

FACTORS ASSOCIATED WITH HIGH NUTRITION  
RISK AMONG OKLAHOMA OLDER  
AMERICANS ACT NUTRITION  
PROGRAM PARTICIPANTS

By

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Submitted to the Faculty of the Graduate College of  
Oklahoma State University in partial Fulfillment  
of the requirements for the Degree of  
DOCTORATE OF PHILOSOPHY  
December, 2005

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## ACKNOWLEDGEMENTS

I would like to sincerely thank my major advisor, Dr. Janice Hermann, for her for her unending patience, constructive guidance, intelligent supervision, her love of “playing with numbers”, her sense of humor, and for her friendship. My sincere appreciation extends to my other committee members Dr. Brenda Smith, Dr. William Warde, and Dr. Esther Winterfeldt. Dr. Winterfeldt is a true inspiration and role model.

I would also like to thank my Supervisor, Susan Tyler, who through her red marker and edits has made me a better writer. I am appreciative to her for allowing me to be creative in my job.

I would like to thank my friends Dr. Glee Absher and Dr. Alma Belzer for their encouragement, support, and for paving the way through the doctoral maze.

Lastly, I would like to thank family. I would like to thank my husband, Dale, for his patience and understanding throughout this difficult process. I appreciate my daughter, McKinzie, who inspires me daily to be a better person. Most of all, I would like to thank my Mom and Dad, Karen and David Duck, who have supported my college education both emotionally and financially. They have instilled in me the importance of a college education, the importance of a strong work ethic, and have empowered me to achieve anything that I set my mind to.

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## CHAPTER I

### INTRODUCTION

It is no secret that the number of people over 65 years of age in the United States is growing rapidly. In fact, the number of older people in the United States has increased dramatically: from 1 million in 1870 up to 35 million in 2000 (Moody, 2002). According to 2000 Census data, 13.2% of the total population in Oklahoma is 65 years of age and over (U.S. Census Bureau, 2001). By 2030, the proportion of people over 65 years of age in the United States is predicted to reach 20% (Moody, 2002). This rate of growth in the older population is unprecedented in human history.

As people age, they become at greater risk for nutritional deficiencies. In fact, older adults are at a disproportionate risk for malnutrition compared to the general population (Vailas et al., 1998). Aging increases the probability of poor nutrient intakes and increases the risk for adverse health events (White et al., 1992). Reduced nutritional status in older adults increases the risks, severity, and complications of disease, and leads to more frequent or longer hospital stays (Vailas et al., 1995). In addition, declining nutritional status is one of the many reasons older adults lose their independence (Litchford, 2004).

The American public and many health professionals agree that nutrition directly affects health (White et al., 1991). Proper nutrition is vital for successful aging. Good



nutritional status in older adults benefits both the individual and society; health is improved, dependence is decreased, time required to recuperate from illness is reduced, and use of healthcare resources is contained (Van Grevenhof & Funderburg, 2003).

The Older Americans Act Nutrition Program (OAANP), is a community-based program that provides partial funding for congregate and home delivered meals for people over 60 years of age. The Older American Act funds forty-four percent of the cost of congregate meal program and thirty percent of the home delivered meal program. In addition to federal funding, support is leveraged by state and local monies, and participant donations (Wellman et al, 2002). The OAANP is highly cost-efficient. For every dollar of federal funding, \$1.70 is leveraged for congregate meals, and \$3.55 is leveraged for home delivered meals. This allows the OAANP to expand its services to at least two times the level that federal funding can provide alone (Millen et al., 2002).

The program is intended to decrease malnutrition, prevent physical and mental deterioration, promote health, reduce social isolation, link older adults to social and rehabilitative services, and provide low-cost nutritionally sound meals (Wellman et al., 2002). Specific program goals are the provision of low-cost nutritious meals, social contact, nutrition screening and education, information and linkages to other support programs and services, counseling, shopping assistance, transportation, and volunteer services. The OAANP meals provide at least one meal a day that meets a third of the RDA for this age group; they must operate five or more days a week. Many programs voluntarily offer additional services based on specific cultural and ethnic needs in the community (Wellman et al., 2002).

The Oklahoma State Department of Human Services, Aging Services Division (OKDHS ASD) is the agency responsible for administering the Older Americans Act Nutrition Program in Oklahoma. Anyone who is 60 years of age or older (and spouse regardless of age) is eligible to participate in the congregate meal program. Participants in the home delivered meal (HDM) program must be homebound and unable to prepare their own meals. The home delivered meal program ensures nutrition, but participants miss out on the social benefit of the congregate meal sites. There is no income requirement to participate (Older Americans Act, 1993). According to 2003 data collected by the Oklahoma Department of Human Services, Aging Services Division, approximately 3% of the older population in Oklahoma receives home delivered meals and approximately 5% participates in the congregate meal program.

All participants in the Oklahoma OAANP complete or receive assistance with completing the Nutrition Screening Initiative (NSI) “Determine Your Nutritional Health Checklist.” The DYNH checklist is a screening tool used by community agencies, educators, and service providers to screen older adults for risk of malnutrition. The use of the Nutrition Screening Initiative (NSI) is part of a national effort to identify and treat nutritional problems among older persons. The NSI DYNH checklist contains a list of statements that relate to ten warning signs of poor nutritional health in older adults. Based on the DYNH score, older adults are categorized as being at low, moderate or high nutritional risk. This tool is expected to increase the consciousness level of both professionals and the public regarding nutrition (Finn, 1990). In addition to the DYNH checklist, demographic data is collected on all Oklahoma OAANP participants.

There are currently minimal interventions available for Oklahoma OAANP participants who score at high nutritional risk based on the DYNH checklist. Results obtained from the DYNH checklist can provide insight into additional programs and services needed by Oklahoma OAANP participants' to reduce nutritional risk and maintain independence.

## Purpose and Objectives

### Phase I

The purpose of Phase I is to investigate characteristics associated with the DYNH checklist among Oklahoma OAANP meal participants. The specific objectives of Phase I are to:

1. Identify characteristics of Oklahoma OAANP participants.
2. Determine if there are significant differences in DYNH checklist scores by age, gender, race, geography, poverty level, living arrangement and meal type among Oklahoma OAANP participants.
3. Determine if there are differences in response rates to select DYNH checklist statements by Oklahoma OAANP participants.

### Phase II

The purpose of Phase II is to further delineate factors associated with select DYNH checklist statements with high response rates by Oklahoma OAANP participants. The specific objectives of Phase II are to:

1. Further delineate factors associated with select DYNR checklist statements with high response rates by Oklahoma OAANP participants.

2. Identify factors associated with select DYNR checklist statements with high response rate by Oklahoma OAANP participants.

### Null Hypotheses

#### Phase I

Ho1: There will be no significant difference in DYNH checklist scores by age, gender, race, geography, poverty level, living arrangement or meal type among Oklahoma OAANP participants.

Ho2: There will be no difference in response rates to select DYNH checklist statements by Oklahoma OAANP participants

#### Phase II

Ho3: There will be no factors significantly associated with select DYNR checklist statements with high response rates by Oklahoma OAANP participants.

### Assumptions

1. Oklahoma OAANP participants will complete the evaluation and demographic questionnaires honestly.

### Limitations

1. Oklahoma OAANP participants will answer the evaluation and demographic questionnaires based on their perceptions.

2. The data is only representative of Oklahoma OAANP participants. It does not represent older adults not participating in the Oklahoma OAANP.

### Definitions

1. The DYNH Checklist is a 10-question screening tool used to identify characteristics associated with nutritional risk in the elderly.
2. The DYNH checklist defines high nutritional risk as a score of 6 or higher.
3. The DYNH checklist defines moderate nutritional risk as a score of 3 to 5.
4. The DYNH checklist defines low nutritional risk as a score of 2 or lower.
5. An Oklahoma OAANP congregate meal participant is:
  - a. persons 60 years of age or older and their spouses of any age;
  - b. disabled persons under 60 years of age who reside with persons over 60 years of age, when the care and maintenance of the disabled person otherwise prevents the older person from participating in the program and when the participation of such individuals does not prevent the participation of older persons and their spouses. The disabled person must accompany the eligible older participant to the site and must be judged by the nutrition project management to pose no threat to the well being of the older participants;
  - c. disabled persons under 60 years of age who reside in housing facilities occupied primarily by older persons and at which congregate nutrition services are provided, when the participation of such individuals does not pose a threat to the

well being of the older participants and when such participation does not prevent the participation of older persons and their spouses;

- d. persons under 60 years of age who provide meal related volunteer services when the participation of such individuals does not prevent the participation of older persons and their spouses;
- e. staff members of the nutrition program who are 60 years of age or older when such participation does not prevent the participation of other older persons and their spouses.

- 6. An Oklahoma OAANP defines a home delivered meal participant as a person who is:
  - a. age 60 years or older who are disabled, homebound (unable to leave home without the assistance of another person), and who have no one available to provide assistance with meal preparation, or
  - b. disabled, under age 60 years who reside with eligible participants, or
  - c. spouse of home delivered meals participant, if, according to Area agency on Aging criteria, receipt of the meal is in the best interest of the participant.

## CHAPTER II

### REVIEW OF LITERATURE

#### Older Population in the United States

The United States is confronting an unprecedented “graying” of the population that will unquestionably dominate societal structure in the new millennium (Rousseau, 2000). The average life expectancy at birth in 1900 was 47 years. It is currently 75 years of age. Statistics reveal that 80% of all deaths occur after age 65 (Kerschner & Pegues, 1998). The 65-year-old age group and older comprised about 13% of the U.S. population in 2000, and is expected to increase to 70 million, or 20% of the population, by 2030 (American Dietetic Association, 2002). Johnson and colleagues predict an increase from 1.6% to about 2.5% of the population 85 years and older by the year 2030 (Johnson et al., 2002). One of the results of the demographic shift is that increasing numbers of older people will face the possibility of many years of chronic disability from health disorders such as arthritis, diminished hearing or visual acuity, hip fracture, and osteoporosis.

#### Nutritional Status of Older Adults

The American public, health professionals, and policy makers generally agree that nutrition directly affects health (White et al., 1991). Many elderly persons do not eat adequately because 1) they cannot afford to do so; 2) they lack the skills to select and prepare nourishing and well-balanced meals; 3) they have limited mobility which may impair their capacity to shop and cook for themselves; and 4) they have feelings of

rejection and loneliness which obliterates the incentive necessary to prepare and eat a meal alone (Wellman et al., 2002). Prime risk factors for malnutrition can be categorized within quality of life domains and include disease, eating poorly, tooth loss and/or mouth pain, economic hardship, reduced social contact, multiple medicines, involuntary weight loss and/or gain, need for assistance with self care, and being over the age of 80 years (American Academy of Family Physicians, 2003).

Looking at the most recent surveys of dietary status of older adults, there is reason for concern. Many elderly are at high nutritional risk due to consuming too few calories, calcium, vitamin E, magnesium, zinc (Weimer, 1997), and vitamin D (Moore et al., 2004). For example, approximately sixteen percent of the elderly population consume less than 1,000 kcal/day (Koughan & Atkinson, 1993). Men consumed eighty percent of the RDA for calories and women consumed a mere seventy-three percent of the RDA for calories. In a 1985 report by Lipschitz and colleagues, thirty-six percent of meal recipients were at risk for protein-energy malnutrition (Lipschitz et al., 1985). With regard to vitamin D, less than 10% of people aged 51 to 70 years of age and no more than two percent of people of 70 years met vitamin D requirements from food sources alone (Moore et al., 2004). Adding to this problem, the skin atrophy occurs with increased age, causing a vitamin D deficiency due to reduced capacity to form calciferol in the skin (Van Grevenhof & Funderburg, 2003). Calcium deficiency can also lead to poor vitamin D status in the elderly. Results from the National Health and Nutrition Examination Surveys (NHANES III) indicate that the consumption of calcium by elderly people falls below the Healthy People 2010 objective (Ervin & Kennedy-Stephenson, 2002).



In addition to deficiencies, there are many problems associated with consuming excesses. The elderly are consuming excessive amounts of fat, saturated fat, cholesterol, and sodium. Elderly men and women have been eating approximately thirty-four to forty-one percent of their total calories from fat (Weimer, 1997). These amounts exceed the Recommended Dietary Allowance. According to NHANES data for 2002, approximately forty-three percent of Oklahomans over the age of 65 report having hypertension and at least thirteen percent reported being obese (National Center for Health Statistics, 2004). In 2002, Oklahoma was ranked thirty-ninth out of fifty states for risk associated with heart disease (United Health Foundation, 2002).

#### Role of Nutritional Status of Older Adults in the United States

A person's nutritional behavior or state affects his or her well-being (Molis, 1990). Nutritional well-being contributes to health, productivity, self-sufficiency, and quality of life in older adults from the young-old to the oldest-old (Weddle & Fanelli-Kuczarski, 2000). Better nutritional care can improve quality of life, facilitate aging in place, promote health, and improve outcomes when people are ill or injured. Proper nutritional status in older adults benefits both the individual and society. Proper nutritional status improves health, decreases dependence, reduces recuperation from illness, and contains utilization of health care resources (Weddle et al., 1996). Proper nutritional status can shorten hospital stays and delay entry into nursing homes (Wellman, 1994). The well-nourished patient can better tolerate treatment, experiences fewer postoperative complications, and recovers more quickly from illness (Finn, 1990).

Malnutrition is a problem among the elderly. Older adults are more likely to have significant health consequences related to the foods they eat or choose not to eat (Litchford, 2004). Although most people recognize the importance of eating a nutritious diet, 85% of the elderly have diseases and illnesses that are nutrition related and preventable (Lyman & Marquardt, 1997).

Research shows that 85% of the diseases and illnesses in the elderly are preventable with proper nutrition (Cope, 1994). Current literature suggests that older adults are at disproportionate risk for malnutrition compared with the general population (Vailas, et al, 1998). Reduced nutritional status in older adults increases disease risks and severity, and leads to more frequent or longer hospital stays (Vailas et al, 1995). Normal and pathological changes that occur with aging can decrease food intake and impair nutrient absorption and use (Russel, 1992). Undernourished seniors have the following characteristics; they are more likely to be female, be depressed, have lower educational levels, do not wear dentures, receive no help in meal preparation, take a large number of medications, and are less likely to follow up with medical care (Rahman, 2001).

#### Older Americans Act Nutrition Program

The Older Americans Act (OAA) created the Elderly Nutrition Program (ENP) in 1965. On a national level, the US Department of Health and Human Services Administration on Aging administers the program. In Oklahoma, OKDHS ASD administers the program to a network that consists of eleven area agencies on aging and 23 nutrition projects. There are approximately two hundred and seventy-seven meal sites

providing nutritious meals and links to other aging-related services. According to Roy Keen, Director, OKDHS ASD, the OAANP in Oklahoma provides approximately 4.4 million meals to 35,000 people yearly.

The OAANP provides nutritious meals that contain one-third of the Recommended Dietary Allowances for all persons over 60 years of age; however, it targets those in greatest economic or social need. It is the largest community nutrition program provided for older people in the United States. The OAANP is particularly beneficial for populations like low-income and ethnic minorities who are more likely to be at nutritional risk (Weddle & Finelli-Kuczmariski, 2000). The OAANP maintains two major service delivery systems: one that provides community-based services to the ambulatory older population and one that provides services to frail, homebound elderly persons (Millen et al., 2002). Although one of the main objectives of the OAANP is to provide a nutritious, low cost meal, the program is “more than a meal.” Other purposes of the program include decreasing malnutrition, preventing physical and mental deterioration, promoting health, reducing social isolation, and linking older adults to social and rehabilitative services (Wellman et al., 2002). The OAA designed the ENP to delay premature institutionalization for the older adult by providing opportunities for social contact and improved nutritional intake (Kretser et al., 2003).

### Impact of the Older Americans Act Nutrition Program on Participants

The OAANP's are successful public-private partnerships that unite local communities to better serve the large aging population. Services are well targeted and serve a large

amount of people who are at high nutritional risk, have high incidences of chronic disease, and have higher losses of functional ability (Podrabsky, 2002). The program has been found to be cost-efficient. Direct funding accounts for only twenty-three percent of the home delivered meals and thirty-seven percent of the congregate meals. Participant donations and/or other public or private sources generate the remainder of the funding. For every dollar in federal funding, there is \$1.70 leveraged for congregate meals and \$3.55 leveraged for home delivered meals (Millen et al., 2002). Donna Shalala, former HHS Secretary, has been quoted, “These programs (OAANP) are a bargain for federal government” (Nation’s Health, 1996).

The basis for success of the OAANP is the fact that proper nutrition is necessary to maintain cognitive and physical functioning; to reduce and manage chronic disease and disease-related disabilities; and to sustain health and quality of life (Wellman et al., 2002). The effectiveness of the program is well documented. Studies have shown that people who participate in the OAANP benefit not only by improving nutrient intake, but by improving socialization (Podrabsky, 2002). The Administration on Aging confirms this claim and states that the program improves nutritional intakes of elderly people, increases socialization, provides nutrient dense meals, and supplies more than 33% of the RDA’s, and about 40-50% of most nutrients (Administration on Aging, 2003). In addition, it improves the nutritional status of the homebound participants, minorities, and persons with diabetes. The home delivered, nutrient dense meals also promote healthy serum albumin levels and reduce the risk of re-hospitalization (Wellman et al., 2002).

## “Determine Your Nutritional Health” Checklist

Nutrition screening, the process of identifying individuals at nutritional risk with malnutrition, is critical not only to cost effective medical nutrition therapy, but also to helping community dwelling older adults maintain their independence and personal well-being (Weddle & Finelli-Kuczmariski, 2000). Currently the OAANP in Oklahoma uses the “Determine Your Nutritional Health Checklist (DYNH)” to screen and identify congregate and home delivered meal program participants who may be at nutritional risk. This tool identifies persons with poor nutritional status, identifies appropriate interventions and monitors progress.

The DYNH checklist was designed after the United States Surgeon General mandated that nutrition screening lead to interventions promoting good nutritional status and would result in improved overall health and enhanced quality of life (Sharkey & Haines, 2001). A Blue Ribbon Advisory Committee consisting of 30 professional organizations designed the screening tool. The committee believed that the first step in improving nutritional care was identifying those individuals at risk of malnutrition (Tonore & Bivona, 1992). With this in mind, the committee used three key considerations for developing the tool including applicability, ease of performance, and cost effectiveness (Lipschitz et al., 1992).

The “Determine Your Nutritional Health” tool, developed in 1990, contains a checklist of 10 statements that are used by community agencies, educators and service providers to identify nutrition risk for malnutrition in older individuals: having an illness or condition that changes the amount of food eaten; eating fewer than two meals per day; eating few fruits, vegetables and dairy products; having three or more drinks of beer,

liquor, or wine almost every day; having tooth or mouth problems that make it hard to eat; not always having enough money to buy foods; eating alone; taking three or more prescribed or over-the-counter drugs per day; losing or gaining 10 pounds without wanting to in the last six months; and not being able to shop, cook, and feed self (Tonore & Bivona, 1992). The goal of the Level I screening tool is to identify older persons who may need preventive services such as congregate or home delivered meals or other services (Lipschitz et al., 1992).

Each statement on the screening tool is assigned points ranging from 1 to 4, depending on the contribution to nutritional risk conferred by the risk indicator alluded to in the item. Respondents circle the points corresponding to the item if they agree to the statement. The total possible points is 21; higher scores indicate greater nutritional risk (Vailas et.al., 1998). The DYNH score identifies categories for older adults at low, moderate or high nutritional risk. Cumulative scores of 0, 1, or 2 points fall into the low nutritional risk category. Cumulative scores of 3, 4, or 5 fall into the moderate nutritional risk category. Cumulative scores of 6 or higher fall into the high nutritional risk category (Millen-Posner et al., 1993).

#### Factors Associated with High Nutritional Risk among Older Adults

##### Having an illness or condition that changes the kind and amount of food eaten

Diseases or conditions that have nutritional implications and increase the risks of malnutrition are very common in elderly persons (Dwyer, 1993). Most older adults experience one or more chronic diseases (Millen et al., 2002). It is estimated that 85% of

non-institutionalized older persons have one or more chronic conditions that could improve with proper nutrition (Posner et al., 1993). Nine out of ten people who have chronic diseases have a condition that could be improved with nutrition intervention (Crippen, 2003).

Any disease or chronic condition which causes persons to change the way they eat, or makes it hard for them to eat puts their nutritional health at risk (American Academy of Family Physicians, 2003). Disease or chronic illness that requires dietary changes may affect not only how a person eats, but, how much he eats (Herndon, 1995). Chronic illness can affect nutritional status and poor nutritional status can aggravate chronic illness. Chronic disease and the adverse effects of malnutrition have an impact on disease processes (White et al, 1991). Malnourished older Americans get more infections and diseases, their injuries take longer to heal, surgery is riskier, and their hospital stays are longer and more expensive (American Academy of Family Physicians, 2003). Since illness starts at the cellular level, and the food we eat nourishes the body at the cellular level, good nutritional status must be considered a vital sign of good health (Cope, 1994). The bad news is that many chronic diseases are caused by poor nutrition and poor food choices. The good news is that nine out of ten people with chronic disease have a condition that could be improved with nutrition intervention (White, 2003). And, we know that proper dietary behavior has been associated with preventing some of the nation's leading causes of death and disability, including coronary heart disease, hypertension, diabetes, osteoporosis, renal disease, and some cancers (Millen et al., 2001).

### Eating Fewer Than Two Meals Per Day

Eating too little can lead to poor nutritional health. One in five adults skip meals each day (American Academy of Family Physicians, 2003). A study was conducted in Northwest Indiana to determine the nutritional status of Meals on Wheels' participants. The study found that twenty-eight percent of the meal participants ate less than two meals per day (Herndon, 1995). Another study conducted in 1995 indicated that twelve percent of the elderly meal participants in Washington State ate fewer than two meals per day (Zylstra et al., 1995). Spangler and Eigenbrod found that eating fewer than two meals per day was correlated positively with the response of eating few fruits, vegetables, or milk products; having tooth or mouth problems; having insufficient money for food; and having physical inability to shop, cook, and/or feed self (Spangler & Eigenbrod, 1995). And finally, a study of persons over 65 years of age in a nursing home found that those residents who skipped meals had a lower body mass index, lower energy and protein intake, and a higher prevalence of negative protein balance (Beck & Ovesen, 2004).

### Eating Few Fruits, Vegetables, or Milk Products

Research has indicated that a relationship exists between nutritional risk and eating few servings of fruits and vegetables daily (Koughan & Atkinson, 1993). Diets high in fruits, vegetables, and calcium are linked to decreased risk of cancer, heart disease, hypertension, macular degeneration, stroke, diabetes, and constipation. The phytochemicals found in fruits and vegetables have been associated with the prevention



and/or treatment of many of the leading causes of morbidity and mortality in this country (Bernstein et al., 2002).

Approximately eighty-five percent of Oklahomans consume less than five servings of fruits and vegetables per day (National Center for Chronic Disease Prevention and Health Promotion, 2003). Older adults consume fewer than the recommended servings of fruits and vegetables as described in the 2005 Dietary Guidelines for Americans and thus may not receive the health promoting benefits associated with adequate consumption. In a recent study of the amount of fruits and vegetables consumed, Oklahoma “failed” in the category of eating “five or more fruits and vegetables” per day (O’Neill & Patrick, 2002). Of those Oklahomans aged 65 and older, 27% eat fewer than three servings of fruits and vegetables per day; of the 65-74 year olds, 28% consume fewer than three servings of fruits and vegetables per day; and of those Oklahomans over the age of 75, 26% consume fewer than three servings of fruits and vegetables per day (National Center for Health Statistics, 2004).

Skeletal fragility at the end of life span is a major source of morbidity and mortality (Power et al., 1999). To avoid skeletal depletion, adults, especially the elderly, need to maintain a state of calcium balance by ingesting an adequate amount to offset their losses (Wardlaw, 1993). A study of elderly persons showed that the majority of the persons surveyed did not meet current recommendations for dairy product intakes. About thirty percent of the participants consumed less than one serving of milk per week. Only twenty percent of those in their 60’s and thirty percent of those in their 80’s and 100’s consumed the recommended two servings of dairy products per day (Fischer et al., 1995).

### Having Three or More Drinks of Beer, Liquor or Wine Every Day

According to 2003 data from the Behavior Risk Factor Surveillance System and National Center for Chronic Disease Prevention and Health Promotion, 56% of Oklahomans have had at least one drink of alcohol in the past thirty days.

Alcohol abuse and dependence among older adults is often undetected and underreported. It is estimated that 2.5 million older adults are affected by alcohol abuse (Weddle & Finelli-Kuczmariski, 2000). Although usually considered a minor indicator of poor nutritional status (Fishman, 1994), alcoholism is inevitably accompanied by poor nutritional status (Ham, 1994). Not only does alcohol hinder absorption and digestion, it often takes the place of more nutrient dense foods. Many health problems become worse if a person drinks more than one or two alcoholic beverages per day (American Academy of Family Physicians, 2003).

### Having Tooth or Mouth Problems That Make It Hard to Eat

Oral health and nutrition have a synergistic relationship. A healthy mouth, teeth, and gums are needed to eat (Wellman et al., 1997). Oral health problems impair food intake, diet quality, and socialization (Tonore & Bivona, 1992). According to an American Association of retired Person (AARP) study in 2001, approximately twenty-five percent of Oklahomans have six or more teeth lost due to decay or gum disease. Study results show that dental health is closely associated with nutritional status and suggest that status of dentition should be considered in nutritional assessment (Bailey et al., 2004).

Dental health can have a major impact on quality of life, health status and longevity (Sahyoun & Krall 2003). Participants who have persistent oral health problems

unquestionably have a greater disease burden (Bailey et al., 2004). Oral infectious diseases, as well as acute, chronic, and terminal systemic diseases with oral manifestations, impact functional ability to eat as well as diet and nutrition status (American Dietetic Association, 2003).

One of the most common oral problems in the elderly is poor dentition (Litchford, 2004). Tooth loss is a determinant for undernutrition for elders (Bermudez & Dwyer, 1999). Loss of teeth results in impaired chewing ability and avoidance of foods that are difficult to chew. These consequences may ultimately lead to clinically important outcomes such as poor diet quality and poor nutritional status because of difficulty chewing foods such as fruits and vegetables, and nutrient dense whole grains (Sahyoun & Krall, 2003). According to the National Center for Health Statistics, 30% of those Oklahomans over the age of 65 are edentulous, 25% of those aged 65-74 years are edentulous, and 36% of those over 85 years of age are edentulous (National Center for Health Statistics, 2004). In addition to loss of teeth, atrophy of oral muscles due to disuse or weakness, and reduction of saliva due to chronic illness or medication may impair chewing ability (Litchford, 2004). Anatomic and functional changes in the mouth, throat, and gastrointestinal tract which occur with aging affect how food and nutrients are ingested, absorbed, and metabolized (Litchford, 2004).

#### Not Having Enough Money to Buy Food

According to the 2000 Census Data, about 3.4 million elderly persons live below the poverty level. Poverty is a strong indicator of nutrition risk and food insecurity of older

adults (Weddle & Finelli-Kuczmariski, 2000). All elderly individuals, regardless of income level, can be at risk for poor nutrition; however, limited economic resources can further increase their risk (Guthrie, 2002). Poverty alone cannot precipitate a nutritional deficiency, but it may affect a person's ability to obtain an adequate diet (Weimer, 1997).

An estimated 2.5 million elderly persons may suffer from food insecurity during any six-month period (American Dietetic Association, 1996). Approximately 40% of older Americans have incomes of less than \$6,000 per year, which is much lower than the U.S. Poverty Guidelines. Limited income and poverty affect the ability to purchase nutritious foods in adequate quantities (Weddle & Fanelli-Kuczmariski, 2000). Low levels of energy intake from low-income elderly have been previously found to be a risk factor for poor diet (Guthrie, 2002). Having less, or choosing to spend less than \$25-\$30 per week for food makes it very hard to get the foods you need to stay healthy (American Academy of Family Physicians, 2003). Many older individuals often have to choose between paying the rent or other bills, buying medications, or buying food (Duff, 1995).

### Eating Alone Most of the Time

In Oklahoma, 30% of those aged 65 and older live alone, 24% of those aged 65-74 live alone, 42% of those aged 75 and older live alone, 38% of those aged 75-84 live alone, and 51% of those 85 years and older live alone (Quigley & Hermann, 2005). Older adults who live alone are particularly vulnerable to poverty, social isolation, diminished psychological well-being, and adverse health conditions (Charlton, 1999). It appears that living and/or eating with others and having broader social support are linked to better nutritional outcomes, at least in the general elderly population (Sharkey &

Haines, 2001). Social isolation affects eating because eating is both a personal care behavior and a social event (Tonore & Bivona, 1992). Studies have shown that there is a relationship between eating alone and nutritional risk (Koughan & Atkinson, 1993). Eating alone leads to eating fewer regularly scheduled meals, using convenience foods more often, and reducing the amount and the variety of food eaten (Charlton, 1999). Elderly adults living alone are more likely to experience hunger than households with more than one elderly member (Dausch, 2003).

Older persons, especially women, may have to deal with loneliness and isolation as a result of the death of a spouse and the fear of outliving their financial resources (Kerschner & Pegues, 1998). In addition, older people who live alone are more likely to be institutionalized as age increases (Tonore & Bivona, 1992). It is not surprising the societal infrastructures are inadequate to deal with the nutritional and other problems faced by the increasing numbers of very old, chronically ill and frail citizens (Dwyer, 1993).

#### Taking Three or More Prescribed or Over-The-Counter Drugs Per Day

Medication use is common in the elderly (Tonore & Bivona, 1992). The average elderly person takes four prescription drugs daily (Podolsky, 1992) and according to 1988-1994 NHANES data, 51% of those aged 65-74 use two or more prescription drugs, and 12% use five or more. For those aged 75 and older, 60% use two or more prescription drugs and 16% use five or more prescription drugs. Medications can often play a role in nutritional status. Drug-to-drug interactions and drug-to-nutrient interactions can affect nutritional status and appetite. Poor nutritional status can alter

drug absorption, metabolism, or use (Cope, 1994). Many prescription and over-the-counter medications can interfere with absorption and utilization of water-soluble vitamins and, to a lesser degree, of fat-soluble vitamins, which are better stored in the body (Ahmed, 1992).

To further complicate things, growing old may change the way the body responds to drugs (American Academy of Family Physicians, 2003). Anorexia is commonly medication-induced, but chronic and acute medication use, have many more subtle effects on nutrition (Ham, 1994). Polypharmacy, or the use of multi-medications, has been documented as affecting well-being, health and independence of older adults. Taking three or more prescriptions is one of the strongest food insecurity indicators and the cost of prescriptions can affect an elderly person's ability to purchase foods (Weddle & Fanelli-Kuczmariski, 2000).

### Losing or Gaining Weight Without Wanting To

Weight loss has been shown to be predictive of nutritional deterioration among older people. Unintentional weight loss may be an indicator of individuals at nutritional risk. (Shahar et al, 2001). Involuntary weight loss is frequently observed in the older population and can be an indicator of significant decline in health and function. Both low body weight and unintentional weight loss have been shown to predict increased morbidity and mortality in the elderly population (Reife, 1995). A five percent involuntary weight loss over one month is associated with almost five times greater one-year mortality (Johnson, 2001). Involuntary weight loss can lead to muscle wasting,

decreased immunocompetence, depression, and an increased rate of disease complications (Huffman, 2002).

It has been estimated that 13% of patients experience involuntary weight loss (Saffel-Shrier, 2003). A significantly low weight for height measurement or a body mass index of lower than 22 or higher than 27 is a significant indicator of poor nutrition (Tonore and Bivona, 1992). In addition, subjects with a low body mass index are at a greater risk for functional impairment (Galanos et al., 1994).

Weight gain can also have profound consequences in the elderly. Obesity in older adults is a serious nutritional risk and has profound functional and psychosocial consequences (Weddle & Fanelli-Kuczmariski, 2000). At times, weight gain is also recommended. A five percent weight gain in previously malnourished institutionalized elderly persons is associated with decreased morbidity and mortality. Obesity in older adults is associated with coronary artery disease, hypertension, and diabetes mellitus, as well as degenerative joint disease, hepatic steatosis, gallbladder disease, gout, proteinuria, pulmonary function impairment, some cancers, and possibly immune dysfunction (Johnson, 2001). In addition, elevated body mass index (BMI) strongly predicts risk for symptomatic knee osteoarthritis in elderly women (Johnson, 2001).

#### Ability to Shop, Cook, and/or Feed Self

Chronic conditions may also affect eating and food procurement or make food preparation difficult (White et al., 1991). Inability to shop and/or cook places another barrier to achieving good nutrition (Herndon, 1995). Lack of physical mobility to shop

and prepare food and lack of transportation and proximity to food stores also contributes to food insecurity (Wolf et al., 1996). Research has indicated that difficulty shopping for food, having difficulty with meal preparation, and eating fewer than two meals per day are linked to nutritional risk (Sharkey, 2002). Functional disabilities can prevent or alter the ability of older persons to obtain, prepare, and consume food and many older persons need help with shopping, preparing meals, and eating (Kelsheimer & Hawkins, 2000). In a recent study of Meals on Wheels participants “Physical acquisition of food-transportation, walking, lifting, preparing-was the primary issue”. Common areas of difficulty involve cutting food and opening containers (Kelsheimer & Hawkins, 2000).

### Functional Dependency

Functional dependency is another cause for concern among the elderly. In 1997, more than half of the older population reported having at least one disability, and over one third reported at least one severe disability (Administration on Aging, 2002). Impaired functional status is negatively associated with quality of life (Vailas et al., 1998). Approximately 23% of the elderly have difficulties with one or more activities of daily living; bathing, dressing, toileting, continence, feeding, and mobility. Twenty-eight percent have difficulty with one or more instrumental activities of daily living; shopping, preparing meals, taking medication, handling finances, etc. Twenty-five percent of Oklahoma’s senior population has difficulties with self-care or mobility (Bernard & Brandt, 2003). Deficits in any of these areas of function have long been considered as risk factors for malnutrition in the elderly (Chen et al., 2001). In addition, functional



impairments have a significant relationship with food insecurity (Lee & Frongillo, 2001). A change in functional status is also an important sign of developing frailty and may even herald the onset of severe, acute, life-threatening illness (Ham, 1994). The greatest strength of evidence for an increased risk in functional status decline was found for cognitive impairment, depression, disease burden (comorbidity), increased and decreased body mass index, lower extremity functional limitation, low frequency of social contacts, low level of physical activity, no alcohol use compared to moderate use, poor self-perceived health, smoking and vision impairment (Stuck et al., 1999).

### Depression

Changes in mental status can have a profound impact on elderly patients and their families. Elderly people with diminished cognitive function and diminished self care ability have more than two times higher risk of being at nutritional risk (Pearson et al., 2001). Two of the cognitive changes include cognitive decline and depression (Miller et al., 2000).

Depression is considered the most common emotional problem of advanced age (Ryan & Shea, 1996). Depression increases morbidity and mortality (Miller, et al., 2000). Depression is an important issue for older adults because it is associated with poor or declining health, functional and cognitive status, loss of independence, bereavement, and reduced income (Hybels, et al., 2001). Reasons for depression in the elderly stem from multiple losses, including deaths of spouses/friends, impaired physical functioning, loss of independence, and lack of a sense of purpose (Ryan & Shea, 1996). Depression in

older adults can also increase risk for disability in the activities of daily living. The increased risk is partly explained by less physical activity and fewer social interactions among depressed people (Weddle & Finelli-Kuczmariski, 2000).

Depression is often associated with reduced nutrient intake. Because depression causes loss of self-worth, indecisiveness, and cognitive loss, the presence of depression leads to a downward spiral of diminished nutrition and reduced ability to organize, choose, and take in nutrients (Ham, 1994). To compound problems, weight loss and constipation are more frequent symptoms of depression in the old.

## CHAPTER III

### **Factors Associated with High Nutrition Risk Among Oklahoma Older Americans Act Nutrition Program Participants**

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**ABSTRACT.** Factors associated with nutritional risk among 18,488 Oklahoma Title III congregate and home delivered meal participants were evaluated using the “Determine Your Nutritional Health” (DYNH) checklist. Eighteen percent of congregate and 42% of home delivered meal participants scored at high nutritional risk. Significant differences were observed in DYNH scores among participants based on age, gender, race, geographic location, poverty level, living arrangement and type of meal received. Differences were observed in Oklahoma Older Americans Act Nutrition Program participants’ responses to DYNH checklist statements by nutritional risk. The results of this study indicate potential problem areas for targeting programs and services to reduce high nutritional risk among Oklahoma Older Americans Act Nutrition Program participants.

**KEYWORDS.** Elderly, Older Americans Act, Elderly Nutrition Program, congregate meals, homebound meals.

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## INTRODUCTION

The United States is facing an unparalleled “graying” of the population that will unquestionably dominate societal structure in the new millennium (Rousseau, 2000). In fact, the number of older people in the United States has increased dramatically; from 1 million in 1870 up to 35 million in 2000 (Moody, 2002). By 2030, the proportion of people over 65 years of age in the United States is predicted to reach 20% (Moody, 2002). This rate of growth in the older population is unprecedented in human history.

As people age, they become at greater risk for nutritional deficiencies. In fact, older adults are at a disproportionate risk for malnutrition compared to the general population (Vailas et al., 1998). Aging increases the probability of poor nutrient intakes and the risk for adverse health events (White et al., 1992). Reduced nutritional status in older adults increases the risks, severity, and complications of disease, and leads to more frequent or longer hospital stays (Vailas et al., 1995). In addition, declining nutritional status is one of the many reasons older adults lose their independence (Litchford, 2004).

The American public and many health professionals agree that nutrition directly affects health (White et al., 1991). Nutritional well-being contributes to health, productivity, self-sufficiency, and quality of life in older adults from the young old to the oldest old (Weddle & Fanelli-Kuczmariski, 2000). In addition, good nutritional status in older adults benefits both the individual and society; health is improved, dependence is decreased, time required to recuperate from illness is reduced, and use of healthcare resources is contained (Van Grevenhof & Funderburg, 2003).

The Older Americans Act Nutrition Program (OAANP), is a community-based program that provides partial funding for congregate and home delivered meals for people over 60 years of age. The Older Americans Act funds forty-four percent of the cost of the congregate meal program and thirty percent of the home delivered meal program. In addition to federal funding, support is leveraged by state and local monies and participant donations (Wellman et al, 2002). The OAANP is highly cost-efficient. For every dollar of federal funding, \$1.70 is leveraged for congregate meals and \$3.55 is leveraged for home delivered meals. This allows the OAANP to expand its services to at least two times the level that federal funding can provide alone (Millen et al., 2002).

The OAANP is intended to decrease malnutrition, prevent physical and mental deterioration, promote health, reduce social isolation, link older adults to social and rehabilitative services, and provide low-cost nutritionally sound meals (Wellman et al., 2002). Specific program goals are the provision of low-cost nutritious meals, social contact, nutrition screening and education, information and linkages to other support programs and services, counseling, shopping assistance, transportation, and volunteer services. The OAANP meals provide at least one meal a day that meets a third of the Recommended Dietary Allowances (RDA) for this age group and must operate five or more days a week. Many programs voluntarily offer additional services based on specific cultural and ethnic needs in the community (Wellman et al., 2002). Anyone who is 60 years of age or older (and spouse regardless of age) is eligible to participate in the congregate meal program. Participants in the home delivered meal (HDM) program must be homebound and unable to prepare their own meals. The HDM program ensures nutrition, but participants miss out on the social benefit of the congregate meal sites.

There is no income requirement to participate in either the congregate or HDM program (Older Americans Act, 1993).

In Oklahoma, the Oklahoma Department of Human Services (OKDHS), Aging Services Division (ASD) administers the Oklahoma OAANP to a network that consists of eleven area agencies on aging and 23 nutrition projects. There are approximately two hundred and forty-seven meal sites providing nutritious meals and links to other aging-related services. The Oklahoma OAANP provides approximately 4.4 million meals to 35,000 people yearly.

The purpose of this study was to investigate characteristics and factors associated with high nutritional risk of Oklahoma OAANP participants. Currently there are minimal interventions for Oklahoma OAANP participants who score at high nutritional risk based on the “Determine Your Nutritional Health (DYNH)” checklist. The results of this study will enable the Oklahoma Department of Human Services, Aging Services Division, to target nutrition education and services to meet program goals and participants’ needs to reduce nutritional risk and maintain independence.

## **METHODS**

### **Subjects**

Survey subjects were congregate and homebound participants over the age of 60 who received meals from the Oklahoma OAANP in 2003.

## **Instruments**

The OKDHS ASD is the administrative agency for the Older Americans Act, OAANP. Participants in the Oklahoma OAANP, both congregate and home delivered, complete or are assisted with completing the Nutrition Screening Initiative (NSI) “Determine Your Nutritional Health Checklist” (DYNH). The DYNH checklist is a screening tool used by community agencies, educators, and service providers to screen older adults for risk of malnutrition (White, et al.1991).

In addition to the DYNH checklist, OKDHS ASD collects demographic data on Oklahoma OAANP participants including age, gender, race, living arrangement, geography, poverty level, and type of meal received. Age categories were 60-69 years, 70-79 years, 80-89 years, and 90 years and above. Race categories include Caucasian, African American, Native American, Hispanic, Asian and Other. Living arrangements included living alone or living with others. Geographical categories include rural and urban. Poverty categories include above or below poverty. Types of meals received include congregate and home delivered meals.

The DYNH checklist is a 10 item instrument containing a list of statements that relate to ten warning signs of poor nutritional health in older adults: having an illness or condition that changes the amount of food eaten; eating fewer than two meals per day; eating few fruits, vegetables and dairy products; having three or more drinks of beer, liquor, or wine almost every day; having tooth or mouth problems that make it hard to eat; not always having enough money to buy foods; eating alone; taking three or more prescribed or over-the-counter drugs per day; losing or gaining 10 pounds without wanting to in the last six months; and not being able to shop, cook, and feed self (Tonore



& Bivona, 1992). The goal of the screening tool is to identify older persons who may need preventive services such as congregate or home delivered meals or other services (Lipschitz et al., 1992).

Each item on the screening tool is assigned points ranging from 1 to 4, depending on the contribution to nutritional risk conferred by the risk indicator alluded to in the statement. Respondents circle the “yes” response if they agree to the statement. The total possible points are 21; higher scores indicate greater nutritional risk (Vailas et al., 1998). Based on the DYNH checklist score, older adults are categorized as being at low, moderate or high nutritional risk. Cumulative scores of 0, 1, or 2 points fall into the low nutritional risk category. Cumulative scores of 3, 4, or 5 fall into the moderate nutritional risk category. Cumulative scores of 6 or higher fall into the high nutritional risk category (Millen-Posner et al., 1993).

## **Procedures**

This study utilized the 2003 Oklahoma OAANP participant archival DYNH checklist data and demographic data from the OKDHS ASD database. The data was collected in 2003 by Oklahoma OAANP staff as part of the procedures required by the OKDHS ASD.

## **Statistical Analyses**

Means, frequencies, independent t test and analysis of variance procedures were performed on Oklahoma 2003 OAANP DYNH checklist and demographic data using the Statistical Analysis System (SAS) for Windows, Version 9.1 (SAS Inst. Inc., Cary NC). Significance was set at the 0.05 level. T-test and analysis of variance procedures were

used to determine if there were significant differences in Oklahoma 2003 OAANP DYNH scores based on age, gender, race, geography, poverty level, living arrangement and type of meal received.

## **RESULTS**

### **Factors Associated With Nutritional Risk Among Oklahoma Older Americans Act Nutrition Program Participants**

Significant differences were observed in DYNH scores among Oklahoma OAANP participants based on age, gender, race, geographic location, poverty level, living arrangement and type of meal received (Table 1).

A significant difference in DYNH scores was observed by gender for all Oklahoma OAANP participants. For all participants and those who scored at low and moderate nutritional risk, females had significantly higher DYNH scores. For those who scored at high nutritional risk, males had significantly higher DYNH scores (Table 1).

A significant difference in DYNH scores was observed by race for all Oklahoma OAANP participants and those within each nutritional risk category. For all participants; the Others group had the highest DYNH scores, African Americans and Native Americans had the second highest DYNH scores, Caucasians and Hispanics had the second lowest DYNH scores and Asians had the lowest DYNH scores. For those who scored at low nutritional risk, the Others group had significantly higher DYNH scores than Caucasians and Native Americans. For those who scored at moderate nutritional risk

Others, Native Americans, African Americans, Caucasians and Hispanics had significantly higher DYNH scores than Asians. For those who scored at high nutritional risk Asians and Others had significantly higher DYNH scores than Native Americans (Table 1).

A significant difference in DYNH scores was observed by age group for all Oklahoma OAANP participants and those who were within the low and high nutritional risk categories. For all participants and those who scored at high nutritional risk the 60-69 year age group had significantly higher DYNH scores. For those who scored at low nutritional risk the 90+ year age group had significantly higher DYNH scores than the 60-69 and 70-79 year age groups. No significant difference was observed in DYNH scores by age group for those who scored at moderate nutritional risk (Table 1).

A significant difference in DYNH scores was observed by poverty level for all Oklahoma OAANP participants and those within the low and high nutritional risk categories. For all participants and those who scored at low and high nutritional risk, participants below the poverty level had significantly higher DYNH scores. No significant difference was observed in DYNH scores by poverty level for those who scored at moderate nutritional risk (Table 1).

A significant difference in DYNH scores was observed by geographic location for all Oklahoma OAANP participants and those within the high nutritional risk categories. For all participants and those who scored at high nutritional risk, those living in urban areas had significantly higher DYNH scores. No significant difference was observed in DYNH scores by geographic location for those who scored at low and moderate nutritional risk (Table 1).

A significant difference in DYNH scores was observed by living arrangement for all Oklahoma OAANP participants and those within the low and high nutritional risk categories. For all participants and those who scored at low nutritional risk, those living alone had significantly higher DYNH scores. For those who scored at high nutritional risk, those living with others had significantly higher DYNH scores. No significant difference was observed in DYNH scores by living arrangement for those who scored at moderate nutritional risk (Table 1).

A significant difference in DYNH scores was observed by type of meal received for all Oklahoma OAANP participants and those within the low and moderate nutritional risk categories. For all participants and those who scored at low and moderate nutritional risk, those receiving home delivered meals had significantly higher DYNH scores. No significant difference was observed in DYNH scores by type of meal received for those who scored at high nutritional risk (Table 1).

### **Older Americans Act Nutrition Program Participants Responses To Determine Your Nutritional Health Statements**

Differences were observed in Oklahoma OAANP participants' responses to DYNH checklist statements by nutritional risk. Thirty-seven percent of all participants, 7% of those who scored at low nutritional risk, 34% of those who scored at moderate nutritional risk and 69% of those who scored at high nutritional risk answered "yes" to the statement "I have an illness or condition that made me change the way I eat" (Table 2).

Five percent of all participants, 0% of those who scored at low nutritional risk, one percent of those who scored at moderate nutritional risk and 16% of those who scored at high nutritional risk answered “yes” to the statement “I eat less than two meals per day” (Table 2).

Ten percent of all participants, 3% of those who scored at low nutritional risk, 7% of those who scored at moderate nutritional risk and 21% of those who scored at high nutritional risk answered “yes” to the statement “I eat few fruits, vegetables or milk” (Table 2).

One percent of all participants, less than 1% of those who scored at low and moderate nutritional risk and 1% of those who scored at high nutritional risk answered “yes” to the statement “I have three or more drinks of beer, alcohol or wine” (Table 2).

Twelve percent of all participants, 1% of those who scored at low nutritional risk, 6% of those who scored at moderate nutritional risk and 31% of those who scored at high nutritional risk answered “yes” to the statement “I have tooth or mouth problems that make it hard for me to eat” (Table 2).

Eight percent of all participants, 0% of those who scored at low nutritional risk, 1% of those who scored at moderate nutritional risk and 24% of those who scored at high nutritional risk answered “yes” to the statement “I don’t always have enough money to buy the food that I need” (Table 2).

Fifty-four percent of all participants, 47% of those who scored at low nutritional risk, 46% of those who scored at moderate nutritional risk and 72% of those who scored at high nutritional risk answered “yes” to the statement “I eat alone most of the time” (Table 2).

Seventy-six percent of all participants, 57% of those who scored at low nutritional risk, 79% of those who scored at moderate nutritional risk and 89% of those who scored at high nutritional risk answered “yes” to the statement “I take three or more prescribed or over the counter drugs” (Table 2).

Nineteen percent of all participants, 1% of those who scored at low nutritional risk, 12% of those who scored at moderate nutritional risk and 45% of those who scored at high nutritional risk answered “yes” to the statement “I have lost or gained ten pounds without wanting to” (Table 2).

Fifty-five percent of all participants, 7% of those who scored at low nutritional risk, 66% of those who scored at moderate nutritional risk and 86% of those who scored at high nutritional risk answered “yes” to the statement “I am not always able to shop, cook, or feed myself” (Table 2).

## **DISCUSSION**

The Oklahoma OAANP served a higher proportion of females and persons living below poverty level than the 2000 Census data for Oklahoma. The Oklahoma 2000 Census data indicated that for the state as a whole; 49.1% were males, 50.9% were females and 14.7% lived below poverty level. Whereas, for the Oklahoma OAANP as a whole; 32% were male, 68% were female and 43% lived below poverty level.

The Oklahoma OAANP appeared to serve a diverse population representative of the state. The Oklahoma 2000 Census data indicated that 76% were Caucasian, 7.6% were African American, 7.9% were Native American, 5.2% were Hispanic and 1.4% were Asian. Among Oklahoma OAANP participants, 83% were Caucasian, 8% were African

American, 7% were Native American, less than 1% were Hispanic, and less than 1% were Asian. The slightly lower number of Native Americans being served by the Oklahoma OAANP may be attributed to the high number of Title VI Native American nutrition sites in Oklahoma. These data indicate additional outreach opportunities for the Oklahoma OAANP to Hispanic and Asian populations.

Factors associated with nutritional risk among 18,488 Oklahoma OAANP congregate and home delivered meal participants were evaluated using the “Determine Your Nutritional Health” checklist. The data indicated 18% of congregate participants and 42% of home delivered meal participants scored at high nutritional risk categories. The prevalence of high nutritional risk among Oklahoma OAANP congregate participants was lower than that reported by Weatherspoon, Worthen and Handu (2004).

Among Oklahoma OAANP participants who scored at high nutritional risk, those who were male, aged 60-69 years, lived below poverty level, lived in urban areas and lived with others had significantly higher DYNH scores. In addition, among those who scored at high nutritional risk, Asians and Others had significantly higher DYNH scores than Native Americans; however, no significant difference was observed in DYNH scores among those who scored at high nutritional risk by type of meal received.

It’s important to note that of those who scored at high nutritional risk, those who lived below poverty level and those 60-69 years of age had significantly higher DYNH scores than those living above poverty level and other age groups. Thus, Oklahoma OAANP participants living below poverty level and 60-69 years of age represent important groups for OKDHS ASD to target nutrition education programs and services. In addition, it’s important to observe that of those who scored at high nutritional risk, those who lived

with others had significantly higher DYNH scores, one explanation for this may be that these participants may need to live with other for additional assistance due to health problems.

However, among Oklahoma OAANP participants who scored at high nutritional risk, important differences are apparent between those with significantly higher DYNH scores and the proportion of participants who scored at high nutritional risk. For example, although males had significantly higher DYNH scores than females among those who scored at high nutritional risk; over two and a-half times as many females scored at high nutritional risk than males. In addition, although Asians and Others had significantly higher DYNH scores than Native Americans among those who scored at high nutritional risk; Asians and Others represent less than 1% of the Oklahoma OAANP participants who scored at high nutritional risk, whereas Native Americans represent 9% of participants who scored at high nutritional risk. Although of those who scored at high nutritional risk, participants living in urban areas had significantly higher DYNH scores than those living in rural areas; almost twice as many participants who scored at high nutritional risk lived in rural areas. Similarly, although among those who scored at high nutritional risk participants living with others had significantly higher DYNH scores than those living alone; almost twice as many participants who scored at high nutritional risk lived alone. No significant difference in DYNH scores was observed among those who scored at high nutritional risk by type of meal received; however, almost two and a-half times as many participants who scored at high nutritional risk received home delivered meals. Hence, OKDHS ASD must take into consideration not only significant differences in DYNH scores among those who score at high nutritional risk, but also the proportion



of participants within different demographic categories who could be reached when appropriating limited funds available for nutrition education programs and services.

Certain “Determine Your Nutritional Health” checklist statements stand out among Oklahoma OAANP participants who scored at high nutritional risk. Eighty-nine percent of those who scored at high nutritional risk answered “yes” to the statement “I take three or more prescribed or over the counter drugs.” Although the Oklahoma OAANP cannot change the number of medications participants are taking, it may be appropriate to provide programs and education addressing drug-nutrient interactions or drug-drug interactions. In addition, Oklahoma OAANP site managers or outreach workers could make appropriate referrals or assist participants in preparing the application for discount prescription cards through major pharmaceutical companies.

Eighty-six percent of those who scored at high nutritional risk answered “yes” to the statement “I am not always able to shop, cook, or feed myself.” Answering “yes” to this statement does not supply adequate information about the participants’ particular situation because the statement “I am not always able to shop, cook, or feed myself” poses three potential problems. Further research is needed in order to further delineate which areas within the statement poses problems.

In addition, seventy-two percent of those who scored at high nutritional risk answered “yes” to the statement “I eat alone most of the time.” Further research is needed to evaluate characteristics of those who answer “yes” to this statement to determine if there are programs or services the Oklahoma OAANP could provide to address this issue.

## **CONCLUSION**

Although scoring high on the “Determine Your Nutritional Health” checklist is not a complete determinant of high nutritional risk, it may certainly indicate potential problem areas and assist the Oklahoma Department of Human Services, Aging Services Division in targeting nutrition education programs or additional services. The results of this study indicate programs and services related to “taking three or more prescribed or over the counter drugs,” “ability to shop, cook and feed self” and “eating alone most of the time,” targeting those who score at high nutritional risk could be beneficial to reduce high nutritional risk among Oklahoma Older Americans Act Nutrition Program participants.

**Table 1. Oklahoma Title III Elderly Nutrition Program Participants  
Nutritional Risk Score by Sociodemographic Factors.**

Sociodemographic Factors	Total Sample n = 18,488		Low Nutritional Risk n = 5,122		Moderate Nutritional Risk n = 7,689		High Nutritional Risk n = 5,677	
	%	Score <sup>1</sup>	%	Score <sup>1</sup>	%	Score <sup>1</sup>	%	Score <sup>1</sup>
<b>Gender</b>								
Male	32	4.25±0.04 <sup>b</sup>	35	1.38±0.01 <sup>b</sup>	33	3.80±0.02 <sup>b</sup>	27	8.27±0.06 <sup>a</sup>
Female	68	4.57±0.03 <sup>a</sup>	65	1.42±0.01 <sup>a</sup>	67	3.86±0.01 <sup>a</sup>	73	8.02±0.04 <sup>b</sup>
<b>Race</b>								
Caucasian	83	4.31±0.02 <sup>c</sup>	88	1.40±0.01 <sup>b</sup>	84	3.82±0.01 <sup>a</sup>	78	8.00±0.04 <sup>ab</sup>
African American	8	5.66±0.07 <sup>b</sup>	5	1.53±0.03 <sup>ab</sup>	8	3.93±0.03 <sup>a</sup>	12	8.67±0.09 <sup>ab</sup>
Native American	7	5.10±0.08 <sup>b</sup>	4	1.40±0.03 <sup>b</sup>	6	3.97±0.04 <sup>a</sup>	9	7.85±0.11 <sup>b</sup>
Hispanic	<1	4.08±0.24 <sup>c</sup>	1	1.57±0.07 <sup>ab</sup>	1	3.79±0.09 <sup>a</sup>	<1	8.42±0.41 <sup>ab</sup>
Asian	<1	2.96±0.28 <sup>d</sup>	1	1.57±0.06 <sup>ab</sup>	<1	3.48±0.12 <sup>b</sup>	<1	9.10±0.75 <sup>a</sup>
Other	<1	6.47±0.37 <sup>a</sup>	<1	1.64±0.15 <sup>a</sup>	<1	4.06±0.19 <sup>a</sup>	<1	9.09±0.40 <sup>a</sup>
<b>Age</b>								
60-69 years	19	4.94±0.05 <sup>a</sup>	18	1.40±0.02 <sup>bc</sup>	17	3.83±0.02 <sup>a</sup>	22	8.66±0.07 <sup>a</sup>
70-79 years	34	4.39±0.04 <sup>bc</sup>	37	1.37±0.01 <sup>c</sup>	33	3.83±0.02 <sup>a</sup>	3	8.17±0.05 <sup>b</sup>
80-89 years	36	4.31±0.04 <sup>a</sup>	37	1.44±0.01 <sup>ab</sup>	38	3.86±0.01 <sup>a</sup>	34	7.75±0.05 <sup>c</sup>
90 years & older	11	4.49±0.07 <sup>b</sup>	8	1.48±0.02 <sup>a</sup>	12	3.81±0.03 <sup>a</sup>	11	7.70±0.10 <sup>c</sup>
<b>Poverty level</b>								
Below	43	5.04±0.04 <sup>a</sup>	32	1.45±0.01 <sup>a</sup>	42	3.85±0.02 <sup>a</sup>	55	8.25±0.05 <sup>a</sup>
Above	57	3.94±0.03 <sup>b</sup>	68	1.38±0.01 <sup>b</sup>	58	3.83±0.01 <sup>a</sup>	45	7.74±0.05 <sup>b</sup>
<b>Geog. location</b>								
Rural	66	4.38±0.03 <sup>b</sup>	66	1.41±0.01 <sup>a</sup>	68	3.84±0.01 <sup>a</sup>	64	7.95±0.04 <sup>b</sup>
Urban	34	4.64±0.04 <sup>a</sup>	34	1.42±0.01 <sup>a</sup>	32	3.83±0.02 <sup>a</sup>	36	8.33±0.05 <sup>a</sup>
<b>Living Arrangement</b>								
Live alone	57	4.67±0.03 <sup>a</sup>	57	1.44±0.01 <sup>a</sup>	51	3.85±0.01 <sup>a</sup>	65	7.96±0.04 <sup>b</sup>
Live with others	43	4.25±0.03 <sup>b</sup>	43	1.37±0.01 <sup>b</sup>	49	3.84±0.02 <sup>a</sup>	35	8.20±0.05 <sup>a</sup>
<b>Meal Type</b>								
Congregate	48	3.48±0.03 <sup>b</sup>	76	1.37±0.01 <sup>b</sup>	43	3.71±0.01 <sup>b</sup>	29	8.04±0.06 <sup>a</sup>
Home delivered	52	5.39±0.03 <sup>a</sup>	24	1.53±0.01 <sup>a</sup>	57	3.94±0.01 <sup>a</sup>	71	8.10±0.04 <sup>a</sup>

<sup>1</sup>Mean "Determine Your Nutritional Health" Score ± Standard Error <sup>a</sup>. Values with different superscripts in each sociodemographic column are significantly different. P<0.05

**Table 2. Oklahoma Title III Elderly Nutrition Program Participants Responses To Determine Your Nutritional Health Statements Within Nutritional Risk Categories**

Reported "Yes" to the following:	Total Sample n = 18,488 %	Low Nutritional Risk n = 5,122 %	Moderate Nutritional Risk n = 7,689 %	High Nutritional Risk n = 5,677 %
I have an illness or condition that made me change the food I eat	37	7	34	69
I eat fewer than 2 meals per day	5	0	1	16
I eat few fruits, vegetables, or milk products	10	3	7	21
I have 3 or more drinks of beer, liquor or wine every day	1	<1	<1	1
I have tooth or mouth problems that make it hard for me to eat	12	1	6	31
I don't always have enough money to buy the food I need	8	0	1	24
I eat alone most of the time	54	47	46	72
I take 3 or more prescribed or over the counter drugs a day	76	57	79	89
Without wanting to, I have lost or gained 10 pounds in the last 6 months	19	1	12	45
I am not always able to shop, cook or feed myself	55	7	66	86

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## CHAPTER IV

### ARTICLE 2

#### **Factors Associated with Oklahoma Older Americans Act Nutrition Program Participants Ability to Shop, Cook and Feed Themselves**

##### **ABSTRACT**

This study evaluated factors associated with Oklahoma Older Americans Act Nutrition Program congregate and home-delivered meal participant's ability to shop, cook and feed one's self. Data was collected using the "Determine Your Nutritional Health" checklist statement, "I am not always able to shop, cook and feed myself" and modified items from the U.S. Administration on Aging Performance Outcomes Measures Project intake forms. Factors related to instrumental activities of daily living, financial security and financial management were significantly related to congregate meal participants not being able to shop, cook and feed themselves. Factors related to instrumental activities of daily living, living arrangement, financial security and social network factors were significantly associated with home delivered meal participants not being able to shop, cook and feed themselves. The results of this study indicate potential areas for targeting programs and services to Older Americans Act Nutrition Program participants' and their social networks in order to improve participant's ability to shop, cook, and feed themselves;

thus increasing the potential to improve participants nutritional status and ability to maintain their independence.

## **INTRODUCTION**

More than anything, older adults want to remain healthy and independent. The Centers for Disease Control and Prevention suggest lifestyle factors have a major role in longevity. Good nutrition and physical activity are important lifestyle factors that can help older adults live longer while maintaining their independence. In addition to reducing risk of disease and delaying death, diet and physical activity have important roles in health and longevity by contributing to wellness, and having the energy and ability to do the things one wants to do and to feel in control of one's life (Krinke, 2002)

As people age, they become at greater risk for nutritional deficiencies. Reduced nutritional status in older adults increases the risks, severity, and complications of disease; and leads to more frequent or longer hospital stays (Vailas et al., 1995). In addition, declining nutritional status is one of the many reasons older adults lose their independence (Litchford, 2004). Good nutritional status in older adults benefits both the individual and society; health is improved, dependence is decreased, time required to recuperate from illness is reduced, and use of healthcare resources is contained (Van Grevenhof & Funderburg, 2003).

The Older Americans Act Nutrition Program (OAANP) is a community-based program that provides partial funding for congregate and home delivered meals for older adults. The OAANP is intended to improve older adults nutritional status, enable them to



avoid medical problems, continue to live in the communities of their choice, and stay out of institutions (Wellman et al., 2002). Specific program goals are to provide low-cost nutritious meals, social contact, nutrition screening and education, information and linkages to other support programs and services, counseling, shopping assistance, transportation, and volunteer opportunities. Anyone who is 60 years of age or older, and spouses regardless of age, is eligible to participate in the congregate meal (CM) program, regardless of income. Participants in the home delivered meal (HDM) program must be homebound and unable to prepare their own meals. The home delivered meal program ensures nutrition, but participants miss out on the social benefit of the congregate meal program (Older Americans Act, 1993). The OAANP meals provide at least one meal a day that meets a third of recommended intakes for this age group and must operate five or more days a week. Many programs voluntarily offer additional services based on specific community needs (Wellman et al., 2002).

In Oklahoma, the Oklahoma Department of Human Services (OKDHS), Aging Services Division (ASD) administers the Oklahoma Older Americans Act Nutrition Program (OAANP). In federal fiscal year 2004, the Oklahoma OAANP provided 4.2 million congregate and home delivered meals to approximately 36,436 participants at 250 nutrition sites.

Participants in the Oklahoma OAANP, both congregate and home delivered, complete or are assisted with completing the Nutrition Screening Initiative (NSI) “Determine Your Nutritional Health Checklist” (DYNH). The Nutrition Screening Initiative is part of a national effort to identify and treat nutritional problems among older adults. The NSI “Determine Your Nutritional Health” checklist consists of ten questions

that indicate warning signs of poor nutritional health in older adults. Based on the DYNH score older adults are categorized as being at low, moderate or high nutritional risk. The DYNH checklist is a screening tool used by community agencies, educators, and service providers to screen older adults for risk of malnutrition (White, et al.1991).

In a previous study, Quigley et al. (2005) evaluated the Oklahoma federal fiscal year 2003 DYNH checklist data from 18,488 Oklahoma OAANP congregate and home delivered meal participants. Quigley et al. (2005) reported 66% and 86% of Oklahoma OAANP participants' who scored at moderate and high nutritional risk answered "yes" to the DYNH statement "I am not always able to shop, cook and feed myself," respectively. Answering "yes" to this statement does not supply adequate information about the participant's particular situation because the statement "I am not always able to shop, cook, or feed myself" poses three potential problems.

The purpose of this study was to further delineate factors associated with Oklahoma OAANP participant's ability to shop, cook and feed ones self. The results of this study will enable the OKDHS ASD to target programs and services related to participant's ability to shop, cook and feed ones self, which could help to reduce participant's nutritional risk and increase their ability to maintain independence.

## **METHODS**

### **Subjects**

The subjects in this study were volunteer Oklahoma congregate and home delivered meal participants from 15 Oklahoma OAANP sites in four Oklahoma counties.

### **Institutional Review Board**

Approval for this study was obtained from the Oklahoma State University Institutional Review Board for Human Subjects prior to any data collection.

### **Instruments**

Data was collected using a project survey containing the “Determine Your Nutritional Health” checklist statement “I am not always able to shop, cook and feed myself” and modified items from the U.S. Administration on Aging Performance Outcomes Measures Project (POMP) Demographic Intake, Home Delivered Meals and Congregate Meals Extended Core, Physical Functioning and Health, and Social Functioning surveys.

Theoretical factors were developed related to OAANP participant’s ability to shop, cook and feed themselves. Based on the theoretical factors, items were selected and modified from the POMP surveys. All survey items posed yes/no responses. Participant responses to survey items were scored yes = 1 and no = 2.

A panel of experts from Oklahoma State University and the Oklahoma Aging Services Division determined face validity of the project survey. After obtaining approval from the Oklahoma State University Review Board for Human Subject the project survey was tested for reliability with 40 congregate and 40 home delivered Oklahoma OAANP participants by test-retest approximately two weeks apart.

## **Procedures**

Oklahoma OAANP site managers and outreach workers were contracted to collect the data using the project survey. Oklahoma OAANP site managers and outreach workers were contracted for data collection because they had an established rapport with Oklahoma OAANP participants and were trained on confidentiality and Health Insurance Portability and Accountability Act (HIPAA). One-day training was conducted on data collection for Oklahoma OAANP site managers and outreach workers who volunteered to participate in the project data collection.

Oklahoma OANNP site managers and outreach workers completed the project survey with Oklahoma OAANP congregate and home delivered meal participants by in-person interviews to avoid problems if a participant did not understand a question or if reading or writing was difficult.

## **Statistical analyses**

All Statistical Analyses System were conducted using the PC SAS Version 9.1 (SAS Inst. Inc., Cary NC). No significant differences were observed in the project survey test-retest item scores for congregate or home delivered participants.

Participant demographic data were analyzed using means and frequency procedures. T-tests and analysis of variance were used to determine the differences in participant's reported ability to shop, cook and feed themselves (SCF score) between types of meal received. T-tests and analysis of variance were used to determine the differences in participant's reported ability to shop, cook and feed themselves (SCF score) between demographic subcategories and by type of meal received.

Construct factors were validated using factor analysis with varimax rotation. Factor analysis produces orthogonal factors which avoids problems with multicollinearity. Factor analysis is a pattern detection method that reduces the number of items by finding factors that are composed of correlated items. The number of construct factors was selected based on a minimum eigenvalue of 1.0. Items were not included in construct factors if loading was  $\leq 0.4$ . Construct factors with only one item were not included.

Participant responses to survey items were scored yes = 1 and no = 2. Construct factor scores were computed by summing the construct factor item scores. In computing the construct factor scores, scores were reversed for items that loaded negatively into a construct factor. Scores were also reversed for all items in some construct factors so that all construct factors a lower construct factor score represented lower functionality.

Differences in construct factor scores between type of meal received and differences in factor scores between participant's ability to shop, cook and feed ones self by type of meal received were analyzed using the t-test procedure.

Construct factors most strongly associated with participant's inability to shop, cook and feed themselves by type of meal received was analyzed using the logistic regression analysis with backwards elimination. Because the outcomes were dichotomous, logistic regressions with backward elimination were used to determine the constructed factors.

## **RESULTS AND DISCUSSION**

### **Subjects**

Demographic frequencies of Oklahoma OAANP participants in this study are presented in Table 1. Eight hundred and fifty nine Oklahoma OAANP participants volunteered to participant in this study. Four hundred and seventy-seven participants (56%) received congregate meals and 382 participants (44%) received home delivered meals (Table 1).

The study participant demographics were similar to the 2003 federal fiscal year statewide Oklahoma OAANP demographic data (Quigley et al., 2005). In this study and in the 2003 Oklahoma OAANP data, 32% of participants were male and 68% of the participants were female.

In this study; 91% of participants were Caucasian, 5% were Native American, 3% were African American, and less than 1% were Hispanic, Asian or Other. From the 2003

Oklahoma OAANP data; 83% were Caucasian, 7% were Native American, 8% were African American and less than 1% were Hispanic, Asian or Other.

In this study; 6% of participants were under 60 years of age, 19% were 60 to 69 years of age, 32% were 70 to 79 years of age, 33% were 80 to 89 years of age and 10% were over 90 years of age. In the 2003 Oklahoma OAANP data; 4% were under 60 years of age, 18% were 60 to 69 years of age, 33% were 70 to 79 years of age, 35% were 80 to 89 years of age and 10% were over 90 years of age.

Additionally in this study; 50% of participants lived alone and 50% lived with others; whereas in the 2003 Oklahoma OAANP data; 57% lived alone and 43% lived with others.

### **Ability to Shop, Cook and Feed Self**

Differences in participant's reported ability to shop, cook and feed themselves (SCF scores) between congregate and home delivered meal participants are presented in Table 1. For all demographic categories home delivered meal participants had significantly lower mean SCF scores than congregate meal participants (Table 1). These data indicate home delivered meal participants significantly reported they were significantly less able to shop, cook and feed themselves than congregate meal participants. As a result, further data is reported by type of meal received.

Differences in participants mean SCF scores between demographic subcategories by type of meal received are presented in Table 2. Significant differences were observed in

congregate and home delivered meal participants mean SCF scores by gender, age group, and income.

Although no significant difference was observed in mean SCF scores for congregate meal participants; for home delivered meal participants females had significantly lower mean SCF scores than males (Table 2). These data indicate female home delivered meal participants significantly reported they were less able to shop, cook and feed themselves than male home delivered participants. No significant difference was observed in mean SCF scores by race for either congregate or home delivered meal participants (Table 2).

For congregate meal participants, those over 90 years of age had significantly lower mean SCF scores than those 79 years of age or younger. For home delivered meal participants, those 80 years of age and older had significantly lower mean SCF scores than those 69 years of age and younger (Table 2). These data indicate among both congregate and home delivered meal participants, older age groups significantly reported they were less able to shop, cook and feed themselves than younger age groups.

No significant difference was observed in mean SCF scores by income for congregate meal participants; however, for home delivered meal participants, those with annual incomes under \$20,000 had significantly lower mean SCF scores than those with annual incomes equal to or above \$20,000 (Table 2). These data indicate among home delivered meal participants, those with lower annual incomes significantly reported they were less able to shop, cook and feed themselves than those with higher annual incomes. No significant difference was observed in mean SCF scores by living arrangement for either congregate or home delivered meal participants (Table 2).



## Theoretical versus Construct Factors

The theoretical factors and construct factors from factor analysis with varimax rotation are presented in Table 3. The number of construct factors was selected based on a minimum eigenvalue of 1.0. Items were not included in construct factors if loading was  $\leq 0.4$ . Construct factors with only one item were also not included. Items in construct factors in parenthesis loaded negatively.

The theoretical factors included: Instrumental Activities of Daily Living, Social Network, Emotional Well-Being, Financial Security, Transportation and Facilities. The construct factors from factor analysis with varimax rotation included: Instrumental Activities of Daily Living, Social Network, Emotional Well-Being, Living Arrangement, Financial Security, Financial Management and Appliances.

The following are differences between the theoretical and construct factors:

- From the theoretical factor Instrumental Activities of Daily Living, the item “Do you have difficulty using the telephone” and from the theoretical factor Social Network, the item “In the past two weeks did you get together socially with friends or neighbors” were not included in construct factors because factor loading was  $\leq 0.4$ .
- From the theoretical factor Transportation, the item “Is a local bus or senior van available for you” and from the theoretical factor Facilities, the item “Is the electricity in your home turned on” were not included as construct factors because they loaded into one-item factors.

- From the theoretical factor Social Network, the item “Do you feel you are doing enough social activities” loaded negatively into the construct factor Emotional Well-Being.
- From the theoretical factor Social Network, the items, “Does anyone else live with you in your household” and “Concerning the meals you eat at home, do you usually eat with others” loaded into a separate construct factor defined as Living Arrangement.
- From the theoretical factor Financial Security, the items “Is your total household annual income below \$20,000” and “Do you ever have to choose between eating and taking your medications” loaded negatively into the construct Financial Security factor.
- From the theoretical factor Financial Security, the item “Do you ever run out of money or food stamps to buy the food you need” and from the theoretical factor Transportation, the item “Do you ever run out of money for transportation,” loaded into a separate construct factor defined as Financial Management.
- From the theoretical factor Transportation, the item “Do you have a car for transportation” loaded into the construct factor Financial Security.
- From the theoretical factor Facilities, the item “Do you have a working telephone” loaded into the construct factor Social Network.
- From the theoretical factor Facilities only the items “Do you have a working stove, oven or microwave,” and “Do you have a working refrigerator,” remained, this construct factor was defined Appliances.

## Factor Scores

Participants responses to survey items were scored yes = 1 and no = 2. Construct factor scores were computed by summing the construct factor item scores. Scoring was reversed for items, indicated in parentheses, which loaded negatively into a construct factor.

Scoring was also reversed for all items in the construct factors Social Network, Living Arrangement, Financial Security and Appliances, indicated in brackets, so that for all construct factors, lower construct factor scores represented a lower functionality.

Differences in construct factor scores between types of meal received are presented in Table 4. Participants receiving home delivered meals had significantly lower mean “Instrumental Activities of Daily Living,” Social Network” and “Financial Security” factor scores compared to congregate meal participants (Table 4). These data indicate home delivered meal participants reported they were significantly less able to conduct instrumental activities of daily living, had significantly less social contact and had significantly less financial security compared to congregate meal participants.

Differences in construct factor scores between participant’s reported ability to shop, cook and feed ones self by type of meal received are presented in Table 5. Participants receiving congregate meals who reported they were not able to shop, cook and feed themselves had significantly lower mean “Instrumental Activities of Daily Living,” “Financial Management,” and “Financial Security” factor scores (Table 5). These data indicate, congregate meal participants who reported they were not always able to shop, cook and feed themselves were significantly less able to conduct instrumental activities

of daily living, had significantly lower financial management resulting in running out of money for food or transportation and were significantly less financially secure.

Participants receiving home delivered meals who reported they were not able to shop, cook and feed themselves had significantly lower mean “Instrumental Activities of Daily Living,” “Living Arrangement,” and Financial Security” factor scores; however, they had significantly higher mean “Social Network” factor scores (Table 5). These data indicate, home delivered meal participants who reported they were not always able to shop, cook or feed themselves were significantly less able to conduct instrumental activities of daily living, were significantly less likely to live and eat meals with others, and were significantly less financially secure; however, they had significantly more social contact.

Although, home delivered meal participants as a whole reported less social contact than congregate meal participants (Table 4); home delivered meal participants who were not always able to shop, cook or feed themselves reported higher social contact, even though they were more likely to live and eat meals alone (Table 5). This observation may indicate home delivered meal participants who live alone and are not always able to shop, cook and feed themselves have found it necessary to established greater social contact in order to over come their inability to shop, cook and feed themselves.

### **Logistic Regression Models**

Full and best-fit logistic regression models evaluating which construct factors were most strongly associated with the statement, “I am not always ability to shop, cook and feed myself,” by type of meal received are presented in Tables 6 and 7.

For congregate meal participants, the construct factors “Instrumental Activities of Daily Living (IADL)” and “Financial Management (FM)” were significant in both the full and best-fit logistic regression models (Table 6). The construct factor “Emotional Well-Being” approached ( $p \leq 0.0802$ ) significance in the full model but dropped out of the best-fit model. For congregate meal participants, the best-fit model was:

$$\text{Not able to shop, cook and feed self} = - 6.6769 + 0.6434 \text{ IADL} + 0.7451 \text{ FM}$$

This model indicates for congregate meal participants:

- Not being able to conduct instrumental activities of daily living was significantly associated with not being able to shop, cook and feed ones self.
- Running out of money for food or transportation was significantly associated with not being able to shop, cook and feed ones self.

For home delivered meal participants, the construct factors “Instrumental Activities of Daily Living (IADL)” and “Social Network (SN)” were significant in both the full logistic and best-fit logistic regression models (Table 7). For home delivered meal participants the best-fit model was:

$$\text{Not able to shop, cook and feed self} = -3.8397 + 0.6921 \text{ IADL} - 0.5452 \text{ SN}$$

This model indicates for home delivered meal participants:

- Not being able to conduct instrumental activities of daily living was significantly associated with not being able to shop, cook and feed ones self.
- Having more social contact was significantly associated with not being able to shop, cook and feed one self. As previously discussed, this observation may reflect home delivered meal participants who live alone and are not always able to shop, cook and feed themselves have found it necessary to established greater

social contact in order to overcome their inability to shop, cook and feed themselves.

## **SUMMARY AND CONCLUSION**

Oklahoma OAANP congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly lower Instrumental Activities of Daily Living factor scores. In addition, lower Instrumental Activities of Daily Living factor scores were significantly associated with not being able to shop, cook and feed oneself in the best-fit logistic regression model for both congregate and home delivered meal participants.

These data indicate both congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves were less able to conduct instrumental activities of daily living. Programs and services to improve these reported problems may include senior driving classes, chore services to improve the interior and exterior home environment to accommodate a disability, and access to assistive technology.

Oklahoma OAANP congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly lower Financial Security factor scores. Congregate meal participants also had significantly lower Financial Management factor scores. In addition, lower Financial Management factor scores were significantly associated with not being able to shop, cook and feed oneself in the best-fit logistic model for congregate meal participants.

These data indicate both congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves were significantly less financially secure and congregate meal participants were significantly more likely to run out of money for food or transportation. These financial security issues may indicate a need for financial management classes to address preparing and purchasing nutritious meals on a budget, making food dollars stretch, applying for additional food assistance programs, applying for discount prescription cards, applying for a reverse home mortgage, asking utility companies to average bills or reassess the due date, and accessing free or reduced cost public transportation in order to improve financial security.

Oklahoma OAANP home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly higher Social Network factor scores. Additionally, higher Social Network factor scores were significantly associated with not being able to shop, cook and feed ones self in the best-fit logistic regression model for home delivered meal participants.

These data indicate home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly more social contact. These social network issues may indicate a need to provide programs addressing establishing social networks for both home delivered meal participants and the community as a whole. In addition, it may be important to include home delivered meal participant's network of informal caregivers in educational programs. There are available funds that can defray the cost of such program development and implementation. For example, Older Americans Act, Title III Part D Disease Prevention and Health Promotion Services and Title III Part E National Family Caregiver Support Program monies fund

programs to eligible grantees in order to manage medications, develop support groups, and develop classes to train caregivers how to cook for their care recipient.



**Table 1. Demographic Frequencies and Differences in Shop, Cook and Feed Self, Statement Scores Of Older Americans Act Nutrition Program Participants Between Types of Meals Received.**

Demographic Factors	All Participants		Congregate Meal		Home Delivered Meal	
	N = 859		n = 477		n = 382	
	%	SCF score <sup>1,2</sup>	%	SCF score <sup>1,2</sup>	%	SCF score <sup>1,2</sup>
<b>Gender</b>						
Male	32	1.67±0.03	34	1.96±0.02 <sup>a</sup>	29	1.28±0.05 <sup>b</sup>
Female	68	1.53±0.02	66	1.91±0.02 <sup>a</sup>	71	1.13±0.02 <sup>b</sup>
<b>Race</b>						
Caucasian	91	1.58±0.02	92	1.92±0.01 <sup>a</sup>	89	1.17±0.02 <sup>b</sup>
Native American	5	1.72±0.08	6	2.00±0.06 <sup>a</sup>	4	1.29±0.10 <sup>b</sup>
African American	3	1.41±0.09	1	2.00±0.10 <sup>a</sup>	6	1.20±0.09 <sup>b</sup>
Hispanic	<1	1.00±0.35	0	-	<1	1.00±0.27
Asian	<1	2.00±0.28	<1	2.00±0.15	0	-
Other	<1	1.50±0.35	<1	2.00±0.27 <sup>a</sup>	<1	1.00±0.38 <sup>b</sup>
<b>Age</b>						
Under 60 years	6	1.81±0.08	8	1.93±0.05 <sup>a</sup>	2	1.38±0.13 <sup>b</sup>
60-69 years	19	1.76±0.04	24	1.96±0.03 <sup>a</sup>	14	1.36±0.05 <sup>b</sup>
70-79 years	32	1.61±0.03	34	1.94±0.02 <sup>a</sup>	30	1.17±0.04 <sup>b</sup>
80-89 years	33	1.51±0.03	30	1.89±0.02 <sup>a</sup>	38	1.15±0.03 <sup>b</sup>
90 years and older	10	1.23±0.06	4	1.80±0.07 <sup>b</sup>	16	1.08±0.05 <sup>b</sup>
<b>Income</b>						
> \$20,000	33	1.76±0.03	44	1.94±0.02 <sup>a</sup>	20	1.31±0.06 <sup>b</sup>
≤ \$20,000	67	1.48±0.02	56	1.91±0.02 <sup>a</sup>	80	1.15±0.02 <sup>b</sup>
<b>Living Arrangement</b>						
Live alone	50	1.63±0.03	52	1.93±0.02 <sup>a</sup>	47	1.22±0.03 <sup>b</sup>
Live with others	50	1.52±0.03	48	1.91±0.02 <sup>a</sup>	53	1.14±0.03 <sup>b</sup>
<b>Meal Type</b>						
			56	1.92±0.01 <sup>a</sup>	44	1.18±0.02 <sup>b</sup>

<sup>1</sup>"I am not always able to shop, cook and feed myself Mean ± S.E.

<sup>2</sup>Coding for statement "I am not always able to shop, cook and feed myself: yes (1), no (2).

Scores in demographic rows with different superscripts significantly different,  $p \leq 0.05$ .

**Table 2. Differences in Shop, Cook and Feed Self, Statement Scores Of Older Americans Act Nutrition Program Participants Within Demographic Subcategories by Type of Meal Received.**

Demographic Factors	Congregate Meal	Home Delivered Meal
	n = 477 SCF score <sup>1,2</sup>	n = 382 SCF score <sup>1,2</sup>
<b>Gender</b>		
Male	1.96±0.02 <sup>a</sup>	1.28±0.05 <sup>a</sup>
Female	1.91±0.02 <sup>a</sup>	1.13±0.02 <sup>b</sup>
<b>Race</b>		
Caucasian	1.92±0.01 <sup>a</sup>	1.17±0.02 <sup>a</sup>
Native American	2.00±0.06 <sup>a</sup>	1.29±0.10 <sup>a</sup>
African American	2.00±0.10 <sup>a</sup>	1.20±0.09 <sup>a</sup>
Hispanic	-	1.00±0.27 <sup>a</sup>
Asian	2.00±0.15 <sup>a</sup>	-
Other	2.00±0.27 <sup>a</sup>	1.00±0.38 <sup>a</sup>
<b>Age</b>		
Under 60 years	1.93±0.05 <sup>a</sup>	1.38±0.13 <sup>a</sup>
60-69 years	1.96±0.03 <sup>a</sup>	1.36±0.05 <sup>a,b</sup>
70-79 years	1.94±0.02 <sup>a</sup>	1.17±0.04 <sup>b,c</sup>
80-89 years	1.89±0.02 <sup>a,b</sup>	1.15±0.03 <sup>c</sup>
90 years and older	1.80±0.07 <sup>b</sup>	1.08±0.05 <sup>c</sup>
<b>Income</b>		
> \$20,000	1.94±0.02 <sup>a</sup>	1.31±0.06 <sup>a</sup>
≤ \$20,000	1.91±0.02 <sup>a</sup>	1.15±0.02 <sup>b</sup>
<b>Living Arrangement</b>		
Live alone	1.93±0.02 <sup>a</sup>	1.22±0.03 <sup>a</sup>
Live with others	1.91±0.02 <sup>a</sup>	1.14±0.03 <sup>a</sup>

<sup>1</sup>"I am not always able to shop, cook and feed myself Mean ± S.E.

<sup>2</sup>Coding for statement "I am not always able to shop, cook and feed myself: yes (1), no (2).

Scores in demographic subcategory columns with different superscripts significantly different,  $p \leq 0.05$ .

**Table 3. Theoretical and Construct Factors Based on Factor Analysis.**

<b>Theoretical Factors<sup>1</sup></b>	<b>Construct Factors<sup>2</sup></b>
<p><b>Instrumental Activities of Daily Living</b>            Do you have difficulty driving an automobile            Do you have difficulty using a bus or senior van            Do you have difficulty getting around inside the home            Do you have difficulty going outside the home            Do you have difficulty when walking            Has your health interfered with your social activities            Do you have difficulty using the telephone</p>	<p><b>Instrumental Activities of Daily Living</b>            Do you have difficulty driving an automobile            Do you have difficulty using a bus or senior van            Do you have difficulty getting around inside the home            Do you have difficulty going outside the home            Do you have difficulty when walking            Has your health interfered with your social activities</p>
<p><b>Social Network</b>             In the past two weeks did you talk with friends or neighbors on the telephone            In the past two weeks did you get together socially with any relatives, excluding those living with you            In the past two weeks did you talk with any relatives on the telephone, excluding those living with you            In the past two weeks did you get together socially with friends or neighbors            Do you feel you are doing enough social activities            Does anyone else live with you in your household            Concerning the meals you eat at home, do you usually eat with others</p>	<p><b>[Social Network]</b>            Do you have a working telephone            In the past two weeks did you talk with friends or neighbors on the telephone            In the past two weeks did you get together socially with any relatives, excluding those living with you            In the past two weeks did you talk with any relatives on the telephone, excluding those living with you</p>
<p><b>Emotional Well-Being</b>            In the last two weeks have you felt sad, blue or depressed            In the last two weeks have you felt worried, tense or anxious            In the last two weeks have you felt like you did not get enough rest or sleep</p>	<p><b>Emotional Well-Being</b>            In the last two weeks have you felt sad, blue or depressed            In the last two weeks have you felt worried, tense or anxious            In the last two weeks have you felt like you did not get enough rest or sleep            (Do you feel you are doing enough social activities)</p>
<p><b>Financial Security</b>             Is your total household annual income below \$20,000            Do you ever have to choose between eating and taking your medications            I do not participate in any other food assistance programs            Do you ever run out of money or food stamps to buy the food you need</p>	<p><b>[Living Arrangement]</b>            Does anyone else live with you in your household            Concerning the meals you eat at home, do you usually eat with others</p>
<p><b>Financial Security</b>             Is your total household annual income below \$20,000            Do you ever have to choose between eating and taking your medications            I do not participate in any other food assistance programs            Do you ever run out of money or food stamps to buy the food you need</p>	<p><b>[Financial Security]</b>            Do you have a car for transportation            (Is your total household annual income below \$20,000)            (Do you ever have to choose between eating and taking your medications)            I do not participate in any other food assistance programs</p>

**Table 3. Theoretical and Construct Factors Based on Factor Analysis  
(continued).**

<b>Theoretical Factors<sup>1</sup></b>	<b>Construct Factors<sup>2</sup></b>
<p><b>Transportation</b>            Do you have a car for transportation            Is a local bus or senior van available for you            Do you ever run out of money for transportation</p>	<p><b>Financial Management</b>            Do you ever run out of money or food stamps to buy the food you need            Do you ever run out of money for transportation</p>
<p><b>Facilities</b>            Do you have a working stove, oven or microwave            Do you have a working refrigerator            Do you have a working telephone            Is the electricity in your home turned on</p>	<p><b>[Appliances]</b>            Do you have a working stove, oven or microwave            Do you have a working refrigerator</p>

<sup>1</sup>Theoretical factors related to participants ability to shop, cook and feed them self.

<sup>2</sup>Construct factors based on factor analysis with varimax rotation. The number of factors was selected based on a minimum eigenvalue of 1.0. Items were not included if factor loadings were  $\leq$  0.4. Factors with only one item were not retained as a construct factor. Items in parentheses in construct factors had a negative loading and coding was reversed. All items in construct factors in brackets were reverse coded so lower scores for all factors indicated lower functionality.

**Table 4. Differences in Construct Factor Scores Between Type of Meal Received.**

<b>Construct Factors</b>	<b>Congregate Meal</b>	<b>Home Delivered Meal</b>
	Factor Score <sup>1</sup>	Factor Score <sup>1</sup>
Instrumental Activities of Daily Living	11.18±0.06 <sup>a</sup>	8.47±0.10 <sup>b</sup>
Social Network	7.67±0.04 <sup>a</sup>	7.50±0.05 <sup>b</sup>
Emotional Well-Being	6.48±0.06 <sup>a</sup>	6.39±0.07 <sup>a</sup>
Living Arrangement	3.04±0.04 <sup>a</sup>	2.93±0.05 <sup>a</sup>
Financial Management	3.47±0.04 <sup>a</sup>	3.42±0.04 <sup>a</sup>
Financial Security	7.20±0.04 <sup>a</sup>	6.27±0.06 <sup>b</sup>
Appliances	3.99±0.01 <sup>a</sup>	3.99±0.004 <sup>a</sup>

<sup>1</sup>Mean±S.E.

<sup>a</sup>Factor scores in a row with different superscripts between significantly different,  $p \leq 0.05$ .

**Table 5. Differences in Construct Factor Scores Between Participants' Ability to Shop, Cook and Feed Themselves by Type of Meal Received.**

Construct Factors	Congregate Meal		Home Delivered Meal	
	Factor Score <sup>1</sup>		Factor Score <sup>1</sup>	
	Not Always Able to Shop, Cook and Feed Self	Able to Shop, Cook and Feed Self	Not Always Able to Shop, Cook and Feed Self	Able to Shop, Cook and Feed Self
Instrumental Activities of Daily Living	10.13±0.36 <sup>b</sup>	11.27±0.06 <sup>a</sup>	8.07±0.11 <sup>b</sup>	10.25±0.21 <sup>a</sup>
Social Network	7.79±0.13 <sup>a</sup>	7.70±0.04 <sup>a</sup>	7.58±0.04 <sup>b</sup>	7.05±0.18 <sup>a</sup>
Emotional Well-Being	6.10±0.28 <sup>a</sup>	6.53±0.07 <sup>a</sup>	6.38±0.08 <sup>a</sup>	6.67±0.17 <sup>a</sup>
Living Arrangement	2.97±0.16 <sup>a</sup>	3.08±0.05 <sup>a</sup>	2.88±0.06 <sup>b</sup>	3.16±0.11 <sup>a</sup>
Financial Management	3.07±0.18 <sup>b</sup>	3.47±0.05 <sup>a</sup>	3.41±0.05 <sup>a</sup>	3.36±0.11 <sup>a</sup>
Financial Security	6.86±0.18 <sup>b</sup>	7.24±0.04 <sup>a</sup>	6.23±0.06 <sup>b</sup>	6.56±0.16 <sup>a</sup>
Appliances	4.00±0.00 <sup>a</sup>	3.99±0.004 <sup>a</sup>	3.99±0.01 <sup>a</sup>	4.00±0.00 <sup>a</sup>

<sup>1</sup>Mean±S.E.

<sup>a</sup> Factor scores in a row within a meal type with different superscripts between significantly different,  $p \leq 0.05$ .

**Table 6. Full and Best-Fit Logistic Regression Models Showing Relationships Between Construct Factors and Congregate Meal Participants Inability to Shop, Cook and Feed Themselves.**

Parameter	DF	Estimate	Standard Error	Chi-Square	Probability
<b>Full Model</b>					
Intercept	1	45.3704	2859.6	0.0003	0.9873
Instrumental Activities of Daily Living	1	0.6463	0.1746	13.7065	0.0002
Social Network	1	-1.3863	0.9123	2.3094	0.1286
Emotional Well-Being	1	0.3991	0.2281	3.0611	0.0802
Living Arrangement	1	-0.0316	0.3019	0.0110	0.9166
Financial Management	1	0.6647	0.2829	5.5221	0.0188
Financial Security	1	0.3381	0.2949	1.3142	0.2516
Appliances	1	-11.4180	714.9	0.0003	0.9873
<b>Best-Fit Model</b>					
Intercept	1	-6.6769	1.9178	12.1216	0.0005
Instrumental Activities of Daily Living	1	0.6434	0.1603	16.1028	<0.0001
Financial Management	1	0.7451	0.2742	7.3854	0.0066

**Table 7. Full and Best-Fit Logistic Regression Models Showing Relationships Between Construct Factors and Home Delivered Meal Participants Inability to Shop, Cook and Feed Themselves.**

<b>Parameter</b>	<b>DF</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>Chi-Square</b>	<b>Probability</b>
<b>Full Model</b>					
Intercept	1	-51.1730	4612.0	0.0001	0.9911
Instrumental Activities of Daily Living	1	0.7089	0.1166	36.9567	<0.0001
Social Network	1	-0.5715	0.1741	10.7771	0.0010
Emotional Well-Being	1	-0.1067	0.1444	0.5456	0.4601
Living Arrangement	1	-0.0414	0.2134	0.0377	0.8461
Financial Management	1	0.1129	0.2203	0.2625	0.6084
Financial Security	1	0.0918	0.1856	0.2446	0.6209
Appliances	1	11.8093	1153.0	0.0001	0.9918
<b>Best-Fit Full Model</b>					
Intercept	1	-3.8397	1.5204	6.3776	0.0116
Instrumental Activities of Daily Living	1	0.6921	0.1052	43.3242	<0.0001
Social Network	1	-0.5452	0.1671	10.6488	0.0011



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92, 163-167.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

The purpose of this study was to 1) To investigate characteristics associated with the Determine Your Nutritional Health (DYNH) checklist among Oklahoma Older Americans Act Nutrition Program (OAANP) participants by identifying characteristics of Oklahoma OAANP participants, determine if there were significant differences in DYNH checklist scores by age, gender, race, geography, poverty level, living arrangement, and meal type among Oklahoma OAANP participants, and to determine if there are differences in response rates to select DYNH checklist statements by Oklahoma OAANP participants, and 2) To further delineate factors associated with select DYNH checklist statements with high response rates by Oklahoma OAANP participants.

Hypothesis one stated that there would be no significant differences in DYNH checklist scores by age, gender, race, geography, poverty level, living arrangement, and meal type among Oklahoma OAANP participants. Based on the data presented in article one, “Factors Associated With High Nutrition Risk Among Oklahoma Older Americans At Nutrition Program Participants,” significant differences were observed in DYNH scores based on age, gender, race, geography, poverty level, living arrangement, and meal type. Therefore, hypothesis one was rejected.

Hypothesis two stated that there would be no difference in response rates to select DYNH checklist statements by Oklahoma OAANP participants. Based on the data presented in article one, “Factors Associated With High Nutrition Risk Among Oklahoma Older Americans Act Nutrition Program Participants,” significant differences were observed in response rates to select DYNH checklist statements by Oklahoma OAANP participants. Therefore, hypothesis two was rejected.

Hypothesis three stated that there will be no factors significantly associated with select DYNH checklist statements with high response rates by Oklahoma OAANP participants. Based on the data presented in article two, “Factors Associated With Oklahoma Older Americans Act Nutrition Program Participants’ Ability To Shop, Cook And Feed Themselves,” significant differences were observed in OAANP participants DYNH checklist statements with high response rates. Therefore, hypothesis three was rejected.

## Conclusions

Significant differences were observed in DYNH scores among Oklahoma OAANP participants based on age, gender, race, geographic location, poverty level, living arrangement and type of meal received. A significant difference in DYNH scores was observed by gender for all Oklahoma OAANP participants and those within each nutritional risk category. A significant difference in DYNH scores was observed by race for all Oklahoma OAANP participants and those within each nutritional risk category. A significant difference in DYNH scores was observed by age group for all Oklahoma

OAANP participants and those who were within the low and high nutritional risk categories. A significant difference in DYNH scores was observed by poverty level for all Oklahoma OAANP participants and those within the low and high nutritional risk categories. A significant difference in DYNH scores was observed by geographic location for all Oklahoma OAANP participants and those within the high nutritional risk categories. A significant difference in DYNH scores was observed by living arrangement for all Oklahoma OAANP participants and those within the low and high nutritional risk categories. A significant difference in DYNH scores was observed by type of meal received for all Oklahoma OAANP participants and those within the low and moderate nutritional risk categories.

Differences were observed in Oklahoma OAANP participants' responses to DYNH checklist statements by nutritional risk. Sixteen percent of those participants who scored at high nutritional risk answered "yes" to the statement "I eat less than two meals per day". Twenty-one percent of those participants who scored at high nutritional risk answered "yes" to the statement "I eat few fruits, vegetables or milk". One percent of those participants who scored at high nutritional risk answered "yes" to the statement "I have three or more drinks of beer, alcohol or wine". Thirty-one percent of those who scored at high nutritional risk answered "yes" to the statement "I have tooth or mouth problems that make it hard for me to eat". 24% of those who scored at high nutritional risk answered "yes" to the statement "I don't always have enough money to buy the food that I need". Seventy-two percent of those who scored at high nutritional risk answered "yes" to the statement "I eat alone most of the time". Eighty-nine percent of those who scored at high nutritional risk answered "yes" to the statement "I take three or more

prescribed or over the counter drugs”. Forty-five percent of those who scored at high nutritional risk answered “yes” to the statement “I have lost or gained ten pounds without wanting to”. Eighty-six percent of those who scored at high nutritional risk answered “yes” to the statement “I am not always able to shop, cook, or feed myself”.

Oklahoma OAANP congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly lower Instrumental Activities of Daily Living factor scores. These data indicate both congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves were less able to conduct instrumental activities of daily living. Oklahoma OAANP congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly lower Financial Security factor scores. These data indicate both congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves were significantly less financially secure and congregate meal participants were significantly more likely to run out of money for food or transportation. Oklahoma OAANP home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly higher Social Network factor scores. These data indicate home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly more social contact.

## Recommendations

Programs and services to improve reported problems with instrumental activities of daily living should include senior driving classes, chore services to improve the interior and exterior home environment to accommodate a disability, and access to assistive technology. The financial security issues may indicate a need for financial management classes to address preparing and purchasing nutritious meals on a budget, making food dollars stretch, applying for additional food assistance programs, applying for discount prescription cards, applying for a reverse home mortgage, asking utility companies to average bills or reassess the due date, and accessing free or reduced cost public transportation in order to improve financial security. The social network issues may indicate a need to provide programs addressing establishing social networks for both home delivered meal participants and the community as a whole. In addition, it may be important to include home delivered meal participant's network of informal caregivers in educational programs. There are available funds that can defray the cost of such program development and implementation. For example, Older Americans Act, Title III Part D Disease Prevention and Health Promotion Services and Title III Part E National Family Caregiver Support Program monies fund programs to eligible grantees in order to manage medications, develop support groups, and develop classes to train caregivers how to cook for their care recipient.

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## Oklahoma State University Institutional Review Board

Date: Wednesday, September 15, 2004

IRB Application No: HE054

Proposal Title: Evaluating Factors Associated with High Nutritional Risk Among Oklahoma Title III Elderly Nutrition Program Participants

Reviewed and  
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Protocol Expires: 9/14/2005

Principal  
Investigator(s):

Janice Hermann  
313 HES  
Stillwater, OK 74075

Kimberly K Quigley  
1280 S. May  
Guthrie, OK 73044

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The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-1676, colson@okstate.edu).

Sincerely,



Carol Olson, Chair  
Institutional Review Board

## INFORMED CONSENT

**Project Title: Evaluating Factors Associated With High Nutritional Risk Among Title III Elderly Nutrition Program Participants In Rural Oklahoma**

### **Purpose:**

Kim Quigley, M.S., R.D./L.D., Nutrition Therapist IV, Aging Services Division, Oklahoma Department of Health and Human Services, Janice Hermann, Ph.D., R.D./L.D., Oklahoma Cooperative Extension Service Nutrition Education Specialist and Chris Harden, Project H.E.A.R.T. Director are conducting interviews with Oklahoma Title III Elderly Nutrition Program congregante and home-bound participants to evaluate factors associated with high nutritional risk.

### **Procedures:**

In order to evaluate these factors you will be asked to answer interview questions related to factors which may affect nutritional risk among Title III Elderly Nutrition Program participants. The interview will take approximately 1 hour.

### **Risks of Participation:**

There are no known risks associated with this project greater than those ordinarily encountered in daily life.

### **Benefits:**

The information obtained from this interview will be used to develop services and educational programs to lower nutritional risk among Title III Elderly Nutrition Program participants.

### **Confidentiality:**

The information you provide will remain anonymous and that no one will be able to connect you personally with any information on the interview form. The signed consent form will be the only place your name will appear. Consent forms will be filed separately from the interview forms. Interview forms will be kept in a locked file cabinet in Dr Janice Hermann's office until all data are entered and analyzed and no longer than two years. The OSU IRB has the authority to inspect consent records and data files to assure compliance with approved procedures.



**Contacts:**

If you have any questions about this interview contact Kim Quigley at 405-522-3075 or Dr. Janice Hermann at 405-744-6824. For information on subjects' rights, contact Dr. Carol Olson, IRB Chair, 415 Whitehurst Hall, 405-744-1676.

**Participant Rights:**

Your participation is voluntary and you can discontinue the interview at any time without penalty.

**Signatures:**

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

I certify that I have personally explained this document before requesting that the participant sign it.

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date



## INFORMED CONSENT

**Project Title: Reliability Testing of an Interview Survey to Evaluate Factors Associated With High Nutritional Risk Among Title III Elderly Nutrition Program Participants In Rural Oklahoma**

### **Purpose:**

Kim Quigley, M.S., R.D./L.D., Nutrition Therapist IV, Aging Services Division, Oklahoma Department of Health and Human Services, Janice Hermann, Ph.D., R.D./L.D., Oklahoma Cooperative Extension Service Nutrition Education Specialist and Chris Harden, Project H.E.A.R.T. Director are testing the reliability of an interview survey to be used with Oklahoma Title III Elderly Nutrition Program congregate and home-bound participants to evaluate factors associated with high nutritional risk.

### **Procedures:**

To test the reliability of the interview survey you will be asked to answer the interview questions related to factors which may affect nutritional risk among Title III Elderly Nutrition Program participants at two separate times approximately two weeks apart. The interviews will take approximately 1 hour.

### **Risks of Participation:**

There are no known risks associated with this project greater than those ordinarily encountered in daily life.

### **Benefits:**

The information obtained from this interview will be used to test the reliability of an interview survey to be used to evaluate factors associated with high nutritional risk among Title III Elderly Nutrition Program participants.

### **Confidentiality:**

The information you provide will remain anonymous and that no one will be able to connect you personally with any information on the interview form. The signed consent form will be the only place your name will appear. Consent forms will be filed separately from the interview forms. Interview forms will be kept in a locked file cabinet in Dr Janice Hermann's office until all data are entered and analyzed and no longer than two years. The OSU IRB has the authority to inspect consent records and data files to assure compliance with approved procedures.

<b>OSU</b>	
Institutional Review Board	
Approved	<u>9/15/04</u>
Expires	<u>9/14/05</u>
Initials	<u>AJ</u>

**Contacts:**

If you have any questions about this interview contact Kim Quigley at 405-522-3075 or Dr. Janice Hermann at 405-744-6824. For information on subjects' rights, contact Dr. Carol Olson, IRB Chair, 415 Whitehurst Hall, 405-744-1676.

**Participant Rights:**

Your participation is voluntary and you can discontinue the interview at any time without penalty.

**Signatures:**

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

I certify that I have personally explained this document before requesting that the participant sign it.

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date



**APPENDIX A**

Determine Your Nutritional Health checklist

	<b>YES</b>
I have an illness or condition that made me change the kind and / or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables, or milk products.	2
I have 3 or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 2 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and / or feed myself.	2
<b>Total</b>	

A score of 6 or higher indicates that an individual may be at high nutritional risk.



## VITA

Kimberly Kay Quigley

Candidate for the Degree of

Doctor of Philosophy

Thesis: FACTORS ASSOCIATED WITH HIGH NUTRITION RISK AMONG OLDER AMERICANS ACT NUTRITION PROGRAM PARTICIPANTS

Major Field: Nutritional Sciences

Biographical:

Personal Data: Born in Pauls Valley, Oklahoma on November 5, 1964.

Education: Received a Bachelor of Science degree in Human Environmental Science from the University of Central Oklahoma in December, 1988; received a Master of Science degree in Human Environmental Science from the University of Central Oklahoma in December, 1990; completed requirements to become a Registered Dietitian from Oklahoma State University, May 1989.

Experience: Consulting Dietitian, Great Plains Regional Hospital, 1990 to 1992; WIC Nutritionist, Neighborhood Services Organization East, 1990 to 1992; Nutrition Consultant, Associated Milk Producers, Inc., 1992-1995; Nutrition Therapist IV, Oklahoma Department of Human Services, Aging Services Division, 1995 to present.

Professional Memberships: American Dietetic Association, Oklahoma Dietetic Association, Oklahoma City District Dietetic Association.

Name: Kimberly Kay Quigley

Date of Degree: December, 2005

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: FACTORS ASSOCIATED WITH HIGH NUTRITION RISK AMONG  
OLDER AMERICANS ACT NUTRITION PROGRAM PARTICIPANTS

Pages in Study: 97

Candidate for the Degree of Doctor of Philosophy

Major Field: Human Environmental Science, Nutritional Science

Scope and Method of Study:

Findings and Conclusions: Factors associated with nutritional risk among 18,488 Oklahoma Title III congregate and home delivered meal participants were evaluated using the "Determine Your Nutritional Health" (DYNH) checklist. Eighteen percent of congregate and 42% of home delivered meal participants scored at high nutritional risk. Significant differences were observed in DYNH scores among participants based on age, gender, race, geographic location, poverty level, living arrangement and type of meal received. Differences were observed in Oklahoma Title III Elderly Nutrition Program participants' responses to DYNH checklist statements by nutritional risk. The results of this study indicate potential problem areas for targeting programs and services to reduce high nutritional risk among Oklahoma Title III Elderly Nutrition Program participants.

Eighty-six percent of those who scored at high nutritional risk answered "yes" to the statement "I am not always able to shop, cook, or feed myself". Oklahoma OAANP congregate and home delivered meal participants who reported they were not always able to shop, cook and feed themselves had significantly lower Instrumental Activities of Daily Living factor scores, had significantly lower Financial Security factor scores. Both congregate and home delivered meal participants who reported they were not always able to shop, cook and feed self were significantly less financially secure and congregate meal participants were significantly more likely to run out of money for food or transportation. Home delivered meal participants who reported they were not always able to shop, cook and feed self had significantly higher Social Network factor scores.

ADVISER'S APPROVAL: Janice Hermann