions)

- Q18: Do your nutrition education lessons consider home or neighborhood environments? (For example, how to obtain fresh produce? how to get to the grocery store? how to prepare meals/meal planning for one or two?)
- Q19: Do your nutrition education lessons include participants' support such as family and friends? (For example, are friends or family members ever asked to join nutrition education sessions?)

Delivery Considerations
(4 questions)

- Q10a,10b,10j,10k,10l: What criteria are used when selecting material for nutrition education lessons at home delivered or congregate meal sites? (Check all that apply) [options, 1 point each: Cover topics clients/participants are interested in; Focus on specific behavior change; Simple messages; Practical; Targeted (specific topic, relevant to older adults)]
- Q14: Are hands-on activities incorporated into lessons? (For example, taste tests, cooking classes, games, worksheets)
- Q15: Are incentives provided for participation in nutrition education lessons? (For example, magnets, pens, free samples, coupon vouchers, gift cards)
- Q11d, 11h: What methods do you use when delivering nutrition education? (Check all that apply) [options: games, discussions 2.5 points each]
Descriptive statistics were used to examine if educators were conducting theory-based, behaviorally focused nutrition education. Independent t-tests were performed to determine whether there were differences between dietetic professionals and non-dietetic professionals with respect to conducting theory-based, behaviorally focused nutrition education.

### 3.8 Creating a Scale for Education Topics Covered

For RQ2d, to assess the number of topics covered in the last two years, question 8 was used. This question asked a total of 27 topics. For each topic, survey respondents checked-off which topics she or he covered in the last two years, making this a 0–27 scale. This scale was used as a proxy for quantity of education over the past two years.

### 3.9 Creating Scales for Evaluating Nutrition Education for Older Adults

For RQ2d a scale was created for total evaluation score for outcomes using questions 24a to 24h. See Outcome section of Table 3.4. For RQ3a scales were created for three areas of outcome evaluations and for process evaluations that are described below. In addition to these evaluation scales, general evaluation questions were asked, such as: Do you conduct evaluations and what type of evaluations are conducted (for example, verbal questions at the end of the lesson, surveys/questionnaires, comment cards)?

For the development of the areas of evaluation scales, one survey question with 11 parts was used to create the scales for evaluation. The four scales are: dietary, enhance motivation, facilitate action, and process. See Table 3.4 for the breakdown of specific survey questions for these scales:
Table 3.4

*Questions Used to Create Variables for Evaluation*

<table>
<thead>
<tr>
<th>Component</th>
<th>Survey Question: When evaluating the effectiveness of your nutrition education lessons, what do you evaluate?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTCOMES:</strong></td>
<td></td>
</tr>
<tr>
<td>Dietary</td>
<td>• Q24b: Behavior changes (e.g., did they decrease salt intake)</td>
</tr>
<tr>
<td>(1 question)</td>
<td></td>
</tr>
<tr>
<td>Enhance Motivation</td>
<td>• Q24c: Increased positive attitudes to behavior change</td>
</tr>
<tr>
<td>(4 questions)</td>
<td>• Q24d: Reduce perceived barriers</td>
</tr>
<tr>
<td></td>
<td>• Q24g: Increased benefits of behavior change</td>
</tr>
<tr>
<td></td>
<td>• Q24h: Established risk/susceptibility to health conditions</td>
</tr>
<tr>
<td>Facilitate Action</td>
<td>• Q24a: Increased knowledge</td>
</tr>
<tr>
<td>(3 questions)</td>
<td>• Q24e: Increased confidence</td>
</tr>
<tr>
<td></td>
<td>• Q24f: Increased skills</td>
</tr>
<tr>
<td><strong>PROCESS</strong></td>
<td></td>
</tr>
<tr>
<td>(3 questions)</td>
<td>• Q24i: If participants enjoyed the lesson</td>
</tr>
<tr>
<td></td>
<td>• Q24j: If participants intend to come to the next lesson</td>
</tr>
<tr>
<td></td>
<td>• Q24k: Number of participants that attended</td>
</tr>
</tbody>
</table>

Descriptive statistics were used to examine if educators were evaluating the effectiveness of their nutrition education sessions; how effectiveness was being measured (verbal questions at the end of the lesson, surveys/questionnaires, comment cards); and what evaluation measures were being used (dietary, enhance motivation, facilitate action, or process). Independent t-tests were performed to determine whether there were
differences between dietetic professionals and non-dietetic professionals with respect to conducting evaluations.

### 3.10 Creating Scales for Evaluating Importance of Malnutrition, Malnutrition Materials, and Screening for Malnutrition

For RQ4a, b, and c several scales were created. To assess whether nutrition educators felt malnutrition was an important topic or concern, the researcher divided Question 8 into 27 yes/no components. Using two of those components—one asked if malnutrition has been a topic in the past 2 years, while the other asked if age-related appetite loss has been a topic of nutrition education in the past two years (Q8b, Q8aa)—the researcher examined how much malnutrition was being addressed with descriptive statistics. Descriptive statistics that examined overall results as well as those split by the dietetics profession were performed. Independent t-tests were also performed to determine whether differences existed on malnutrition education between dietetics and non-dietetic professionals. Specifically, the answers to these three questions was assessed, each on a 5-point scale, for independent t-tests: if malnutrition was perceived to be a major concern (Q34), if educators felt they had tools for screening malnutrition (Q35), and if there were adequate education materials to address malnutrition (Q36).

### 3.11 State Policies for Nutrition Education at Congregate and Home-Delivered Meal Sites

The researcher found all state policies for nutrition education at congregate and home-delivered meal sites on the Meals on Wheels website, https://www.mealsonwheelsamerica.org/theissue/research/policy-myths. A database was compiled that included as much of the following information as was available from each state: credentials, training,
education of nutrition educator; number of nutrition education sessions; modes of education delivery; topic; length of presentation; when presentation is to be presented; recommendations for evidence-based lessons; and any specifics or differing information for nutrition education at home-delivered meal sites. Descriptive statistics were done on policy differences between states and for each policy type examples of typical policies and particularly clear and detailed policies are presented.

### 3.12 Qualitative Data Analysis Plan

Various short-answer text-box questions were included on the survey: eight “other” text boxes, two “comments” text boxes to expand on multiple-choice answers, and two open-ended questions. The “comments” and “other” data were coded as choices provided in the survey where appropriate. The open-ended questions (Q37 and Q49) were treated as qualitative data and placed into a category or multiple categories where appropriate, and responses were coded based on topics to determine themes.

### 3.13 Research Questions, Measures, and Data Analysis Plan

Table 3.5 lists each of the research questions, the measures (specific survey questions), and how the data were analyzed. First, descriptive statistics and frequencies were performed for all research questions for all participants and also split by professional credential (dietetic professionals vs. non-dietetic professionals).

For RQ2a, b, and c, independent t-tests were performed to compare dietetic professionals vs. non-dietetic health professionals on their total scores on the theory-based, behaviorally focused nutrition education described in section 3.7. For all
significant t-tests, effect size was calculated using Cohen D difference in Standard Error, with .20 indicating small effect, .5 indicating medium effect, and .8 larger effect.

For RQ3d, which asked what educator factors explain variance in theory-based, behaviorally focused nutrition education score a regression analysis was conducted. This took a series of steps. To meet the assumption of a positive linear correlation between two continuous variables, a correlational analysis was conducted between theory-based, behaviorally focused nutrition education score and the scale of educational topics covered in the past two years, described in section 3.9. This yielded a .475 correlation (p<0.01). Meeting this assumption, eight educator factors that research literature have evidence might influence quality of education were determined. Table 3.6 lists these educator factors and the rationale for this factor. Correlational analyses of the eight educator factors with each other and with theory-based behaviorally focused nutrition education scores were conducted. Educational topics was used for RQ2d to determine if there is linear correlation. Additionally, for RQ2d, multiple linear regression analysis was performed to determine if the eight educator factors explain the variance in theory-based, behaviorally focused score. The initial analysis contained all eight factors. To create the most parsimonious model, educator factors that had low beta coefficients and were not significant would be removed in a step-wise fashion.

For RQ3a, independent t-tests were performed to compare dietetic professionals vs. non-dietetic health professionals on their scores on the outcome and process evaluation scales described in section 3.9.
For RQ4a, b, and c, independent t-tests were performed to compare dietetic professionals vs. non-dietetic health professionals on the malnutrition scales described in section 3.10.
Table 3.5

*Research Questions, Measures, and Data Analysis Plan*

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Measure (Survey Question)</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Characteristics of people who conduct nutrition education for older adults</td>
<td>Q3, Q4, Q5, Q7, Q44, Q45, Q46, Q47, Q48</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>General Characteristics of nutrition education for older adults</td>
<td>Q39, Q40, Q41, Q42, Q43</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1: What is the state of nutrition education for older adults?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ1a: What topics do educators feel are important?</td>
<td>Q8, Q29</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1b: What criteria do educators use to choose materials?</td>
<td>Q10</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1c: What materials are being used to deliver nutrition education and how satisfied are educators with these materials?</td>
<td>Q9, Q27, Q28</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1d: How are educators delivering nutrition topics?</td>
<td>Q11</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1e: What do educators see as the barriers and facilitators to conducting nutrition education?</td>
<td>Q30, Q31</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1f: What are educators’ interest in and available funding for evidence-based program?</td>
<td>Q32, Q33</td>
<td>Descriptives/frequencies-overall and split by professional credential</td>
</tr>
<tr>
<td>RQ1g: What are state policies for nutrition education for congregate and home-delivered meal sites</td>
<td>Analysis of state policy documents</td>
<td></td>
</tr>
<tr>
<td>RQ2: Is nutrition education at congregate and home-delivered meal sites being conducted in a way that is theory-based and behaviorally focused?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ2a: How do dietetic professionals differ from non-dietetic professionals in their degree of conducting theory-based and behaviorally focused nutrition education?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21</td>
<td>Independent t-tests to compare dietetic professionals versus non-dietetic professionals for the four theory-based behaviorally focused nutrition education components, as well as total score</td>
<td></td>
</tr>
<tr>
<td>RQ2b: How do dietetic professionals from states with a policy that requires nutrition professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition education from dietetic professionals from states without such a policy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as RQ2a</td>
<td>Independent t-tests to compare dietetic professionals in states with a nutrition profession oversight policy versus dietetic professionals in states without such a policy for the four theory-based behaviorally focused nutrition education components, as well as total score</td>
<td></td>
</tr>
<tr>
<td>RQ2c: How do non-dietetic professionals from states with a policy that requires professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition education from non-dietetic professionals from states without such a policy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as RQ2a</td>
<td>Independent t-tests to compare non-dietetic professionals in states with a nutrition profession oversight policy versus non-dietetic professionals in states without such a policy for the four theory-based behaviorally focused nutrition education components, as well as total score</td>
<td></td>
</tr>
<tr>
<td>RQ2d: What educator factors influence theory-based, behaviorally focused nutrition education score?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as RQ2a (theory-based behaviorally focused nutrition education score) AND Q2, Q3, Q8, Q24, Q42, Q43, Q45, Created variable for state policy on dietetic professional oversite (8 educator factors)</td>
<td>Correlational analysis of theory-based behaviorally focused nutrition education scores and educational topics (to determine if there is linear correlation) Multiple linear regression analysis to determine if educator factors explain the variance in theory-based, behaviorally focused score.</td>
<td></td>
</tr>
<tr>
<td>RQ3: Is nutrition education at congregate and home-delivered meal sites being evaluated for effectiveness?</td>
<td>RQ3a: How do dietetic professionals differ from non-dietetic professionals with respect to evaluation efforts?</td>
<td>Q22, Q23, Q24</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>RQ4: Is malnutrition of older adults playing a role in nutrition education at congregate and home-delivered meal sites?</td>
<td>RQ4a: How much is malnutrition being perceived as a problem by nutrition educators and does this differ between dietetic and non-dietetic professionals?</td>
<td>Q34</td>
</tr>
<tr>
<td></td>
<td>RQ4b: How much is malnutrition being addressed in nutrition education sessions and does this differ between dietetics and non-dietetic professionals?</td>
<td>Q8b, Q8aa</td>
</tr>
<tr>
<td></td>
<td>RQ4c: Do educators feel they have the tools to address and screen for malnutrition and does this differ between dietetic and non-dietetic professionals?</td>
<td>Q35, Q36</td>
</tr>
</tbody>
</table>
Table 3.6 shows the rationale for educator factors used in the regression analysis to determine influence on theory-based behaviorally focused nutrition education. A total of 8 factors were used in this approach. This included 5 survey questions that were used as single questions: Length of educator credential (Q3), professional credential (Q2), group size (Q42), experience with older adults (Q45), and time spent on lessons (Q43). Educator topics was created as total score for Q8 with scores ranging from 0 to 24. Evaluation score was created by using 8 (a-h) out of 11 components from Q24. For evaluation score, the 3 elements that were process evaluation measures were not included as they do not measure use of theory-based behaviorally focused nutrition education. State policies on dietetic professional oversight requirements was used for the final educator factor.
Table 3.6

*Rationale for Educator Factors Included in the Regression Analysis*

<table>
<thead>
<tr>
<th>Educator Factors</th>
<th>Measure (Survey Question)</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of credential</td>
<td>Q3</td>
<td>Educators with more experience would be well-versed in theory-based behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Professional credential</td>
<td>Q2</td>
<td>Dietetic professionals would be better trained than non-dietetic professionals on theory-based behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Education topics</td>
<td>Q8</td>
<td>Greater number of topics covered can be used as a proxy for greater number of education sessions and these educators might be more comfortable or have more experience providing theory-based behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Group size</td>
<td>Q42</td>
<td>Smaller group size would be more conducive to providing the interactive, hands-on and discussion-based activities that are conducive to theory-based, behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Experience with older adults</td>
<td>Q45</td>
<td>More experience with older adults would expose educators to more theory-based behaviorally focused education materials</td>
</tr>
<tr>
<td>Evaluation score</td>
<td>Q24</td>
<td>Educators conducting evaluations would be those who want to measure outcomes of theory-based behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Time spent on lessons</td>
<td>Q43</td>
<td>More time spent on lessons would allow more time for implementing theory-based behaviorally focused nutrition education</td>
</tr>
<tr>
<td>Policy on dietetics professional oversight</td>
<td>Analysis of state policy documents</td>
<td>States with policies on dietetics professional oversight would have educators providing theory-based behaviorally focused nutrition education due to the training of the dietetic professionals</td>
</tr>
</tbody>
</table>
Chapter IV

RESULTS

4.1 Results Overview

This chapter provides an overview of the results for the four research questions being investigated in this dissertation. A total of 261 participants had complete data with 122 dietetic professionals and 139 non-dietetics professionals.

4.2 Characteristics of Nutrition Educators and Nutrition Education Sessions for Older Adults

Tables 4.1 shows the general characteristics of the survey participants. Almost 70% of the total participants surveyed have been working in the profession for 10 or more years. This was also true for almost 80% of the dietetic professionals, while a slightly lower percentage (63%) of non-dietetic health professionals worked in the profession for 10 or more years. About one-quarter of participants worked with older adults in congregate and home-delivered meal settings for 1-3 years while almost half worked with this population for 10 or more years. When asked about time worked with older adults in other settings, almost half of the participants reported working with older adults for 10 or more years. This was true for both total participants as well as when separated into dietetic professionals vs. non-dietetic health professionals.
In terms of education, for dietetic professionals, 59% had a master’s degree compared to 27% of non-dietetic health professionals (42% total). More than 40% of participants’ highest degree was a bachelor’s degree, with this being about equal for dietetic and non-dietetic professionals (41% of dietetic professionals and 44% of non-dietetic health professionals).

Almost 60% of total participants were over the age of 50. Approximately 10% were 46-50 years of age. Only about 7% of the participants were in the 20-30-year-old age range.

Most participants were female (89.5% vs. 10.5%) with an almost even percent of dietetic professionals vs. non-dietetic health professionals (90% vs. 88.6%).

Table 4.1

*General Characteristics of the Survey Participants*

<table>
<thead>
<tr>
<th></th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 221</td>
<td>n = 110</td>
<td>n = 111</td>
</tr>
<tr>
<td>Length of time in profession</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 3 years</td>
<td>13.5</td>
<td>11.2</td>
<td>15.2</td>
</tr>
<tr>
<td>4–9 years</td>
<td>16.9</td>
<td>11.2</td>
<td>21.6</td>
</tr>
<tr>
<td>≥10 years</td>
<td>69.5</td>
<td>77.5</td>
<td>63.2</td>
</tr>
<tr>
<td>Work in Senior meals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congregate meals</td>
<td>9.7</td>
<td>8.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Home-delivered meals</td>
<td>8.4</td>
<td>8.8</td>
<td>7.5</td>
</tr>
<tr>
<td>Both</td>
<td>81.9</td>
<td>83.2</td>
<td>81.8</td>
</tr>
<tr>
<td>Employment Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work for congregate meal site</td>
<td>48.3</td>
<td>42.3</td>
<td>53.5</td>
</tr>
<tr>
<td>Work for home delivered site</td>
<td>45.8</td>
<td>41.5</td>
<td>49.7</td>
</tr>
<tr>
<td>Service provider</td>
<td>49</td>
<td>46.2</td>
<td>51.6</td>
</tr>
</tbody>
</table>
**Other** | 14.6 | 22.3 | 7.7  

### Area of the Country

<table>
<thead>
<tr>
<th>Region</th>
<th>States</th>
<th>Total (n)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 1</td>
<td><strong>CT, ME MA, NH, RI, VT</strong></td>
<td>27</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>Region 2</td>
<td><strong>NJ, NY, PR</strong></td>
<td>46</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>Region 3</td>
<td><strong>DE, DC, MD, PA, VA, WV</strong></td>
<td>28</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td>Region 4</td>
<td><strong>AL, FL, GA, KY, MS, NC, SC, TN</strong></td>
<td>39</td>
<td>26</td>
<td>74</td>
</tr>
<tr>
<td>Region 5</td>
<td><strong>IL, IN, MI, MN, OH, WI</strong></td>
<td>4</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Region 6</td>
<td><strong>AR, LA, NM, OK, TX</strong></td>
<td>13</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>Region 7</td>
<td><strong>IA, KS, MO, NE</strong></td>
<td>14</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Region 8</td>
<td><strong>CO, MT, ND, SD, UT, WY</strong></td>
<td>33</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Region 9</td>
<td><strong>AZ, CA, HI, NV</strong></td>
<td>43</td>
<td>37</td>
<td>63</td>
</tr>
<tr>
<td>Region 10</td>
<td><strong>AK, ID, OR, WA</strong></td>
<td>17</td>
<td>29</td>
<td>71</td>
</tr>
</tbody>
</table>

*States that are bolded have at least one policy regarding dietetic professionals developing, approving, and/or supervising nutrition education at congregate meal sites and/or home-delivered meals (referred to as dietetic oversight policy)*

### Time worked with older adults in congregate and home-delivered meal sites

<table>
<thead>
<tr>
<th>Time</th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>7.0</td>
<td>10.9</td>
<td>3.5</td>
</tr>
<tr>
<td>1-3 years</td>
<td>22.8</td>
<td>25.5</td>
<td>20.0</td>
</tr>
<tr>
<td>4-6 years</td>
<td>15.8</td>
<td>14.5</td>
<td>16.5</td>
</tr>
<tr>
<td>7-9 years</td>
<td>10.5</td>
<td>10.0</td>
<td>11.3</td>
</tr>
<tr>
<td>10+ years</td>
<td>43.9</td>
<td>39.1</td>
<td>48.7</td>
</tr>
</tbody>
</table>

### Time worked with older adults in other settings

<table>
<thead>
<tr>
<th>Time</th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>23.6</td>
<td>21.3</td>
<td>24.8</td>
</tr>
<tr>
<td>1-3 years</td>
<td>17.3</td>
<td>15.7</td>
<td>19.3</td>
</tr>
<tr>
<td>4-6 years</td>
<td>6.8</td>
<td>8.3</td>
<td>5.5</td>
</tr>
<tr>
<td>7-9 years</td>
<td>8.2</td>
<td>6.5</td>
<td>10.1</td>
</tr>
<tr>
<td>10+ years</td>
<td>44.1</td>
<td>48.1</td>
<td>40.4</td>
</tr>
</tbody>
</table>

### Highest level of education

<table>
<thead>
<tr>
<th>Level</th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>14.1</td>
<td>0</td>
<td>28.3</td>
</tr>
<tr>
<td>Bachelors</td>
<td>43.6</td>
<td>41.4</td>
<td>44.2</td>
</tr>
<tr>
<td>Masters</td>
<td>42.3</td>
<td>58.6</td>
<td>27.4</td>
</tr>
<tr>
<td>Doctorate</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 4.2 presents the gender demographics for dietitian professionals, nurses, and social workers; as illustrated, the overall gender split for these professions nationwide is similar to our population. This shows that the sample for this study was similar to professionals in dietetics and non-dietetic health professionals (e.g., nurses and social workers).

Table 4.2

<table>
<thead>
<tr>
<th>Gender Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

*2.4% unreported; Commission on Dietetic Registration (CDR); Data USA

Table 4.3 presents descriptive statistics in nutrition education provided to older adults at congregate meal sites and home-delivered meals. More than 80% of participants surveyed work in both home-delivered as well as congregate meal settings, while less
than 10% worked in just one or the other. The breakdown was similar for the total population sampled as well as for dietetic versus non-dietetic health professionals.

Table 4.3

*Characteristics of Nutrition Education Session for Older Adults*

<table>
<thead>
<tr>
<th></th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 221</td>
<td>n = 110</td>
<td>n = 111</td>
</tr>
<tr>
<td><strong>Typical size of group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4.0</td>
<td>5.5</td>
<td>2.7</td>
</tr>
<tr>
<td>2–9</td>
<td>11.7</td>
<td>10.0</td>
<td>13.5</td>
</tr>
<tr>
<td>10–20</td>
<td>35.9</td>
<td>43.6</td>
<td>28.8</td>
</tr>
<tr>
<td>21–30</td>
<td>19.7</td>
<td>21.8</td>
<td>17.1</td>
</tr>
<tr>
<td>31–40</td>
<td>13.9</td>
<td>8.2</td>
<td>19.8</td>
</tr>
<tr>
<td>41–50</td>
<td>4.9</td>
<td>3.6</td>
<td>5.4</td>
</tr>
<tr>
<td>&gt;50</td>
<td>9.9</td>
<td>7.3</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Length of session</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–20 minutes</td>
<td>50</td>
<td>47.2</td>
<td>52.3</td>
</tr>
<tr>
<td>30 minutes</td>
<td>25.5</td>
<td>26.9</td>
<td>24.8</td>
</tr>
<tr>
<td>45 minutes</td>
<td>10.0</td>
<td>13.0</td>
<td>7.3</td>
</tr>
<tr>
<td>1 hour</td>
<td>10.5</td>
<td>8.3</td>
<td>11.9</td>
</tr>
<tr>
<td>&gt;1 hour</td>
<td>4.1</td>
<td>4.6</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Number of Sites Responsible for</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3</td>
<td>30.2</td>
<td>17.7</td>
<td>43.1</td>
</tr>
<tr>
<td>4–6</td>
<td>12.9</td>
<td>14.2</td>
<td>12.1</td>
</tr>
<tr>
<td>7–9</td>
<td>11.2</td>
<td>12.4</td>
<td>10.3</td>
</tr>
<tr>
<td>≥10</td>
<td>45.7</td>
<td>55.8</td>
<td>34.5</td>
</tr>
<tr>
<td><strong>Sessions Per Month</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>49.8</td>
<td>52.3</td>
<td>46.5</td>
</tr>
<tr>
<td>1–3</td>
<td>39.6</td>
<td>33.3</td>
<td>46.5</td>
</tr>
<tr>
<td>4–6</td>
<td>6.2</td>
<td>9.0</td>
<td>3.5</td>
</tr>
<tr>
<td>7–9</td>
<td>0.9</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>10+</td>
<td>3.5</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td><strong>Sessions Per Year</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>11.7</td>
<td>9.7</td>
<td>14.0</td>
</tr>
<tr>
<td>1–3</td>
<td>15.7</td>
<td>16.8</td>
<td>14.9</td>
</tr>
</tbody>
</table>
More non-dietetic health professionals were responsible for 1-3 sites than dietetic professionals (43% vs 18%), while more dietetic professionals were responsible for 10 or more sites than non-dietetic health professionals (56% vs. 35%). When asked how many education sessions they provided per month and year, almost half of the participants responded that they provided zero per month but 10 or more per year.

Participants were grouped into 10 regions which are the designated regions used by the Administration for Community Living (ACL). Some regions had higher representation in the sample than others, with the most participants coming from region 2 (n = 46), which included NJ, NY, and PR, although no participants came from PR. Also well represented were regions 9 (n = 43), 4 (n = 39), and 8 (n = 33). Region 5, which included six states, was the least represented region with just four participants, all of whom were dietetic professionals. Most other regions had similar percentages of dietetics and non-dietetic professionals except region 2, which had 70% dietetic professionals vs. 30% non-dietetic professionals responding. Interestingly, this is the only region in which all participants came from states with one or more state-level policy regarding dietetic professionals developing, approving, and/or supervising (dietetic oversight policy) for nutrition education with older adults in congregate meal sites and home-delivered meals. Conversely, region 10 had 71% of participants as non-dietetic professionals vs. 29% dietetic professionals, and only one of these states had one or more dietetic oversight

<table>
<thead>
<tr>
<th></th>
<th>4-6</th>
<th>7-9</th>
<th>10+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.9</td>
<td>3.0</td>
<td>45.7</td>
</tr>
<tr>
<td></td>
<td>24.8</td>
<td>2.7</td>
<td>46.0</td>
</tr>
<tr>
<td></td>
<td>22.8</td>
<td>3.5</td>
<td>44.7</td>
</tr>
</tbody>
</table>
policy. In the state-level review of nutrition education policies, only 20 states indicated they have a dietetic professional oversight policy of any type.

The typical size of the group being provided with nutrition education ranged from 1 to more than 50, with 10-20 participants being the most common size (28.8% total), especially among dietetic professionals (43.6%) vs. non-dietetic health professionals (28.8%). The most common length for the nutrition education sessions was between 15 and 20 minutes (50% total) and was similar for both dietetic professionals (47.2%) and non-dietetic professionals (52.3%). About 25% of participants reported the length of nutrition education as 30 minutes, which was the second most common length of education session. Less than 25% of participants reported nutrition education sessions that were 45 minutes or more.

4.3 RQ1: What is the state of nutrition education for older adults?

4.3.1 RQ1a: What topics do educators feel are important?

As shown in Table 4.4, the most common topic for nutrition education in the past 2 years was food safety (80%), followed by overall healthy eating (74.6%), impact of food choices on the environment (73.4%), diabetes (73.1%), MyPlate (64.4%), and heart disease (63.3%). The least common topics for nutrition education in the past 2 years were sustainability issues (6.8%), age-related appetite loss (22%), drug/nutrient interactions (27.3%), supplements (27.7%), and malnutrition (28%). Overall, dietetic professionals provided more education on selected education topics than non-dietetic professionals except for malnutrition (26.2% vs 29.5%), physical activity (53.7% vs. 62.6%), and meal planning (46.7% vs. 48.9%).
When asked about what topics educators would like more resources for, the top responses were hypertension, eating alone and cooking for one or two (49.1%, 47.8% and 47.3%, respectively). Other popular topics of interest for more resources included: drug/nutrient interactions (45.3%), identifying malnutrition (44.6%), eating on a budget (43.9%), and age-related appetite loss (43.8%). Overall, non-dietetic health professionals wanted more resources than dietetic professionals for all topics except for supplements, sustainability issues, cooking for one or two, nutrition label reading, and hydration where dietetic professionals wanted more information than non-dietetic health professionals, though percentages only differed by about 2% except for supplements where there was a 4% difference.

Table 4.4

*Topics in Nutrition Education for Older Adults*

<table>
<thead>
<tr>
<th></th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Covered in last 2 years</td>
<td>Want more resources</td>
<td>Covered in last 2 years</td>
</tr>
<tr>
<td>Diabetes</td>
<td>73.1</td>
<td>41.1</td>
<td>73.8</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>28.0</td>
<td>NA</td>
<td>26.2</td>
</tr>
<tr>
<td>Identifying Malnutrition</td>
<td>NA</td>
<td>44.6</td>
<td>NA</td>
</tr>
<tr>
<td>Treating Malnutrition</td>
<td>NA</td>
<td>33.3</td>
<td>NA</td>
</tr>
<tr>
<td>Heart disease</td>
<td>63.3</td>
<td>28.6</td>
<td>71.3</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>39.8</td>
<td>23.2</td>
<td>50.8</td>
</tr>
<tr>
<td>Hypertension</td>
<td>53.6</td>
<td>49.1</td>
<td>67.8</td>
</tr>
<tr>
<td>Fats</td>
<td>47.0</td>
<td>13.8</td>
<td>57.4</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>41.3</td>
<td>13.5</td>
<td>46.7</td>
</tr>
<tr>
<td>Protein</td>
<td>40.2</td>
<td>17.4</td>
<td>50.0</td>
</tr>
<tr>
<td>Category</td>
<td>136</td>
<td>16.1</td>
<td>59.0</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Fiber</td>
<td>44.7</td>
<td>16.1</td>
<td>59.0</td>
</tr>
<tr>
<td>Sodium &amp; Potassium</td>
<td>49.6</td>
<td>21.4</td>
<td>63.9</td>
</tr>
<tr>
<td>Calcium and Vitamin D</td>
<td>42.8</td>
<td>18.3</td>
<td>56.6</td>
</tr>
<tr>
<td>Weight</td>
<td>36.7</td>
<td>20.1</td>
<td>40.2</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>57.8</td>
<td>29.5</td>
<td>53.7</td>
</tr>
<tr>
<td>Eating on a Budget</td>
<td>49.6</td>
<td>43.9</td>
<td>57.4</td>
</tr>
<tr>
<td>Food Safety</td>
<td>80.3</td>
<td>35.3</td>
<td>82.8</td>
</tr>
<tr>
<td>Supplements</td>
<td>27.7</td>
<td>29.0</td>
<td>36.1</td>
</tr>
<tr>
<td>MyPlate</td>
<td>64.4</td>
<td>19.6</td>
<td>70.5</td>
</tr>
<tr>
<td>Sustainability Issues</td>
<td>6.8</td>
<td>29.6</td>
<td>9.0</td>
</tr>
<tr>
<td>Overall Healthy Eating</td>
<td>74.6</td>
<td>38.4</td>
<td>79.5</td>
</tr>
<tr>
<td>Cooking for One or Two</td>
<td>44.3</td>
<td>47.3</td>
<td>49.2</td>
</tr>
<tr>
<td>Meal Planning</td>
<td>47.3</td>
<td>33.0</td>
<td>46.7</td>
</tr>
<tr>
<td>Nutrition Label Reading</td>
<td>60.2</td>
<td>35.5</td>
<td>63.9</td>
</tr>
<tr>
<td>Hydration</td>
<td>55.3</td>
<td>29.0</td>
<td>63.9</td>
</tr>
<tr>
<td>Healthy Snacking</td>
<td>45.5</td>
<td>29.5</td>
<td>48.4</td>
</tr>
<tr>
<td>Eating Alone</td>
<td>30.3</td>
<td>47.8</td>
<td>32.8</td>
</tr>
<tr>
<td>Drug/Nutrient Interactions</td>
<td>27.3</td>
<td>45.3</td>
<td>31.1</td>
</tr>
<tr>
<td>Age Related Appetite Loss</td>
<td>22.0</td>
<td>43.8</td>
<td>23.0</td>
</tr>
<tr>
<td>Impact of Food Choices on the Environment</td>
<td>73.4</td>
<td>Xx</td>
<td>48.3</td>
</tr>
</tbody>
</table>

NA = Not Asked
4.3.2 RQ1b: What criteria do educators use to choose materials?

Table 4.5 shows the criteria educators used when choosing their education materials and these are broken down into theory-based considerations, topic-based considerations, and delivery considerations. Only 29% of educators focused on specific behavior change, but this percentage was higher among dietetic professionals than non-dietetic health professionals. A total of 32.5% of educators chose education materials based on the nutrition risk assessment, with slightly more non-dietetic health professionals choosing materials based on this than dietetic professionals. Topic-based considerations included covering topics clients are interested in and choosing material targeted toward older adults. Most educators reported choosing topics based on these criteria, with 82.5% covering topics participants are interested in and 73% choosing materials targeted towards older adults. More dietetic professionals used topic-based
considerations when choosing materials than non-dietetic health professionals. The most common delivery considerations used when choosing education materials were practical materials/topics (63.5%), simple messages (63.1%), lessons that were easy to teach/implement (56%), and those with interesting activities (41.3%). Dietetic professionals were less likely to choose lessons that provided all teaching materials needed than non-dietetic health professionals (36.7% vs 41.1%) and were also less likely than non-dietetic health professionals to have their organization select the topic for them (3.3% vs 12.4%). For all other delivery considerations used to select education materials, more dietetic professionals than non-dietetic health professionals said they chose materials based on criteria provided in the survey. With respect to cost, however, dietetic and non-dietetic professionals were evenly split on using cost as a criterion for choosing education materials (28.3% vs. 29.5%), though this did not seem to be one of the major factors taken into consideration.

Table 4.5

Criteria Used for Choosing Materials

<table>
<thead>
<tr>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 249</td>
<td>n = 129</td>
<td>n = 120</td>
</tr>
<tr>
<td>Topic and behavior change-based considerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus on specific behavior change</td>
<td>29.4</td>
<td>35.0</td>
</tr>
<tr>
<td>Based on nutrition risk assessment</td>
<td>32.5</td>
<td>31.7</td>
</tr>
<tr>
<td>Covers topic clients interested in</td>
<td>82.5</td>
<td>92.5</td>
</tr>
<tr>
<td>Targeted (specific topic for older adults)</td>
<td>73.4</td>
<td>81.7</td>
</tr>
<tr>
<td>Delivery considerations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Materials Used, Satisfaction and Desire for More Teaching Resources

<table>
<thead>
<tr>
<th></th>
<th>Total mean (SD)</th>
<th>Dietetic Professionals mean (SD)</th>
<th>Non-Dietetic Health Professionals mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n= 234</td>
<td>n= 112</td>
<td>n = 122</td>
</tr>
<tr>
<td>SNAP-ED/County extension materials</td>
<td>1.43 (.84)</td>
<td>1.43 (.82)</td>
<td>1.44 (.86)</td>
</tr>
<tr>
<td>State Department on Aging Nutrition education materials</td>
<td>1.76 (.84)</td>
<td>1.50 (.87)</td>
<td>1.99 (.75)</td>
</tr>
</tbody>
</table>

#### 4.3.3 RQ1c: What materials are being used to deliver nutrition education and how satisfied are educators with these materials?

As shown in Table 4.6, when educators were asked about the materials used for their education sessions, Chef Charles/Fresh Conversations was hardly chosen by dietetic professionals as well as non-dietetic professionals. Eat Better & Move More was also not chosen for use. In fact, most materials presented as options were rated by both sets of educators as familiar with but did not use. MyPlate was an exception, with professionals overall stating they used its components. More dietetic professionals said they used MyPlate than non-dietetic professionals. This was not surprising considering MyPlate, developed by the USDA, is a well-marketed and well-known tool for both consumers and educators.

Table 4.6
<table>
<thead>
<tr>
<th></th>
<th>Mean 0–3 (SD)</th>
<th>Mean 0–4 (SD)</th>
<th>Mean 0–4 (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State University extension programs</td>
<td>1.53 (.87)</td>
<td>1.48 (.87)</td>
<td>1.59 (.87)</td>
</tr>
<tr>
<td>Company nutrition materials</td>
<td>1.43 (.88)</td>
<td>1.38 (.85)</td>
<td>1.50 (.88)</td>
</tr>
<tr>
<td>Eat Smart, Live Strong: Nutrition Education for Older Adults</td>
<td>1.35 (.95)</td>
<td>1.34 (.92)</td>
<td>1.37 (.98)</td>
</tr>
<tr>
<td>MyPlate</td>
<td>2.09 (.76)</td>
<td>2.32 (.60)</td>
<td>1.89 (.84)</td>
</tr>
<tr>
<td>DASH Diet</td>
<td>1.4 (.95)</td>
<td>1.89 (.66)</td>
<td>.84 (.94)</td>
</tr>
<tr>
<td>Chef Charles/Fresh Conversations</td>
<td>.20 (.55)</td>
<td>.17 (.47)</td>
<td>.22 (.60)</td>
</tr>
<tr>
<td>Eat Better &amp; Move More</td>
<td>.93 (.94)</td>
<td>.93 (.89)</td>
<td>.94 (.99)</td>
</tr>
<tr>
<td>Cooking Matters</td>
<td>1.05 (1.4)</td>
<td>.93 (.86)</td>
<td>1.16 (1.8)</td>
</tr>
<tr>
<td>Healthy Eating for Successful Living in Older Adults</td>
<td>1.04 (1.0)</td>
<td>.98 (1.0)</td>
<td>1.08 (1.8)</td>
</tr>
<tr>
<td>‡Satisfaction with nutrition education materials</td>
<td>2.2 (.96)</td>
<td>2.32 (.98)</td>
<td>2.08 (.94)</td>
</tr>
<tr>
<td>Would like more resources to provide education</td>
<td>2.84 (1.0)</td>
<td>2.72 (1.0)</td>
<td>2.97 (1.0)</td>
</tr>
</tbody>
</table>

*Materials rated on 0–3 scale: 0 = do not use; 1 = familiar with but do not use; 2 = use components; 3 = use extensively
‡Satisfaction rated on 0–4 scale: 0 = not satisfied; 1 = neutral; 2 = somewhat satisfied; 3 = satisfied; 4 = very satisfied
More materials rated on 0–4 scale: 0 = definitely not; 1 = probably not; 2 = might or might not; 3 = probably yes; 4 = definitely yes

Both Chef Charles/Fresh Conversations and Eat Better & Move More are evidence-based programs and of high quality; both can be accessed online and implemented for free or at low cost. Because Chef Charles/Fresh Conversations was developed in Iowa, educators in other states might not be aware of the program. Eat Better & Move More was developed by Florida International University and is widely available. A guidebook is available for this 12-week program, so it was surprising that more educators were not using this tool.

The DASH diet, another evidence-based, long-standing program, was also noted to be underutilized by nutrition educators. This diet focuses on dietary approaches to reduce or prevent hypertension. Although more than 50% of nutrition educators said...
hypertension was a topic in the past 2 years, educators indicated they were familiar with but did not use the DASH diet in their nutrition education sessions.

Cooking Matters is another evidence-based program that educators were familiar with but did not use. Many educators did not have access to cooking equipment or funds to purchase the necessary tools to conduct these lessons, but they indicated they were interested in conducting cooking-based lessons. In the past 2 years, 44% of educators provided education on cooking for one or two, 47% on meal planning, and 30% on eating alone. Cooking Matters would be an appropriate program for any of these topics.

It was surprising that even state, company, and county materials were underutilized by nutrition educators. Although multiple education materials and resources do exist, but educators were not aware of them or not utilizing them.

When asked about satisfaction with nutrition education materials available, dietetic professionals reported greater satisfaction than non-dietetic professionals. Overall satisfaction with education materials among educators averaged 2.2, indicating somewhat satisfied.

Non-dietetic professionals indicated a greater desire for more resources to provide nutrition education than dietetic professionals. Overall, nutrition educators rated the desire for more resources to provide nutrition education as in between might or might not and probably yes.

4.3.4 RQ1d: How are educators delivering nutrition topics?

As shown in Table 4.7, the most common way educators are delivering their nutrition topics are handouts/printed materials/brochures (96%). Also popular are discussions (62.5%) which are utilized slightly more among dietetic professionals than
non-dietetic health professionals (65% vs. 60.8%). Lectures are the next most common delivery method (51.8%) with slightly more dietetic professionals reporting giving lectures than non-dietetic health professionals (63.3% vs. 40.8%), followed by hands-on activities (41.1%) and visual displays (40.3%). Dietetic professionals reported utilizing hands-on activities and visual displays more than non-dietetic health professionals. Phone education, videos and telehealth were the least popular methods for delivering nutrition education among both groups.

Table 4.7

*Methods for Delivering Nutrition Education*

<table>
<thead>
<tr>
<th>Method</th>
<th>Total (%)</th>
<th>Dietetic Professionals (%)</th>
<th>Non-Dietetic Health Professionals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture based</td>
<td>n = 250</td>
<td>n = 120</td>
<td>n = 130</td>
</tr>
<tr>
<td>Powerpoint</td>
<td>18.6</td>
<td>24.2</td>
<td>13.8</td>
</tr>
<tr>
<td>Handouts/printed materials/brochures</td>
<td>96.0</td>
<td>96.7</td>
<td>95.4</td>
</tr>
<tr>
<td>Lecture</td>
<td>51.8</td>
<td>63.3</td>
<td>40.8</td>
</tr>
<tr>
<td>Visual displays</td>
<td>40.3</td>
<td>43.3</td>
<td>36.9</td>
</tr>
<tr>
<td>Videos</td>
<td>7.9</td>
<td>7.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Interactive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Games</td>
<td>30.8</td>
<td>35.8</td>
<td>26.2</td>
</tr>
<tr>
<td>Discussions</td>
<td>62.5</td>
<td>65.0</td>
<td>60.8</td>
</tr>
<tr>
<td>Hands-on activities</td>
<td>41.1</td>
<td>45.0</td>
<td>37.7</td>
</tr>
<tr>
<td>Distance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone education</td>
<td>10.3</td>
<td>15.0</td>
<td>6.2</td>
</tr>
<tr>
<td>Tele-health</td>
<td>0.8</td>
<td>1.7</td>
<td>0.8</td>
</tr>
</tbody>
</table>
4.3.5 RQ1e: What do educators see as the barriers and facilitators to conducting education with older adults?

Table 4.8 illustrates barriers and facilitators to conducting nutrition education with older adults. The biggest barrier to conducting nutrition education was reported to be no budget for nutrition education activities (52.8%), with a higher number of non-dietetic health professionals reporting this to be a barrier than dietetic professionals (56.8% vs. 49.5%). Difficulty getting/maintaining participant attention and lack of participant interest were also commonly cited barriers (48% and 47.6%, respectively). Slightly more non-dietetic health professionals compared to dietetic professionals reported these as barriers. Lack of time also seemed to be a barrier for 38.4% of educators—40.4% for dietetic professionals vs. 37.3% for non-dietetic health professionals.

When asked about facilitators for nutrition education, more than half of the educators reported a larger budget and about half reported more nutrition education
materials being available. More non-dietetic health professionals chose these as facilitators than dietetic professionals. Additionally, about half chose increased participant interest in nutrition education sessions as a facilitator.

**4.3.6 RQ1f: What are educators’ interest in and available funding for evidence-based programs?**

Shown in Table 4.9 are the mean responses for whether educators would use evidence-based nutrition education programs if available and if they had funding to implement evidence-based programing. On a scale of 0-4, with 0 indicating definitely not and 4 indicating definitely yes, participants indicated they probably would use evidence-based nutrition education programs if available. There was little difference between dietetic professionals and non-dietetic health professionals for this question. Educators
Table 4.8

Barriers and Facilitators to Conducting Nutrition Education With Older Adults

<table>
<thead>
<tr>
<th></th>
<th>Total (%) n = 236</th>
<th>Dietetic Professionals (%) n = 116</th>
<th>Non-Dietetic Health Professionals (%) n = 120</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Barriers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of materials available</td>
<td>23.0</td>
<td>19.1</td>
<td>27.1</td>
</tr>
<tr>
<td>No budget for nutrition education activities</td>
<td>52.8</td>
<td>49.5</td>
<td>56.8</td>
</tr>
<tr>
<td>No promotion of nutrition education sessions</td>
<td>21.4</td>
<td>26.6</td>
<td>16.9</td>
</tr>
<tr>
<td>Staff unaware of visits/unprepared</td>
<td>7.4</td>
<td>9.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Competitive events scheduled</td>
<td>16.6</td>
<td>18.3</td>
<td>14.4</td>
</tr>
<tr>
<td>No incentives</td>
<td>26.6</td>
<td>27.5</td>
<td>26.3</td>
</tr>
<tr>
<td>Clients/participants not interested</td>
<td>47.6</td>
<td>44.0</td>
<td>51.7</td>
</tr>
<tr>
<td>Lack of time</td>
<td>38.4</td>
<td>40.4</td>
<td>37.3</td>
</tr>
<tr>
<td>No access to cooking resources</td>
<td>17.5</td>
<td>24.8</td>
<td>11.0</td>
</tr>
<tr>
<td>Lack of access to projector, computer</td>
<td>19.2</td>
<td>21.1</td>
<td>16.1</td>
</tr>
<tr>
<td>Difficulty getting/maintaining participant attention</td>
<td>48.0</td>
<td>44.0</td>
<td>52.5</td>
</tr>
<tr>
<td><strong>Facilitators</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More nutrition education materials being available</td>
<td>49.6</td>
<td>44.5</td>
<td>55.3</td>
</tr>
<tr>
<td>Larger budget for nutrition education activities</td>
<td>57.5</td>
<td>52.7</td>
<td>63.2</td>
</tr>
<tr>
<td>Promotion of nutrition education sessions</td>
<td>35.0</td>
<td>37.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Congregate meal site staff/participants prepared for visit</td>
<td>28.3</td>
<td>34.5</td>
<td>22.8</td>
</tr>
<tr>
<td>Decrease in competing events</td>
<td>18.6</td>
<td>21.8</td>
<td>14.9</td>
</tr>
<tr>
<td>Increased participant interest</td>
<td>51.3</td>
<td>43.6</td>
<td>58.8</td>
</tr>
<tr>
<td>More time for preparation/delivery of nutrition education</td>
<td>32.4</td>
<td>32.1</td>
<td>33.3</td>
</tr>
<tr>
<td>Access to cooking resources, hot plates, etc.</td>
<td>20.8</td>
<td>30.0</td>
<td>12.3</td>
</tr>
<tr>
<td>Access to projector, computer, etc.</td>
<td>21.2</td>
<td>24.5</td>
<td>17.5</td>
</tr>
</tbody>
</table>
indicated between definitely not add probably not having the funding to implement evidence-based programming, and again, there were only slight differences between the answers of dietetic professionals and non-dietetic professionals.

Table 4.9

Use of Evidence-based Materials for Conducting Nutrition Education With Older Adults

<table>
<thead>
<tr>
<th></th>
<th>Total (mean)</th>
<th>Dietetic Professionals (mean)</th>
<th>Non-Dietetic Health Professionals (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would use evidence-based nutrition education program if available</td>
<td>3.04 (.91)</td>
<td>3.07 (.87)</td>
<td>3.03 (.94)</td>
</tr>
<tr>
<td>Have funding for reasonable priced evidence-based materials</td>
<td>1.80 (1.1)</td>
<td>1.91 (1.0)</td>
<td>1.69 (1.1)</td>
</tr>
</tbody>
</table>

Rated on a scale of 0-4: 0 = definitely not; 1 = probably not; 2 = might or might not; 3 = probably yes; 4 = definitely yes

4.3.7 RQ1g: What are state policies for nutrition education for congregate and home-delivered meal sites?

Only 21 states have a specific policy on dietetic professional oversight for nutrition education at congregate and home-delivered meal sites. Most often, these same states specify the number of sessions that need to be provided per month or per year. Addressing the needs of the client/population (topics) during nutrition education sessions is required by only 18 states. Two states provide requirements on the length of the presentation (Florida and Georgia) which stated lessons should be at least 15 minutes long. Only one state (Alabama) used the term “evidence-based” in their requirements for nutrition education.

Overall, the state with the strongest policies appear to be Alabama, which requires weekly nutrition education and, as previously stated, evidence-based programing.
Colorado, Connecticut, Georgia, Florida, and Tennessee also appear to have strong policies regarding nutrition education, with all requiring dietetic professional oversight, specific number of sessions per year, information on topics to be covered, and two (Florida and Georgia) specifying a minimum amount of time for the education session.

Alabama is the only state requiring weekly nutrition education. Georgia, Florida, Colorado, and Tennessee all require 12 education sessions per year, while Arkansas and Maryland only require two sessions per year. For the 12 states that provided guidance on mode of delivery for nutrition education, most specified that written materials in addition to oral material needed to be provided and written material be large print. Regarding guidance on topics covered, Wisconsin, Kentucky, Louisiana, Pennsylvania, Oregon, and Tennessee provided lists of examples of potential topics. Virginia specified that food safety must be covered at least once per year. Delaware was the only state that specified evaluations of nutrition education should be conducted (see Table 4.10).

Table 4.10

*State-level Policies for Nutrition Education With Congregate and Home-Delivered Meal Sites*

<table>
<thead>
<tr>
<th>Policy</th>
<th>States with Policy Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietetic Professional Oversight of Nutrition Education</td>
<td>21 (42%)</td>
</tr>
<tr>
<td>Required minimum number of sessions</td>
<td>21 (42%)</td>
</tr>
<tr>
<td>Mandate on topic(s) of sessions</td>
<td>18 (36%)</td>
</tr>
<tr>
<td>Mandate on mode of delivery</td>
<td>12 (24%)</td>
</tr>
<tr>
<td>Mandate on length of presentations</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Mandate on when presentations given</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Mandate that programs are evidence-based</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Mandate evaluation</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Specific requirements on nutrition education for home-delivered meals</td>
<td>18 (36%)</td>
</tr>
</tbody>
</table>
4.4 RQ2: Is nutrition education at congregate and home-delivered meal sites being conducted in a way that is theory-based and behaviorally focused?

4.4.1 RQ2a: How do dietetic professionals differ from non-dietetic professionals in their degree of conducting theory-based and behaviorally focused nutrition education?

Table 4.11 illustrates the relationship of possessing dietetics credentials or not to conducting theory-based behaviorally focused nutrition education. The factors that were included on this scale were providing nutrition education that enhanced motivation, nutrition education that helped facilitate action, education that helped create a supportive environment, and delivery considerations such as making education sessions practical and targeted. The highest total mean on a 0-4 scale from least to most was for providing nutrition education that enhanced motivation, followed by providing education that helped facilitate action (mean of 2.80 and 2.33, respectively). Create a supportive environment had the lowest mean of 1.90.

When dietetic professionals were compared to non-dietetic professionals, dietetic professionals scored significantly higher on each individual component and higher on overall score. Pooled standard deviation using grouped variances was used to determine effect size which were moderate for all factors.

4.4.2 RQ2b: How do dietetic professionals from states with a policy that requires nutrition professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition from dietetic professional from states without such a policy?

Table 4.12 shows the sample was divided further into dietetic professionals from a state with a dietetic professional oversight policy versus those from a state with no policy. Scores for dietetic professionals were about the same with or without policy.
Scores for non-dietetic professionals were lower than they were for dietetic professionals, especially with respect to non-dietetic professionals from a state without policy.

Table 4.11

*Relationship of Possessing Dietetics Credential or Not to Conducting Theory-based Behaviorally Focused Nutrition Education*

<table>
<thead>
<tr>
<th></th>
<th>Total (mean) n=214</th>
<th>Dietetic Professionals (mean) n=102</th>
<th>Non-Dietetic Health Professionals (mean) n=109</th>
<th>T</th>
<th>p</th>
<th>Effect Size (Cohen D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance Motivation</td>
<td>2.80 (.76)</td>
<td>2.96 (.68)</td>
<td>2.67 (.80)</td>
<td>-3.36</td>
<td>0.001</td>
<td>.4</td>
</tr>
<tr>
<td>Facilitate Action</td>
<td>2.33 (.71)</td>
<td>2.48 (.64)</td>
<td>2.18 (.74)</td>
<td>-3.24</td>
<td>0.001</td>
<td>.43</td>
</tr>
<tr>
<td>Create Supportive</td>
<td>1.90 (.93)</td>
<td>2.13 (.91)</td>
<td>1.72 (.90)</td>
<td>-3.54</td>
<td>&lt;0.001</td>
<td>.45</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Considerations</td>
<td>2.11 (.95)</td>
<td>2.29 (.87)</td>
<td>1.97 (.97)</td>
<td>-2.75</td>
<td>0.006</td>
<td>.35</td>
</tr>
<tr>
<td>Total</td>
<td>2.29 (.68)</td>
<td>2.49 (.61)</td>
<td>2.11 (.70)</td>
<td>-4.29</td>
<td>&lt;0.001</td>
<td>.57</td>
</tr>
</tbody>
</table>

#Questions asked on a 0-4 point scale, with 0 = least to 4 = most

Table 4.12

*Relationship of Policy or No Policy on Nutritional Oversight for Nutrition Education to Theory-based and Behaviorally Focused Nutrition Education Among Dietetic Professionals*

<table>
<thead>
<tr>
<th></th>
<th>Dietetic Professionals States With Policy (mean) n=66</th>
<th>Dietetic Professionals States No Policy (mean) n=43</th>
<th>T</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance Motivation</td>
<td>3.00 (.67)</td>
<td>2.95 (.69)</td>
<td>-.339</td>
<td>.735</td>
</tr>
<tr>
<td>Facilitate Action</td>
<td>2.45 (.63)</td>
<td>2.53 (.67)</td>
<td>.587</td>
<td>.559</td>
</tr>
<tr>
<td>Create Supportive</td>
<td>1.97 (.84)</td>
<td>2.34 (.98)</td>
<td>2.067</td>
<td>.0042</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Considerations</td>
<td>2.40 (.86)</td>
<td>2.16 (.89)</td>
<td>-1.437</td>
<td>.154</td>
</tr>
<tr>
<td>Total</td>
<td>2.47 (.58)</td>
<td>2.50 (.65)</td>
<td>.231</td>
<td>.818</td>
</tr>
</tbody>
</table>

*Questions asked on a 0-4 point scale, with 0 = least to 4 = most
4.4.3 RQ2c: How do non-dietetic professionals from states with a policy that requires nutrition professional oversight for nutrition education differ in their degree of conducting theory-based and behaviorally focused nutrition from non-dietetic professional from states without such a policy?

Table 4.13 shows non-dietetic professionals from a state with a dietetic professional oversight policy versus those from a state with no policy. Scores for non-dietetic professionals had lower means on all scales and the total score, but none of the differences were statistically significant.

Table 4.13

<table>
<thead>
<tr>
<th>Relationship of Policy or No Policy on Nutritional Oversight for Nutrition Education to Theory-based and Behaviorally Focused Nutrition Education Among Non-Dietetic Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Dietetic Health Professionals States With Policy (mean) n=46</td>
</tr>
<tr>
<td>Enhance Motivation</td>
</tr>
<tr>
<td>Facilitate Action</td>
</tr>
<tr>
<td>Create Supportive Environment</td>
</tr>
<tr>
<td>Delivery Considerations</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* Questions asked on a 0-4 point scale, with 0 = least to 4 = most

All educators with a state policy were compared to those without a state policy. No significant differences were found other than for mean delivery considerations for which educators from a state with a policy scored statistically higher (results not shown).
4.4.4 RQ2d: What educator factors influence theory-based, behaviorally focused nutrition education score?

Figure 4.3 shows the scatterplot used to check for a linear relationship between theory-based, behaviorally focused nutrition education and the number of education topics covered by educators to ensure no violation of the regression assumptions.

The regression analysis for educator factors predicting theory-based, behaviorally focused nutrition education score included all eight educator factors presented in the correlation analysis (Table 4.1). The $R^2$ was 0.519. To create a more parsimonious model, we dropped educator factors that had low B values and were not significant. When experience with older adults was dropped, $R^2$ was 0.518. Next, we dropped being from a state with a dietetic professional oversight policy and $R^2$ remained 0.518. The final model with six educator factors is presented in Table 4.1. The regression equation used for the analysis is: \[ TB = \beta_0 + 0.078(Q3) + 0.026(Q8) + 0.128(Q24) - 0.094(Q42) + 0.97(Q43) + 0.131 (Q2). \]

With all eight original educator factors included, all factors but dietetic professional oversight policy were significantly correlated to theory-based, behaviorally focused nutrition education score. Additionally, number of education topics covered was significantly correlated to evaluation score (Table 4.1).

Each educator factor was significant in predicting whether educators provided theory-based, behaviorally focused education. Evaluation score made the strongest contribution to explaining whether nutrition educators conducted theory-based, behaviorally focused nutrition education when all other educator factors were controlled for, followed by number of education topics, size of group, time spent on lessons, and
finally, length of credential. Although the professional credential was correlated with theory-based, behaviorally focused education score, in the regression model, it was not significant (Table 4.15).

If educators are conducting theory-based, behaviorally focused nutrition education, it is not surprising that they would also be conducting evaluations of their efforts, so the contribution of evaluation score was not surprising. With respect to group size, as the size of the group increased, it was less likely for nutrition educators to provide theory-based, behaviorally focused nutrition education. Smaller groups are more conducive to theory-based, behaviorally focused nutrition education. Spending more time on education lessons also increases the likelihood of conducting theory-based, behaviorally focused nutrition education. Many evidence-based programs are 30-45 minutes long, while the educators in our sample were spending just 15-20 minutes on lessons. Finally, the more experience or length of credential of the nutrition educator, the more likely it was that theory-based, behaviorally focused nutrition education would be provided.

As shown in Table 4.14, with all eight original educator factors, all factors but dietetic professional oversight policy were significantly correlated to theory-based, behaviorally focused nutrition education score. Additionally, number of education topics covered was significantly correlated to evaluation score.
Figure 4.3. Scatterplot for relationship between theory-based, behaviorally focused nutrition education and topics covered in lessons in the last two years

Table 4.14

Correlations Among Eight Educator Factors and Theory-based, Behaviorally Focused Nutrition Education Scores

<table>
<thead>
<tr>
<th>Educator Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Theory-based, Behaviorally Focused Score</td>
<td>1</td>
<td>.183**</td>
<td>.475**</td>
<td>.571**</td>
<td>-.279**</td>
<td>.190**</td>
<td>.271**</td>
<td>.276**</td>
<td>.114</td>
</tr>
<tr>
<td>2. Length-Credential</td>
<td>1</td>
<td>.088</td>
<td>.074</td>
<td>.107</td>
<td>.378**</td>
<td>.002</td>
<td>.147**</td>
<td>.030</td>
<td></td>
</tr>
<tr>
<td>3. Education Topics</td>
<td>1</td>
<td>-</td>
<td>-0.55</td>
<td>-0.49</td>
<td>.161*</td>
<td>.093</td>
<td>.068</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>4. Evaluation Score</td>
<td>1</td>
<td>-0.55</td>
<td>.161*</td>
<td>.093</td>
<td>.068</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Size of Group</td>
<td>1</td>
<td>0.15</td>
<td>-0.21</td>
<td>-0.153*</td>
<td>.089</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Experience with Older Adults</td>
<td>1</td>
<td>-0.28</td>
<td>.067</td>
<td>.072</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Time Spent on Lessons</td>
<td>1</td>
<td>.027</td>
<td>-0.170*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Professional Credential</td>
<td>1</td>
<td>.218**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n's range from 185-227
* $p<0.05$ ** $p<0.01$
Table 4.1

Regression Analysis for Educator Factors Predicting Theory-based, Behaviorally Focused Nutrition Education Score

<table>
<thead>
<tr>
<th>Educator Factors</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>P</th>
<th>lower-bound</th>
<th>upper-bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Credential (0–4 scale)</td>
<td>.071</td>
<td>.029</td>
<td>.135</td>
<td>2.422</td>
<td>.017</td>
<td>.013</td>
<td>.129</td>
</tr>
<tr>
<td>Educational Topics (0–27 scale)</td>
<td>.024</td>
<td>.005</td>
<td>.270</td>
<td>4.544</td>
<td>.000</td>
<td>.014</td>
<td>.034</td>
</tr>
<tr>
<td>Evaluation Score (0–8 scale)</td>
<td>.128</td>
<td>.018</td>
<td>.433</td>
<td>7.307</td>
<td>.000</td>
<td>.094</td>
<td>.163</td>
</tr>
<tr>
<td>Average Group Size (1–7)</td>
<td>-.084</td>
<td>.024</td>
<td>-.198</td>
<td>-3.490</td>
<td>.001</td>
<td>-.132</td>
<td>-.037</td>
</tr>
<tr>
<td>Time Spent on Lessons (0–4 scale)</td>
<td>.098</td>
<td>.029</td>
<td>.184</td>
<td>3.331</td>
<td>.001</td>
<td>.040</td>
<td>.156</td>
</tr>
<tr>
<td>Professional Credential (0=non-dietetic, 1=dietetic)</td>
<td>.131</td>
<td>.071</td>
<td>.105</td>
<td>1.826</td>
<td>.070</td>
<td>-.011</td>
<td>.272</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td>.518</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F for R²</td>
<td></td>
<td></td>
<td>28.793</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p for R²</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average group size scale 1-7; 1 = 1, 2 = 2-9, 3 = 10-20, 4 = 21-30, 5 = 31-40, 6 = 41-50, 7 = >50
Time spent on lesson 0 = 15-20, 1 = 30, 2 = 45, 3 = 1hr, 4 = >1hr

4.5 RQ3: Is nutrition education at congregate and home-delivered meal sites being evaluated for effectiveness?

4.5.1 RQ3a: How do dietetic professionals differ from non-dietetic professionals with respect to evaluation efforts?

Table 4.16 shows that though nutrition educators are only sometimes evaluating the effectiveness of their education sessions, dietetic professionals are evaluating their education sessions more often than non-dietetic health professionals.

The most commonly used method of evaluation are verbal questions at the end of the session (65.9%), followed by surveys/questionnaires (63.9%) and then comment
cards (19%). Dietetic professionals utilized verbal questions at the end of the nutrition education session and comment cards slightly more often than non-dietetic health professionals did, while non-dietetic health professionals utilized surveys/questionnaires slightly more often than dietetic professionals.

When participants were asked what is measured during evaluation, process measures, such as whether participants enjoyed the lesson, if they intend to come to the next lesson, and the number of participants that attended the session, was the most frequently measured (53%). This was followed by facilitate action (52%) and behavior change (48%). Even though enhance motivation is what was covered the most in nutrition education sessions, it was the least evaluated (33%). No significant differences existed between dietetic and non-dietetic health professionals with respect to what was measured during evaluation.
Table 4.1

**Relationship of Possessing Dietetics Credential or Not to Type of Evaluation Conducted**

<table>
<thead>
<tr>
<th></th>
<th>Total (mean)</th>
<th>Dietetic Professionals (mean)</th>
<th>Non-Dietetic Health Professionals (mean)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation Conducted (mean*)</td>
<td>2.13 (1.3)</td>
<td>2.10 (1.2)</td>
<td>1.67 (1.5)</td>
<td></td>
</tr>
<tr>
<td>Evaluation method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal questions end of session</td>
<td>65.9</td>
<td>68.8</td>
<td>62.6</td>
<td></td>
</tr>
<tr>
<td>Surveys/questionnaires</td>
<td>63.9</td>
<td>63.5</td>
<td>65.4</td>
<td></td>
</tr>
<tr>
<td>Comment cards</td>
<td>19.0</td>
<td>20.8</td>
<td>17.8</td>
<td></td>
</tr>
<tr>
<td>What is measured</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcome: Behavior change</td>
<td>48% (50%)</td>
<td>47% (50%)</td>
<td>49% (50%)</td>
<td>.81</td>
</tr>
<tr>
<td>Outcome: Enhance motivation</td>
<td>33% (31%)</td>
<td>35% (33%)</td>
<td>32% (30%)</td>
<td>.56</td>
</tr>
<tr>
<td>Outcome: Facilitate action</td>
<td>52% (31%)</td>
<td>53% (32%)</td>
<td>51% (30%)</td>
<td>.81</td>
</tr>
<tr>
<td>Process</td>
<td>53% (33%)</td>
<td>51% (31%)</td>
<td>55% (34%)</td>
<td>.43</td>
</tr>
</tbody>
</table>

* Questions asked on a 0-4 point scale, with 0 = least to 4 = most

**4.6 RQ4: Is malnutrition of older adults playing a role in nutrition education at congregate and home-delivered meal sites?**

The following section discusses: RQ4a: How much is malnutrition being perceived as a problem by nutrition educators and does this differ between dietetic and non-dietetic professionals? RQ4b: Do educators feel they have the tools to assess and screen for malnutrition and how does this differ between dietetic and non-dietetic professionals? and RQ4c: How much is malnutrition being addressed in nutrition education sessions and does this differ between dietetic and non-dietetic professionals?

Table 4.17 shows that only about 25% of all nutrition educators reported malnutrition as an education topic in the last 2 years and the difference between groups was not significant. Less than 25% of all nutrition educators covered age-related appetite
loss as a topic in the past 2 years and the difference between the two groups here was also not significant. Approaching significance between the two groups was whether educators viewed malnutrition as a major issue, with dietetic professionals rating this as probably yes, while non-dietetic health professionals reported between might or might not and probably yes. Significant differences were seen between the two groups of educators with respect to whether they feel they have the tools for screening for malnutrition. Non-dietetic health professionals were significantly less likely than dietetic professionals to feel they have the tools to screen for malnutrition (p = 0.03). Though differences between groups was not significant with respect to whether educators felt they have adequate materials available to address malnutrition, both groups reported probably not.
<table>
<thead>
<tr>
<th></th>
<th>Total (mean) n=231</th>
<th>Dietetic Professionals (mean) n=114</th>
<th>Non-Dietetic Health Professionals (mean) n=117</th>
<th>T</th>
<th>p</th>
<th>Effect Size (Cohen D)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Malnutrition Major Issue</strong></td>
<td>3.01 (.98)</td>
<td>3.12 (.87)</td>
<td>2.88 (1.06)</td>
<td>1.80</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td><strong>Tools and materials for malnutrition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have tools for screening malnutrition</td>
<td>2.14 (1.1)</td>
<td>2.26 (1.15)</td>
<td>1.93 (1.10)</td>
<td>1.82</td>
<td>0.03</td>
<td>0.3311</td>
</tr>
<tr>
<td>Adequate materials for malnutrition</td>
<td>1.87 (1.0)</td>
<td>1.88 (1.04)</td>
<td>1.86 (1.02)</td>
<td>0.13</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>Covering malnutrition in sessions over last two years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malnutrition (generally)</td>
<td>26%</td>
<td>25%</td>
<td>29%</td>
<td>-.703</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>Age-related appetite loss</td>
<td>21%</td>
<td>22%</td>
<td>21%</td>
<td>.17</td>
<td>.86</td>
<td></td>
</tr>
</tbody>
</table>

* Range: 0–4 (0=definitely not to 4=definitely yes)
Chapter V

DISCUSSION

5.1 Discussion Overview

This chapter provides an overview of the interpretation of findings and study limitations. Implications for future research are also discussed in this section.

5.2 Introduction

The purpose of this study was to describe the type and frequency of nutrition education provided by nutrition educators at congregate and home-delivered meal sites and whether the lessons are theory-based and behaviorally focused. Utilizing both Sahyoun et al.’s (2004) proposed framework for older adults and Contento’s (2007, 2015) components of nutrition education, we developed a revised model for nutrition education for older adults. Additionally, we also sought to determine whether malnutrition of older adults is playing a role in nutrition education at congregate and home-delivered meal sites.

Very little prior research exists in this topic area. This study sought to conduct initial exploratory investigations and act as a starting point for improving nutrition education in this population. This advances the field of nutrition education because there are limited criteria for nutrition education at congregate and home-delivered meal sites.
other than just the number of lessons required or dietetic professionals providing oversight. Nutrition educators are left on their own to develop and implement lessons.

5.3 The State of Nutrition Education

5.3.1 Theory-based Considerations for Choosing Education Materials and Materials Used for Education

As outlined by Sahyoun et al. (2004) and Contento (2007, 2015), theory-based, behaviorally focused nutrition education is required for behavior change to occur and be sustainable. Behaviorally focused nutrition education involves lessons that target a specific dietary behavior (e.g., eat more vegetables at dinner). Research has found that when education is behaviorally focused, it is much more likely to be effective (Contento, 2007, 2015). Yet, our results found overall, only 29% of educators surveyed reported that they chose materials that focus on specific behavior change. While more dietetic professionals (35%) than non-dietetic professionals (24%) stated they chose materials focused on behavior change, the numbers are still very low. It would be expected that due to their training, dietetic professionals would be more likely to choose behaviorally focused materials than non-dietetic professionals. This finding suggests there is a need for more training and professional development for more educators to be aware that behaviorally focused materials are more effective and to seek out such materials when providing nutrition education.

Various theory-based and behaviorally focused nutrition programs and education materials do exist and have been evaluated. Chef Charles, now known as Fresh Conversations, was developed in Iowa and targets participants at congregate meal sites (Iowa Department of Public Health, 2018). This newsletter-based nutrition education
utilizes the Health Belief Model and includes a section intended to facilitate discussions during the session on goal setting, identifying barriers to achieving the goals, and strategies for overcoming barriers (Francis et al., 2014). In our survey, we asked nutrition educators if they use this educational program for nutrition education sessions and found that not only was this program used the least out of all those listed, but when rated on a scale with 0 = do not use and 3 = use extensively, Fresh Conversations scored an average of .20. Slightly more non-dietetic professionals utilized this program than dietetic professionals, and this could be because it was a ready-to-use source with no modifications needed. Non-dietetic professionals indicated they were more likely than non-dietetic professionals to choose education materials that provide all the teaching materials needed (41.1% vs. 36.7%). Fresh Conversations is a free newsletter funded by USDA’s Supplemental Nutrition Assistance Program (SNAP) and can be accessed online. A Fresh Conversations video and free training guide are also available online. Because this is an Iowa-based program, perhaps educators and administrators in other states are not familiar with the availability of this program.

Another large community-based program developed for OAA Nutrition Program sites and the AOA’s national You Can! Campaign is Eat Better & Move More (EBMM), which was developed by the National Policy and Resource Center on Nutrition and Aging at Florida International University. This program consists of 12 weekly sessions that include mini-talks and activities for group nutrition and physical activity sessions. This program utilizes the Theory of Planned Behavior and a guidebook is available to assist educators in implementing this program. Nutrition educators surveyed for this dissertation reported being familiar with but not utilizing this program (overall .93 on the
0–3 scale). Reasons for educators not knowing about or using this program are not known, but an evaluation study found this to be a high-quality nutrition education program. Wellman et al. (2007) assessed outcomes of this program at multiple sites nationwide and found that participants in the EBMM program significantly increased the number of servings of fruits, vegetables, fiber, calcium-rich foods, and increased fluid intake. Additionally, 99% of older adults who participated in this program said they would recommend this program to others, 93% said it helped them “eat better,” and 90% said it helped them “move more” (Wellman et al., 2007). Interestingly, one of the main barriers to conducting nutrition education for older adults that was reported by the participants of this survey of nutrition educators was difficulty getting/maintaining participant attention (48% overall) and clients/participants not interested (47.6% overall). Yet, the EBMM program seemed to be well-liked among the older adults (Wellman et al., 2007). Utilizing a program such as this would help attain and maintain older adult interest, could improve eating behaviors, and be inexpensive to implement and specifically designed to be used in community settings. The program even suggests ways to obtain raffle items/incentives via donations from grocery stores and other local businesses. Half of the nutrition educators surveyed in this study indicated they spend between 15-20 minutes on their education sessions and the EBMM program is designed to be just 30 minutes in length. A common time for nutrition education at congregate meal sites is before lunch. This 30-minute lesson could easily be implemented before lunch.

Eat Smart, Live Strong: Nutrition Education for Older Adults was developed to increase fruit and vegetable intake as well as physical activity in older adults participating
in or eligible for Food and Nutrition Service nutrition assistance programs and is grounded in the BEHAVE decision-making theory (Middlestadt et al., 2004). Online resources including a leader’s guide, four 45-minute interactive education sessions, ready-to-go participant handouts, and marketing flyers are all available, for free, online. Santiago et al. (2014) evaluated the impact of this program and found that the Eat Smart, Live Strong program significantly increased intake of fruits and vegetables daily. Overall, nutrition educators in our survey indicated they do not use this program for their nutrition education sessions (overall, 1.35 on the 0-3 scale). One reason nutrition educators might not use this program is that less than 25% of all nutrition educators reported spending 45 minutes or more on nutrition education sessions and the Eat Smart, Live Strong program requires 45 minutes. Perhaps the sessions can be broken down into smaller increments and spread over an additional 4 weeks since about 50% of all nutrition educators reported spending 15-20 minutes on education sessions. Almost 40% of all nutrition educators indicated one of the main barriers to conducting nutrition education with older adults was lack of time. If more time and resources were allocated for these professionals to provide nutrition education, perhaps the Eat Smart, Live Strong program would be utilized more frequently.

Healthy Eating for Successful Living in Older Adults was developed by Hebrew Senior Living and Harvard University and uses USDA Guidelines and MyPlate to improve the nutrition and physical activity needs of older adults. This intervention uses peer support, one of the components of Sahyoun et al.’s (2004) framework for designing and implementing nutrition education for older adults, to focus on behavior change as a central piece. Main components of this program are: self-assessments, goal setting,
problem solving, group support and interaction, education, and behavior change strategies. A registered dietitian/nutritionist serves as a resource. Survey participants in this study indicated they were familiar with but did not use this program. One reason might be that each of the six sessions are 2.5 hours each, which is much longer than most nutrition educators indicated they had time for lessons.

Cooking Matters is a long-standing, evidence-based program that teaches those in low-income communities to eat better for less (UNC Center for Health Promotion and Disease Prevention, 2016). This program offers 6-week cooking classes to adults, children, and families, and each course is taught by a volunteer chef and nutrition educator (UNC Center for Health Promotion and Disease Prevention, 2016). Meal preparation, grocery shopping, food budgeting, and nutrition are taught in the lessons. An evaluation that included more than 1,600 participants was conducted from 2014-2015 by the Altarum Institute (UNC Center for Health Promotion and Disease Prevention, 2016). Participants were surveyed 6 months after the program ended and results showed an increase in fruit and vegetable intake, confidence in cooking skills, fewer barriers to making healthy and affordable meals, and increased confidence in stretching food dollars due to the strategies learned in the program (UNC Center for Health Promotion and Disease Prevention, 2016). When survey participants in this study were asked about facilitators to conducting nutrition education, 21% total (30% dietetic professionals, 12.3% non-dietetic professionals) indicated access to cooking resources would be beneficial. Programs such as Cooking Matters could then be more easily implemented in congregate meal site settings. Access to hot plates and other small appliances would be a relatively inexpensive and simple way to enable nutrition educators to conduct a program
like Cooking Matters or other food demonstrations for teaching participants how to cook for one or two. If participants knew about such a program in advance, perhaps they would stay after the lunch meal for the program or come earlier to participate.

Though multiple nutrition programs and materials exist, they are being underutilized. Perhaps part of nutrition training can involve ensuring that nutrition educators are aware of these materials and programs and how to access them. In this survey sample, nutrition educators have been working in this area for a long time and are experienced, so another thought is that these educators already have their education materials developed and might not be aware of more newly developed programs and materials. A network of Title-III C educators would help keep educators informed on availability of new materials and programs.

5.3.2 Barriers and Facilitators to Conducting Nutrition Education With Older Adults

Overall, about 23% of nutrition educators surveyed in this study indicated that a lack of materials was a barrier to conducting nutrition education with older adults. More non-dietetic professionals (27.1%) than dietetic professionals (19.1%) indicated this as a barrier, even though they utilized the above programs and materials slightly more than dietetic professionals. Overall, educators said they were somewhat satisfied with nutrition education materials currently available, with dietetic professionals being slightly more satisfied with available nutrition education materials than non-dietetic professionals, even though they did not seem to be using the listed materials as much as the non-dietetic professionals. Perhaps there were other resources dietetic professionals were using that were not listed as a choice on the survey. However, since our survey listed the larger
evidence-based programs developed with government funding, it appears that there is a lack of awareness of the available programs. Interestingly, almost 50% of total participants in this survey responded that one factor that could facilitate their nutrition education efforts is higher availability of education materials. A central repository of nutrition education materials for this population might be warranted since many of these programs and resources, even at the local county and state level, appear to be underutilized. Educators are citing time as a barrier to conducting nutrition education, so having materials in one central location might help decrease time spent finding education materials and increase time spent actually educating older adults in congregate and home-delivered meal settings.

Educators also cited difficulty getting and maintaining participant interest as a major barrier to conducting nutrition education, but the above programs can be implemented on a low budget. Utilizing local grocery stores and businesses for incentives might be a possibility for increasing participant interest. Many of the above programs have been evaluated for effectiveness and significant changes in dietary intake have been noted in older adults receiving these programs. If these programs are effective at changing dietary behaviors, it is highly likely that these programs maintained older adult attention and interest. Educators might need to be more creative with their programming to help stimulate interest and excitement in their older adult population. As mentioned, only about 29% of total educators reported choosing materials that focus on a specific behavior as one of the criteria used for choosing materials. Perhaps if more theory-based, behaviorally focused, high-quality education materials were selected, participant interest might increase.
5.3.3 Delivery Considerations Used for Choosing Education Materials

Educators cite various practical considerations when choosing materials for nutrition education. The most common are those that are practical (63.5%), those with simple messages (63.1%), materials that are easy to teach and/or implement (56%), and those that include interesting activities (41.3%). All but using materials that are easy to teach and/or implement are included as components on Sahyoun et al.’s (2004) proposed framework. The free or low-cost educational resources discussed above provide many of these practical considerations but are underutilized. Education materials developed by cooperative extensions, such as the Healthy Living program, have also been evaluated though were not included in this survey. Hermann et al. (2000) found that this program significantly increased food and nutrition behavior scores via recipes and tasters, activities, visuals, recipes, and handouts. Additionally, state, county, and company materials are also underutilized and might meet some, if not all, of the above practical considerations cited by nutrition educators.

Interestingly, though almost 53% of participants cited no budget for nutrition education activities and though this was the main barrier cited, only 29% of educators overall cited cost as being one of the criteria used for choosing materials. This shows a disconnect and might indicate that training is needed to teach educators how to make education sessions exciting and interesting on a low budget. Perhaps also educators are unsure of their budget and choose education materials that are low or no cost based on this. It could be some money is available to provide more interesting activities, incentives, and education than educators realize.
5.3.4 Use of Evidence-Based Programming

Most educators indicated they would probably utilize evidence-based nutrition programming when conducting nutrition education with older adults if available, but also felt they probably did not have funding for reasonably priced evidence-based materials. Utilizing evidence-based programming is important since it increases the likelihood that the program will produce successful outcomes and help to create new knowledge about what works and how to do it. It could be that educators are also unsure of which materials are evidence-based, as some of these are low or no cost, such as the DASH diet. When asked if they use the DASH diet for their education sessions, overall educators reported they were familiar with it but did not use. Dietetic professionals, however, utilized this more than non-dietetic professional (1.89 vs. .84 on 0-3 scale, do not use to use extensively). Additionally, the Eat Better & Move More program, which educators said they were not familiar with, is a low-cost, evidence-based nutrition education program. The program itself is free and implementing the program is not expensive. The Eat Smart, Live Strong program and Cooking Matters program are also evidence-based, but both were underutilized among nutrition educators, with most reporting they were familiar with but did not use the program. All of the above evidence-based programs are available for free and also offer free training resources.

The Title III-D program has a document/website with a table that lists various health promotion and disease prevention evidence-based programs, along with information on websites, program description and goals, target audiences, costs, training requirements, and who should deliver the program. No such list or table exists for the Title III-C nutrition programs to help educators find and utilize high-quality education
materials and programs. A repository or website with this information would be helpful for nutrition educators working with congregate and home-delivered meal programs.

5.3.5 Topics Covered by Educators in the Past Two Years

In the past 2 years, food safety is the topic most commonly covered by nutrition educators. The evidence-based programming cited above does not currently address food safety, and the literature reviewed also did not evaluate programming related to food safety for older adults. The other most commonly covered topics were overall healthy eating and diabetes. Both of these topics have evidence-based resources available. Overall healthy eating can be addressed via the evidence-based programs listed above as well as with other resources, like MyPlate, SNAP-ED, county-extension materials, state department materials, university extension programs, and company nutrition materials. One evidence-based program that focused on diabetes called “Eat Well, Live Well-Diabetes” was discussed previously in the literature review and was evaluated by Redmond et al. (2006). Heart disease, MyPlate, and label reading were also common topics covered in the past 2 years. MyPlate was also rated by nutrition educators in this survey as being one of the more commonly utilized education materials.

Sustainability was the topic that was covered the least by nutrition educators in the past 2 years. This could be because many participants in home and congregate meal sites are food insecure and/or physically limited, which would make it difficult for them to grow their own gardens or try to shop locally. However, this might also be a case of educators not assessing the interest of the participants. According to Hackman and Wagner (1990), older adults rank gardening as a top hobby, making it an ideal way to incorporate both social support and nutrition intervention. In their study, staff visited
participants at home twice a month to provide support and 90-minute meetings were held at senior centers for 5 months (Hackman & Wagner, 1990). During the 90-minute meetings, participants shared success stories with one another and helped brainstorm how to help each other eat well. At the final group meeting, participants shared a potluck meal that included ingredients from their garden as well as one or more nutrition principles prevented in the intervention. Results showed that about 90% of potluck dishes mirrored one or more nutrition principles covered and that significant increases in nutrition-related attitudes were seen. Such an intervention shows that sustainability along with nutrition education principles can be taught to older adults and is well-received. This might be another novel and creative way to provide nutrition education to older adults in a way that will increase and maintain their interest.

5.3.6 Commonly Used Methods of Delivery

The most commonly used method of delivery is handouts. This is not surprising considering this is how home-delivered meal participants often receive their education since nutrition educators are not regularly visiting homes. Unfortunately, it was beyond the scope of this study to separate educator responses for home-delivered vs. congregate meal sites, so it cannot be determined what proportion of these responses are for home-delivered meal sites. As reported by Wunderlich et al. (2011), counseling services via phone or in-person contacts for home-delivered meal participants might help improve nutrition behaviors, thereby decreasing risk of chronic disease. Another home-based intervention sought to examine the effectiveness of the program in increasing fruit, vegetable, and calcium-rich food consumption in community-dwelling, physically impaired older adults (Bernstein et al., 2002). Results showed significant increases in
self-reported intakes of fruits, vegetables, and dairy servings. Though self-reported intake is related to many limitations, this was an important finding nonetheless and indicates that when visited in-person, given individualized and specific recommendations/education, the diets of older adults in the home-based setting can improve. Many home-delivered meal participants live in rural areas that cannot be easily accessed by nutrition educators, so in this case, telephone-based counseling or nutrition education might be appropriate and effective. In our survey, less than 10% of participants reported providing phone education, yet more than 80% said they worked in both home-delivered and congregate meal sites. More research needs to be done in this area to evaluate the effectiveness of such interventions. Newsletters can be effectively used with participants that are difficult to reach, such as those receiving home-delivered meals. Fresh Conversations is one evidence-based newsletter program that can be used for both congregate and home-delivered meal participants. Davis et al. (2000) evaluated the usefulness of a newsletter that was based in theory and found that newsletters can be an effective way to communicate nutrition education with home-delivered meal participants. Unlike the findings of Wunderlich et al. (2011), Davis et al. (2000) found that follow-up phone calls after receipt of the newsletters did not improve the newsletter intervention and that the newsletter by itself was effective at communicating health and nutrition information. Higgins and Barkley (2004) performed a literature review of studies that focused on using written nutrition education materials with older adults and found that these materials can increase knowledge, at least over the short term, and might be ideal for older adults who cannot or do not want to attend group nutrition education. As a result of their literature review, Higgins and Barkley designed 10 suggestions for selecting or
developing nutrition education resources for older adults. Some suggestions paralleled those posed by Sahyoun et al. (2004). Handouts also help reinforce topics and concepts discussed in the congregate meal setting, which is also a component of the Sahyoun et al. framework, as older adults can go back and re-read information at their leisure. Overall, it appears that handouts do have an important place in nutrition education for older adults, but should likely follow some guidelines. As mentioned previously, a common repository of handouts and education materials would help nutrition educators access high-quality written handouts, saving time, energy, and even resources. The evidence-based programs mentioned previously all contain various handouts for each education session.

Following handouts, discussions and lectures were the next commonly used methods of delivery among nutrition educators. As mentioned in the Sahyoun et al. (2004) framework, hands-on activities and interactive learning are important components when providing nutrition education for older adults. Many of the successful interventions outlined in the literature review included activities and discussions rather than just lecture, and all of the evidence-based programs also included discussions and activities. Almost half of the survey participants reported using discussions as a method of delivering nutrition education, so this might be a good opportunity to encourage and/or train educators to reevaluate their nutrition education to be sure their discussions are interactive and interesting and include hands-on activities, as this will also help increase and maintain the interest of the older adults attending the program. Only about 30% of nutrition educators reported using hands-on activities and even fewer reported using games. These could be two reasons why educators feel participants are not interested in their education sessions.
5.4 Theory-based, Behaviorally Focused Nutrition Education in Congregate and Home-Delivered Meal Sites

Providing theory-based, behaviorally focused nutrition education is a key factor in motivating individuals to make sustained lifestyle changes. Limited previous research exists regarding such programs for use specifically with the congregate meal and home-delivered meal programs, but the studies that have been conducted do show promise.

One study examined the effectiveness of a theory-driven, 5-lesson nutrition program on knowledge and behavior changes (Sharpe et al., 1996). The lessons focused on cues for behavior change, such as perceived susceptibility and severity, strategies for behavior change, and tips for decreasing barriers to change and targeted clients at various stages of readiness to change. Additionally, as emphasized in Sahyoun et al.’s (2004) framework, games and activities were used to reinforce the lessons. Each session was 1 hour long, which is more than what most nutrition educators in this study were spending on lessons. Results demonstrated that the older adults receiving this program experienced significant increase in fruit intake and knowledge of the Five-a-Day fruit and vegetable recommendation.

Another study did not explore actual dietary or behavior changes, but rather knowledge gained and participants’ planned behavior change (Bobroff et al., 2003). After the intervention, at least 61% of participants planned on making changes in eating behaviors as a result of the nutrition education lessons. Four participants were chosen for follow-up and all said they enjoyed the lessons and felt the topics pertained to them, which again shows that the approach and methods used for delivering education play a role in sparking and maintaining participant interest.
A third study focused specifically on fruit and vegetable intake in older adults participating in a congregate meal program to determine if the amount and variety of fruits and vegetables consumed increased after a series of five nutrition education sessions (Brewer et al., 2016). The intervention was adapted from another program and involved 15-minute nutrition lessons, and it was novel in that it actually measured plate-waste after the congregate meals. Analysis showed that the intervention group significantly increased fruit and vegetable intake as a result of the program. These studies showed that use of theory-based nutrition education is important for changing behavior and for providing effective nutrition education.

5.5 Difference Between Dietetic and Non-Dietetic Professionals in Degree of Conducting Theory-Based, Behaviorally Focused Nutrition Education

Our revised model for nutrition education for older adults operationalizes conducting and evaluating theory-based, behaviorally focused nutrition education for older adults by combining the Sahyoun (2004) framework and Contento’s (2015) three components of nutrition education. The four components of conducting theory-based, behaviorally focused nutrition education for older adults are: enhance motivation, facilitate action, create a supportive environment, and delivery considerations. We used these four components to evaluate whether nutrition educators in this study were conducting education in a way that was theory-based and behaviorally focused.

The highest total mean on a scale from 0-4 (0 = never, 1 = rarely; 2 = sometimes, 3 = usually, 4 = always) was for the enhanced motivation component (2.80), which included whether educators increase perception of risk or susceptibility to disease, promote positive attitudes, discuss health benefits associated with behavior change,
and/or decrease perception of barriers in their nutrition lessons. Sharpe et al. (1996) examined attitudes of participants, though they did not find a significant difference in attitude post intervention. Klinedinst (2005) incorporated many areas of the revised model for nutrition education for older adults, including focusing on benefits and barriers to healthy eating, but unfortunately only measured knowledge as an outcome. Other programs, like the evidence-based Fresh Conversations Newsletter, that target perceived susceptibility and severity and perceived benefits of behavior change while also addressing goal setting and identifying ways to reduce barriers, show positive results like a significantly reduced nutrition risk score. While dietetic professionals scored significantly higher than non-dietetic professionals on this component, both groups said they were between sometimes and usually included this component in their education sessions.

The next highest total mean was for education that helped facilitate action (2.33). This component includes pieces such as tailoring lessons to common disease states, providing culturally tailored lessons, providing knowledge, increasing skills and confidence, setting behavior change goals, creating action plans, and providing follow-up lessons to reinforce behavior change. Bobroff et al. (2003) conducted an intervention that both provided knowledge and assisted in helping older adults create behavior change goals. In fact, 70-80% of older adults in this study checked a specific behavior change goal and 11% wrote in their own behavior change goals. This study showed that utilizing this component of theory-based and behaviorally focused nutrition education can improve outcomes. Additionally, two studies reviewed in this dissertation were culturally tailored to Black and Chinese American populations (Campbell et al., 1999; Jih et al., 2016) and
were successful at inducing behavior change. Again, while dietetic professionals scored significantly higher on this component than non-dietetic professionals, neither group was regularly including this component of theory-based, behaviorally focused nutrition education in their lessons.

Surprisingly, the delivery consideration component total mean score (2.11) was even less than the two components (enhance motivation and facilitate action) discussed above. This score showed that educators were only sometimes utilizing delivery considerations when developing/delivering nutrition education. The pieces of this component are based on Sahyoun et al.’s (2004) framework and include using messages that are related to clients, focused on behavior change, simple, practical, and targeted. Delivery considerations also include the use of hands-on activities and incentives, and interactive delivery methods like games and discussions. Dietetic professionals did score significantly higher on this component than non-dietetic professionals (2.29 vs. 1.97) and scores showed that non-dietetic professionals were between rarely and sometimes for this component. It is important to relate this back to one of the main barriers noted by participants in this survey of lack of participant interest in nutrition education. This could be because educators are not spending enough time or effort on delivery considerations, which would make the lessons more interactive and interesting for participants. The studies examined in the literature review of this dissertation and mentioned briefly in this discussion section emphasized the importance of including these components in nutrition education for older adults, due to the positive influences this component has on increasing knowledge and behavior change (Bobroff et al., 2003; Brewer et al., 2016; Sharpe et al., 1996).
Overall, the total mean for create a supportive environment, the third component of Contento’s (2015) Nutrition Education model, scored the lowest of all four components (1.90), indicating educators rarely to sometimes utilize this component. Pieces of this component include considering home or neighborhood environment and discussing family and friends as a support network when providing nutrition education. Campbell et al. (1999) is an excellent example of how considering the neighborhood environment and support networks can help achieve positive outcomes. Not only was this study culturally tailored to the African American population, but the intervention also involved increasing fruit and vegetable availability at church functions as a way to incorporate the physical environment. Church members also attended training classes on providing social support and helping church members advance in stages of change. Community coalitions also met regularly to plan community events and the pastor even promoted the project from the pulpit and helped write and review tailored messages. Overall, this program was successful for promoting dietary changes that appeared to be maintained even at the 2-year follow-up. Though dietetic professionals again scored significantly higher on this component than non-dietetic professionals, this was their lowest scoring area.

Dietetic professionals scored significantly higher on each individual component as well as overall score when compared to non-dietetic professionals, but neither group scored a 3 or higher on any component (or total), which would indicate they usually-always incorporated these pieces into their nutrition education sessions. This emphasizes the fact that more training needs to be provided for all educators, especially non-dietetic professionals on theory-based, behaviorally focused nutrition education, what it is, and
how to incorporate it into their lessons. Again, by providing this high-quality nutrition education, older adults might be more interested and more likely to maintain interest throughout the duration of the nutrition education sessions. A training manual on how to develop and provide effective nutrition education could be developed for use as an online resource. Additionally, a central repository of materials that are evidence-based, theory-based, and behaviorally focused would aid nutrition educators in their efforts.

5.6 Relationship of Policy or No Policy on Nutritional Oversight for Nutrition Education to Theory-Based and Behaviorally Focused Nutrition Education Among Non-Dietetic Professionals

When our sample was divided into dietetic professionals from a state with a policy that a dietetic professional provided oversight (e.g., developed, approved, and/or supervised nutrition education) vs. those from a state without policy, scores for dietetic professionals were about the same with or without policy and no significant difference was found. This could be due to lack of power as each component of theory-based, behaviorally focused education only included 43-69 participants. For non-dietetic professionals, the scores trended lower in states without a dietetic professional oversight policy for all four of the components, yet none were significant. The overall score was approaching significance ($p = 0.074$). Again, the n’s for each component of theory-based, behaviorally focused nutrition education ranged from 46-78 and lack of power might have impacted significance.

Though the results were not what was expected nor desired, having a specific state policy for dietetic professional oversight of nutrition education along with additional training for nutrition educators on providing theory-based, behaviorally focused nutrition
education might improve the effectiveness of the education sessions as well as congregate/home-delivered meal participant interest.

### 5.7 Educator Factors Predicting Theory-based, Behaviorally Focused Nutrition Education Scores

When we examined whether educator factors predicted theory-based, behaviorally focused nutrition education score, we found that multiple factors had an impact. While professional credential was correlated with theory-based, behaviorally focused score, in the regression model this was not significant ($p < 0.07$). The lack of a statistically significant result in the regression model was surprising because there was a significant result on the T-test analysis and this is often a component of dietetics training. Almost 70% of the nutrition educators in this survey had been in the profession for 10 or more years. Educators who were in the profession longer, and thus more experienced, could explain why this is a factor that was associated with theory-based, behaviorally focused nutrition education score.

When given a list of 27 topics and asked which were included in nutrition education lessons in the past 2 years, educators who chose more topics had higher theory-based, behaviorally focused nutrition education scores. This demonstrates that educators who put an emphasis on a broad range of nutrition education topics are providing higher quality nutrition education. Educators who are evaluating their nutrition education efforts are also more likely to provide theory-based, behaviorally focused nutrition education. Evaluation of nutrition education is important for evaluating changes in knowledge and behavior as well as the goals of nutrition education and should be conducted by nutrition educators.
Not surprising, as size of the group being educated increased, the likelihood of conducting theory-based, behaviorally focused nutrition education decreased. Smaller group sizes seem to facilitate the ability of educators to conduct high-quality nutrition education. Educators might be able to split a larger group into smaller groups based on common factors shared by individuals, as suggested by Sahyoun et al. (2004) in their framework. For example, determining groups based on common disease states, age, culture, and other factors might improve the ability to conduct education that is theory-based and behaviorally focused.

Length of education session also significantly impacted theory-based, behaviorally focused nutrition education scores. The longer the education lesson, the more likely the education was to be of high quality. As previously discussed, quite a few of the evidence-based programming available are 30 minutes or more. In our survey, half of educators were only spending 15-20 minutes on their nutrition lessons. Only about 25% were spending 45 minutes or more on lessons. It is important to note that many educators cited lack of time as a barrier to conducting nutrition and also reported that being given more time for nutrition education sessions would help facilitate their efforts. Programming and policy changes are needed to allocate more time for nutrition education efforts.

5.8 Evaluation of Nutrition Education Efforts

As shown in the revised model for nutrition education for older adults that combines both Sahyoun et al.’s (2004) framework and Contento’s (2015) three components of nutrition education, evaluation of education efforts can include outcome
measures on whether behavior changed, motivation was enhanced, or action to change behaviors was facilitated. Evaluating whether motivation was enhanced can be in the form of lessons that resulted in increased positive attitudes, those that reduced potential barriers, or lessons that increased perception of benefits. Evaluations that demonstrate an increase in the participant’s knowledge, skills, or confidence are part of the facilitate action outcome. Process measure evaluations include whether participants enjoyed the lessons, their intention to come to the next lesson, and/or number of participants attending lessons. Evaluations are important as this can identify the strengths and weaknesses of the nutrition education and can help develop more evidence-based programming.

Overall, nutrition educators are only sometimes (2.13 on scale of 0-4 with 0 = least, 4 = most) conducting evaluations. Slightly more dietetic professionals are conducting evaluations than non-dietetic professionals, with non-dietetic professionals saying on average they never-rarely conduct evaluations.

Though enhance motivation was the most commonly used component of theory-based, behaviorally focused nutrition education in our survey sample, this component was the least evaluated. Only 33% of educators reported evaluating this component and the difference between dietetic professionals and non-dietetic professionals was not significant. Process measures were most often evaluated (53%), which is interesting as this in part measures participant enjoyment and intention to come to the next lesson. More than half of all nutrition educators sampled for this study indicated lack of participant interest as a major barrier to conducting nutrition education in this population, but these process measure evaluations could be used to improve upon current lessons.
More than 65% of nutrition educators, however, said verbal questions at the end of the nutrition education session was the evaluation method used. This was the most popular evaluation method, followed by surveys/questionnaires and then comment cards.

Surprisingly, only 48% of all educators were measuring behavior changes. Behavior change should be a goal of any nutrition education session and is important to evaluate in order to determine if the intervention/education was effective. Perhaps more training needs to be provided to nutrition educators on the importance of not only conducting evaluations, but also how to conduct them so that more meaningful information can be obtained.

It is important to note that not all participants come to each nutrition education session making evaluation of effectiveness difficulty. Additionally, when educators only have a short amount of time to conduct nutrition education, there might not be enough time left over to also conduct evaluations. This might be one reason educators are asking participants for their feedback at the end of the session rather than performing a more formal evaluation. Older adults with cognitive deficits might also have difficulty filling out formal evaluations as are older adults with vision deficits or health conditions that make it difficult for them to hold a writing utensil and/or write. Some older adults might also not have sufficient literary skills to complete evaluations. All of these factors might contribute to the lack of doing evaluations with this population.

5.9 The Role of Malnutrition in Nutrition Education at Congregate and Home-Delivered Meal Sites

No national prevalence rates for malnutrition across healthcare settings in older adults exist and much of what is known about the prevalence of malnutrition comes from
research studies that vary in methodology and quality. It is estimated that about one in three patients is malnourished when admitted to the hospital and another one-third experience deterioration of nutritional status while hospitalized (Defeat Malnutrition Today Coalition, 2017). As the older adult population continues to grow, the prevalence of malnutrition will become an increasing concern. Estimates of the annual burden of disease associated malnutrition in older adults in the United States is about $51.3 billion (Profiles of an Aging Society, 2015).

When participants in our survey were asked if they thought malnutrition was a major issue, dietetic professionals responded “probably yes” while non-dietetic professionals reported between “might or might not” and “probably yes.” The difference between the two groups was not significant but was approaching significance ($p = 0.07$). It is important to note that this question was asked of both nutrition educators working with congregate and home-delivered meal sites and, depending on the population, malnutrition might not be an issue. Home-delivered meal participants, for example, might be more at risk than congregate meal participants. Despite this, only about 25% of all nutrition educators reported malnutrition as a topic they covered in the past 2 years in their education sessions. In fact, when given the list of 27 nutrition topics covered in the past 2 years, malnutrition was in the bottom five. Other options listed as topics, however, were indirectly related to malnutrition so participants may have chosen these rather than the broad topic of malnutrition. These topics included cooking for one or two, which was chosen by 44% of participants as a topic covered in the past 2 years, eating alone which was chosen by 30% of total participants, and age-related appetite loss which was chosen by 22% of participants.
Nutrition educators were also asked if they felt they had the tools for screening malnutrition, and the difference between the dietetic professionals and non-dietetic professionals was significant (p = 0.03). Neither group felt especially confident in its ability to screen for malnutrition, however, with dietetic professionals rating this as “might or might not” and non-dietetic professionals rating their ability as between “probably not” and “might or might not.” Various malnutrition and screening assessment tools exist but are not used routinely, and they are not always validated and reliable in different care settings (Defeat Malnutrition Today Coalition, 2017). The Malnutrition Quality Collaborative (2017) has indicated that across the healthcare institution and community spectrum, it recommends the community promote standardization of a validated national community screening tool. This clearly needs to be examined more closely in the congregate and home-delivered meal settings as educators are not feeling confident they have the tools to screen for malnutrition. Adopting a validated, standardized tool and providing the training for the use of this tool would help educators in these settings be better able to recognize malnutrition and provide appropriate resources or interventions.

Though the difference between professional credential was not significant, neither dietetic professionals nor non-dietetic professionals in our survey felt they had adequate materials to address malnutrition. Malnutrition is not currently a key health indicator for older adults and is known by the Centers for Medicare and Medicaid Services (CMS) to be a gap area (National Blueprint, 2017). Currently, Title III-C of the OAA does not include any specific or validated procedures for screening and intervening for malnutrition (Defeat Malnutrition Today, 2017) and that is most likely why the nutrition
educators we surveyed did not feel they had the adequate tools for screening or materials to address malnutrition. Theory-based, behaviorally focused nutrition education materials for both prevention and treatment of malnutrition need to be developed and placed in a central location with other education materials for older adults so that educators can easily find and utilize these tools.

5.10 Qualitative Discussion

Participants in this survey were asked what changes they would like to see in their nutrition education program for congregate and/or home-delivered meal sites, given unlimited resources in an open-ended format. Most responses can be divided into a few categories: those who would like more time for their nutrition education efforts, those who would like an increase in budget for incentives and/or supplies, and those who would like more education materials and evidence-based programming. These comments align with what educators selected for barriers and facilitators to nutrition education. More time would also facilitate more evidence-based programming and theory-based, behaviorally focused nutrition education.

Many educators requested cooking equipment to enable them to conduct cooking demonstrations and food tastings. Cooking Matters, an evidence-based program not currently being utilized by nutrition educators, could be implemented at congregate meal sites if more cooking equipment was made available to educators. Cooking demonstrations might also increase participant interest because they are more interactive.

Other educators indicated they would like to be able to hire a registered dietitian for nutrition education efforts at congregate and home-delivered meal sites. A few
comments were: “Registered dietitians personally delivering nutrition education handouts to clients and being available for face-to-face education and counseling at time of delivery” and “One FTE dietitian with resources (education material, cooking classes, food demo, activities). We have 12 sites and 500 congregate and home-delivered meals. Would like to give personalized attention to each senior.”

Finally, one interesting comment that encompasses many other educator sentiments is:

Every quarter I feel like I am reinventing the wheel. I would love to see not just handouts developed but new modules available annually to use that are interactive and provide specific and effective information in a way that inspires seniors to make changes. After writing my own curriculum for 8 years, I am a bit tapped out and need some fresh information. We need a portable microphone system and portable travel kit with the tools and equipment needed to present each module. We need money to purchase incentives and tools to help them make the changes.

5.11 Limitations

This study had various limitations. Because so little previous research has been conducted on this topic and because no previous validated, reliable survey has been developed, the survey used in this study was developed for the purpose of this dissertation and is not validated. Though we did receive feedback from the National Nutritionist at the Administration for Community Living (ACL), various faculty members, and professionals in the field who helped us in development, the instrument was nonetheless neither validated nor tested for reliability.

We had great difficulty obtaining participants for this study as no one national list of nutrition educators for congregate and home-delivered meal sites exists. Each State Unit on Aging (SUA) acts relatively independently when executing their program and
some states are more organized than others and can more easily locate educators than other states. We relied on the National Nutritionist with the ACL to send emails with the survey link to her various Listervs and contacts, who then also forwarded the survey link to any potential participants they knew. Because of this, our sample was a convenience sample. Also, due to the survey link being sent out by individual State Units on Aging with it potentially being forwarded to other groups, it is impossible to determine how many people received the survey, so the response rate is unknown. While we tried to obtain participation from every state, not every state was represented in this study and some, such as New York, were over-represented. Some states, such as New York, have their own Listservs with networks of nutrition educators which made it easier to recruit participants. For these reasons, this study might not be generalizable as we are not sure how many nutrition educators for the Title III-C programs exist and whether we captured most of them.

Some participants in our survey commented that a “N/A” response would have been helpful as not all questions applied to the nutrition professional taking the survey. Most questions were asked in a way that assumed the educator was actually developing and/or conducting the education rather than providing oversight. Yet, from the written comments, some of the respondents only provided oversight. Therefore, some participants either skipped or were not able to choose answers accurately based on their current role.

Another limitation is that this survey was not designed to separate educators with home-delivered vs. educators with congregate meal sites. More than 80% of participants indicated they worked in both areas. If we wanted to be able to distinguish how education
differs between congregate or home-delivered meal sites, we would have needed to ask these participants to answer the questions twice, for congregate meal sites and for home-delivered meal sites. This would have provided us with the ability to conduct statistical analyses to compare education between these two settings.

In the survey, we did not define what evidence-based nutrition programming is or what examples are, and it is suspected that many nutrition educators were not aware of what this term meant. We also did not provide a definition for malnutrition and only asked three broad questions on this topic. Malnutrition screening and interventions in this population need to be addressed in future research.

Though we reviewed state-level policy documents to determine which states had various types of policies for nutrition education for older adults, we were not able to determine the extent to which the policies were followed. This may have contributed to the lack of significant findings between nutrition educators with and without state policies. This area also needs further examination to determine if states with stronger policies for nutrition education at congregate and home-delivered meal sites lead to higher-quality, more frequent nutrition education.

Lack of power for some research questions might have contributed to insignificant findings. Again, this was related to the difficulty of obtaining survey participants and perhaps a larger sample size would have led to more significant findings in some areas such as those related to policy. Because the sample size was relatively small, it is reasonable to question if results with small findings are meaningful. Some results were significant, yet the differences between groups (credential) were not that large.
Another question that was unable to be answered within this dissertation is why non-dietetic professionals are providing nutrition education. Is this due to lack of funding? Lack of dietetics’ professional manpower? Convenience? Our findings showed that dietetic professionals are providing more theory-based, behaviorally focused nutrition education than non-dietetic professionals, so this is an important question that might need further examination. Is it that only dietetic professionals should be providing the nutrition education or that more training is needed for non-dietetic professionals who provide nutrition education? Or a combination?

5.12 Implications

Because this is the first study of its kind, further exploration is indicated. Nutrition educators working with congregate and home-delivered meal participants need to be better trained on providing theory-based and behaviorally focused nutrition education, conducting evaluations, and finding materials and evidence-based lessons for older adults. Better training can also help educators implement more interactive lessons that will maintain the attention of the older adults they serve. Online training modules could be developed for educators working with Title III-C nutrition programs that can be completed on their own time. Additionally, a central online repository of education materials and lessons would enable educators easier access to high-quality nutrition materials. Though education materials exist, extensive amounts of curricula and programs do not seem to exist. Many of the programs mentioned in this dissertation are not ongoing and have a set number of lessons, yet programming must be offered on a regular basis. Once the program is over, nutrition educators might struggle to find new programming.
Therefore, new programs and ongoing programs like Fresh Connections need to be developed so that educators working at home and congregate meal sites have ample materials to choose from. Once developed, evaluations of these programs would be an important step for future research and would assist in the collection of high-quality nutrition education materials and programs.

The network of educators for the Title III-C nutrition program is very much disjointed. Each State Unit on Aging and even each Area Agency on Aging operate differently from one area to the next. Because of this and the fact that multiple service providers are also involved in education at congregate and home-delivered meal sites, no one list of contacts exists. Creating a nationwide listserv or another kind of contact list would be helpful in creating a support network for educators. Materials and ideas can be shared more easily this way and could even help facilitate a more streamlined approach to providing nutrition education at congregate and home-delivered meal sites. When speaking with potential survey participants on the phone during recruitment, many were unaware of what was happening with nutrition education in other states and some also indicated they would like more support. Creating a network would increase communication among nutrition educators and could also help organize efforts to bring important issues to the attention of legislators. The Women Infants and Children Program (WIC) has a National WIC Association that provides information and resources to professionals working with the program. This could be used as a model for the Title III-C program (https://www.nwica.org/) and would help connect nutrition educators to resources and information on policy changes, news, and continuing education opportunities.
With respect to malnutrition in older adults, other than recently being mentioned in Massachusetts legislation, the term *malnutrition* is not mentioned in enacted or proposed legislation, but some laws address the nutritional needs of older adults and could be changed to incorporate malnutrition care (Defeat Malnutrition Today, 2017). Services for older adults are funded through the Older Americans Act (OAA), but significant cuts have been made to program services because funding has not kept up with the growth of this population (Defeat Malnutrition Today, 2017). Currently, Title III-C does not include any specific or validated procedures for screening and intervening for malnutrition (Defeat Malnutrition Today, 2017). It is important for this program to be properly funded so that malnutrition screening and interventions can be implemented. As evidenced by our survey, nutrition educators currently do not feel they have the tools or materials for malnutrition screening and intervention. As the older population continues to grow and live longer, malnutrition in this population is going to be an increasing problem that needs to be addressed. Additionally, Medicare Part B does not include screening and counseling for malnutrition (Defeat Malnutrition Today, 2017). Likewise, no initiatives in the Affordable Care Act currently tackle the health indicator of malnutrition specifically and no allowances are made for malnutrition screening or coverage (Defeat Malnutrition Today, 2017). Policy changes are needed.

At the public health level and practitioner levels, healthcare professionals need to be better trained on identifying and treating malnutrition in older adults. Routine nutrition screening and malnutrition intervention skills need to be built into healthcare professionals’ training, education, and practice. Older adults and their caregivers need to be educated on malnutrition, prevention, treatment, and community resources such as
congregate or home-delivered meal programs. More financial resources also need to be
dedicated to food and nutrition programs to support them in their efforts to educate and
nourish this population.

Additionally, inadequate malnutrition screening is a key barrier when it comes to
malnutrition care and use of non-validated screening tools is an issue. Standardization of
a validated national community screening tool is needed, as suggested by the
Malnutrition Quality Collaborative.

Finally, stronger state policies on nutrition education will help improve the quality
of nutrition education being provided at congregate and home-delivered meal sites.
Currently, less than half of all states have any policy on oversight by dietetic
professionals for nutrition education and the states that do have policies vary widely on
the strength of the policy. Due to the limitations of this study, we do not know the extent
to which educators are following their state policies, so future research on this is
indicated. Perhaps all states should adopt a clear nutritional oversight policy for nutrition
education occurring at congregate and home-delivered meal sites to serve as a guide for
nutrition educators. This is another area in which having a network of Title III-C
educators would be helpful, as states can assist one another in the development of these
policies and can share what works and does not work, along with how to improve on
nutrition education for older adults.
REFERENCES


Campbell, L. V., Barth, R., Gosper, J. K., et al. (1990). Impact of intensive educational approach to dietary change in NIDDM. Diabetes Care, 13(8), 841-847.


Appendix A
IRB Approval

Teachers College IRB  Exempt Study Approval

To: Christina Riccardo
From: Curt Naser, TC IRB Administrator
Subject: IRB Approval: 17-238 Protocol
Date: 03/29/2017

Thank you for submitting your study entitled, "Type and frequency of nutrition education provided at home delivered and congregate meal sites.;" the IRB has determined that your study is Exempt from committee review (Category 2) on 03/29/2017.

Please keep in mind that the IRB Committee must be contacted if there are any changes to your research protocol. The number assigned to your protocol is 17-238. Feel free to contact the IRB Office by using the "Messages" option in the electronic Mentor IRB system if you have any questions about this protocol.

As your consent will be online in the survey itself, not stamped consent form is provided with this approval. Further, all research recruitment materials must include the study's IRB-approved protocol number. You can retrieve a PDF copy of this approval letter from the Mentor site.

Best wishes for your research work.

Sincerely,

Curt Naser, Ph.D.
TC IRB Administrator
curtn@axiomeducation.com
Appendix B

Survey

Nutrition Education at Congregate Meal Sites - Copy

Q1 Survey Consent  Your participation in this online survey will take about 10 minutes to complete and is being conducted by Christina Riccardo, MS, RD and EdD candidate in Nutrition Education at Teachers College, Columbia University, New York, NY. This survey is to better understand the type and frequency of nutrition education provided to older adults at congregate meal and home-delivered meal sites. It will also help us to better understand what resources might be helpful for educators. All nutrition educators who provide and/or develop/approve nutrition education for older adults at congregate and/or home-delivered meal sites are invited to participate in this survey. There is minimal risk associated with completing an online survey, such as feeling uncomfortable answering particular questions. Participation in this survey is voluntary and anonymous and you are free to withdraw at any time without penalty. Participation in this survey, as well as your responses, will be kept confidential. Additionally, electronic information will be password protected. There are no direct benefits to you for participating in this survey but responses might help better inform recommendations, strategies, and resources for providing nutrition education at congregate/home-delivered meal sites. If you have any questions or comments regarding your participation in this survey or survey questions or questions related to the topic of the dissertation, please contact the principal investigator (Christina Riccardo 215-962-8849 cr2528@tc.columbia.edu) or the research advisor (Dr. Randi Wolf, 212-678-3912). If you have questions or concerns about your rights as a research subject, you should contact the Institutional Review Board (IRB) (the human research ethics committee) at 212-678-4105 or email IRB@tc.edu. Or you can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY 1002. The IRB is the committee that oversees human research protection for Teachers College, Columbia University. If you understand the information
provided and consent to participation in this study, please choose “Yes” below to begin the survey. Thank you for your time and participation!  IRB Protocol # 17-238

Yes (1)    No (2)

Q2 What professional credentials do you have?

☐ Registered Dietitian (1)
☐ Licensed Dietitian (2)
☐ Dietetic Intern (3)
☐ Health and Human Science Degree (4)
☐ Certified Dietary Manager (5)
☐ Registered Nurse (6)
☐ Licensed Practical Nurse (7)
☐ Social Worker (8)
☐ Licensed Clinical Social Worker (9)
☐ Diet Tech (10)
☐ Other (12) ________________________________
Q3 How long have you held the credential indicated in question 1?

- (1)
- 1-3 years (2)
- 4-6 years (3)
- 7-9 years (4)
- 10 or more years (5)

Q4 Do you currently work with/provide nutrition education for an Older Americans Act Nutrition Program such as a congregate meal site or a home-delivered meal provider? (check all that apply)

- Congregate meal (1)
- Home-delivered meal (2)
- No (3)

Skip To: End of Survey If Do you currently work with/provide nutrition education for an Older Americans Act Nutrition Progr... = No
Q5 Do you work directly for the congregate meal/home delivered site, as a service provider, or with another organization associated with the congregate/home-delivered meal site(s)?

- Congregate site (1)
- Home delivered site (2)
- Service provider (3)
- Other (4)

Q6 Do you directly deliver, oversee, or design nutrition education to participants at congregate meals or home-delivered meals? (check all that apply)

- Deliver (1)
- Oversee (2)
- Design (3)
- None of the above (4)

*Skip To: End of Survey If Do you directly deliver, oversee, or design nutrition education to participants at congregate meals or home-delivered meals? = None of the above*
Q7 In what state(s) are the congregate meal site(s) or home-delivered meal site(s) where you work? (check all that apply)

- Alabama (1)
- Alaska (2)
- Arizona (3)
- Arkansas (4)
- California (5)
- Colorado (6)
- Connecticut (7)
- Delaware (8)
- Florida (9)
- Georgia (10)
- Hawaii (11)
- Idaho (12)
- Illinois (13)
- Indiana (14)
- Iowa (15)
- Kansas (16)
- Kentucky (17)
- Louisiana (18)
Pennsylvania (39)
Rhode Island (40)
South Carolina (41)
South Dakota (42)
Tennessee (43)
Texas (44)
Utah (45)
Vermont (46)
Virginia (47)
Washington (48)
West Virginia (49)
Wisconsin (50)
Wyoming (51)
Tribal Organizations (54)
American Samoa (55)
Virgin Islands (56)
Puerto Rico (57)
Guam (58)
Northern Mariana Islands (CMMI) (59)
Q8 Which of the following have been a topic of your nutrition education lessons within the last 2 years? (Check all that apply.)

- Diabetes (1)
- Malnutrition (28)
- Heart Disease (2)
- Osteoporosis (3)
- Hypertension (4)
- Fats (5)
- Carbohydrates (6)
- Protein (7)
- Fiber (8)
- Sodium and Potassium (9)
- Calcium/Vitamin D (10)
- Weight (11)
- Physical Activity (12)
- Eating on a budget (13)
- Food safety (14)
- Supplements (15)
- MyPlate (16)
### Q9 Do you use any of these materials to develop nutrition education?

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<th>Material</th>
<th>Not familiar with (1)</th>
<th>Familiar with but do not use (2)</th>
<th>Use components (3)</th>
<th>Use extensively (4)</th>
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<tr>
<td>SNAP-ED/County extension materials (13)</td>
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<td>State Department on Aging nutrition education materials (14)</td>
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<td>State University Extension programs (15)</td>
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<td>Company nutrition materials (for example, food service provider nutrition education materials) (16)</td>
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<td>Eat Smart, Live Strong: Nutrition Education for Older Adults (17)</td>
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<td>MyPlate (Choosemyplate.gov) (18)</td>
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<td>Healthy Eating for Successful Living in Older Adults (NCOA Model Health Program) (23)</td>
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</table>
Q10 What criteria are used when selecting material for nutrition education lessons at home delivered or congregate meal sites? (Check all that apply)

- [ ] Cover topics clients/participants are interested in (1)
- [ ] Focus on specific behavior change (2)
- [ ] Interesting activities (3)
- [ ] Easy to teach/implement (4)
- [ ] Can cover in allotted time (5)
- [ ] Provide all teaching materials/resources I need (handouts, etc) (6)
- [ ] What I am familiar with already (7)
- [ ] Organization selects for me (8)
- [ ] Based on nutrition risk assessment (9)
- [ ] Simple messages (10)
- [ ] Practical (11)
- [ ] Targeted (specific topic, relevant to older adults) (12)
- [ ] Cost (13)
- [ ] Other (14) ____________________________________________
Q11 What methods do you use when delivering nutrition education? (Check all that apply)

- [ ] PowerPoint (1)
- [x] Handouts/printed materials/brochures (2)
- [ ] Lecture (3)
- [ ] Games (4)
- [ ] Phone education (5)
- [ ] Visual displays (6)
- [ ] Videos (7)
- [ ] Discussions (8)
- [ ] Hands on activities (9)
- [ ] Tele-health (11)
- [ ] Other (10) ________________________________

Q12 Are participants encouraged to set behavior change goals during nutrition education sessions? (For example, participants state that they will increase intake of calcium rich foods)

- [ ] Never (1)
- [ ] Rarely (2)
- [ ] Sometimes (3)
- [ ] Usually (4)
- [ ] Always (5)
Q13 Do lessons provide opportunities for participants to create action plans for how they will carry out their stated behavior change goal(s)? (for example, participant will state what fruit they will add to breakfast and how often)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Q14 Are hands-on activities incorporated into lessons? (For example, taste tests, cooking classes, games, worksheets)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
Q15 Are incentives provided for participation in nutrition education lessons? (For example, magnets, pens, free samples, coupon vouchers, gift cards)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Q16 Are lessons tailored to common disease states of the participants at your congregate meal sites or home-delivered meal sites? (for example, osteoporosis, diabetes)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
Q17 Are lessons culturally tailored to participants at your congregate meal or home-delivered meal sites? (for example, do you make recommendations about meal planning based on ethnicity of the group?)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Q18 Do your nutrition education lessons consider home or neighborhood environments? (For example, how to obtain fresh produce? how to get to the grocery store? how to prepare meals/meal planning for one or two?)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
Q19 Do your nutrition education lessons include participants' support such as family and friends? (For example, are friends or family members ever asked to join nutrition education sessions?)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Q20 Are follow-up lessons provided to reinforce behaviors?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- If not, why not? (6) ________________________________________________
Q21 Are these elements incorporated into lessons? (check all that apply)

<table>
<thead>
<tr>
<th>Element</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Usually (4)</th>
<th>Always (5)</th>
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<tbody>
<tr>
<td>Promote positive attitudes to behavior change (e.g., promote positive feelings about decreasing salty foods in the diet)</td>
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<td>Discuss health benefits of behavior change (e.g., discussing how decreasing salty foods will lower blood pressure)</td>
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<td>Provide information/knowledge (e.g., providing handout on foods that contain a lot of salt)</td>
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<td>Increase confidence (e.g., enhance individual’s feelings that they have the ability to decrease intake of salty foods)</td>
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<tr>
<td>Increase skills (e.g., demonstrating how to reduce salt while cooking)</td>
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<tr>
<td>Reduce perceived barriers (e.g., providing examples/samples of low sodium foods that taste good)</td>
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</tbody>
</table>
Establish risk/susceptibility to health conditions (e.g., provide self-assessment of salt intake compared to recommendations) (7)

Understand impact of food choice on the environment (e.g., choosing local foods, buying from farmers markets) (8)

---

Q22 Do you evaluate the effectiveness of your nutrition education lessons?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Skip To: Q25 If Do you evaluate the effectiveness of your nutrition education lessons? = Never
Q23 How do you evaluate the effectiveness of your nutrition education lessons? (Check all that apply)

☐ Verbal questions at the end of the lesson (1)
☐ Surveys/questionnaires (2)
☐ Comment cards (3)
☐ Other (4) __________________________________________

Q24 When evaluating the effectiveness of your nutrition education lessons, what do you evaluate? (Check all that apply)

☐ Increased knowledge (1)
☐ Behavior changes (eg. did they decrease salt intake?) (2)
☐ Increased positive attitudes to behavior change (3)
☐ Reduced perceived barriers (4)
☐ Increased confidence (5)
☐ Increased skills (6)
☐ Increased benefits of behavior change (7)
☐ Established risk/susceptibility to health conditions (8)
☐ If participants enjoyed the lesson (9)
☐ If participants intend to come to the next lesson (10)
☐ Number of participants that attended (11)
Q25 Do you feel you need better resources to conduct evaluations?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

Q26 What resources would make it easier for you to conduct an evaluation of a nutrition education lesson? (Check all that apply)

- An evaluation relating to the topic(s) covered during the nutrition education lessons (1)
- An evaluation relating to the participant's enjoyment of education lessons (2)
- More education for me as an educator on how to conduct evaluations (3)
Q27 How satisfied are you with the nutrition education materials available to you?

- Not satisfied (1)
- Neutral (2)
- Somewhat satisfied (3)
- Satisfied (4)
- Very satisfied (5)

Q28 Do you feel you need more resources to provide nutrition education to congregate meal/home-delivered meal participants?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

Skip To: Q30 If Do you feel you need more resources to provide nutrition education to congregate meal/home delivered... = Definitely not
Q29 Which of the following topics do you feel you need more information/materials on? (Choose all that apply)

- Diabetes (1)
- Malnutrition, identifying (31)
- Malnutrition, treating (32)
- Coordinating with local health care entities in support of continued nutritional care over the continuum of care (33)
- Heart disease (2)
- Osteoporosis (3)
- Hypertension (4)
- Behavior change methods (34)
- Protein (5)
- Fats (6)
- Carbohydrates (7)
- Fiber (8)
- Sodium and potassium (9)
- Calcium/Vitamin D (10)
- Weight (11)
- Physical activity (12)
- Eating on a budget (13)
- Food safety (14)
☐ Dietary supplements (15)
☐ Nutritional supplements (35)
☐ MyPlate (16)
☐ Sustainability issues (17)
☐ Overall healthy eating (18)
☐ Cooking for one or two (19)
☐ Meal planning (20)
☐ Nutrition label reading (21)
☐ Hydration (22)
☐ Healthy snacking (23)
☐ Eating alone (24)
☐ Drug/nutrient interactions (25)
☐ Age related appetite loss (26)
☐ Training on how to communicate effectively with older adults (28)
☐ Caregiving (27)
☐ SNAP (36)
☐ CACFP (37)
☐ Senior Farmers Market (38)
☐ Food banks (39)
How to address hunger (40)

None of the above (29)

Other (30) ________________________________________________

Q30 What do you feel are your main barriers to providing and implementing effective nutrition education at congregate meal/home-delivered meal sites? (Check all that apply)

☐ Lack of materials available (1)

☐ No money available to do activities/budget (2)

☐ No promotion of nutrition education sessions (3)

☐ Staff unaware of visits/unprepared (4)

☐ Competing events scheduled (5)

☐ No incentives (6)

☐ Clients/participants not interested (7)

☐ Lack of time (8)

☐ No access to cooking resources (9)

☐ Lack of access to projector, computer (10)

☐ Difficulty getting/maintaining participant attention (11)

☐ Other (12) ________________________________________________

☐ Comments (13) ____________________________________________
Q31 What do you feel makes it easier for you/helps you to provide and implement effective nutrition education at congregate meal/home-delivered meal sites? (Check all that apply)

☐ More nutrition education materials available (1)

☐ More money available for activities, incentives, etc (2)

☐ Promotion of nutrition education sessions (3)

☐ Congregate meal site staff/participants prepared for visit (4)

☐ Decrease in competing events scheduled at the same time as nutrition education (5)

☐ Increased interest of participants (6)

☐ More time for preparation/delivery of nutrition education (7)

☐ Access to cooking resources, hot plates, etc (8)

☐ Access to projector, computer, etc (9)

☐ Other (10) __________________________________________________________

☐ Comments (11) ______________________________________________________
Q32 Would you use an evidence-based nutrition program at your congregate meal/home-delivered meal site(s) if available?

- Definitely yes (25)
- Probably yes (26)
- Might or might not (27)
- Probably not (28)
- Definitely not (29)

**Skip To: Q34 If Would you use an evidence based nutrition program at your congregate meal/home-delivered meal sit... = Definitely not**

Q33 If you are interested in evidence-based nutrition program(s), would you have the funding to implement a reasonably priced program?

- Definitely yes (24)
- Probably yes (25)
- Might or might not (26)
- Probably not (27)
- Definitely not (28)
Q34 Do you feel that malnutrition is a major issue facing your older adult population?

- Definitely yes (33)
- Probably yes (34)
- Might or might not (35)
- Probably not (36)
- Definitely not (37)

Q35 Do you feel you have the tools to assess/screen for malnutrition in your older adult population?

- Definitely yes (47)
- Probably yes (48)
- Might or might not (49)
- Probably not (50)
- Definitely not (51)
Q36 Do you feel there is adequate nutrition education materials available to address malnutrition in your population?

- Definitely yes (47)
- Probably yes (48)
- Might or might not (49)
- Probably not (50)
- Definitely not (51)

Q37 Given unlimited resources, what changes would you like to see in your nutrition education program for congregate meal sites/home delivered sites?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Q38 According to your current Area Agency on Aging or State Unit on Aging, how often are nutrition education services required to be provided to participants for the congregate meal/home-delivered meal program where you work?

○ None (8)
○ 1 session per year (1)
○ 2 sessions per year (2)
○ Quarterly (4 sessions per year) (3)
○ Monthly (12 sessions per year) (4)
○ More than monthly (12+ sessions per year) (5)
○ Nutrition education is not available to program participants (6)
○ Other (7) ________________________________________________

Q39 How many congregate meal sites/home-delivered meal sites are you responsible for?

○ 1-3 (1)
○ 4-6 (2)
○ 7-9 (3)
○ 10 or more (4)
Q40 How many nutrition education sessions do you conduct at each site per month?

- (1)
- 1-3 (2)
- 4-6 (3)
- 7-9 (4)
- 10 or more (5)

Q41 How many total nutrition education sessions do you conduct at congregate meal sites/home-delivered meal site per year?

- (1)
- 1-3 (2)
- 4-6 (3)
- 7-9 (4)
- 10 or more (5)
Q42 What is the typical size of the groups that you work with?

- 1 (1)
- 2-9 (2)
- 10-20 (3)
- 21-30 (4)
- 31-40 (5)
- 41-50 (6)
- >50 (7)

Q43 How much teaching time do you have to conduct each lesson?

- 15-20 minutes (1)
- 30 minutes (2)
- 45 minutes (3)
- 1 hour (4)
- >1 hour (5)
Q44 How long have you worked with older adults at congregate meal sites/home-delivered meal sites?

- (1) 1-3 years
- (2) 4-6 years
- (3) 7-9 years
- (4) 10 or more years

Q45 How long have you worked with older adults in settings other than congregate meal sites/home-delivered meal sites? (For example, long term care facilities)

- < 1 year
- (1) 1-3 years
- (2) 4-6 years
- (3) 7-9 years
- (4) 10 or more years
Q46 What is your highest level of education?

- High School (4)
- Bachelors (1)
- Masters (2)
- Doctorate (3)

Q47 How old are you?

- 20-25 (1)
- 26-30 (2)
- 31-35 (3)
- 36-40 (4)
- 41-45 (5)
- 46-50 (6)
- >50 (7)

Q48 What is your gender?

- Male (1)
- Female (2)
Q49 Additional comments:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

End of Block: Default Question Block
Appendix C

Pilot Survey

**Nutrition Education at Congregate Meal Sites**

---

**Start of Block: Default Question Block**

Q1 Are you an RD/RDN?

- Yes (1)
- No (2)

**Skip To: End of Survey If Are you an RD/RDN? = No**

---

Q2 Do you currently work with congregate meal sites for older adults?

- Yes (1)
- No (2)

**Skip To: End of Survey If Do you currently work with congregate meal sites for older adults? = No**

---
Q3 Do you directly deliver, oversee, or design nutrition education to participants at congregate meal sites? (check all that apply)

☐ Deliver (1)
☐ Oversee (2)
☐ Design (3)
☐ None of the above (4)

Skip To: End of Survey If Do you directly deliver, oversee, or design nutrition education to participants at congregate meal sites? = None of the above

Q4 In what state are the congregate meal site(s) where you work? (check all that apply)

☐ Maine (1)
☐ Vermont (2)
☐ Massachusetts (3)
☐ Connecticut (4)
☐ New Hampshire (5)
☐ Rhode Island (6)
☐ New York (7)
☐ Pennsylvania (8)
☐ New Jersey (9)
☐ Wisconsin (10)
☐ None of these states (11)
Q5 Which of the following topics are covered in nutrition education lessons at your congregate meal sites? (Check all that apply.)

- Diabetes (1)
- Heart Disease (2)
- Osteoporosis (3)
- Hypertension (4)
- Fats (5)
- Carbohydrates (6)
- Protein (7)
- Fiber (8)
- Sodium and Potassium (9)
- Calcium/Vitamin D (10)
- Weight (11)
- Physical Activity (12)
- Eating on a budget (13)
- Food safety (14)
- Supplements (15)
- MyPlate (16)
- Sustainability Issues (17)
- Overall healthy eating (18)
Q8 What materials are used to develop nutrition education lessons at your congregate meal sites?

<table>
<thead>
<tr>
<th>Material</th>
<th>Not familiar with/do not use (1)</th>
<th>Familiar with but do not use (2)</th>
<th>Select Components (3)</th>
<th>Extensively follow/use (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP-ED connection (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Eat Smart, Live Strong: Nutrition Education for Older Adults (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>MyPlate(choosemyplate.gov) (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>DASH Diet (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Program Description</td>
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<td>4</td>
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<tr>
<td>Chef Charles Club (5)</td>
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<td>o</td>
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<tr>
<td>Eat Better &amp; Move More (6)</td>
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<td>o</td>
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<tr>
<td>Cooking Matters (7)</td>
<td>o</td>
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<tr>
<td>Healthy Eating for Successful Living in Older Adults (NCOA Model Health Program) (8)</td>
<td>o</td>
<td>o</td>
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<tr>
<td>State Department on Aging nutrition education materials (9)</td>
<td>o</td>
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<td>State University Extension Programs (10)</td>
<td>o</td>
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<td>Company nutrition materials (eg food service provider nutrition education materials (11)</td>
<td>o</td>
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<tr>
<td>Other (12)</td>
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</table>

Q9 What criteria are used when selecting material for nutrition education lessons? (check all that apply)

- [ ] Cover topics clients/participants are interested in (1)
- [ ] Focus on specific behavior change (2)
- [ ] Interesting activities (3)
- [ ] Easy to teach/implement (4)
Can cover in allotted time (5)
Provide all teaching materials/resources I need (handouts, etc.) (6)
What I am familiar with already (7)
Organization selects for me (8)
Based on nutrition risk assessment (9)
Simple messages (10)
Practical (11)
Targeted (specific topic, relevant to older adults) (12)
Cost (13)
Other (14) ________________________________

Q10 What methods do you use when presenting nutrition education? (Check all that apply)

PowerPoint (1)
Handouts/printed materials (2)
Lecture (3)
Games (4)
Phone education (5)
Visual displays (6)
Videos (7)
Q11 Who decides topics for education sessions?

<table>
<thead>
<tr>
<th></th>
<th>Fully involved in deciding topics (1)</th>
<th>Somewhat involved (2)</th>
<th>Not at all involved (3)</th>
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</thead>
<tbody>
<tr>
<td>Clients/participants</td>
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<tr>
<td>Me as the educator/supervisor</td>
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<td>Supervisor</td>
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<td>State specific</td>
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<td>requirements/policy</td>
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<tr>
<td>Food service provider</td>
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<tr>
<td>Other</td>
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Q12 How are participants involved in determining the topics covered in nutrition education lessons? (check all that apply)

- Participants are not involved (1)
- Focus groups (2)
Q13 Are participants encouraged to set behavior change goals during nutrition education lessons at your congregate meal sites? (For example, participants state that they will consume more fruits and vegetables after the session)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)

Q14 What behavior change goals do you commonly address? (check all that apply)

- Do not address behavior change goals (1)
- Increase fruits and vegetables (2)
- Increase fiber rich foods (3)
- Increase whole grains (4)
Q15 How often do lessons provide opportunities for participants to create action plans for how they will carry out their stated behavior change goal(s)? (for example, participant will state what fruit they will add to breakfast and how often)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- Explain/comment? (6) ____________________________

Q16 How often are hands-on activities incorporated into lessons?

- Never (1)
Q17 If hands-on activities are incorporated into nutrition education lessons, what type(s) are used? (Check all that apply)

☐ Tastes tests (1)
☐ Cooking classes (2)
☐ Games (3)
☐ Worksheets (4)
☐ Group break-out sessions (5)
☐ Grocery store tours (6)
☐ Other (7) ________________________________

Q18 Are incentives, such as freebies/giveaways provided for participation in nutrition education lessons at your congregate meal sites?

☐ Never (1)
Q19 If incentives are used, what types? (check all that apply)

☐ Magnets (1)
☐ Pens (2)
☐ Free samples (3)
☐ Mugs/cups (4)
☐ Coupons/vouchers (5)
☐ Gift cards (6)
☐ Cash (7)
☐ Cooking utensils/supplies (8)
☐ Other (9) ________________________________

Q20 What is the typical size of the groups that you work with?
Q21 How often are lessons tailored to common disease states of the participants at your congregate meal sites?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- How? (6) ________________________________________________

Q22 How often are lessons culturally tailored to participants at your congregate meal sites? (for example, do you make recommendations about meal planning based on ethnicity of the group?)

- Never (1)
- Rarely (2)
Q23 How often do your nutrition education lessons consider home or neighborhood environments? (For example, how to obtain fresh produce? how to get to the grocery store? how to prepare meals/meal planning for one or two?)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- How? (6) ____________________________

Q24 How often do your nutrition education lessons include participants' support such as family and friends? (For example, are friends or family members ever asked to join nutrition education sessions?)

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- How? (6) ____________________________
Q25 How often are follow-up lessons provided to reinforce behaviors?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Usually (4)
- Always (5)
- If not, why? (6) ________________________________________________

Q26 Which of these behavior change theories are you familiar with? (check all that apply)

- I don’t use theory (1)
- Health belief model (2)
- Social cognitive theory (3)
- Trans theoretical model (4)
- Social ecological model (5)
- Comments (6) ________________________________________________

Q27 How often are behavior change theories used at your congregate meal sites?

- Never (1)
- Rarely (2)
- Sometimes (3)
Q28 How often are these elements incorporated into lessons? (check all that apply)

<table>
<thead>
<tr>
<th>Increase positive attitudes to behavior change (eg. promote positive feelings about decreasing salty foods in the diet)</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
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<tr>
<th>Increase benefits of behavior change (eg. discussing how decreasing salty foods will lower blood pressure)</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Usually (4)</th>
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<tr>
<th>Increasing knowledge (eg. providing information on foods that contain a lot of salt)</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Usually (4)</th>
<th>Always (5)</th>
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<th>Increase confidence (eg. enhance individual's feelings that they have the ability to decrease intake of salty foods)</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
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<th>Always (5)</th>
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<tr>
<th>Increasing skills (eg. demonstrating)</th>
<th>Never (1)</th>
<th>Rarely (2)</th>
<th>Sometimes (3)</th>
<th>Usually (4)</th>
<th>Always (5)</th>
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</table>
Reduction perceived barriers (eg. providing examples/samples of low sodium foods that taste good) (6)

Establishing risk/susceptibility to health conditions (eg. provide self-assessment of salt intake compared to recommendations) (7)

Understanding impact of environment (eg. help identify locations where participants can get low sodium foods) (8)

Other (9)

Q29 How often do you evaluate the effectiveness of your nutrition education lessons?

Never (1)
Rarely (2)
Sometimes (3)
Usually (4)
Always (5)

Skip To: Q77 If How often do you evaluate the effectiveness of your nutrition education lessons? = Never

Q30 How do you evaluate the effectiveness of your nutrition education lessons? (check all that apply)

- Verbal questions at the end of the lesson (1)
- Surveys/questionnaires (2)
- Comment cards (3)
- Other (4) ________________________________

Q31 When evaluating the effectiveness of your nutrition education lessons, what do you evaluate? (check all that apply)

- Increased knowledge (1)
- Behavior changes (eg. did they decrease salt intake?) (2)
- Increased positive attitudes to behavior change (3)
- Reduced perceived barriers (4)
- Increased confidence (5)
- Increased skills (6)
- Increased benefits of behavior change (7)
- Established risk/susceptibility to health conditions (8)
- If participants enjoyed the lesson (9)
- If participants intend to come to the next lesson (10)
- Number of participants that attended (11)

Q77 How satisfied are you with the evaluations being done?

- Evaluations are not done (1)
- Not satisfied (2)
- Neutral (3)
- Somewhat satisfied (4)
- Satisfied (5)
- Very satisfied (6)

Q79 Do you feel you need better resources to conduct evaluation?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
Q80 What resources would make it easier for you to conduct evaluations of your nutrition education?

________________________________________________________________

Q32 How satisfied are you with the nutrition education materials available to you?

○ Not satisfied (1)
○ Neutral (2)
○ Somewhat satisfied (3)
○ Satisfied (4)
○ Very satisfied (5)

Q33 Do you feel you need more resources to provide nutrition education to congregate meal site participants?

○ Definitely yes (1)
○ Probably yes (2)
○ Might or might not (3)
Q34 What resources do you need? (check all that apply)

- [ ] Pamphlets (1)
- [ ] Videos (2)
- [ ] Recipes (3)
- [ ] Outlines (4)
- [ ] Pre-developed lessons/curriculum (5)
- [ ] Handouts (6)
- [ ] Activities (7)
- [ ] Other (8) ____________________________

Q35 Which of the following topics do you feel you need more information/materials on? (choose all that apply)

- [ ] Diabetes (1)
- [ ] Heart disease (2)
- [ ] Osteoporosis (3)
☐ Hypertension (4)
☐ Protein (5)
☐ Fats (6)
☐ Carbohydrates (7)
☐ Fiber (8)
☐ Sodium and potassium (9)
☐ Calcium/Vitamin D (10)
☐ Weight (11)
☐ Physical activity (12)
☐ Eating on a budget (13)
☐ Food safety (14)
☐ Supplements (15)
☐ MyPlate (16)
☐ Sustainability issues (17)
☐ Overall healthy eating (18)
☐ Cooking for one or two (19)
☐ Meal planning (20)
☐ Nutrition label reading (21)
☐ Hydration (22)
Healthy snacking (23)
Eating alone (24)
Drug/nutrient interactions (25)
Age related appetite loss (26)
Behavior change methods (27)
Training on how to communicate effectively with older adults (28)
None of the above (29)
Other (30) ____________________________

Q39 What do you feel are your main barriers to providing and implementing effective nutrition education at congregate meal sites? (check all that apply)

Lack of materials available (1)
No money available to do activities/budget (2)
No promotion of nutrition education sessions (3)
Staff unaware of visits/unprepared (4)
Competing events scheduled (5)
No incentives (6)
Clients/participants not interested (7)
Lack of time (8)
Q40 What do you feel makes it easier for you/helps you to provide and implement effective nutrition education at congregate meal sites?

________________________________________________________________

Q41 Given unlimited resources, what changes would you like to see in your nutrition education program for congregate meal sites?

________________________________________________________________

Q42 Do you work directly for the congregate meal site or as a service provider?

○ Congregate site (1)

○ Services provider (2)

Q43 How satisfying do you find providing nutrition education at these congregate meal sites?
Q44 According to your current Area Agency on Aging, how often are nutrition education services required to be provided to participants for the congregate meal program where you work?

- 1 session per year (1)
- 2 sessions per year (2)
- Quarterly (4 sessions per year) (3)
- Monthly (12 sessions per year) (4)
- More than monthly (12+sessions per year) (5)
- Nutrition education is not available to program participants (6)
- Other (7) __________________________

Q45 How many congregate meal sites are you responsible for?

- 1-3 (1)
- 4-6 (2)
- 7-9 (3)
Q46 How many nutrition education sessions do you conduct at each site per month

- 1 (1)
- 1-3 (2)
- 4-6 (3)
- 7-9 (4)
- 10 or more (5)

Q47 How many total nutrition education sessions do you conduct at congregate meal sites per year?

- 1 (1)
- 1-3 (2)
- 4-6 (3)
- 7-9 (4)
- 10 or more (5)

Q48 How much time do you have to conduct each lesson?

- 15-20 minutes (1)
Q49 How long have you been an RD/RDN?

- (1)
- 1-3 years (2)
- 4-6 years (3)
- 7-9 years (4)
- 10 or more years (5)

Q50 How long have you worked with older adults at congregate meal sites?

- (1)
- 1-3 years (2)
- 4-6 years (3)
- 7-9 years (4)
- 10 or more years (5)
Q51 How long have you worked with older adults in settings other than congregate meal sites? (For example, long term care facilities)

- < 1 year (1)
- 1-3 years (2)
- 4-6 years (3)
- 7-9 years (4)
- 10 or more years (5)

Q52 What is your highest level of education?

- Bachelors (1)
- Masters (2)
- Doctorate (3)

Q53 How old are you?

- 20-25 (1)
- 26-30 (2)
- 31-35 (3)
- 36-40 (4)
- 41-45 (5)
Q54 What is your gender?

- Male (1)
- Female (2)

Q55 Additional comments:

End of Block: Default Question Block
Appendix D

Survey Distribution Letter

Survey Invitation email sent 4/19/17
Hello Nutrition Professionals/Colleagues,
A PhD candidate is conducting a survey to better understand how nutrition education is conducted within the congregate and home delivered meal programs. To this end, I hope you will support her endeavor by taking the survey yourself, or forwarding it (whichever is applicable). If you have any questions regarding this survey please direct them to Ms. Chrissy Riccardo.
Thank you for your consideration in this matter.
Healthy Regards,

Holly
Holly Kellner Greuling RDN, National Nutritionist
U.S. Department of Health & Human Services
Administration for Community Living
330 C Street S.W.
Washington, D.C. 20024
202-795-7355
Please excuse any cross posting.

Dear Nutrition Educators,
Teachers College, Columbia University is conducting an exciting new research survey of nutrition educators who deliver/develop/oversee nutrition education at congregate meal and/or home-delivered meal sites for older adults. We would greatly appreciate your participation and hope to use this data to improve resources for implementing effective nutrition education and care for our rapidly growing older adult population using congregate meal and/or home delivered services across the U.S.
This survey will take 10 minutes to complete.
Please note, the survey is completely anonymous, and it will not ask for any identifying information. All information provided will not be linked in any way to your personal survey entry, email address or IP address.
Thank you for your participation and for your commitment to nutrition research in older adults. If you have any questions about the administration of the survey, please contact Chrissy Riccardo (Principal Investigator) at 215-962-8849 or cr2528@tc.columbia.edu
Sincerely,

Chrissy Riccardo, RD, Principal Investigator for Effective Nutrition Education for Older Adults in Congregate Meal Sites Study,
Teachers College, Columbia University
Isobel R. Contento, Ph.D. Professor of Nutrition Education, Teachers College, Columbia University
Randi L. Wolf, Ph.D, MPH, Associate Professor of Human Nutrition, Teachers College, Columbia University
Use the following to access the survey:
https://tccolumbia.qualtrics.com/jfe/form/SV_9BjBzcfxw1RQzi
Dear Nutrition Educators,

Teachers College, Columbia University is conducting an exciting new research survey of nutrition educators who deliver/develop/oversee nutrition education at congregate meal and/or home-delivered meal sites for older adults. We would greatly appreciate your participation and hope to use this data to improve resources for implementing effective nutrition education and care for our rapidly growing older adult population using congregate meal and/or home delivered services across the U.S. You were selected to be a part of this project because you are a nutrition educator working with congregate meal/home-delivered meal sites. I know this is a busy time of year, but I hope that you will take 10 minutes to participate in this brief web survey.

Please feel free to forward this email and survey link to other nutrition educators.

This survey is completely anonymous, and it will not ask for any identifying information. All information provided will not be linked in any way to your personal survey entry, email address or IP address.

Thank you for your participation and for your commitment to nutrition research in older adults. If you have any questions about the administration of the survey, please contact Chrissy Riccardo (Principal Investigator) at 215-962-8849 or cr2528@tc.columbia.edu

Survey Link: https://tccolumbia.qualtrics.com/jfe/form/SV_9BjBzcxfw1RQzi

Sincerely,

Chrissy Riccardo, MS, RD, Principal Investigator for Effective Nutrition Education for Older Adults in Congregate Meal Sites Study, Teachers College, Columbia University

Isobel R. Contento, Ph.D. Professor of Nutrition Education, Teachers College, Columbia University

Randi L. Wolf, Ph.D, MPH, Associate Professor of Human Nutrition, Teachers College, Columbia University