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A Review of Geriatric Content in Accredited Nutrition & Dietetic Programs

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DEDICATION

I would like to dedicate this work to my supportive, caring, and most amazing father, who unexpectedly passed away during this process. You are my guardian angel and your continued strength has helped me get to this point.

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Introduction

Older adults are the fastest growing sector of individuals in the United States (Bernstein & Munoz, 2016). While the overall health of this growing segment of the population varies widely, the growing strain on the healthcare system is already evident (Dall, et al., 2013). The healthcare system has to respond to the needs of this age group, to ensure a good quality of life (Augustine, Shah, Makadia, Shah, & Lee, 2014; Bernstein & Munoz, 2016; Duque, et al., 2013; Reicherter & Waller, 2014). With this population influx, the demand for specialized clinicians in the field of geriatrics will undoubtedly increase (Dall, et al., 2013).

Nutritional health is one part of the health equation that can negatively or positively affect an older adult's quality of life (Bernstein & Munoz, 2016; Chernoff, 2014). The harmonious relationship between aging and nutrition is a unique one and an area that can be capitalized on by dietitians, the food and nutrition experts (Bernstein & Munoz, 2012; Rhea & Bettles, 2012).

This research focused on accredited nutrition and dietetics programs' delivery of geriatric-focused content within the curricula. This study addressed the current nutrition and dietetic program standards for geriatric-focused content as it relates to the curricula. It also addressed the need for geriatric-focused dietitians to provide the distinct nutritional needs of the growing elderly population. This chapter includes background to the problem, rationale for the project, the purpose, research questions, definition of terms, limitations, and a summary.

Background

The Administration on Aging predicts the elderly population will continue to grow steadily up to 80 million by 2040, more than twice the 35 million elderly that were living in the United States in 2000 (Administration on Aging [AOA], 2015). The population cohort 'elderly' or 'geriatric' includes individuals of chronological age 65 years and older (World Health Organization [WHO], 2015). This trend is a concern for nutrition and dietetic programs going forward, because the curriculum to support geriatric-trained students may be limited (Rhee, Wellman, Castellanos, & Himburg, 2004).

The importance of well-educated and enthusiastic professionals who can work well and effectively with the aging population is well documented. As Koren and colleagues (2008) found, "The growing number of older adults with multiple healthcare needs underscores the importance of teaching gerontological content to students…". As the job trends and open positions continue to rise in geriatrics, young professionals need a strong foundation and interest to work in the area, which can be formed while receiving their college education. However, current gerontology content in curricula of many healthcare fields is not adequate as Ryan & McCauley (2004-2005) and Wesley (2005) found in their extensive research.

Rationale

A study completed by Rhee, Wellman, Castellanos, and Himburg (2004) found that, out of the 203 undergraduate dietetic programs and 88 graduate programs, many of which were offered online, only 22% of undergraduate programs and 44% of graduate programs offered a course in ageing. This percentage is quite similar to the results of a comparable study done in 1989, even though the geriatric population had continued to grow. When delving into the reasons

why more geriatric nutrition courses were not being offered, "lack of faculty expertise" and "curriculum already full" were provided as the rationale (Rhee, et al., 2004).

Registered dietitians are the food and nutrition experts best suited to provide individuals with the information and tools to make healthy food choices. Their unique expertise can be utilized in many settings, especially in care for the older adult (Academy of Nutrition and Dietetics [AND], 2015; Kamp, Wellman, & Russell, 2011). The demand for healthcare providers to provide specialized geriatric care is increasing with the rapid rise of older adults living in the United States (AOA, 2015; Healthy People 2020). Therefore, having dietitians who are trained and educated regarding the unique nutrition needs of the elderly will be crucial to meet the growing demands of the population (Bernstein & Munoz, 2016; Kamp, et al., 2011). It has been thirteen years since the last documented study on this topic was completed; consequently, it is important to investigate if there have been changes in the provision of aging content in the curriculum of accredited nutrition and dietetic programs across the United States.

Purpose

The purpose of this study was to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs.

Research Questions

The study described in the following chapters initiated with research questions. The questions addressed by this research were:

1) What are the differences among accredited nutrition and dietetic programs regarding the geriatric-related nutrition content offered in their respective curricula?

2) What is the perceived level of satisfaction expressed by accredited nutrition and dietetic program directors regarding geriatric-related content in their curriculum?

3) What are the opinions among accredited nutrition and dietetic program directors about the importance of including geriatric-related nutrition content in their curriculum?

Definition of Terms

Definitions of terms used in this research include:

Elderly: An individual or group of individuals that are of chronological age 65 years and older (WHO, 2015).

Food insecurity: A "household-level economic and social condition of limited or uncertain access" to a sufficient quantity of affordable, nutritious food (USDA, 2016).

Frailty: A clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with every day or acute stressors is comprised (Xue, 2011).

Geriatric: A branch of medicine that deals with the problems and diseases of old age and aging people (Merriam-Webster, 2015).

Nutrition and Dietetics: The field of study that encompasses the professions of registered dietitians.

Registered Dietitian: The Registered Dietitian (RD) credential describes the healthcare professional who has met the educational requirements to provide medical nutrition therapy to the public. Achievement of the RD credential requires a passing score on a national registration exam. Maintenance of the RD credential requires 75 continuing education units per five-year

cycle. Registered dietitians work in a variety of settings including hospitals, community health centers, universities and corporate wellness (AND, 2015).

Sarcopenia: A condition characterized by loss of skeletal muscle mass and function (Santilli, Bernetti, Mangone, & Paoloni, 2014).

Disclaimer

The principal investigator (PI) for this research has work history that includes clinical work with the elderly. This experience may have influenced the research approach and may impact interpretation of the results.

Chapter Summary

This chapter provides an introduction to the research questions the following study will address. The background and rationale discuss the growing aging population and the likely demand for experienced healthcare practitioners in the area of geriatric care. In particular, this research proposal focused on a specific group of healthcare practitioners, namely registered dietitians.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter is a review of the literature that is foundational to this study. The literature review addresses the growing elderly population and how healthcare practitioners fit into the changing demographics. Themes that emerged from reviewing the literature included in this chapter are: healthcare disciplines and aging content, unique nutritional needs of the elderly, and health concerns for the elderly. This chapter ties the above themes together and concludes with a chapter summary.

Introduction

According to the Merriam-Webster definition, the term 'elderly' refers to "old or rather old: past middle age", while the Oxford dictionary defines the term "(of a person) old or aging" (2015). Despite the way this age cohort is defined, the fact remains that the number of elderly individuals living in the United States continues to rise and is expected to reach 56 million by the year 2020 (AOA, 2015). This steady increase has been attributed to the 'baby boom' population reaching 65 years of age or older. With this 'boom' in the elderly population, the need for qualified healthcare providers to meet the unique needs of the elderly is great (Clark 1999; Eldercare Workforce Alliance, 2017). Not only is the elderly population growing in size, but the age cohort as a whole is becoming more racially and ethnically diverse (University of North Carolina [UNC], 2014). While these changes in the United States population are noteworthy, perhaps the area of greater concern is the healthcare workforce needed to provide the specialized and unique care that elderly individuals require (UNC, 2014).

To meet the unique needs of the growing elderly population, the healthcare workforce must be properly trained (The National Academies of Science, Engineering, Medicine, 2015).

"Geriatric education on all levels is severely lacking and needs to be drastically revised. While eighty-nine (89%) of medical schools began requiring geriatrics exposure in 2000, that exposure is not quantified, often brief, and much too late in their students training" (Hamrick, Kennedy-Malone, Barba, 2008, p. 383). Doctors, physician assistants, psychiatrists, nurses, psychologists, pharmacists, social workers and other healthcare professionals specially trained in the care of older adults are in short supply (The National Academies of Sciences, Engineering, Medicine, 2015). Furthermore, the complex problems associated with aging will demand a supply of healthcare providers with special training in geriatrics (American Geriatrics Society, 2015).

Healthcare Disciplines and Aging Content

Researchers within several of the mentioned healthcare disciplines have assessed their respective fields and program offerings to determine if the current curricula for students would prepare them to work with the elderly population (American Geriatrics Society, 2015). For example, researchers Bell-Dzide, Gokula, & Gasper (2014) looked at physician assistant training. They found that after a required 4-week long geriatric rotation, knowledge of geriatrics was significantly improved (Bell-Dzide, et al., 2014). Positive baseline attitudes reported by this group of students were unchanged following the geriatric rotation (Bell-Dzide, et al., 2014). These researchers agreed that incorporating a geriatric specific rotation will help provide the much needed knowledge and skill set to optimize care for the older adult (Bell-Dzide, et al., 2014). Researchers Damron-Rodriguez, Kramer, and Gallagher-Thompson (1998) surveyed students, from various health disciplines including medicine, physician assistants, psychology, pharmacy, social, and occupational therapy in the Veterans Health Affairs medical systems in West Los Angeles and Palo Alto, California. The students received geriatric training programs that included geriatric-specific lectures and clinical experiences. While the specific content,

length, and intensity of the programs differed, the outcomes from the students surveyed indicated no differences based on these factors. The surveys did indicate that students exposed to the training program expressed a higher interest in working with the elderly, had an increased knowledge base for working with the elderly, and displayed a significant decrease in level of bias toward the elderly (Damron-Rodriguez, et al. 1998).

Similarly, Koren and associates researched nursing students' knowledge and attitudes towards older adults (2008). Although multiple variables were presented, students expressed a need for more education to increase their comfort and confidence when caring for older adults, with two of the most requested topics as end-of-life care and specific disorders (Koren, et al., 2008). Koren and colleagues (2008, p. 40) highlighted "The growing number of older adults with multiple healthcare needs underscores the importance of teaching gerontological content to students…". These researchers offered their results as a foundation to other nursing programs looking to add or enhance gerontology to their respective curricula (Koren, et. al., 2008). Wong, Odom, and Barr honed in on curricula in physical therapy to identify if adequate courses and/or experiences were being implemented in order to handle the growing aging population (2014). Results from their study showed that small enhancements to the curriculum to better prepare physical therapy students have been made, but they insisted that the "marginal success" was not and would not meet the increasing demand for trained and specialized professionals (Wong, Odom, & Barr, 2014). While Wong and colleagues outlined an approach to address the shortfalls in the curricula of physical therapy programs, they also suggested that a deliberate and concerted effort is needed, which many programs may not be able to give (Wong, et al., 2014).

Nutrition and dietetic students are similar to other students in healthcare associated disciplines in terms of their varied coursework and clinical training. Rasor-Greenhalgh and

colleagues (1993) recognized that nutrition and dietetic students typically have limited exposure to geriatric patients. Therefore, they looked into the attitudes and perceptions of nutrition and dietetic students toward the elderly in order to better incorporate this age group into the dietetics curriculum (Rasor-Greenhalgh, Stombaugh, & Garrison, 1993). The results found that following direct contact with a group of elderly patients, students' attitudes and perceptions showed significant positive change (Rasor-Greenhalgh,et al., 1993). Overall, these researchers suggested that looking at the dietetic curriculum and implementing nutrition and aging content and experiences is necessary for students to gain a level of exposure that would allow them to be effective practitioners in the field of geriatrics (Rasor-Greenhalgh,et al., 1993).

Kaempfer (2002) supported the idea of adding and/or improving the geriatric education; "With the recent passage of the Medicare medical nutrition therapy bill by Congress, dietitians are expected to become more involved with older adults" (p.197). Similarly, Prohaska and Wallace (1997) explained, "The profession should expand its training to meet the needs of older people, including quality of life issues and nutrition as primary prevention, even in later years" (p.120).

A study completed by Rhee and associates (2004) found that out of the 203 undergraduate dietetic programs and 88 graduate programs, many offered online, only 22% of undergraduate programs and 44% of graduate programs offered a course in ageing. This percentage is quite similar to the results of a comparable study done in 1989, yet the geriatric population had grown significantly. When delving into the reasons why more geriatric nutrition courses were not being offered, "lack of faculty expertise" and "curriculum already full" were provided as the rationale (Rhee, et al., 2004).

Integrating Geriatric Education

Various approaches to educating students to care for geriatric patients have been implemented across health disciplines. Although many programs have tried to adjust their curricular offerings to meet the changes in patient demographics, program leaders must deal with the difficulty of integrating additional content into a packed-full curriculum (MacRae, 2012). Despite the significant and very real challenges, health programs, including pharmacy, nursing, and social work, to name a few, have been able to add a course specific to geriatrics. Other programs have added an elective geriatric-related course, while others have been able to implement an interdisciplinary course to meet the increased demand for aging content (Etsus, Hume, & Owens, 2010; Bridges, Davidson, Odegard, Maki, & Tomkowiak, 2011). Focusing in a little more, some programs have added geriatric content through a more innovative approach. For example, some pharmacy and physical therapy programs have used either introductory or advanced practice experiences or a certificate program for students to engage in the necessary content, while others have utilized a service-learning model (Clark, Spence, & Sheehan, 1996; Felton, Jarrett, & Meyer, 2016; Reicherter & Waller, 2014; Woelfel, Boyce, & Patel, 2011).

While experts and working professionals across health professions agree that the changing demographics of the majority of patients is a concern that needs to be addressed through education, some professionals have reached out across disciplines to engage in a team approach to educate students. Occupational therapist, Nancy MacRae (2012) and fellow colleagues in numerous health professions came together to begin a geriatric interprofessional education program. With the help of colleagues, an education program was developed that included students, elderly individuals, and faculty members from several departments. The program consisted of experiential learning, where students visited, learned from, and assessed

the elderly living in the community, assisted living, or nursing homes (MacRae, 2012). The students gained insight, experience, and rapport-building skills during the interprofessional education program and expressed numerous positive benefits from being a part of it (MacRae, 2012). Other allied health programs have implemented similar programs and have also reported positive results. Researchers Bonifas and Gray (2013) reviewed curriculum models prepared to provide social work students for an interdisciplinary collaboration within geriatric health care. Results identify that a greater number of meaningful changes occur in students' attitudes and values when they worked with interdisciplinary teams, indicating the value in these programs (Bonifas & Gray, 2013). While the concept of interprofessional education is not a new one, the use of this concept specifically in geriatrics education is new and is not widespread despite its documented benefits (Keijsers, Dreher, Tanner, Forde-Johnston, & Thompson, 2016).

Another approach to educating students about geriatric care is a blended learning model. Program directors in geriatric medicine at the University of Sydney, implemented a blended system in the curriculum as a way to add the essential content in an inventive way (Duque, et al., 2013). The blended system combined e-learning and person-to-person interaction, where hands-on learning experiences, technology, interactive learning, interaction with the multidisciplinary team, and more exposure to patients coupled with regular feedback from instructors were paramount to the success of the model (Duque, et al., 2013). Another tactic to educate students about geriatric care is through community-based educational programs. These programs have developed across health disciplines in an attempt to shift the learning focus from the classroom to the community and to ultimately benefit both the student and the community (Village & Village, 2001; Seifer, 1998; Jarvis, 1999; Glendon & Ulrich, 1997).

A rather new method developed by programs to fill the gap of limited geriatric education and exposure is the use of senior mentor programs. These programs include intergenerational contact into health sciences education with the goal of increasing students' knowledge of older persons and the aging process, thus improving the students' attitudes, perceptions, and respect for elderly individuals, while enhancing the skills necessary to work with older adults such as assessment and communication skills (Eleazar, Stewart, Wieland, Anderson, & Simpson, 2009; Genoe, Crosbie, Johnson, Sutherland, & Golderberg, 2013; Heflin, 2006; Hoffman, Gray, Hosokawa, & Zweig, 2006; Kropf, Idler, Flacker, Clevenger, & Rothschild, 2015). Paramount to many of the senior mentor programs is a student-senior mentor relationship with community-dwelling older adults who are representative of good health. This relationship results in students identifying an increased level of comfort and decreased level of bias when working with the elderly (Bates, Cohan, Bragg, Bedinghaus, 2009; Corwin, et al., 2006; Genoe, Crosbie, Johnson, Sutherland, & Goldberg, 2013; Kropf, Idler, Flacker, Clevenger, & Rothschild, 2015; Roberts, Richeson, Thornhill, Corwin, & Eleazer, 2006; Wieland, et al., 2008).

While many of the documented senior mentor programs have been specific to medical schools and medical students, there is significant potential for similar programs in other health professions to build a bridge between the elderly and students and improve healthcare systems. For example, the Atlanta Regional Geriatric Education Center (ARGEC) offered a senior mentoring program to first year medical, nursing, and physician assistant students. The program required the students to first work in an interdisciplinary team and then come together in larger groups to reflect and discuss experiences with graduate gerontology students as facilitators (Kropf, et al., 2015).

Another example is a senior mentor program at the University of South Carolina College of Medicine that included pharmacy students (Shrader, Hummel, Byrd, & Wiley, 2013). A team consisting of a medical student and a pharmacy student completed in-home comprehensive assessments that were followed-up with the rest of the program participants in a group dialogue. Facilitators of this program highlighted the importance of interprofessional collaboration, specifically the increased ability of the students to identify polypharmacy concerns within this population (Shrader, et al., 2013). Although there are multiple approaches and opinions regarding what approach is best to integrate geriatric content across healthcare disciplines, researchers do agree that effective collaboration among healthcare professionals is essential for serving this population, and a better understanding of each discipline's specific role could advance geriatric care (Golden, Gammonley, Hunt, Olsen, & Issenberg, 2014; Shrader, et al., 2013).

Unique Nutritional Needs of the Elderly

Nutrition is a concern for the geriatric population, not only because they are at an increased risk of developing malnutrition, but also because it is harder to determine individual nutrition needs. Determining adequate nutrition recommendations for this group can be difficult because the amount of lean body mass coupled with the decreased basal metabolic rate is highly individualized and varied (Brownie, 2006). Moreover, various chronic diseases can greatly affect metabolism, nutrient needs, and intake (WHO, 2015).

Registered dietitians can play an integral part in preventing chronic disease and disability and managing disease with medical nutrition therapy (Academy of Nutrition and Dietetics [AND], 2012). The Dietary Guidelines for Americans (two years and older) continues to be the standard for appropriate nutrition to live a full and healthy life. These guidelines encourage

Americans to eat a wholesome diet to promote health, maintain weight, and prevent disease. The United States Department of Agriculture (USDA) and the United States Department of Health and Human Services (HHS) have provided these guidelines to Americans since 1980, updating them every five years. Based on a rigorous review of relevant scientific evidence, these revised guidelines serve as the cornerstone for all federal nutrition education and program activities (Dietary Guidelines, 2015).

In addition to the comprehensive document, listing the specific recommendations and details, there are additional resources to help communicate the Dietary Guidelines for Americans, including consumer messages, tools (MyPlate), and educational materials. The 2015-2020 Dietary Guidelines for Americans provides five principle guidelines for individuals to remember when making their food and beverage choices: 1. Follow a healthy eating pattern across the lifespan; 2. Focus on variety, nutrient density, and amount; 3. Limit calories from added sugars and saturated fats and reduce sodium intake; 4. Shift to healthier food and beverage choices; and 5. Support healthy eating patterns for all (Dietary Guidelines, 2015).

The elderly, however, have different nutrition concerns. The cause or causes of nutritional deficiency in the elderly care are multifactorial and often reflect physical and physiological impairments and psychosocial influences (Brownie, 2006; Evans, 1995). Today much geriatric research in relation to malnutrition has focused on frailty and sarcopenia; two modifiable conditions that can lead to poor health outcomes (Xue, 2011; Heuberger, 2011). According to the literature, frailty is the increased susceptibility among the elderly to experience functional decline while having an impaired ability to deal with everyday life and acute stressors (Litchford, 2014; Xue, 2011; Heuberger, 2011). Characteristics of frailty include malnutrition, unintentional weight loss, fatigue, exhaustion, weakness, reduced walking speed, low physical

activity, and impaired mobility (Litchford, 2014). Frailty is linked to an increased number of falls, disability, and hospitalization and is a predicator of mortality (Litchford, 2014). Sarcopenia is defined as the major age-related decline in skeletal muscle mass (Bales & Ritchie, 2002; Batsis, Mackenzie, Barre, Lopez-Jimenez, & Bartels, 2014). Although loss of skeletal muscle mass is considered inevitable, it can also be negatively accelerated by physical inactivity, disuse of muscles, inadequate protein intake and/or impaired utilization (Brownie, 2006). The problem with decreased skeletal muscle mass is not only limited functional capacity, but the decreased reserves of this tissue for catabolic processes or inflammatory response while the individual is sick (Brownie, 2006). These reduced reserves can be compounded by limited functional capacity to complete everyday tasks, resulting in poor nutrient intake.

Often, access to the quality and variety of foods needed to maintain a healthy system can be a barrier for the elderly (Chernoff, 2014). Limited financial resources, limited access to food resources and/or problems with certain food consistencies can present as obstacles to achieving and maintaining good nutritional status. Additionally, micronutrient deficiencies are often seen in the elderly. This can be a result of decreased absorptive capacities, limited variety in the diet, or presence of disease (WHO, 2015). Yet, the recommended intake levels for many of the micronutrients are either the same or greater when compared to the recommended levels for younger adult population , creating a substantial challenge for many elderly individuals.

There are several reasons why this group of individuals needs ready sources of micronutrients, but perhaps the most common is to enhance immunity (Chernoff, 2014). Aging leads to decreased function of the immune system, that can be further diminished by disease, so encouraging foods rich in micronutrients, that are easy to consume, purchase, and prepare, is very important to the everyday health of the elderly (Chernoff, 2014; Vallejo, 2011). However,

elderly patients may be less likely to consume the appropriate amount of nutrients on a daily basis because of physiological, psychological, and environmental changes. The presentation of these changes vary among the elderly population, but many elderly experience challenges to maintaining good nutrition status such as fluctuations in appetite, loss of sensory sense of taste and/or smell changes, changes in socialization around eating (i.e. loss of friends or loved ones), and the ability to purchase and prepare food.

Health Concerns for the Elderly by System

While older individuals typically have more health problems than their younger counterparts, a large percentage of those older than 65 years are relatively healthy and live a good quality of life. Still, more than half of the elderly population lives with at least one disability, and one-third has at least one severe disability (Chernoff, 2006).

Some of the most common medical concerns for the elderly population are greatly affected by diet and include: cardiovascular disease, cerebrovascular disease, diabetes, osteoporosis and cancer (Duque, et al. 2013; WHO, 2015). These chronic diseases are compounded by the ageing body and can prove debilitating in many ways (Augustine, et al., 2014). Unfortunately, many elderly may have multiple chronic diseases, and thus morbidity and mortality is higher than younger populations. As the body ages, numerous changes occur in all of the body systems. The effects of these changes can greatly impact not only the nutritional needs of this population, but can also affect their nutritional intake.

Digestive system

The beginning of the digestion system is the oral cavity. Not typically looked at as an area of concern within the general adult population, this can be of great concern for the elderly.

Taste and smell can be affected by infection, oral lesions, xerostomia, and poorly fitting dentures. Frequently oral problems are associated with chronic disease (Berkey & Scannapieco, 2013; Cefalu, 2011; Chernoff, 2014). One vital component of the oral cavity is saliva, necessary to maintain oral health and for tastes to reach taste receptors. In elderly individuals the amount of saliva produced tends to decline as mucous membranes become thinner, less elastic and vascular (Chernoff, 2006).

Sense of taste often decreases with age, even in the absence of medication and disease. However, medication and disease can exacerbate changes in taste (Chernoff, 2014; Miles, McFarlane, Kainth, & Parmar, 2014). Changes in the way foods taste can affect appetite and overall perceived diet quality, especially if the individual no longer enjoys foods that were formerly considered to be favorites. Taste alterations can be further influenced by prescription and over-the-counter medications (Chernoff, 2014). Nutritional deficiencies or toxicities can also affect oral health. Specifically, researchers have found a zinc deficiency can result in taste loss, so ensuring adequate consumption of this micronutrient is a must (Chernoff, 2016). Individuals experiencing problems with his/her oral health need a dietitian trained in gerontology to provide an individualized plan and recommendations to address their unique needs and maintain optimal nutritional health (Feldblum, German, Castel, Harman-Boehm, & Shahar, 2011).

A further concern, when it comes to oral health in the elderly, is swallowing problems. The term dysphagia is used to refer to difficulty swallowing, oropharyngeal or esophageal problems. Researchers offer alarming statistics when it comes to dysphagia and the elderly population. Some studies suggest 70-90% of the elderly deal with some degree of dysphagia (Kelly, Wright, & Wood, 2011). Additional problems associated with dysphagia include social isolation, physical discomfort, nutritional deficiencies, aspiration, pneumonia and death. Stroke

and dementia have the highest rates of dysphagia (Miles, et al., 2014; Sura, Madhavan, Carnaby, & Crary, 2012). Treatment for dysphagia is vital for these individuals, whether it be rehabilitation or learning compensatory behaviors to maintain a safe swallow.

Specific modifications in the surrounding environment, feeding equipment, and/or diet may be needed to improve overall success when dealing with this condition. Furthermore, texture modification, food fortification, and dietary supplements are all pieces to be considered when assessing an elderly individual with dysphagia (Miles, et al., 2014; Morris, 2012). Although rarely performed, surgical procedures do exist for severe dysphagia with structural or functional impairments (Chernoff, 2014).

Moving down through the digestion system, the gut can also experience changes as one ages, primarily as a result of disease (Chernoff, 2014). Typical gastrointestinal (GI) symptoms tend to be nonspecific and can also be a result of medication, infection, or other issues. Therefore, trained clinicians in geriatrics are a must to provide these individuals with optimal care. Individuals also commonly complain of gastroesophageal reflux disease (GERD). Although GERD is often associated with other underlying diseases, additional problems in the GI system that influence GERD symptoms include delayed gastric emptying, an inefficient lower sphincter, failure of the esophagus to stimulate peristalsis, and copious amounts of acidic gastric content (Chernoff, 2014; Poh, Navarro-Rodriguez, & Fass, 2010). A more aggressive treatment approach for the elderly is typically prescribed because of the potential for complications. For example, the typical treatment for an adult with GERD may be the use of antacids; however, simple antacids must be closely monitored in the elderly, because they can have negative consequences such as diarrhea, constipation, hypercalcemia, and hypermagnesemia (Chernoff, 2014; Poh, et al., 2010).

Moving down to the pancreas, elderly individuals do experience acute and chronic pancreatitis more often than non-elderly adults (Chernoff, 2014). These conditions are particularly significant because they can affect nutrition with episodes of reduced oral intake and loss of pancreatic enzymes that allow for proper digestion. If the liver is involved, the main concern for clinicians is the alteration in metabolism, generally secondary to medications (Almazroo, Miah, & Venkataramanan, 2017; Crooks, 1976; Hunt, Westerkam, & Stave, 1992). In particular, the elderly have reduced lean body mass, total body water, oxygenation, and hepatic blood flow which alter the distribution of water-soluble and fat-soluble medications (Almazroo, et al., 2017). On top of the medication side effects, the metabolism of the medication can be a major concern for clinicians (Crooks, 1976; Hunt, et al., 1992). Similar to the adult population, a whole host of liver diseases can be present in the elderly, including fatty liver, acute hepatitis, cholestasis, cirrhosis, hepatic encephalopathy, and ascites (Almazroo, et al., 2017; Chernoff, 2014). Although many of the treatments for these diseases seem to be fairly similar when compared to the adult population, special care must be taken with any side effects of medications, changes in appetite, or changes in daily living.

At the terminus of the GI tract, is the colon. Two of the most common concerns for the elderly related to the colon are constipation and diverticular disease (Bernstein & Munoz, 2016; Chernoff, 2014; Cheskin, 1990). Constipation can be a difficult to effectively manage because there are so many different factors affecting it. Possible factors to be considered are medications, neurologic disease, structural abnormalities, systemic disease, and diet and lifestyle (Bernstein & Munoz, 2016; Chernoff, 2014). Here again, special attention to the individual - looking at underlying disease and other factors is key to effective management (Bernstein & Munoz, 2016; Chernoff, 2014). From a nutritional standpoint, increasing the individual's fiber intake and

ensuring proper hydration is usually recommended. Depending on the individual, encouraging daily activities such as walking or easy exercises can also ease constipation symptoms and help with controlling it.

Diverticular disease, defined as an out-pouching or pocket in the wall of the colon, is also a common disorder of the GI tract in the elderly; general nutrition recommendations for the elderly with this disease are similar to that given to the adult population, increase daily fiber consumption (Bernstein & Munoz, 2016; Chernoff, 2014; Commane, Arasaradnam, Mills, Mathers, & Bradburn, 2009; Hull, Greco, & Brooks, 1980; Ünlü, Daniels, Vrouenraets, & Boermeester, 2012). Inflammatory bowel disease, which includes Crohn's disease and ulcerative colitis, is also on the rise in the elderly population (Chernoff, 2014; Gabrielli, et al., 1995; Gisbert & Chaparro, 2014). These conditions often include symptoms such as constipation and may even include diverticular disease, which can make it hard for the clinician to properly treat (Gisbert & Chaparro, 2014). Further compromising treatment for affected individuals is the difficult regimen required to minimize symptoms, often including the use of additional medications. Additional medication can hinder the effectiveness of treatment, since elderly individuals may already have several prescribed medications and adding one or two more could increase the likelihood of medication miss-management and adverse drug reactions (Chernoff, 2014; Gisbert & Chaparro, 2014).

Cardiovascular system

According to several researchers, diseases of the heart and blood vessels are the most important cause of morbidity and mortality in the elderly (Chernoff, 2014; North & Sinclair, 2012). Forty percent of individuals with cardiovascular disease (CVD) are over the age of 65; whereas ~84% of the deaths from CVD occur in those over the age of 65 (Chernoff, 2014;

Chernoff, 2006). More than half of the individuals that reach the age of 65 will suffer a cardiac tragedy (Chernoff, 2014; Chernoff, 2006). Decline in cardiovascular function is a part of the aging process; for example, loss of cardiovascular reserve capacity is part of the normal aging process (Cefalu, 2011; Chernoff, 2014; North & Sinclair, 2012). Unfortunately, CVD may go undiagnosed longer in the elderly when compared to the adult population because of unrecognized symptoms that are often dismissed as part of "normal aging" (Fair, 2003; North & Sinclair, 2012). Similar to adults with cardiovascular problems, there are modifiable risk factors that affect one's condition including smoking status, body mass index, physical activity, diet, total cholesterol, blood pressure, and fasting glucose (AHA, 2016; Erdman, Macdonald, & Zeisel, 2012). Atherosclerosis or the thickening and hardening of the arteries is usually the underlying factor for CVD in the elderly (Cefalu, 2011; Chernoff, 2014). Although some of the thickening and rigidity of the arteries is due to the normal aging process, CVD is largely influenced by environment and lifestyle (Chernoff, 2014; Erdman, et al., 2012).

A large part of recommendations for prevention and limited progression of heart disease is based on the daily diet. For example, the Therapeutic Lifestyle Changes (TLC) Diet suggests individuals reduce saturated fat intake to less than 7% of total calories, decrease cholesterol to 200mg/d, increase soluble fiber and plant stanol/sterol intake, reduce body weight, and increase physical activity (Chernoff, 2014; HHS, 2002). Further evidence-based guidelines focused on lifestyle management, recommended by the American Heart Association and the American College of Cardiology, include lowering lower density lipoprotein levels (LDL, also known as the 'harmful' cholesterol level) and blood pressure (Bernstein & Munoz, 2016). The dietary pattern suggested is similar to the DASH diet (Dietary Approaches to Stop Hypertension), which

encourages more fruits, vegetables, whole grains, fish, low-fat dairy, nuts, and oils (Bernstein & Munoz, 2016; Božić, Durlen, Pehar, Matešić, & Galešić, 2012).

High blood pressure is common in older adults and the classification system used is the same as what is used in the adult population (Božić, et al., 2012; Chernoff, 2014). Unfortunately, high blood pressure is the most powerful predictor of a stroke, so taking steps to modify blood pressure is important. There is a form of hypertension referred to as isolate systolic hypertension (ISH), which affects elderly individuals, and is a reflection of the diminished capacity of the distensibility of the aorta (Božić, et al., 2012; Chernoff, 2014). Despite the origin or form of the CVD, all individuals should follow a healthy lifestyle with proper diet and exercise.

Renal system

There are significant changes in the kidneys (renal system) of an elderly individual. These changes include renal blood flow decline, filtration rate decrease, along with a decreased ability to dilute and concentrate fluids (Abrams & Thompson, 2014; Chernoff, 2014). In addition to these changes, elderly individuals with a chronic disease will likely have additional decline and problems with his/her kidneys (Bernstein & Munoz, 2016; Chernoff, 2006). When looking at the health of one's kidneys, despite age, the glomerular filtration rate (GFR) is the best index (Chernoff, 2014; Mallappallil, Friedman, Delano, McFarlane, & Salifu, 2014). If the GFR is at a level that prompts concern, clinicians will evaluate laboratory and imaging studies to further define the damage to the kidneys (Abrams & Thompson, 2014; Chernoff, 2014). Like many other chronic diseases, chronic kidney disease (CKD), has a disproportionately higher prevalence in the elderly population, according to NHANES 2001-2013 (Mallappallil, et al., 2014; National Kidney and Urological Information Clearinghouse, 2017).

Rates of older adults (greater than 70) with CKD are close to 50% (Levey, 2009). Even though a majority of the risk factors for CKD in the elderly are the same as the adult population, i.e. diabetes, CVD, hypertension, and obesity; older age itself is actually a risk factor (Bernstein & Munoz, 2016; Chernoff, 2014). Additionally, the United States Renal Data System (USRDS) 2016 Annual Data Report confirmed that older adults are the fastest growing segment of the population beginning dialysis (USRDS, 2016). Even though this segment only makes up about half of the individuals on dialysis, they tend to begin with a lower body mass index, have more comorbidities, and have higher hospital admission rates (USRDS, 2016). Therefore, a trend of functional decline, morbidity, and mortality is being experienced by this older group of adults on dialysis. Other concerns for this population include higher rates of anemia, sarcopenia, malnutrition, and depression (Bernstein & Munoz, 2016; Chernoff, 2014).

Although anemia is a problem for older individuals with CKD, older individuals without CKD also experience this significant health concern. Unfortunately, anemia is highly associated with a decline in the quality of life, clinical depression, falls, functional impairment, slower walking speed, reduced grip strength, loss of mobility, and worsening comorbidities and mortality (Balducci, Ershler, & Bennet, 2007; Nissenson, Goodnough, & Dubois, 2003; Turusheva, et al., 2015). The overall prevalence of anemia in the elderly population ages 65 and up is about 11% (American Society of Hematology, 2017). "Overall, deficiencies of iron, folate, or vitamin B12 account for one-third of all anemias in older adults. Within this group, half of the anemia is related to iron deficiency" (Guralnik, 2004, pg. 2265). Nutritional factors contribute to many changes in the blood system, but most notably in anemia. Ensuring older adults are eating a well-balanced diet, full of micronutrient rich fruits and vegetables and good iron sources is a must (Bernstein & Munoz, 2016; Chernoff, 2014).

Skeletal system

"A decline in bone density has been reported to begin after the second, third, fourth, or fifth decade" (Marcus, Kosek, Pfefferbaum, & Horning, 1983; Arnold, 1973; Weaver & Chalmers, 1966). The changes in bone mineral density (BMD) are attributed to changes in hormones and cells associated with the aging process (Chernoff, 2014). Women experience accelerated trabecular bone loss at menopause; yet, changes in nutrient intake, metabolism of protein, magnesium, iron, and vitamin C can all affect bone mass in both genders (Chernoff, 2014). Some of the best strategies for preserving BMD include adequate vitamin D and calcium intakes and exercise.

While adequate amounts of calcium and vitamin D are not a problem for a majority of the adult population, the older adult population can have some difficulty in reaching the recommended amounts. For example, the elderly tend to have lower calorie intake which decreases calcium intake, plus they have higher rates of lactose intolerance, and sometimes avoid calcium-rich foods all together (Levis & Lagari, 2012; Mangano, Walsh, Insogna, Kenny, & Kerstetter, 2011). Similarly, sufficient intake of vitamin D can be hard to achieve. Not only is sun exposure reduced in this age group, but daily recommendations increase from 10 micrograms per day to 15 micrograms per day if an individual is over the age of 70 (Chernoff, 2014; Nowson, 2007). Therefore, encouraging both natural and fortified food options for the elderly can be very useful and protective. Additionally, exercise, specifically resistance training, plays an important role in maintaining BMD and preventing further problems such as osteoporosis (Bacelar, et al., 2015).

Endocrine system

The loss of functional reserve in some endocrine organs increases the likelihood for older adults to develop diseases such as diabetes mellitus, hypothyroidism, and hypogonadism (Bernstein & Munoz, 2016; Chernoff, 2014). Nutritional status and dietary intake can affect circulating hormone levels; on the other hand, these hormones play a major role in the regulation of nutrient intake and utilization. Further, weight loss can be a nonspecific symptom of endocrine disease in the elderly (Chernoff, 2014). Therefore treatment of many endocrine disorders involves dietary modification. The prevalence of diabetes mellitus increases with age; 25.9% of individuals aged 65 years and older have this chronic disease (American Diabetes Association [ADA], 2016; Halter, et al., 2014).

Additionally, several studies show diabetes mellitus is related to a higher rate of disability, depression, and poor subjective health (Bourdel-Marchasson & Berrut, 2005). Multiple factors lead to hyperglycemia in the older adult including: decline in physical activity, decrease in lean body mass, increase in visceral adiposity, decrease in insulin secretion, and peripheral insulin resistance (Halter, et al., 2014; Bourdel-Marchasson & Berrut, 2005; Chernoff, 2014). Unfortunately, elderly individuals with diabetes, no matter the actual cause, are at a higher risk for cardiovascular and peripheral vascular complications (Halter, et al., 2014; Kuswardhani & Suastika, 2010; Perry, 1999). Markedly, more than 65% of deaths in the geriatric population with diabetes are the result of cardiovascular disease (Rosenthal, Fajardo, Gilmore, Morley, & Naliboff, 1998). Reasonable control of blood glucose levels can improve quality of life and decrease morbidity and mortality rates (Chernoff, 2014; Halter, et al., 2014). Although the progression of diabetes mellitus may be different in the elderly, treatment modalities remain the same as they are for the adult population. A combination of diet, exercise, oral medications,

and insulin still remains the recommended regimen (Bernstein & Munoz, 2016; Chernoff, 2014; Halter, et al., 2014). Recommendations to prevent complications from diabetes for elderly individuals include annual foot and retinal exams and possible medication treatment as determined by his/her care team.

Diabetes mellitus can also alter the vitamin and mineral status of those elderly affected. For example, zinc is an essential mineral required for many cellular functions; and altered zinc intake and absorption can lead to deficiency or even concentrated levels in the blood (Haase, Overbeck, & Rink, 2008; Kinlaw, Levine, & Morley, 1983; Song, Wang, Li, & Cai, 2005). "Zinc deficiency is associated with poor wound healing, poor immune function, skin rash, altered taste/smell perception, hair loss, abnormal hemostasis, decreased muscle strength, and anorexia" (Sriram & Lonchyna, 2009). Chromium, copper, selenium, thiamine, and vitamin C are all micronutrients of particular importance in diabetes mellitus because they can affect metabolism, enzyme activity, immune function, and antioxidant capacity (Brewer, 2007; Chernoff, 2014; Wang & Cefalu, 2010). However, studies are inconclusive as to whether supplementing any of these micronutrients is of particular benefit, so ensuring the individual is consuming a varied diet with whole grains, fruits, vegetables, low-fat dairy, and lean protein is the best approach to keep these levels optimal.

Water metabolism can also be altered in the elderly, as aging is linked with a decrease in total body water and intravascular water (Chernoff, 2016; Wilson, 2014). Both dehydration and hyponatremia tend to be fairly common in the older adult population (Chernoff, 2014; Wilson, 2014). Medications may further contribute to these problems; therefore, fluid balance and hydration maintenance should be closely monitored in the elderly.

Elderly men experience hypogonadism at an increased rate with a decrease in total, free, and bioavailable testosterone as a result of an increase in sex hormone-binding globulin levels (Asthana, et al., 2004; Elmlinger, Dengler, Weinstock, & Kuehnel, 2003; Huhtaniemi, 2014). Obesity may be one of the most powerful predictors of secondary hypogonadism in elderly men (Huhtaniemi, 2014; Tajar, et al., 2010). Additional risk factors that can lead to decreased circulating testosterone include acute illness, diabetes, hypertension, cardiovascular disease, smoking and alcohol use (Isidori & Lenzi, 2005; Zarotsky, et al., 2014). Studies have found that testosterone replacement in older men can have favorable effects on bone density, strength and muscle mass, mood, libido, and overall well-being (Chernoff, 2016).

For women, menopause comes with its own side effects, including negative vasomotor symptoms, urogenital atrophy, psychosomatic complaints, osteoporosis, increased risk of CVD, and lipid metabolism changes (Gambrell, 1982; Sarkar, 2011; Sharma & Mahajan, 2015). There are benefits to treatment; however, there are also significant risks associate with estrogen therapy replacement that need to be considered before treatment begins (Abernethy, 2015; Chernoff, 2014; Sarkar, 2011). Most notably in women, aging also has an effect on calcium metabolism. Not only does calcium intake decrease with age, but the absorption of calcium decreases with age (Gallagher, Riggs, Eisman, Arnaud, & DeLuca, 1979; Gennari, 2014). Additionally, there is decreased vitamin D synthesis in the skin and decreased enzyme activity in the kidney (Gennari, 2014; MacLaughlin & Holick, 1985). The typical treatment for individuals with marked deficiencies in calcium and vitamin D is supplementation (Chernoff, 2016; Gennari, 2014).

Psychological system

While psychological concerns in the elderly do not routinely require the expertise of a dietitian, several of these conditions can affect nutritional intake and requires a dietitian's

expertise as part of the managing healthcare team. For example, dementia, of which there are several different types, most notably Alzheimer's, can be greatly affected by diet (Van de Rest, Berendsen, Haveman-Nies, & de Groot, 2015). In these conditions, researchers and practitioners alike believe oxidative stress, inflammation, and vascular risk factors all play a role. In an effort to decrease the influence of these mechanisms on cognitive decline, nutrition intervention with a dietary pattern similar to the Mediterranean Diet or one that is full of antioxidants, monounsaturated fats, and balanced omega-3 and omega-6 fatty acids is often recommended (Van de Rest, et al., 2015). Several studies have documented the promising and almost protective effects of a Mediterranean-type diet on cognitive function in the elderly (Psaltopoulou, et al., 2013; Samieri, et al., 2013; Sofi, Abbate, Gensini, & Casini, 2010; Tsivgoulis, et al., 2013; Wengreen, et al., 2013). While there is a large amount of research still being done in this area, weight loss and micronutrient deficiencies are common in individuals with dementia (Cova, et al., 2016; Hansen, Waldorff, & Waldemar, 2011; Kilic, SÜMER, & ÜLGER, 2015).

Similar nutrition concerns are apparent in elderly individuals who suffer from depression (Bernstein & Munoz, 2012). Depression can be a major concern in the elderly, because many older adults face chronic illnesses as well as various social and economic difficulties. However, healthcare professionals may mistakenly conclude that an individual's depressive symptoms are a normal consequence of the biological, social, and economic complications (National Institute of Mental Health [NIMH], 2017). Depressed older adults visit the doctor and ER more often, have longer stays in the hospital, incur more medical expenses, and take more medications (Centers for Disease Control [CDC], 2014). However, 80% of older adults recovered from depression after receiving treatment that included both psychotherapy and anti-depressant medication (Washington State Department of Social and Health Services, 2017). In terms of

nutrition therapy, recommendations for individuals with depression parallel those for individuals with dementia. Therefore, a varied and adequate diet high in omega-3 fatty acids, sufficient micronutrients, and plenty of protein is suggested (Jones & Papamandjaris, 2012; Pan, et al., 2012).

Medications

The increasing number of elderly adults with multiple chronic diseases, inevitably leads to increased drug consumption (Chernoff, 2014; Lin, Yeh, & Lau, 2013; Triantafyllou, Vlachogiannakos, & Ladas, 2010). Moreover, this population takes medication for additional medical concerns including memory loss, confusion, dementia and changed sleep patterns. Kantor and colleagues looked into the prevalence of prescription drug use in the adult population using NHANES data (Kantor, Rehm, Haas, Chan, & Giovannucci, 2015). Based on their research, 39% of individuals over the age of 65 were taking more than 5 prescription medications (Kantor, et al., 2015). Taking this many medications can cause major problems. An additional concern is the over-the-counter medications and herbal remedies typically consumed for various ailments by the elderly. A quarter of all prescription medications and a half of all nonprescription medications are consumed by the elderly population, resulting in almost 40% of all adverse drug reactions (Diehl, et al., 1991; Hayes, Klein-Schwartz, & Barrueto, 2007; Stoehr, Ganguli, Seaberg, Echement, & Belle 1997; Young, 1987).

There are multiple concerns associated with over-medication or polypharmacy among the elderly. These concerns include adverse drug reactions, adverse drug-drug interactions, and adverse drug-nutrient interactions such as nutritional deficiency, drug toxicity, loss of drug efficacy and disease control, and body weight changes (Chernoff, 2014). Researcher Maher and colleagues (2014) found nearly 50% of older adults took one or more unnecessary medications.

Therefore, it is worth looking a little further at the potential nutritional interactions and problems that can arise within this population. A drug-nutrient interaction is defined as an alteration of kinetics or dynamics of a drug or a nutritional element or a compromise in nutritional status as a result of the addition of a drug (Bernstein & Munoz, 2016; Genser, 2008). A whole variety of nutrition concerns can be the result of too many medications coupled with the changes of an aging body. These concerns include: vitamin deficiencies, altered nutrient absorption, transport, and metabolism, increased excretion of nutrients, electrolyte imbalance, and changed glucose and lipid metabolism (Bernstein & Munoz, 2016; Chernoff, 2014; Heuberger, 2012). In addition to all of these internal concerns, over-medication can suppress an individual's appetite and result in insufficient food/calorie/nutrient intake. Although much is already known about the negative consequences of polypharmacy, many potential drug-nutrient interactions have yet to be studied (Bernstein & Munoz, 2016). However, limiting over-medication of the elderly can help improve quality of life (less money for medications, less time spent taking pills, less adverse reactions) and nutritional status.

Life aspects in aging

There are other aspects of an individual's life that change as they age. These aspects include financial situation, social life, mobility, and self-care (Bernstein & Munoz, 2016). Many elderly individuals experience financial hardship later in life with less income and higher medical expenditures (Chernoff, 2014; Gould & Cooper, 2013). A majority of the elderly live on modest retirement incomes which tend to be barely adequate or too often inadequate to provide necessary resources to meet every day needs. Medicare and Social Security tend to be the foundation for the living situation (Bernstein & Munoz, 2016; Chernoff, 2014). Nearly half of the United States' elderly population is categorized as "economically vulnerable", defined as

having an income less than two times the supplemental poverty threshold (Gould & Cooper, 2013; U.S. Census Bureau, 2015). In addition to the everyday living costs (home, food, clothing, transportation, etc.) that must be considered are the extensive medical costs. As described above, elderly have a number of medical concerns that increase the demands for them to visit physicians, specialists, or hospitals and increase the use of several daily medications. Not only does this put a huge amount of financial stress on the elderly individual, but the rising costs of healthcare can significantly impact chronic disease treatment and maintenance.

As individuals age, their social circle tends to shrink, and it may be more difficult to get out-and-about on a regular basis (Melchiorre, et al., 2013). Social networks and support can have a strong, positive influence on individuals and must be a focus when caring for an elderly individual (Melchiorre, et al., 2013). Having family, friends, or neighbors stop by for a visit, go to lunch, venture to a new store, or attend church, can greatly impact the elderly individual's overall health and wellbeing.

Mobility is an essential part of everyday life; being able to get to places in a timely manner, whether it is the bathroom or the store, can impact or be impacted by health. The elderly often face mobility issues. Improvements in mobility assessments of community-dwelling older adults are needed to better meet the rising needs and increase in physical disabilities or impairments (AOA, 2015). Self-care is also an essential part of everyday life, but the ability of many elderly to take care of it on their own care is no longer possible. Getting help from friends/family/care-takers to ensure community-dwelling elderly maintain a daily routine and maintain abilities are essential to sustaining the health of the individual (Health in Aging, 2017). Once the 'structure' of everyday self-care and mobility is lost, individuals can become depressed and have a sense of worthlessness (Health in Aging, 2017).

Elderly individuals dealing with loss and significant change often present with nutritional inadequacy (Bernstein & Munoz, 2016; Chernoff, 2014). Additionally, many of these individuals have few financial reserves, thus leveraging community resources and support to maintain optimal nutrition status is essential. Nearly 10% of the elderly individuals living in the community experience food insecurity (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016). The United States Department of Agriculture (USDA) defines food insecurity by ranges of severity (USDA, 2016). They delineate food insecurity into low food security and very low food security. Low food security describes an individual who has reduced quality, variety, or desirability of diet, without reduced food intake. Very low food security describes individuals who have multiple indications of disrupted eating patterns and reduced food intake (USDA, 2016). For individuals living under either of these conditions, nutritional inadequacy is definitely an issue. In response to this growing concern, many areas now have several options to help the at-risk, elderly individual. For example, senior centers, congregate feeding sites, Meals on Wheels, Supplemental Nutritional Assistance Program (previously identified as Food Stamps), Elder Nutrition Program, and adult day centers are available for elderly individuals in need (Bernstein & Munoz, 2016; Chernoff, 2014).

Research finds that individuals can age successfully despite health and social set-backs; and, as individuals age, a different quality of life perspective emerges (Berglund & Ericsson, 2003; Rowe & Kahn, 1998; Stordal, Bosnes, Bosnes, Romuld, & Almkvist, 2012). According to Rowe (1998), successful aging can be defined as "an ability to maintain low risk of disease and disease-related disability, high mental and physical functioning and active engagement with life". Similarly, some experts refer to aging successfully as healthy aging. According to the West Virginia Rural Healthy Aging Network (2014), healthy aging is defined as "the development and

maintenance of optimal mental, social, and physical well-being and function in older adults". Waites and Onolemhemhen (2014) looked at healthy aging and health promotion through the perceptions and practices of African-American and Ethiopian older adults. Despite the significant differences in the ecological environment between the groups, both groups expressed high levels of spirituality and belief in God. The group of African-American elderly identified healthy aging as an avenue to preserve their independence, while the Ethiopian elder group identified a holistic view of healthy aging including close ties with family members (Waites & Onolemhemhen, 2014). Other researchers have also found the elderly view autonomy, health, social network, and positive feelings as important to achieving a good quality of life (Berglund & Ericsson, 2003; Stordal, et al., 2012).

While health promotion can be defined in several ways by elderly individuals, any form of wellness advocacy whether it is cessation of smoking, beginning an exercise class, or encouraging regular doctor visits is beneficial (Chernoff, 2014). Research supports that even small changes towards health in later life can improve quality of life (Bernstein & Munoz, 2016). Of course chronic disease and disability can greatly impact one's health, thus recognizing all steps to improve and maintain health status is important (Chernoff, 2014; Bernstein & Munoz, 2016). Waites and Onolemhemhen (2014) pointed out that while health promotion and programs are beneficial for all elderly, the concept of health promotion should be approached by higher systems, to establish policies and programs at the state, national, and international level.

In particular, certain social relationships may reduce mortality in the elderly. Researchers found that elderly who attended church/temple, volunteered, saw friends or neighbors, and/or talked with those friends on the phone, reduced their risk of mortality (Bernstein & Munoz, 2016; Sabin, 1993). While resources and focus on these aspects of an individual's life can be

supported, it is clear that quality of life and successful aging is unique to each individual. Thus, despite what health professionals, researchers, or even family members view as important for the elderly, it is imperative to get a true understanding of what the aging individual views as important. Recognizing individuals as unique and individualizing the care approach can help maintain a positive and fulfilling quality of life, and still allow the elderly to maintain dignity and independence (Berglund & Ericsson, 2003; Stordal, et al., 2012).

Although the above literature review presents only a brief overview of the major body systems affected by aging, it provides justification and rationale for affirming the role of the dietitian on the healthcare team. Furthermore it highlights the need for specific training and education in geriatrics for students in nutrition and dietetic programs.

Chapter Summary

The aging population is increasing significantly, and promoting health for these individuals is key to keeping them functionally independent and reducing socioeconomic impact (Nass, Johannsson, Christiansen, Kopchick, & Thorner, 2009). A majority of the population is aging and living longer than ever before (AOA, 2015). However, with age also comes a whole host of concerns, from medical to nutritional to everyday living. This population trend also presents unique challenges for the healthcare system where specialized clinicians will be critical to providing optimal care for the elderly.

Specifically, nutrition is a concern for the elderly; not only do body system changes affect the nutritional needs, but chronic diseases and certain limitations emphasize the need for competent, enthusiastic, and knowledgeable geriatric dietitians (Chernoff, 2014). It has been thirteen years since the last documented study on this topic was completed; consequently, it was

time to investigate if there have been changes in the provision of aging content in the curricula of accredited nutrition and dietetic programs across the United States (Rhee, et al., 2004). By investigating the provision of geriatric content in the current curricula of nutrition and dietetic programs, dietetic program directors will have an idea of how other programs are providing the content to further assess if their current curricula offerings are meeting the workforce demands of geriatric trained clinicians. Young health professionals, especially dietitians, who receive exposure to the elderly population in their training, will be able to respond to the increasing aged population with optimal skills and knowledge to promote quality of life.

CHAPTER 3: METHODOLOGY

Introduction

This chapter describes the methodology used in this research study. This chapter contains the following sections with accompanying descriptions: purpose of the study, research questions, and research design including variables, population description, instrumentation, data collection, data analysis, and a chapter summary.

Purpose of the Study

The purpose of this study was to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs.

Research Questions

1) What are the differences among accredited nutrition and dietetic programs regarding the geriatric-related nutrition content offered in their respective curricula?

2) What is the perceived level of satisfaction expressed by accredited nutrition and dietetic program directors regarding geriatric-related content in their curriculum?

3) What are the opinions among accredited nutrition and dietetic program directors about the importance of including geriatric-related nutrition content in their curriculum?

Research Design

To answer the research questions, a quantitative research design using a descriptive, cross-sectional approach was chosen for this study. This approach allowed for the use of specific and narrow questions via a survey to obtain quantifiable data from participants in an unbiased, objective manner (Creswell, 2012). Quantitative research design can be categorized into two different design approaches, experimental and non-experimental. For this research, non-

experimental was chosen given there is not an independent variable that can be manipulated to determine if associations or correlations exist between or among variables. To gather the data, survey research was used. As Leedy and Ormord (2016) point out, survey research includes selecting a group of people, asking them a series of questions, organizing their responses, and drawing inferences from the data gathered. Creswell (2009) also noted that survey research can be used to collect information related to trends, attitudes, and opinions of the sample, making it the most appropriate approach for this research.

Quantitative data collected in this research affords an overview of how many accredited nutrition and dietetic programs are providing geriatric nutrition content in their curricula. It also provides a synopsis of how satisfied the program directors are with their current curricula. The opinions among accredited nutrition and dietetic program directors about the importance of including geriatric-related nutrition content in their curriculum was captured in the survey through a distinct question asking for write-in responses. Data collected were analyzed. Trends, gaps, and overall relationships are reported in the following chapters of this research as part of the results, conclusions, limitations, and recommendations.

Variables

There were several variables investigated in this study. The variables included: demographic information specific to the program director (i.e. age, gender, ethnicity, dietetic experience), demographic information specific to the nutrition and dietetic program (i.e. geographic location, setting, type program, courses offered, mode of delivery of courses), program offerings related to nutrition and older adults, and the director's perspective on program aspects related to nutrition and older adults (overall importance of content and level of satisfaction with program offerings).

Demographic information is important to ascertain in order to collect factors that may be associated with the type of program or program offerings (Kelley, Clark, Brown, & Sitzia, 2003). Type of accredited nutrition and dietetic program, is necessary to collect for a couple reasons. All college students pursuing a profession as a registered dietitian will have to attend one of the three types of accredited nutrition and dietetic programs (AND, 2017). While, accreditation standards for the different program types are similar, there may be variability among the programs that impact the aging curricula (AND, 2015). Curricula offerings related to nutritional care for older adults is the core of this research. By investigating what accredited nutrition and dietetic programs are offering, researchers can see if students are provided the knowledge and skills needed to enter the workforce in the geriatric setting (Rhee, et al., 2004). Program director's perceptions of their current program are also part of the core of this research. Gauging whether or not the accredited nutrition and dietetics program directors are satisfied with the current offerings of geriatric content can help to determine what best practices are for implementing this content (Rhee, et al., 2004).

Population

Description

Based on the research questions listed above, there was one target population for this study. The target group was inclusive of all accredited nutrition and dietetic program directors in the United States. For the purposes of this study, accredited nutrition and dietetic programs are those recognized by the Academy of Nutrition and Dietetics' Accreditation Council for Education in Nutrition and Dietetics (ACEND ®). Program directors will include one or more of the following: didactic program directors (undergraduate), dietetic internship directors (post-

graduate with and without graduate coursework), and coordinated program directors (undergraduate and graduate).

The Academy of Nutrition and Dietetics (AND) is the world's largest organization of food and nutrition professionals (AND, 2016). With over 75,000 nutrition professionals, the Academy is "committed to improving the nation's health and advancing the profession of dietetics through research, education, and advocacy" (AND, 2016). The accrediting agency for the Academy of Nutrition and Dietetics is The Accreditation Council for Education in Nutrition and Dietetics, often referred to as ACEND ® (AND, 2015). The United States Department of Education recognizes ACEND ® meets national standards to serve as the reliable authority on the quality of nutrition and dietetic education programs (ACEND, 2015). ACEND ® meets the national standards to be a Title IV gatekeeper and is a member of the Association of Specialized and Professional Accreditors (ACEND, 2015). In order for a nutrition and dietetics program to be recognized as being accredited under this body, entities must meet ACEND® standards.

The ACEND ® standards used for nutrition and dietetic programs evaluation are developed and adjusted by two sets of committees and one workgroup comprised of nutrition and dietetic experts in various disciplines, public members, and a student representative (AND, 2015). The three groups include: a 2015-2016 ACEND ® Standards Committee, an Expanded Standards Workgroup Assisting Standards Committee with Future Education Model, and a Visionary Workgroup (AND, 2015). ACEND ® serves as the enforcement agency in terms of eligibility and accreditation for all nutrition and dietetic education programs in the United States to ensure quality and continued improvement in nutrition and dietetics education programs (AND, 2015). ACEND ® is dedicated to ensuring high quality education through the standards

and the agency is mission driven to "prepare graduates with the foundation knowledge, skills, and/or competencies for current dietetics practice" (AND, 2015).

There are variations of accredited nutrition and dietetic programs, but for the purposes of this study coordinated programs in dietetics, didactic programs in dietetics, and dietetic internships are the programs that will be included. A coordinated program (CP) in dietetics is defined as an academic program with dietetics coursework meeting ACEND® standards that includes at least 1200 hours of supervised practice and leads to either a bachelors or graduate degree (AND, 2015). Once students complete the requirements of their respective coordinated program, they are eligible to take the national registration exam for dietitians (AND, 2015).

A didactic program in dietetics (DPD) is defined as a program providing just the dietetic coursework at an accredited institution meeting ACEND® standards that leads to a bachelors, or sometimes graduate, degree (AND, 2015). If this route is chosen, students must apply to and be accepted into an accredited dietetic internship (DI) program (AND, 2015). An ACEND® accredited dietetic internship program (DI) is defined as a program that includes supervised practice experiences (minimum of 1200 hours) that nutrition and dietetic students need to be eligible to take the national registration exam for dietitians (AND, 2015). The DIs are further set-apart by the type of experience students will encounter. The types include distance programs, programs that result in a graduate degree, programs that have a graduate degree available, and programs that offer an individual specialized practice pathway (ISPP).

A distance program prides itself on allowing the student stay within his/her geographic location, without having to relocate. However, most programs include the student organizing and setting up the supervised practice experiences, thus certain students are better fit for these

program types. Distance internships also may require for students to 'meet' online with the program director and/or other interns for discussions, simulations, or additional course material (AND, 2015).

An ISPP is an alternative program type that provides an option for students that are not matched with an internship the first attempt. These programs are similar to the distance program in that students set-up their own experiences with preceptors. An ISPP option is only offered to accredited programs that have a didactic program in dietetics or have a dietetic internship, but do provide an option for students to gain the necessary supervised practice to take the national exam. A DI that doesn't fit into any of the mentioned programs are considered traditional internships that offer the student the required supervised experience without coursework tied to a university or college (AND, 2015).

While ACEND® has accreditation standards for each of the different programs, CPs, DPDs, and DIs, for the purposes of this study, the standards will be mentioned as a single group because the elderly population is addressed identically in each set of standards (ACEND®). The standards outline specific learning activities that must be included in the curricula of accredited nutrition and dietetic programs to attain all "the Core Knowledge defined to enter practice as a registered dietitian" (ACEND®, p.25). The elderly population is mentioned in the standards under the Learning Activities section and under Guideline 11.1, in which programs must include activities to "prepare students/interns to implement the nutrition care process with various populations and diverse cultures, including infants, children, adolescents, adults, pregnant/lactating females and the elderly" (ACEND®, p. 25).

While the standards outline what areas of content and experiences the students must receive in their programs, they do not detail how programs are supposed to meet the requirements. Therefore, accredited nutrition and dietetic programs include some content in their respective curricula about the elderly population, but how that content is delivered to the students is up to each program (ACEND®, 2015). Currently there are a total of 223 DPDs, 246 DIs, and 56 CPs accredited by ACEND® in United States (ACEND®, 2015), and all include some education/experience regarding the elderly in their curricula, but not much is known on how (i.e. course instruction, experiential learning, simulations, site shadowing) the programs are meeting this standard.

Sample

Purposeful, total population parameter sampling was used to target all accredited nutrition and dietetic program directors. Program directors were contacted by email to request participation in this study. Email addresses were gathered from the Academy of Nutrition and Dietetics' public website (AND, 2017). There were a total of 525 program directors that lead the 223 DPDs, 246 DIs, and 56 CPs (ACEND, 2015).

All participants in this research are knowledgeable about the material based on their job title as a nutrition and dietetics program director. ACEND® sets minimum standards for nutrition and dietetic program directors. Therefore, all individuals in this total population parameter sampling meet the following requirements: hold a master's degree, be credentialed as a registered dietitian nutritionist by the Commission on Dietetic Registration, have a minimum of three years professional experience post credentialing, hold a full-time position with the program's institution, and not direct another ACEND® accredited nutrition and dietetic program. Institutional Review Board (IRB) approval at Saint Louis University was granted by Board #1,

#28456, on 6/19/17 for this research to be conducted. All program directors were introduced to the research through email; each received an introduction to the study, a recruitment statement, and a survey link (Appendix C). A follow-up email was sent to all program directors two weeks after the initial email to serve as a reminder to complete the survey (Appendix D). All program directors were informed about the purpose of the research, the potential risks, and potential benefits. Additional explanation to all directors included that participation in the survey was voluntary and came with no obligation; furthermore, participation in the survey served as consent to include responses in the study's data analysis, results, discussion, and recommendations. This information was contained in the email and recruitment statement.

Instrumentation

An electronic survey was used as the sole data collection instrument for this quantitative research study. Qualtrics software, an online survey platform, was used to create and disseminate the survey. All 525 accredited nutrition and dietetic program directors were emailed and asked to complete the electronic survey. Program directors received an invitation to complete the electronic survey via email and were asked to complete it at their own convenience. An advantage to using surveys as a data collection method is the ability to gather descriptive information from a target population; however, a disadvantage to using surveys is that participant response rate is influenced by motivation (Rea & Parker, 2005). Even though some past research suggests incorporating a reward or incentive for participants, Mercer and colleagues (2015) argue that promised incentives for participating in surveys does not yield higher completion rates. After completing a meta-analysis of literature on the relationship that exists between survey completion and monetary incentives, the researchers found that provision of the incentive did not yield in higher completion rates and thus had a null effect on overall results (Mercer,

Caporaso, Cantor, & Townsend, 2015). In light of this research, participants in this study were not offered any type of incentive.

The survey was developed after reviewing two previous surveys administered to nutrition and dietetic program directors. A part of the survey included questions adapted from Rhee and colleagues (2004) research titled "Continued need for increased emphasis on aging in dietetics education". Permission was granted from the corresponding author to use and adapt questions, as needed. The second part of the survey included adapted questions from a thesis project titled "Perceptions and attitudes of dietetic program educators regarding the use of distance education and computer-based simulations in dietetics education". Again, permission was granted to use and/or adapt the questions as needed by the author.

Initially, the survey questions underwent content expert review. The first content expert was a director of a four year, undergraduate accredited nutrition and dietetics program. She had led the undergraduate program for eight years. The second content expert was a dietetic internship program director of one of the largest internships in the Midwest. The third content expert was an associate professor in educational studies with extensive experience with survey design and research. All of the content expert's feedback was used to revise the survey format and the survey questions. Following the content expert review, the survey was submitted to the SLU Institutional Review Board (IRB) for approval. IRB approval was granted by Board #1, #27694, on 12/8/16 for the pilot-test of the survey. Using systematic sampling, a sample of ten program directors was selected from a total list of 532 individuals. The electronic survey was emailed to the sample of ten nutrition and dietetic program directors using systematic sampling. The researcher utilized the published email addresses available through the Academy of Nutrition and Dietetics to complete systematic sampling. The directors were introduced to the

pilot survey through email; each received an introduction to the research, a recruitment statement, and a survey link. A follow-up email was also sent to the group of directors as a reminder to complete the survey. Three completed surveys were received. The responses to the pilot survey were recorded and used to adjust the final survey that used in this study.

Data Collection

The survey was administered electronically to all accredited nutrition and dietetic program directors using Qualtrics Survey Tool. All program directors were introduced to the research through email; each received an introduction to the study, a recruitment statement, and a survey link. A follow-up email was sent to all program directors two weeks after the initial email to serve as a reminder to complete the survey. All participants completed the survey voluntarily. Demographic information specific to the program director (i.e. age, gender, ethnicity, dietetic experience), demographic information specific to the nutrition and dietetic program (i.e. geographic location, setting, type program, courses offered, mode of delivery of courses), program offerings related to nutrition and older adults, and the director's perspective on program aspects related to nutrition and older adults (overall importance of content and level of satisfaction with program offerings) were included in the survey. These variables were included to explore possible associations or correlations to the questions regarding nutrition and dietetic program curricula. Program directors had one month to complete the survey, all received a reminder email two weeks after the initial email. The participants' responses were collected electronically through Qualtrics software and remained anonymous. All data collected were anonymous, unless participants choose to disclose his/her name and program affiliation. Data were exported from Qualtrics in a comma-separated values (CSV) file, and then accessed using Microsoft Excel. Data were transcribed into SPSS for analysis.

Data Analysis

Data were analyzed once data collection was completed. This research study used a total population parameter sampling so a power analysis was unnecessary, but was calculated to ascertain a minimum amount of responses to indicate significance. Using the G-Power 3.1 statistical software, a sample size of 102 was calculated to represent significance. The effect size (ES) in this calculation was 0.5, considered to be large using Cohen's criteria (1992). With an alpha of 0.05, and a power of 0.8, a projected sample size of 102 was needed for the simplest between group comparisons. Thus, the total population parameter sample of 525 was more than adequate to meet the purposes of this study.

Descriptive statistics were used to provide descriptive summaries of the survey responses after being categorized by program type (coordinated program, didactic program, or dietetic internship). Pearson's Chi Square test was used most prevalently to test for associations between categorical variables. All tests were two-tailed and p-values < 0.05 were considered to be significant. Narrative data were analyzed by the researcher using manual coding and emergent themes.

Chapter Summary

This chapter describes the research methodology for this research study. Accredited nutrition and dietetic program directors across the United States were asked to complete a survey. The survey asked about demographics, current curricular offerings related to aging and nutrition content, as well as the level of satisfaction the director had with curricular offerings. The survey was developed by previous researchers and was adapted to meet the needs of this study. The survey authors granted the researcher permission to use and adapt the survey, as

needed. Data collected from the survey were analyzed and inferences are made in the following chapters.

CHAPTER 4: RESULTS

Introduction

This chapter describes the data analysis used for this research study. This chapter contains the following sections: survey results, participant demographics, program demographics, U.S. regions, nutrition and aging content, program director perception, perceived and potential barriers, content, and relationships, followed by a chapter summary. To answer the research questions the twenty-two question survey was emailed to all program directors based on the database provided by the Academy of Nutrition and Dietetics website. Both descriptive and inferential statistical findings from the survey will be presented in this chapter.

Survey Results

A total of 540 individuals were sent an email request to participate in the Qualtrics survey; however, 9 emails bounced, resulting in 531 receiving the survey. These individuals were contacted based on their information listed on the Academy of Nutrition and Dietetics website as a program director of one of the following accredited programs: DPD, DI, or CP. There are a total of 223 didactic programs in dietetics, 252 dietetic internships, and 55 coordinated programs in dietetics in the United States (ACEND, 2017). Each individual received an introductory email and survey link through Qualtrics. A follow-up email was sent out 2 weeks later reminding program directors about the opportunity to participate in the survey. The survey was available for one month. Data available through Qualtrics identified the dates, times, and frequency the survey was opened.

Individual correspondence with the researcher also took place. The researcher received 16 separate emails regarding the survey. Based on the information provided in the emails, seven individuals stated they could not complete the survey. The PI followed-up with each individual

to answer any questions and encourage completion. Two individuals asked if they needed to complete the survey based on the reminder email; the PI thanked the individuals for already completing the survey based on the original email and confirmed they did not need to complete it again. Three individuals stated they were no longer the program director and provided an additional email to include; the PI adjusted the program director list and updated Qualtrics. Four individuals asked unrelated questions to the survey. All inquiries were resolved through direct contact (phone or email). One respondent of the sixteen directs a non-traditional dietetic internship program and asked to be removed from the list; her contact information was removed from the list for further correspondence. These adjustments resulted in a respondent pool of 530 individuals.

The results in Qualtrics indicate that 130 individuals began the online survey; however, 16 respondents didn't complete the survey, and 7 indicated they were not a nutrition and dietetic program director. The demographic data for all individuals, whether or not they were program directors were included; however, the responses from the individuals with incomplete surveys were not included. The final survey respondent pool was 107 completed surveys used in data analyses. Statistics included in the following tables are only based on cases with valid data reported through Qualtrics software.

Participant Demographics

Some demographic questions yielded responses that led to collapsing a few of the options to get a better representation of the sample and allow for more accurate statistical analysis. First, the gender category selections were collapsed based on the survey responses. Instead of three categories for gender, there are two; female and other (including males and individuals that responded as other). Second, the ethnicity category selections were collapsed based on the

survey responses. Instead of seven ethnicity groups to report, the data were collapsed into two options white or other (encompassing black or African American, Hispanic or Latino, American Indian or Alaskan Native, Asian, Native Hawaiian or Pacific Islander, and other). Third, the age category for the respondents was collapsed based on the results. Instead of seven different age category options, the collapsed results included three different age categories. The resulting three age categories are: 25-44 years old, 45-54 years old, and 55-74 years old. The age category options on the survey, including 75 years old and older received no responses and thus were removed from the analysis.

The number of program directors that completed the personal demographic questions was 92 participants; almost all were female 96.7% (89 individuals), yet 15 survey participants chose not to complete the personal demographic questions. Among the 92 participants, overwhelmingly the group of respondents identified as white 88% (81 individuals). The age group of 55-74 years old represented nearly half of the respondents 43.5% (40 individuals). Participant demographic results are presented in Table 1.

Table 1. Participant demographics

Gender	
Female	89 (96.7%)
Male	3 (3.3%)
Race/Ethnicity	
White	81 (88%)
Other	11 (12%)
Age Category	
25-44	26 (28.3%)
45-54	26 (28.3%)
55-74	40 (43.5%)

The number of participants that chose to answer questions related to experience in dietetics was a pool of 107. A little over half, 51.4% (55 individuals) of the respondents indicated they have been a nutrition and dietetic program director for 1-5 years, while 21.5% (23 individuals) of the respondents indicated they had been a program director for 5-10 years. A smaller percentage, 8.4% (9 individuals) of the respondents indicated they had been a program director for 10-15 years, while 18.7% (20 individuals) of the respondents indicated they have been a program director for more than 15 years. Survey participants were also asked to indicate areas of previous employment and were encouraged to select all applicable choices listed on the survey. The options included: clinical (hospital, acute-care centers), long-term care (nursing home, assisted living), community (doctor's office, agency, clinic), foodservice (hospital, school, business), research (product development), government (health department, policy, advocacy), education (higher education), wellness (gyms, wellness programs, sports), private practice, and other. Nearly two-thirds, 65.4% (70 individuals) of the program directors had previous employment in the clinical setting, while a third, 34.6% and 32.7%, had long-term care and/or community experience respectively. Table 2 displays these results.

Table 2. Years of Experience & Previous Employment

Number of Years	
1 to 5	55 (51.4%)
5 to 10	23 (21.5%)
10 to 15	9 (8.4%)
More than 15	20 (18.7%)
Previous Employment	
Clinical	70 (65.4%)
Long-term care	37 (34.6%)
Community	35 (32.7%)
Foodservice	24 (22.4%)
Research	18 (16.8%)
Government	13 (12.1%)
Education	61 (57%)
Wellness	20 (18.7%)
Private Practice	28 (26.2%)
Other	7 (6.5%)

Program Demographics

The next section provides an overview of the nutrition and dietetic program characteristics as provided by the survey respondents. The first breakdown of participants is based on program type. Out of the 107 respondents, half (51.4%) direct a DI, and a third (35.5%) direct a DPD. If program directors selected dietetic internship, they were prompted to identify which type of internship program they direct with 5 options (a program resulting in a graduate degree, a program that has a graduate degree available, a program that offers distance education, a program that offered an ISPP, or other). Table 3 displays this information.

Table 3. Accredited Program Type

Program Type	
Coordinated Program	14 (13.1%)
Didactic Program	38 (35.5%)
Dietetic Internship	55 (51.4%)

Respondents that oversaw a dietetic internship were prompted to indicate the sub-type of internship program they direct. Statistical analysis was not completed for the DI sub-type because of missing and varied data. A total of 62 directors indicated they had an emphasis area; using emergent themes, the researcher manually coded the emphasis areas. A community emphasis existed among 18 programs, while a medical nutrition therapy emphasis existed for 15 programs, and a clinical emphasis among 14 programs. Less common emphases identified included wellness (5 programs), gerontology/long-term care (5 programs), foodservice management (4 programs), research (4 program), nutrition education (4), pediatric (3 programs), sports (3 programs), leadership (3 programs), and communication (2 programs). Additional emphases with less frequency included food insecurity, interprofessional practice, diabetes counseling and education, rural health, sustainable food systems, and entrepreneurial.

The type of course delivered among the programs was also gathered (See Table 3a in Appendix E). A total of 97 directors responded to this question; 35.1% (34 individuals) oversaw programs that included distinctly undergraduate courses, 30.9% (30 individuals) oversaw programs that included distinctly graduate courses, while 13.4% (13 individuals) oversaw programs that included both undergraduate and graduate courses. The remaining respondents,

20.6% (20 individuals), selected ‘other’ when asked to select the best choice for type of courses included in the nutrition and dietetic program they oversaw.

The next pieces of demographics describe the delivery of courses, the program setting, and location. Nearly half of the 96 directors (47.9%) (46 individuals) indicated the courses in the program they oversaw were held on-campus, while 34.4% (33 individuals) indicated the courses they oversaw were a combination of both on-campus and off-campus (online) courses. Yet, 12.5% (12 individuals) indicated the courses in the program they oversaw fell into the ‘other’ category. An overwhelming majority, 81.3% (78 individuals) indicated the nutrition and dietetic program they directed was offered through a college or university, and 65.6% (63 individuals) are located within an urban setting. Accredited nutrition and dietetic programs are available across the United States. The four quadrants referenced in this research, South, West, Midwest, and Northeast, are the same quadrants the U.S. Census Bureau uses for data and reports (United States Census Bureau, n.d). Survey participants were asked to select the state that the nutrition and dietetic program was located. Responses were categorized into one of the four US Census quadrants. Nearly half, 45.5% of the programs were in the South quadrant, 20% in the West quadrant, 19% in the Midwest, and 14.7% in the Northeast. The remaining 19 survey responders did not answer this question. Table 4 displays these results.

Table 4. Program Type, Setting, and Location

Course Delivery	
On-campus courses	46 (47.9%)
Off-campus (online)courses	5 (5.2%)
Both on-campus and off-campus (online) courses	33 (34.4%)
Other	12 (12.5%)
Program Setting	
College/University	78 (81.3%)
Hospital	11 (11.5%)
Corporate	3 (3.1%)
Government	4 (4.2%)
Program Location	
Rural	28 (29.2%)
Urban	63 (65.6%)
Distance	5 (5.2%)
U.S. Region	
South	40 (45.5%)
West	18 (20%)
Midwest	17 (19%)
Northeast	13 (14.5%)

Nutrition and Aging Content

A majority of participants, 61.7 % (66 individuals) direct programs that do not offer a specific course in nutrition and aging. Yet, 26.2 % (28 individuals) do offer a specific course in nutrition and aging. A follow-up question for the program directors that chose their program does not offer a specific course on nutrition and aging, asked if they had ever considered including a specific course; nearly half, 41.1% (44 individuals) selected no. While a majority of the programs do not offer a separate nutrition and aging course, 70.1% (75 individuals) indicated the content is delivered in other courses. Of the directors that indicated the content wasn't included in any course (s), they also have not considered adding it. Table 5 displays these results.

Table 5. Course Offering in Nutrition and Aging

Separate course is offered	
Yes	28 (26.2%)
No	66 (61.7%)
Consider offering separate course	
Yes	22 (20.6%)
No	44 (41.1%)
Content in other courses	
Yes	75 (70.1%)
No	18 (16.8%)
Consider adding content to other courses	
Yes	0 (0%)
No	18 (100%)

The program directors were also asked if their students were exposed to nutrition and aging content through other courses or activities (i.e. inter-professional education, service-learning, workshops); 85% (80 individuals) indicated they were. Emergent themes coded manually by the researcher in order of descending frequency included: clinical rotations, service learning/community service/volunteer opportunities, specialty coursework, and supervised practice. Additional experiences included: long-term care visits, interprofessional education, area dietetic association meetings, research, simulations, field experience, and student clubs.

Program Director Perceptions

Most survey participants, 83.2%, indicated that including nutrition and aging content (whether integrated into a course or offered as a separate course) was important. Survey participants were also asked to identify a level of satisfaction with their respective program's nutrition and aging content. A satisfaction scale with 7 responses (very dissatisfied, dissatisfied,

somewhat dissatisfied, neutral, somewhat satisfied, satisfied, and very satisfied) was provided for this question; however, the satisfaction scale was collapsed due to an insufficient number of responses for each category. Thus the data are based on 4 four satisfaction responses (dissatisfied, neutral, somewhat satisfied, and satisfied). Nearly half, 43.9% of program directors are satisfied/very satisfied, followed by 18.7% (20 individuals) indicated they are somewhat satisfied. A small percentage, 14%, of survey participants did not answer this question. Table 6 displays these results.

Table 6. Content Importance and Satisfaction

Is nutrition and aging content important?	
Yes	89 (83.2%)
No	3 (2.8%)
Satisfaction with nutrition and aging content in curricula	
Dissatisfied	9 (8.4%)
Neutral	16 (15%)
Somewhat Satisfied	20 (18.7%)
Satisfied	47 (43.9%)

Perceived and Potential Barriers

Survey participants were asked to consider potential barriers related to two scenarios, the first scenario would be to add a separate course for nutrition and aging, while the second scenario would be to add nutrition and aging content to an existing course. For the first scenario, the majority of the respondents, 51.4%, indicated the curriculum is already full, while 18.7% (20 individuals) indicated no barriers exist. The second scenario resulted in very similar selections, 51.4% (55 individuals) indicated the curriculum is already full, while 18.7% (20 individuals)

indicated no perceived barriers exist to adding a nutrition and aging content to an existing course. Table 7 displays these results.

Table 7. Perceived and Potential Barriers

Barriers to adding a separate course	
Curriculum is already full	55 (51.4%)
Lack of faculty expertise	11 (10.3%)
Lack of faculty interest	3 (2.8%)
Lack of student interest	6 (5.6%)
Lack of financial support	9 (8.4%)
Other	22 (20.6%)
No barriers exist	20 (18.7%)
Barriers to adding content to curriculum	
Curriculum is already full	57 (53.3%)
Lack of faculty expertise	11 (10.3%)
Lack of faculty interest	7 (6.5%)
Lack of student interest	6 (5.6%)
Lack of financial support	11 (10.3%)
Other	10 (9.3%)
No barriers exist	25 (23.4%)

Increasing Content

Survey participants were then asked to identify how she/he would increase nutrition and aging content in their respective curricula; options included: add content to a current course, add

assignments and field experiences to a current course, develop a new course, make no changes, add an inter-professional course, or other. The results indicated that 36.4% (39 individuals) would add assignments and field experiences to a current course, while 22.4% (24 individuals) would make no changes to their current curricula offerings. Table 8 displays these results.

Table 8. Adding Nutrition and Aging Content

Approach	
Add content to a current course	27 (25.2%)
Add assignments/experiences to a current course	39 (36.4%)
Develop a new course	14 (13.1%)
Add an inter-professional course	13 (12.1%)
Make no changes	24 (22.4%)
Other	9 (8.4%)

Relationships among Variables

A cross-tabulation table was used to describe the relationship between two categorical variables. Chi-square test of independence was then used to make comparisons between the two categorical variables. The chosen significance level was $\alpha = 0.05$; thus a p-value < 0.05 indicates enough evidence to suggest an association between the two categorical variables.

The following table, Table 9, represents the association between nutrition and dietetic program type (coordinated, didactic, or internship) and the director's perception relating to the level of satisfaction with the current aging and nutrition content offered in their respective programs. A total of 92 directors responded to this question; 13 (14.1%) direct a coordinated program, 37 (40.2%) direct a didactic program, and 42 (45.7%) direct an internship. The data

show CP directors are the least satisfied while DI directors are the most satisfied. A significant association ($p = 0.017 < 0.05$), exists between program type and level of satisfaction.

Table 9. Program Type and Satisfaction Level

	Perception Level			
Program Type	Dissatisfied	Neutral	Somewhat Satisfied	Very/Satisfied
Coordinated	5 (55.6%)	2 (12.5%)	1 (5%)	5 (10.6%)
Didactic	3 (33.3%)	6 (37.5%)	9 (45%)	19 (40.4%)
Internship	1 (11.1%)	8 (50%)	10 (50%)	23 (48.9%)
Level of significance ($\alpha = 0.05$), P-value (0.017)				

The following table (Table 10) represents the association between age and the director's level of satisfaction with their respective program's curricula offerings in aging and nutrition. A total pool of 92 directors responded to this question; 26 (28.3%) respondents were between the ages of 25-44; 26 (28.3%) respondents were between the ages of 45 -54; and 40 (43.5%) respondents were between the ages of 55-74. There was a clear association between age category and satisfaction with the offerings with the majority who were dissatisfied (66.7%) being in the oldest age category. After completing a Chi-Square Test of Independence for the two categorical variables, age category and level of satisfaction, results indicate there was no significant association between the two with a p-value of 0.060 (> 0.05). This association is approaching significance.

Table 10. Age and Satisfaction Level

	Perception Level				
Age Category	Dissatisfied	Neutral	Somewhat Satisfied	Very/Satisfied	Totals
25-44	2 (22.2%)	6 (37.5%)	6 (30%)	12 (25.5%)	26 (28.3%)
45-54	1 (11.1%)	1 (6.3%)	10 (50%)	14 (29.8%)	26 (28.3%)
55-74	6 (66.7%)	9 (56.3%)	4 (20%)	21 (44.7%)	40 (43.5%)
Level of significance ($\alpha = 0.05$), P-value (0.060)					

See Appendix F for the Table 10a displaying program type and whether or not nutrition and aging courses are offered. After completing a Chi-Square Test of Independence for the two categorical variables, race/ethnicity and level of satisfaction, results indicated there was no significant association between the two with a p-value of 0.648 (> 0.05).

Age of program director (25-44 years old, 45-54 years old, 55-74 years old) and whether or not the program offers a specific course on nutrition and aging was looked at next for an association (See Table 10b in Appendix G). Within the 27 programs that indicated they offered a specific course in nutrition and aging, the majority of directors were in the 55-74 age category (55.6%). After completing a Chi-Square Test of Independence for the two categorical variables, program type and whether or not a specific course in nutrition and aging, results indicate there was no significant association between the two with a p-value of 0.267 (> 0.05).

The next table, Table 11, presents the association between nutrition and dietetic program type (coordinated, didactic, or internship) and whether or not the program director had ever considered including a specific course on nutrition and aging. This was further broken down by program type, 6 (27.3%) coordinated program directors, 9 (40.9%) didactic program directors,

and 7 (31.8%) dietetic internship program directors have considered including a specific course on nutrition and aging. After completing a Chi-Square Test of Independence for the two categorical variables, program type and whether or not the program director had considered including a specific course in nutrition and aging, results indicate there was a significant association between the two with a p-value of 0.032 (< 0.05).

Table 11. Program Type and Course Consideration

	Considered a separate course on nutrition and aging	
Program Type	Yes	No
Coordinated	6 (27.3%)	3 (6.8%)
Didactic	9 (40.9%)	15 (34.1%)
Internship	7 (31.8%)	26 (59.1%)
Level of significance (α = 0.05), P-value (0.608)		

The previous categorical variable, gender, was not considered a variable for this question, because all respondents were female. No statistics were computed because gender was a constant.

Table 12 presents the association between age of program director (25-44 years old, 45-54 years old, 55-74 years old) and whether not the program director had ever considered including a specific course on nutrition and aging. A total of 7 (31.8%) directors between the ages of 25-44, 7 (31.8%) directors between the ages of 45-54, and 8 (36.4%) directors between the ages of 55-74 have considered including a specific course on nutrition and aging. After completing a Chi-Square Test of Independence for the two categorical variables, age group and

whether or not the program director had ever considered including a specific course on nutrition and aging, results indicate there is no significant association between the two with a p-value of 0.943 (> 0.05).

Table 12. Age and Course Consideration

	Considered including a separate course on nutrition and aging	
Age Category	Yes	No
25-44	7 (31.8%)	14 (32.6%)
45-54	7 (31.8%)	12 (27.9%)
55-74	8 (36.4%)	17 (39.5%)
Level of significance (α = 0.05), P-value (0.943)		

Table 13 presents the association between nutrition and dietetic program type (CP, DPD, or DI) and whether or not nutrition and aging was incorporated into any of their courses. This participant pool was a little smaller, with 93 directors responding; 13 (17.3%) CP directors, 37 (49.3%) DPD directors, and 25 (33.3%) DI directors indicated their respective program incorporated nutrition and aging content into their offered courses. While 18 (100%) dietetic internship directors indicated their respective program did not incorporate nutrition and aging content into their offered courses. After completing a Chi-Square Test of Independence for the two categorical variables, program type and whether or not nutrition and aging content was included in an existing course, results indicate there was a significant association between the two with a p-value of 0.00 (< 0.05).

Table 13. Program Type and Content Inclusion

	Content in any other courses (i.e. Lifecycle, Community, Medical Nutrition Therapy)	
Program Type	Yes	No
Coordinated	13 (17.3%)	0 (0%)
Didactic	37 (49.3%)	0 (0%)
Internship	25 (33.3%)	18 (100%)
Level of significance ($\alpha = 0.05$), P-value (0.000)		

The next table (Table 14) presents the association between age of program director (25-44 years old, 45-54 years old, 55-74 years old) and whether or not the program director reported that their respective program had nutrition and aging incorporated into any offered courses. Looking at the age categories, 26.7 % directors between the ages of 25-44, 29.3% directors between the ages of 45-54, and 44% directors between the ages of 55-74 indicated they did include nutrition and aging content in other courses. After completing a Chi-Square Test of Independence for the two categorical variables, age category and whether or not the nutrition and aging content was included in other courses, results indicate there was no significant association between the two with a p-value of 0.757 (> 0.05).

Table 14. Age and Content Inclusion

	Content in any other courses (i.e. Lifecycle, Community, Medical Nutrition Therapy)	
Age Category	Yes	No
25-44	20 (26.7%)	6 (35.3%)
45-54	22 (29.3%)	4 (23.5%)
55-74	33 (44%)	7 (41.2%)
Level of significance ($\alpha = 0.05$), P-value (0. 757)		

Program directors were asked to select the type of dietetic program they directed with 4 options (coordinated, didactic, dietetic internship, other). If program directors selected dietetic internship, they were prompted to identify which type of internship program they direct with 5 options (a program resulting in a graduate degree, a program that has a graduate degree available, a program that offers distance education, a program that offered an Individualized Supervised Practice Pathway (ISPP), or other). Results indicated that 67 directors identified as directing a dietetic internship; 13 programs of these programs resulted in a graduate degree, 16 programs had a graduate degree available, 10 programs were distance education, 4 programs were ISPP, while 24 programs identified as other. The program directors that selected other were prompted to describe and responses were coded based on emergent themes. Dietetic internship without graduate credit, stand-alone or 'traditional' dietetic internship, and certificate programs were the emergent themes.

Further along in the survey directors were asked if their program offered a specific course on nutrition and aging; 30 programs had a stand-alone course. Of those courses, the course names that emerged from most frequent to less frequent were geriatric nutrition, nutrition and aging, nutrition in aging, nutrition for the older adult, nutrition health and aging, nutrition and gerontology. The frequency of the course names are listed in descending order. A few course titles that were not included as emergent themes include: lifecycle-mid to later years, nutrition genes and longevity, health promotion and aging, and ageless wisdom.

The next question that allowed for directors to write-in responses asked if he/she had ever considered including a specific course on nutrition and aging; 24 selected 'yes', 73 selected 'no'. Of the directors that selected 'yes', they were prompted to explain why; using emergent themes directors listed the increasing aging population most prevalently. Additional write-ins included:

career opportunities & faculty interest. Of the directors that selected no, they were also prompted to explain why; using emergent themes directors listed too many required courses, not a focus of their program, content in other courses (undergraduate and graduate), content is presented in a different format such as specialty lectures, modules, or enrichment. Additional listings included a limited number of faculty, limited number of resources, hadn't thought about it, not required, don't offer courses.

The next question asked directors to identify if nutrition and aging content was incorporated into one or more of their offered courses. A total of 20 selected 'no', 77 selected 'yes'. The directors that selected yes were then prompted to list the courses; using emergent themes, lifecycle/lifespan, medical nutrition therapy (including clinical nutrition), and community were identified as including the content. Other course listings identified, but not emerging were assessment and nutrition. Directors that selected 'no' to this question were prompted to select whether or not they had considered including nutrition and aging content in one or more of their courses. All 20 selected 'no'; they indicated that their program does not offer courses and it was not a focus area.

The next question asked directors if they felt nutrition and aging content (whether integrated into a course or a stand-alone course) was important. The majority, 92 selected 'yes', 4 selected 'no'. The directors that selected 'yes' were then prompted to describe why they felt the content was important. The information was coded using emergent themes- all dietitians serve the elderly, a large aging population, multiple nutrition risk factors, and quality of life. Within the theme, all dietitians serve the elderly, employment and specialized presented as co-themes. Within the theme of a large aging population, chronic disease and specific needs presented as co-themes. Within the theme of multiple nutrition risk factors, no other themes or

co-themes emerged. Within the theme of quality of life, sociological issues, end of life care emerged as co-themes. Additionally, a couple descriptions included information about the need for students to have increased exposure to nutrition and aging content. The directors that selected 'no' were then prompted to describe why they felt the content was not important; based on the limited responses there were just a few reasons; nutrition and aging content is not a specifically required standard, feels like a rerun of medical nutrition therapy, and not a focus area for his/her program. The next question asked directors to select barriers they perceived to adding an additional course in nutrition and aging. Respondents could select any/or all of the following: lack of faculty expertise, lack of faculty interest, lack of financial support, curriculum already full, lack of student interest, no barriers, or other.

The next question asked directors if their students were exposed to nutrition and aging content through other courses or activities (i.e. inter-professional education, service-learning, workshops). The majority, 80 directors responded 'yes', with14 responding 'no'. The directors that selected 'yes' were prompted to name what experiences their students take part in to cover the content. Emergent themes included: clinical rotations, service learning/community service/volunteer opportunities, specialty coursework, and supervised practice. Additional experiences included: long-term care visits, interprofessional education, area dietetic association meetings, research, simulations, field experience, and student clubs.

When participants were asked to list any additional information he/she felt was important to consider based on the topic of nutrition and aging content in current nutrition and dietetic programs. A total of 32 survey participants choose to write-in comments. See the table below for a summary of the write-in responses.

Table 15. Director's Narrative Input on Nutrition & Aging

Content Inclusion	**Specialty Population**	**Constraints**
consider faced paced course	assessment skills	competencies
case studies and resources	MDS regulations	certificate in gerontology
interprofessional education	end of life	decreased student interest

Research Questions

1) What are the differences among accredited nutrition and dietetic programs regarding the geriatric-related nutrition content offered in their respective curricula?

2) What is the perceived level of satisfaction expressed by accredited nutrition and dietetic program directors regarding geriatric-related content in their curriculum?

3) What are the opinions among accredited nutrition and dietetic program directors about the importance of including geriatric-related nutrition content in their curriculum?

Chapter Summary

This chapter describes the data analysis used for this research study. This chapter contained the following sections: survey results, participant demographics, program demographics, nutrition and aging content, program director perception, perceived and potential barriers, increasing content, and relationships. Descriptive and inferential statistics were used to analyze the data; Pearson's Chi Square test was used most prevalently to test for associations between categorical variables.

CHAPTER 5: DISCUSSION

Introduction

This chapter will provide a summary of the current research study that investigated the geriatric content in nutrition and dietetics curricula. Three major conclusions exist within this research. The first conclusion is that the amount of nutrition and aging content in accredited programs has not changed over the past 15-30 years when similar research was conducted. The second conclusion is that most of the nutrition and aging content is contained within other courses where nutrition and aging is not the overarching main topic. The third conclusion is that program directors indicate nutrition and aging content as important for students to have. Specific suggestions for future research are also provided along with a chapter summary.

Statement of the Problem

The purpose of this study was to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs. The older adult population, those older than 65, continues to rise. The number of individuals 65 years of age and older in the world is expected to increase by nearly 60% by the year 2030, equaling near 1 billion older adults on the globe or about 12% of the entire population (He, Goodkind, & Kowal, 2016, p.3). While life expectancy for older adults varies immensely among men and women, geographic location, level of economic development, and life experiences, researchers acknowledge that a few overarching factors across the globe have led to the remarkable increase in life expectancy. The factors highlighted include water, sanitation, and diet (He, et. al., 2016). In the United States, most of the population would have access to clean water and proper sanitation, but the third factor, diet, is one that can be addressed through purposeful, strategic, and thoughtful planning in health policy at the local, state, and national level. The concern is food insecure older adults (individuals with

limited or uncertain access to adequate food); according to Feeding America, a nationwide network of foodbanks, more than 5 million seniors struggle with hunger (2017; USDA, 2016). The number is projected to increase by 50% by 2025 (Ziliak & Gunderson, 2009). While there are food assistance programs in the United States to help low-income seniors (and adults with disabilities), evidence suggests that a more concerted effort to improving the utilization of the available programs is necessary (Fitzpatrick & Greenhalgh-Stanley, 2015).

Obesity is another factor that has shown to be an important risk factor for mortality and disproportionately affects individuals with lower socioeconomic status, who are less likely to have access to adequate healthcare and more likely to be food insecure (Flegal, Kit, Orpana, & Graubard, 2013; Kramer, Zinman, & Retnakarn, 2013). Unlike the adult population group, obesity proves to serve as a protective factor for the elderly individual as the continuum of aging may present unintentional and/or involuntary weight loss (Bernstein, M. 2017). Furthermore, chronic disease in this group of older adults often leads to decrements in overall health such as changes in mobility, further disease, and more reliance on healthcare (He, et. al., 2016).

The importance of educated and enthusiastic professionals who can work effectively with the aging population is well documented (Koren, 2008). At the same time, numerous health professions are experiencing a decline in students and practitioners interested in specializing in geriatrics. The growing number of adults suggests a growing number of healthcare needs and increased burden on the healthcare providers; they also highlight the importance of providing gerontological content to students studying in any of the healthcare disciplines (Koren, 2008). A growing phenomenon among the older population cohort and potentially one that an interdisciplinary team can fill is the role of care taker or case worker. While children of the older adults have tended to care for their ageing parents, this may not be the case in the very near

future. Not only has life expectancy increased, but the number of offspring has decreased, thus the caretaker role traditionally filled by the grown child or children, is no longer there (Albertini & Mencarini, 2014). The healthcare needs of the aging, diverse population are projected to be immense, where more care and assistance in living longer will need to be provided by others in the family or possibly the healthcare system. The evolving and diverse needs of the older population range from preventative measures to twenty-four hour care; therefore, clinicians trained in geriatrics will best meet the needs. In order for healthcare disciplines to provide the needed skillset, geriatric content should be included in the curricula of future healthcare practitioners. However, many health discipline curricula are packed full of required coursework and clinical hours with little wiggle room for additional courses or requirements in the traditional format.

Registered dietitians serve an important role in all aspects of care for the older adult, from prevention to treatment to continued care to end of life, yet the aging trend is a concern for nutrition and dietetic programs going forward, because the curriculum to support geriatric-trained students may be limited (Rhee, Wellman, Castellanos, & Himburg, 2004). Literature that looks at the curricular offerings of accredited nutrition and dietetic programs is very limited, thus this research sought to ask about offerings across the varied programs and provide information on current offerings. This study sought to answer the following questions:

1) What are the differences among accredited nutrition and dietetic programs regarding the geriatric-related nutrition content offered in their respective curricula?

2) What is the perceived level of satisfaction expressed by accredited nutrition and dietetic program directors regarding geriatric-related content in their curriculum?

3) What are the opinions among accredited nutrition and dietetic program directors about the importance of including geriatric-related nutrition content in their curriculum?

Review of the Methodology

This study used survey methodology to gather mostly quantitative and a small amount of qualitative data. The Survey of Geriatric Content in Nutrition and Dietetics Curricula was developed by adapting two previous surveys administered to nutrition and dietetic program directors. A part of the survey included questions adapted from Rhee and colleagues (2004) research titled "Continued need for increased emphasis on aging in dietetics education". Permission for use and adaptation was granted from the corresponding author to use and adapt the questions, as needed. The second part of the survey includes adapted questions from a thesis project titled "Perceptions and attitudes of dietetic program educators regarding the use of distance education and computer-based simulations in dietetics education". The surveys were sent to content experts, and then pilot tested with ten nutrition and dietetic program directors using systematic sampling.

The survey included twenty-two questions. The first set of questions asked for information regarding the nutrition and dietetic program; the next set of questions asked specific questions about the nutrition and aging content in their respective curricula. Questions were asked to better determine how the information was being delivered, i.e. stand-alone course vs. within a course, and if the program directors felt nutrition and aging content was important to include. Program directors were asked to select perceived barriers to adding nutrition and aging content; they were also asked about their level of satisfaction with their course offerings in nutrition and aging. Basic demographic questions were included. The electronic survey was distributed to 531 nutrition and dietetic program directors. Results were analyzed using

descriptive and inferential statistics. Descriptive statistics were used to provide descriptive summaries. Pearson's Chi-Square was used most often to test for an association between categorical variables. Most tests were two-tailed and p-values < 0.05 were considered significant; SPSS software was used. Narrative data was analyzed by manual coding and emergent themes by the PI.

Summary of Results

Demographics

One hundred and seven survey participant responses were complete and usable for data analyses; resulting in a response rate of 20.4%. The majority of participants direct a dietetic internship (54.4%), followed by didactic programs in dietetics (34.5%), and lastly coordinated programs (11.1%). This distribution doesn't align directly with the breakdown of accredited nutrition and dietetic programs, because there were not as many DPD program directors represented in this respondent pool as anticipated. The breakdown for accredited nutrition and dietetic programs is nearly 49% DIs, 40% DPDs, and 11% CPs; this indicates that DPD program directors were underrepresented. Most respondents were white females between the ages of 55-74 with 1-5 years of experience as program director (51.4%) in various areas of dietetic practice, most namely clinical, education, and long-term care. The programs they directed included undergraduate (35.1%) or graduate (30.9%) courses mostly on-campus (46%) within an urban college/university setting. Nearly half of the participants direct programs in the Southern region of the United States which encompasses 17 states and a quarter of the participants direct a program in the Midwest region of the United States which encompasses 12 states.

Nutrition and Aging Content

A majority (61.7%) of the programs did not offer a specific or stand-alone course in nutrition and aging, and 41% of these program directors indicated they had not considered including a specific course to cover this content. At the same time, 70% of program directors in this survey indicated nutrition and aging content was incorporated into other courses within the curricula. Overwhelmingly, participants (83%) indicated that nutrition and aging content is important to include because most all dietitians will serve this population through medical nutrition therapy because of the aging population. Namely the elderly cohort includes many individuals with multiple nutrition risk factors, chronic disease, and will heavily populate areas where registered dietitians practice. When asked if students were exposed to nutrition and aging content through non-traditional ways (i.e. not a course), 84% of program directors indicated yes, and identified clinical experience through rotations, supervised practice, and service learning. These results are similar to other health professions including nursing, physical therapy, nursing, pharmacy to name a few, that recognize students need the content and exposure to the elderly population, yet are also dealing with full curricula and increased demand on time for other requirements (Duque, et al., 2013; MacRae, 2012).

When program directors were asked how they would increase nutrition and aging content in their respective curriculum, directors selected adding assignments and field experiences to a current course or make no changes more often than adding a stand-alone course or offering an inter-professional course. These results are similar to what other health professions have mentioned; however, the one opportunity that program directors did not identify as an area for opportunity to add content is through interdisciplinary teamwork (Bonifas & Gray, 2013; MacRae, 2012).

Perceived and Potential Barriers

It was identified earlier that a majority of the programs do not offer a stand-alone course for nutrition and aging; when asked to select barriers the program director perceived to adding such a course, curriculum is already full, lack of faculty expertise, and lack of financial support were chosen most often. Similarly, when program directors were asked to select potential barriers that could prevent them from adding nutrition and aging content (despite what mode was chosen) to their respective curricula, curriculum is already full was selected by more than half (53.3%) of the directors. These results are almost identical to those described by Rhee and colleagues (2004), thirteen years ago. ACEND® sets the standards for accredited nutrition and dietetic programs to achieve, and most recently released the 2017 Accreditation Standards for all programs including CPs, DPDs, and DIs. The previous standards were published in 2012. Several adjustments were made to the standards and accompanying competencies; however, no adjustments, revisions, or suggestions were included regarding the elderly population. While program directors and affiliated faculty of accredited nutrition and dietetic programs formulate their curricula to meet the ACEND® standards and meet the guidelines set by the encompassing institution, simply suggesting that an emphasis in nutrition and aging should be included is not enough to make a change. This is evident through the fact that curricular offerings related to nutrition and aging content have not changed over the past 15 to even 30 years yet the population continues to change.

Level of Satisfaction

Program directors were then asked to rate their level of satisfaction with the current curricular offerings related to nutrition and aging content; 62.6% were satisfied/somewhat satisfied (43.9% were satisfied, 18.7% were somewhat satisfied). The PI was not able to

determine a correlation between the level of satisfaction and course offerings, but the data suggests that programs are satisfied with their current provisions which include nutrition and aging content within existing courses (such as Lifecycle, Medical Nutrition Therapy, or Community).

Conclusions

Three major conclusions exist within this research. The first conclusion is that the amount of nutrition and aging content in accredited programs has not changed over the past 15-30 years when similar research was conducted. The second conclusion is that most of the nutrition and aging content is contained within other courses where nutrition and aging is not the overarching main topic. The third conclusion is that program directors indicate nutrition and aging content as important for students to have.

Developing nontraditional strategies, utilizing technology through webinars, simulations, or group exercises or crafting specialized experiences will be helpful in increasing exposure to the aging population. These approaches can help to ensure students are exposed to geriatric content during their dietetic program, while minimizing the impact (i.e. cost, faculty time, faculty expertise, etc.) on the overall curriculum. Even still, the importance of healthcare practitioners trained in geriatrics can help recognize geriatric conditions early, provide appropriate treatment or intervention, and supply resources for continued care and maintenance.

Limitations of the Study Design

The study design used in this research was thoughtfully put together to mitigate potential sources of error; however limitations with the study design do exist. The list of nutrition and dietetic program directors was received using the Academy of Nutrition and Dietetics website;

therefore it was assumed that this list was inclusive, up to date, and accurate. Yet, there were nine bounced emails. In addition the researcher received individual correspondences from program directors not listed. There were also four individuals listed on the Academy of Nutrition and Dietetics website, who were no longer serving in the program director role. These shifts were unknown to the PI prior to sending out the participant email and recruitment statement. Additionally, data were self-reported by the directors of the programs who may not have first-hand knowledge of course content or clinical experiences offered in the various programs – this particularly true of DPDs – though DI directors do not always know what goes on at the clinical rotations.

In this particular study design, bias may have occurred among program directors who have an interest in research and learning about what other accredited programs offer. Similarly, bias may have occurred in directors who do not have an interest in working with the elderly population. Being Cross-sectional, it only looks at a single point in time and is subject to possible bias – i.e. a prevalence-incidence bias known as the Neyman bias – even if using a completely objective questionnaire, the person answering cannot answer questions with perfect accuracy.

Limitations from Data Collection Errors

Additional limitations were presented during data collection. One limitation that developed was an error in the skip logic for one of the survey questions. The survey question asked for the program director to identify the type of program he/she oversaw; while dietetic internships present in various forms, the other programs do not. Unfortunately, the appropriate skip logic was not in place to have directors of coordinated or didactic programs move to the next question, without answering a question specific for dietetic internship directors first. Another limitation was an error in the options for the geographic location of the program.

Participants were asked to select the state where their program is located, and Puerto Rico was not included in the list. The errors were recognized within the first 8 hours of sending the survey, and fixed to eliminate additional errors in these areas. The responder pool was not affected by these minor tweaks. Because the survey was anonymous, the researcher was not able to identify which directors had filled out the survey before the errors were fixed, thus all individuals on the initial email list, received a duplicate email. Two directors corresponded directly with the researcher to further clarify the intent of the duplicate email.

Another data collection limitation was the timing of the survey. Program directors received the introductory email and request to complete the survey near the end of June, and a follow-up reminder email the beginning of July. Participation may have been lower because directors may be out of the office on vacation or, may be transitioning out of their position. On the other hand, course load and program demands tend to be lighter in the summer months, so the timing of the email and survey may have been ideal. Program directors may have increased vigilance in checking emails during the fall, winter, or spring months, and may account for the smaller percentage of DPD directors that completed the survey.

Recommendations

Three major conclusions exist within this research. The first conclusion is that the amount of nutrition and aging content in accredited programs has not changed over the past 15-30 years when similar research was conducted. The second conclusion is that most of the nutrition and aging content is contained within other courses where nutrition and aging is not the overarching main topic. The third conclusion is that program directors indicate nutrition and aging content as important for students to have.

Future Research

This study has identified several areas for potential research related to nutrition and aging content moving forward. An important distinction that was identified through this research and one that should be considered is separating the nutrition and dietetic programs by program type. The results show that nutrition and aging content is delivered in a variety of ways among the program types, which makes it hard to determine best practices and valid approaches.

Beyond nutrition and dietetic program directors, it would be interesting to determine the student's level of interest, knowledge, and attitude towards the elderly population. At the same time, surveying registered dietitians that work predominately with elderly to determine if they felt their education and internship experience provided ample content and training to work effectively with the aging population. Since many of the registered dietitians serve as preceptors, having students adequately prepared for their experience with elderly can help foster an interest in the area and highlight the importance of nutrition professionals in elderly care.

Within the nutrition and dietetic curricula it would be beneficial to investigate best practices related to providing nutrition and aging content in a non-traditional format. The results from this study exemplify that many programs are already full of other courses and requirements, so adding a course or even content to a course may not be a manageable and nor widespread approach. Therefore, establishing a consortium of leaders in the field of nutrition and aging to determine best practices in geriatrics and interpret the skills, knowledge, clinical abilities into non-traditional approaches would be ideal.

Lastly, as stated several times, most program directors indicated that their program was already full; therefore, a look into the competencies provided by ACEND® to determine if

additional language or more specific language to nutrition and aging should be included to meet the growing demands of the aging population.

Final Remarks

Registered dietitians are the nutrition experts that lead the way for nutritional care in all age groups. However, the global population is aging and the result is many elderly individuals, suffering from chronic disease and other ailments related to aging will need to be appropriately addressed and recognized in order for the profession to stay relevant and at the table with the first line of care for the majority of the patients.

Chapter Summary

This chapter describes the results and discussion for this research study. A summary of results is discussed, along with study conclusions, limitations, recommendations, future research, and final remarks. This chapter concludes the study content and is followed by the appendices and references.

APPENDIX A

Survey of Geriatric Content in Nutrition and Dietetics Curricula

Survey of Geriatric Content in Nutrition and Dietetics Curricula

Thank you for taking time to complete the Survey of Geriatric Content in Nutrition and Dietetics Curricula. Your participation is greatly appreciated. By completing this survey you are consenting to allow your responses to be anonymously collected, analyzed, and published as part of a doctoral dissertation study. The risks to you are minimal. These include loss of productive and/or free time. Participation in this survey will not benefit you directly, but may benefit society by identifying opportunities for enhanced curricula.

This survey is designed to capture the geriatric content in your current nutrition and dietetics program*. Please complete all questions. This survey takes about 15 minutes to complete. You can save your answers and return to the survey later as needed. For the purpose of this survey, the terms geriatric and aging refers to individuals over the age of sixty-five. *This survey was adapted from surveys used in both of the following citations: Rhee, L. Q., Wellman, N.S., Castellanos V.H, & Himburg, S.P. (2004). Continued need for increased emphasis on aging in dietetics education. Journal of the American Dietetic Association, 104, 645-649. Schlein, K. M. (2011). Perceptions and attitudes of dietetic program educators regarding the use of computer-based simulations in dietetics education (Unpublished master's thesis). University of Massachusetts Amherst, Amherst, MA.

Q1 Are you a nutrition and dietetics program director?

Yes (1)

No (2)

Condition: No Is Selected. Skip To: Select your gender.

Q2 How many years have you been a nutrition and dietetics program director?

1-5 years (1)

5-10 years (2)

10-15 years (3)

More than 15 years (4)

Q3 What type of nutrition and dietetics program do you oversee?

Coordinated program (1)

Didactic program (2)

Dietetic internship (3)

Other (4)

Condition: Dietetic internship Is Selected. Skip To: Select which description best encapsu....

Q3i Select which description best encapsulates your internship program.

A program resulting in a graduate degree (1)

A program that has a graduate degree available (2)

A program that offers distance education (3)

A program that offers an Individualized Supervised Practice Pathway (ISPP) (4)

Q4 Does your nutrition and dietetics program have an emphasis area (i.e. community nutrition)?

Yes (1)

No (2)

Condition: Yes Is Selected. Skip To: Please list the emphasis area(s). .

Q4i Please list the emphasis area(s).

Q5 Which of the following choices best describes the courses included in your nutrition and dietetics program?

Undergraduate courses (1)

Graduate courses (2)

Both undergraduate and graduate courses (3)

Q6 Which of the following choices best describes the delivery of courses in your nutrition and dietetics program?

On-campus courses (1)

Off-campus (online) courses (2)

Both on-campus and off-campus (online) courses (3)

Q7 Which of the following settings best describes your nutrition and dietetics program?

College/University (1)

Hospital (2)

Corporate (3)

Government (4)

Q8 Which of the following best describes the location of your nutrition and dietetics program?

Rural (1)

Urban (2)

Distance (3)

Q9 Select the state that your nutrition and dietetics program is located.

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)

Maine (19)

Maryland (20)

Massachusetts (21)

Michigan (22)

Minnesota (23)

Mississippi (24)

Missouri (25)

Montana (26)

Nebraska (27)

Nevada (28)

New Hampshire (29)

New Jersey (30)

New Mexico (31)

New York (32)

North Carolina (33)

North Dakota (34)

Ohio (35)

Oklahoma (36)

Oregon (37)

Pennsylvania (38)

Rhode Island (39)

South Carolina (40)

South Dakota (41)

Tennessee (42)

Texas (43)

Utah (44)

Vermont (45)

Virginia (46)

Washington (47)

West Virginia (48)

Wisconsin (49)

Wyoming (50)

Puerto Rico (51)

Q10 Does your program offer a specific course on nutrition and aging?

Yes (1)

No (2)

Q10i List the name(s) of your course(s) on nutrition and aging.

Q10ii Have you ever considered including a specific course on nutrition and aging?

Yes (1)

No (2)

Condition: Yes Is Selected. Skip To: Briefly explain why..Condition: No Is Selected. Skip To: Briefly explain why not.

Q10iii Briefly explain why.

Q10iv. Briefly explain why not.

Q11 Do you have nutrition and aging incorporated into any of your courses (i.e. Lifecycle Nutrition, Community Nutrition, Medical Nutrition Therapy, etc.)?

Yes (1)

No (2)

Condition: No Is Selected. Skip To: Have you ever considered including nu....Condition: Yes Is Selected. Skip To: List the name(s) of your course(s) th....

Q11i List the name(s) of your course(s) that include aging content.

Q11ii Have you ever considered including nutrition and aging content in one or more of your courses?

Yes (1)

No (2)

Condition: Yes Is Selected. Skip To: Identify which course you would consi....Condition: No Is Selected. Skip To: Briefly explain why. .

Q11iii Identify which course you would consider adding nutrition and aging content.

Q11iiii Briefly explain why.

Q12 Do you feel that including nutrition and aging content (whether integrated into a course or offered as a separate course) is important?

Yes (1)

No (2)

Condition: Yes Is Selected. Skip To: Please describe why you feel it is im....Condition: No Is Selected. Skip To: Please describe why you feel it is no....

Q12i Please describe why you feel it is important to include nutrition and aging content in your nutrition and dietetics curriculum (whether integrated into a course or offered as a separate course).

Q12ii Please describe why you feel it is not important to include nutrition and aging content in your nutrition and dietetics curriculum (whether integrated into a course or offered as a separate course).

Q13 Select any barriers you perceive to adding an additional course, specific to nutrition and aging to your program's curriculum. Select all that apply.

Lack of faculty expertise (1)

Lack of faculty interest (2)

Lack of financial support (3)

Curriculum is already full (4)

Lack of student interest (5)

No barriers exist (6)

Other (7)

Condition: Other Is Selected. Skip To: Please describe..

Q13i Please describe.

Q14 Are your students exposed to nutrition and aging content through other courses or activities (i.e. inter-professional education, service-learning, workshops)?

Yes (1)

No (2)

Condition: Yes Is Selected. Skip To: Identify which other courses or activ....

Q14i Identify which other courses or activities expose your students to nutrition and aging content.

Q15 How satisfied are you with the aging and nutrition content that is currently offered in your program's curriculum?

Very dissatisfied (1)

Dissatisfied (2)

Somewhat dissatisfied (3)

Neutral (4)

Somewhat satisfied (5)

Satisfied (6)

Very satisfied (7)

Q16 If you could increase your current nutrition and dietetics curriculum with nutrition and aging content, how would you add it? Select any that apply.

Add content to a current course (1)

Add assignments and field experiences to a current course (i.e. experiential and/or service-learning) (2)

Develop a new course (3)

Add an inter-professional course (6)

Make no changes (4)

Other (please describe) (5) _____

Q17 Select any potential barriers that could prevent you from adding nutrition and aging content to your nutrition and dietetics curriculum.

Lack of faculty expertise (1)

Lack of faculty interest (2)

Lack of financial support (3)

Curriculum is already full (4)

Lack of student interest (5)

No barriers exist (6)

Other (please describe) (7) _____

Q18 Please list any additional information you feel is important to consider based on the topic of nutrition and aging content in current nutrition and dietetics programs.

Q19 Select all categories that apply to your previous areas of employment in dietetics.

Clinical (hospital, acute-care centers) (1)

Long-term care (nursing home, assisted living) (2)

Community (doctor's office, agency, clinic) (3)

Foodservice (hospital, school, business) (4)

Research (product development) (5)

Government (health department, policy, advocacy) (6)

Education (higher education) (7)

Wellness (gyms, wellness programs, sports) (8)

Private practice (9)

Other (10)

Condition: Other Is Selected. Skip To: Describe..

Q19i Describe

Q20 Select your gender

Female (1)

Male (2)

Other (3)

Q21 Select your ethnicity

White (1)

Black or African American (2)

Hispanic or Latino (7)

American Indian or Alaska Native (3)

Asian (4)

Native Hawaiian or Pacific Islander (5)

Other (6)

Q22 Select your age category

25 - 34 (13)

35 - 44 (14)

45 - 54 (15)

55 - 64 (16)

65 - 74 (17)

75 - 84 (18)

85 or older (19)

Thank you for taking the time to complete this survey. Your participation is greatly appreciated.

APPENDIX B

Permission for Survey Usage and Adaptation

Melissa Ramel <mreyno14@slu.edu>

Re: {EXTERNAL} Question concerning one of your publications...

3 messages

Ramel, Melissa <mreyno14@slu.edu> Mon, Nov 2, 2015 at 2:52 PM

To: Nancy Wellman <nancy.wellman@fiu.edu>

Good Afternoon Dr. Wellman,

I hope you are doing well. My name is Melissa Ramel and I am a junior faculty member in the Nutrition and Dietetics department at Saint Louis University (SLU). I am also pursuing my PhD in education. The reason for my email is related to your publication from 2004 in JADA (Continued Need for Increased Emphasis on Aging in Dietetics Education). You and the other authors refer to contacting program directors electronically and asking them a set of questions. I was wondering if I could have permission to use those same questions in a similar survey I am developing for my class project and dissertation? I thank you greatly for your time and consideration.

Thank you! Melissa

--

Melissa Ramel MS, MPH, RD, LD Faculty Member, Nutrition Coordinator St. Louis City Department of Health

Saint Louis University, Nutrition & Dietetics

Nancy Wellman <wellmann@fiu.edu> Mon, Nov 2, 2015 at 3:23 PM

To: Melissa Ramel <mreyno14@slu.edu>

Dear Melissa:

Thank you for your interest in our earlier work. You may certainly use the same questions we asked of educators. I've attached Table 2 from Lauren Rhee's thesis for your information. It is essentially the same as Table 1 in JADA.

We also published several related articles as listed below:

Kaempfer DJ, Wellman NS, Himburg SP. Dietetics students' low knowledge, attitudes, and work preferences toward older adults indicate need for improved education on about aging. J Am Diet Assoc. 2002;102:197-202.

O'Neill PS, Wellman NS, Himburg SP, Johnson P, Elfenbein P. Aging in community nutrition, diet therapy, and nutrition and aging textbooks. Gerontol Geriatr Educ. 2005;25(3):65-83.

Wellman NS, Kondracki NL, Johnson P, Himburg SP. Aging in introductory and life cycle nutrition textbooks. Gerontol Geriatr Educ. 2004;24(3):67-86.

I attached the GGEd papers as they are more difficult to access.

I have my doubts that much has changed in the curricula. It is important to document what are students are/are not learning.

Let me know if I can be of further assistance.

Best,

Nancy S Wellman

305-283-1763 cell

Nancy

--

3 attachments

G&GEd Comm Dx Aging Bks O'Neill 05.pdf 122K

GGEd Intro Life Cycle Bks J021v24n03_06.pdf 672K

LR_Thesis_Table 2.doc 25K

Melissa Ramel <mreyno14@slu.edu> Mon, Nov 2, 2015 at 4:18 PM

To: Nancy Wellman <wellmann@fiu.edu>

Dear Dr. Wellman,

Thank you so much for your quick response and additional documents. I truly appreciate it!

Take Care,

Melissa

Melissa Ramel <mreyno14@slu.edu> Tue, Nov 3, 2015 at 2:35 PM

Question concerning one of your student's publications...

5 messages

To: cohen@nutrition.umass.edu

Good Afternoon Dr. Cohen,

I hope you are doing well. My name is Melissa Ramel and I am a junior faculty member in the Nutrition and Dietetics department at Saint Louis University (SLU). I am also pursuing my PhD in education. The reason for my email is related to your student's thesis publication from 2011 (PERCEPTIONS AND ATTITUDES OF DIETETIC PROGRAM EDUCATORS REGARDING USE OF DISTANCE EDUCATION AND COMPUTER-BASED SIMULATIONS IN DIETETICS EDUCATION). Your student (KIRSTEN M. SCHLEIN) and the other authors include a comprehensive survey of dietetic program directors. I was wondering if I could have permission to use some of those same questions in a similar survey I am developing for my class project and dissertation (working title- 'how are dietitians educated to provide)? I thank you greatly for your time and consideration.

Thank you!

--

Melissa Ramel MS, MPH, RD, LD Faculty Member, Nutrition Coordinator St. Louis City Department of Health

Saint Louis University, Nutrition & Dietetics

Nancy Cohen <cohen@nutrition.umass.edu> Tue, Nov 3, 2015 at 2:40 PM

To: Melissa Ramel <mreyno14@slu.edu>

Cc: Elena Carbone <ecarbone@nutrition.umass.edu>

Hi Melissa – I am cc'ing Dr. Carbone on this email in hopes that she may be able to provide further information regarding your question.

Sincerely,

Nancy Cohen, PhD, RD, LDN, FAND

Professor

Department of Nutrition

University of Massachusetts, Amherst

Amherst, MA 01003

cohen@nutrition.umass.edu

2015-16 Chancellor's Leadership Fellow

Chair, Association of Nutrition Departments and Programs

Voice 413-545-1079

Fax 413-545-1074

From: Melissa Ramel [mailto:mreyno14@slu.edu]

Sent: Tuesday, November 03, 2015 3:35 PM

To: cohen@nutrition.umass.edu

Subject: Question concerning one of your student's publications...

To: Nancy Cohen <cohen@nutrition.umass.edu>

Cc: Elena Carbone <ecarbone@nutrition.umass.edu>

Dr. Cohen,

Thank you!

Melissa

Elena Carbone ecarbone@nutrition.umass.edu

Wed, Nov 4, 2015 at 11:08 AM

To: Nancy Cohen <cohen@nutrition.umass.edu>, Melissa Ramel <mreyno14@slu.edu>

Melissa,

Kirsten was my advisee and this was part of her thesis. I don't have her current email address, but she is a Clinical Dietitian at Baylor University Medical Center in Dallas, Texas if you would like to get in touch with her.

Elena

Elena T. Carbone, DrPH, RD, LDN

Associate Professor/Graduate Program Director

Melissa Ramel <mreyno14@slu.edu> Wed, Nov 4, 2015 at 11:38 AM

To: Elena Carbone <ecarbone@nutrition.umass.edu>

Cc: Nancy Cohen <cohen@nutrition.umass.edu>

Great. Thank you for the follow-up and additional information.

Take Care,

Melissa

From: Melissa Ramel <mreyno14@slu.edu>

Sent: Tuesday, January 24, 2017 12:24:17 PM

To: Schlein, Kirsten

Subject: {EXTERNAL} Questions on concerning one of your publications...

Good Afternoon Kirsten,

I hope you are doing well. My name is Melissa Ramel and I am a junior faculty member in the Nutrition and Dietetics department at Saint Louis University (SLU). I am also pursuing my PhD in education. The reason for my email is related to your thesis publication from 2011 (PERCEPTIONS AND ATTITUDES OF DIETETIC PROGRAM EDUCATORS REGARDING USE OF DISTANCE EDUCATION AND COMPUTER-BASED SIMULATIONS IN DIETETICS EDUCATION). You include a comprehensive survey of dietetic program

directors. I was wondering if I could have permission to use some of those same questions in a similar survey I am developing for my research/dissertation (working title- 'Educating nutrition students for geriatric care')? I thank you greatly for your time and consideration.

Thank you!

--

Melissa Ramel MS, MPH, RD, LD Faculty Member, Nutrition Coordinator St. Louis City Department of Health, Saint Louis University, Nutrition & Dietetics

Schlein, Kirsten <Kirsten.Schlein@bswhealth.org>

Wed, Jan 25, 2017 at 4:05 PM

To: Melissa Ramel <mreyno14@slu.edu>

Hi Melissa,

Thank you for getting in touch. Yes, you are welcome to do that, I just ask that you please use a reference.

Good luck!

Kirsten Schlein MS, RDN, LD, CNSC

Clinical Dietitian

Baylor Scott & White Health Care System

Melissa Ramel <mreyno14@slu.edu> Wed, Jan 25, 2017 at 4:09 PM

To: "Schlein, Kirsten" <Kirsten.Schlein@bswhealth.org>

Hi Kirsten,

Thank you! I will definitely include the reference. Take Care,

Melissa

APPENDIX C

Introductory Email and Recruitment Letter

Dear Nutrition and Dietetics Program Director,

My name is Melissa Ramel and I am a doctoral student at Saint Louis University in the Department of Education. You are receiving this email because of your role in the nutrition and dietetic program at your institution. You are invited to participate in this research study. The purpose of this study is to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs. Your participation in this study will involve completing an electronic, anonymous survey that takes about 20 minutes to complete. Please consider taking some time to complete the survey within the next two weeks. Please click on this link to access the survey [XXXXX]. Your participation is greatly appreciated. If you have questions about this research study, you can call Melissa Ramel at 314-977-8523. Thanks for your time.

Sincerely,

Melissa M Ramel

SAINT LOUIS UNIVERSITY

Recruitment Statement for Research Participation

1. Melissa Ramel MS, MPH, RD, LD, principal investigator is inviting you to participate in this research study.

2. The title of this study is 'A Review of Geriatric Content in Accredited Nutrition and Dietetic Programs'. The purpose of this study is to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs.

3. Your participation in this study will involve completing a brief anonymous, electronic survey. The survey should take about 20 minutes to complete.

4. The risks to you as the participant are minimal. These include loss of productive and/or loss of free time.

5. The results of this pilot study may be published in scientific research journals or presented at professional conferences. However, your name and identity will not be revealed and your record will remain anonymous. All surveys will be completed through Qualtrics Survey Software and won't require personal information to be used.

6. Participation in this study will not benefit you directly. However, participation may benefit society by identifying opportunities for enhanced curricula.

7. You can choose not to participate. If you decide not to participate, there will not be a penalty to you or loss of any benefits to which you are otherwise entitled. You may withdraw from this study at any time.

8. If you have questions about this research study, you can call Melissa Ramel at 314-977-8523. If you have questions about your rights as a research participant, you can call the Saint Louis University Institutional Review Board at 314-977-7744 and reference IRB # 27694.

APPENDIX D

Reminder Email

Dear Nutrition and Dietetics Program Director,

My name is Melissa Ramel and I am a doctoral student at Saint Louis University in the Department of Education. You are receiving this reminder email because of your role in the nutrition and dietetic program at your institution. I again invite you to participate in this research study. The purpose of this study is to investigate nutrition and aging content inclusion in accredited nutrition and dietetic programs. Your participation in this study will involve completing an electronic, anonymous survey that takes about 20 minutes to complete. Please consider taking some time to complete the survey within the next week. Please click on this link to access the survey [XXXXX]. Your participation is greatly appreciated. If you have questions about this research study, you can call Melissa Ramel at 314-977-8523. Thanks for your time.

Sincerely,

Melissa M Ramel

APPENDIX E

Table 3a. Nutrition and Dietetic Program Course Inclusion

Courses offered	
Undergraduate courses	34 (35.1%)
Graduate courses	30 (30.9%)
Both undergraduate and graduate courses	13 (13.4%)
Other	20 (20.6%)

APPENDIX F

Table 10a. Program Type and Aging Course Offered

	Offers a specific course on nutrition and aging	
Program Type	Yes	No
Coordinated	4 (14.3%)	9 (13.6%)
Didactic	13 (46.4%)	24 (36.4%)
Internship	11 (39.3%)	33 (50%)
Level of significance ($\alpha = 0.05$), P-value (0.608)		

APPENDIX G

Table 10b. Age and Aging Course Offered

	Offers a specific course on nutrition and aging	
Age Category	Yes	No
25-44	5 (18.5%)	21 (32.3%)
45-54	7 (25.9%)	19 (29.2%)
55-74	15 (55.6%)	25 (38.5%)
Level of significance ($\alpha = 0.05$), P-value (0.267)		

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VITA AUCTORIS

Melissa Margaret Ramel was born on April 25, 1983 in Colorado Springs, Colorado. She received a Bachelor of Arts in Dietetics from the University of Northern Colorado in Greeley, Colorado in May 2005. After taking a year to work as a special education aid and dance teacher, she moved to St. Louis and completed a dietetic internship at Saint Louis University in 2007. She went on to earn a Master of Science in Medical Dietetics and a Master of Public Health in 2009.

Ms. Ramel practiced as a clinical dietitian in a large long-term care facility both part-time and full-time until 2011. She served a preceptor role during her time at the long-term care facility, supporting the development and skill acquisition of dietetic students. In 2011, she accepted a position as instructor/nutrition coordinator in the department of nutrition and dietetics within the Doisy College of Allied Health. A majority of Ms. Ramel's time is contracted with the City of St. Louis Department of Health to provide nutrition and health promotion through educations, presentations, cooking demonstrations, and community events.

In the fall of 2013, Ms. Ramel began pursuit of her doctoral degree in Education with an emphasis in Curriculum and Instruction. She anticipates completion of this degree in December 2017.