PREVALENCE AND PREDICTORS OF RECOMMENDATIONS TO LOSE WEIGHT IN OVERWEIGHT AND OBESE OLDER ADULTS IN GEORGIA SENIOR CENTERS

by

ALISON CLUNE

(Under the Direction of Dorothy B. Hausman)

ABSTRACT

This study examined the prevalence and predictors of health professional recommendations to lose weight in overweight and obese older adults in Georgia senior centers. Participants were a convenience sample (n=793, mean age 75.9; 82% female; 37% black, 36% overweight, 38% obese) and provided demographic, health, and weight loss recommendation information via interviewer administered questionnaires. Seventy percent of participants met published criteria for weight loss recommendation, and only 36.2% of them received advice to lose weight in the past year. Weight loss recommendation was significantly ($p < 0.05$) associated with high body mass index (kg/m^2), a high waist circumference, self-reported disability, younger age, and urban living. In summary, most individuals who may benefit from weight loss are not receiving advice to lose weight from a health professional. Educational programs for community dwelling older adults could increase awareness of this problem and improve health-related quality of life.

INDEX WORDS: Older adults, Overweight, Obesity, Weight Loss, Recommendation to lose weight, Older Americans Act Nutrition Program

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DEDICATION

This work is dedicated to my mother and father, Loretta and Richard Clune, for their love and support throughout this entire process. You keep me grounded and looking forward. When the edge was so close and easy to go over, you were there to keep me from falling. I am so grateful to have you for parents. If there is anything in this world that I am completely sure of, it is that I wouldn't be here and I wouldn't be this person without you.

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CHAPTER 1

INTRODUCTION

The older adult population is increasing faster than any other segment of the world population. Older adults comprised 8% of the population in 1950, 11% in 2007, and are expected to comprise approximately 22% or one fifth of the global population in 2050 (United Nations, 2007). In developed nations, such as the United States and Western Europe, this proportion is even higher: 33% (United Nations, 2007). The state of Georgia is experiencing a similar surge in the older adult population and ranks ninth among the 50 states in rate of growth for the population aged 60 and older.

The growth in this segment of the population has far reaching implications in the developed world and in the state of Georgia, especially with regard to health care. In an effort to protect the health and well-being of older adults in the community, the Older Americans Act of 1965, as amended by the US federal government in 2006, provides for grants to states for nutrition and related health services through the Older Americans Act Nutrition Program (OAANP), including congregate and home delivered meal services, nutrition screening, and nutrition education (AOA, 2006). Previous studies in Georgia revealed that OAANP participants have a particularly high prevalence of chronic conditions, including overweight and obesity (Hendrix et al., 2007, Speer et al., 2007). Chronic diseases, especially overweight and obesity, are costly and currently account for 70% of all deaths in the U.S (Heron, 2007; Wolff et al., 2002; CDC, 2009). In fact, the Federal Interagency Forum on Aging-Related statistics (2008) cited obesity as second only to smoking as a preventable risk factor contributing to mortality in the United States.

The relationship of overweight and obesity with morbidity and mortality is well established in the general adult population ($\geq$ 18 years), and weight loss therapy is the recommended treatment (NIH, 1998; Janssen, 2007; McTigue et al., 2006; Corrada et al., 2006). However, there is less evidence for the existence of this relationship in the older adult population, so the appropriateness of weight loss therapy for overweight and obese older adults is controversial. This issue is reflected in conflicting government and professional organization guidelines for weight loss treatment for overweight and obese older adults (Must et al., 1999; NIH, 1998; McTigue et al., 2006; Corrada et al., 2006; Villareal et al., 2005; Heiat et al., 2001). Therefore, the purpose of this study was to examine the prevalence and predictors of health professional recommendations to lose weight in overweight and obese older adults in Georgia senior centers who met government (National Institutes of Health, National Heart, Lung, Blood Institute) and professional organization (American Society for Nutrition and the North American Association for the Study of Obesity) criteria for weight loss recommendation.

Participants (n=793, mean age=76 years) were primarily recipients of OAANP congregate meals. Data on demographic, health, and weight loss recommendation information were collected via interviewer administered questionnaires. Based on previous studies in the general adult population, (Galuska et al., 1999; Stafford et al., 2000; Sciamanna et al., 2000) it was hypothesized that overweight and obese adults at Georgia senior centers who met ASN/NAASO and/or NIH criteria for weight loss recommendation would be inadequately (<50%) receiving advice from health care professionals to lose weight, and that disparities with regard to age, gender or educational attainment in giving recommendations may exist. The results of this study support the hypothesis, revealing that only 36.2% of participants who met published criteria for weight loss recommendation received advice to lose weight in the past year. Furthermore,

weight loss recommendation was significantly associated with demographic and health characteristics, such as urban living and self-reported disability. The findings from this study can contribute to addressing the issues of overweight and obesity in community-dwelling older adults, and thus, help to reduce overweight and obesity-associated health care costs and promote healthy aging in this growing population.

Chapter 2 is a review of the literature concerning the older adult population, community health promotion programs available to older-adults in the US, the relationship between overweight and obesity, chronic conditions, and functional impairment, and current available guidelines for overweight and obesity treatment. The review identifies other research on overweight and obesity in adults, including prevalence, evidence for treatment, and current physician treatment practices.

Chapter 3 is a manuscript that will be submitted to the *Journal of Nutrition, Health, and Aging*. This chapter includes an introduction, the methods, results, and discussion for this evaluation, and data tables.

Chapter 4 summarizes the findings of this study and presents general conclusions and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

Demographics of Older Adults

The older adult population is increasing faster than any other segment of the world population. Older adults ($\geq$ 60 years) comprised 8% of the population in 1950, 11% in 2007, and are expected to comprise approximately 22% or close to one fifth of the global population in 2050 (United Nations, 2007). In developed nations, such as the United States and Western Europe, this proportion is even higher: 33% (United Nations, 2007). By the year 2050, it is estimated that 86.7 million adults aged 65 and older will be living in the US, and 20.9 million of these adults will be aged 85 and older (NCHS, 2007). The state of Georgia is experiencing a similar surge in the older adult population and ranks ninth among the 50 states in rate of growth for the population aged 60 and older.

The growth in this segment of the population has far reaching implications in the developed world and in Georgia. The health care industry will be markedly affected, because older adults disproportionately utilize health care. For example, in 2002 older adults accounted for 13% of the total U.S. population but were responsible for 36% of total health care expenditures (Stanton, 2006). Furthermore, in 2003, the annual health care cost per Medicare enrollee was approximately $12,510 (Federal Interagency Forum on Aging Related Statistics, 2008), and total health care expenditures are estimated to increase by 25% by the year 2030.

Older Americans Act Nutrition Program and Participants

The Older Americans Act (OAA) of 1965 as amended in 2006 provides for Nutrition Service for older adults in Title III, *Grants for State and Community Programs on Aging,* Part C and Title VI, *Grants for Native Americans* (AOA, 2006). The purpose of nutrition services as defined by the act includes the promotion of health and well-being of older adults, especially those at risk of losing their independence, through access to nutrition and disease prevention and health promotion services (AOA, 2006). The Older Americans Act Nutrition Program (OAANP), established in 1972, executes this purpose through funding of state grants to support congregate and home delivered meal services, nutrition screening, nutrition education, and other health services for older adults in the community. In 2006, the OAANP provided over 1.5 million meals to participants through the congregate meals program (AOA, 2006). Under Title III, OAANP nutrition services are legally available to all individuals aged 60 years and older and their spouses and other specific populations as defined by the act, such as individuals with disabilities. OAA services, including OAANP, are targeted toward individuals "in greatest economic and or social need, with particular attention paid to low-income minorities and rural individuals" (AOA, 2006). In the fiscal year of 2006, OAA services reached approximately 40,000 individuals in Georgia of which 46.2% fell below poverty guidelines, 36.8% were minorities, and 28.7% lived in rural areas (AOA, 2006). Furthermore, OAA Title III participants are more likely to have low educational attainment, self-report poor health, have lower incomes, and have poorer physical functioning (Beauchamp & Trebino, 2007). Previous studies in Georgia have revealed similar participant characteristics as well as a particularly high prevalence of chronic conditions, including overweight and obesity (Hendrix et al., 2007, Speer et al., 2007).

The Five Georgias

The Older Americans Act Nutrition Program (OAANP) is targeted toward lower income older adults, especially minorities and individuals living in rural areas (AOA, 2006). Approximately 43% of all older adults living in rural areas of the United States live in the Southeast (Rosenthal and Fox, 2000). According to the Profile of Older Americans Act (OAA) Programs in Georgia for the fiscal year 2006, approximately 350,000 older Georgians served under the OAA live in rural areas (AOA, 2006).

Rural Growth and Rural Decline are two of the five country groupings in Georgia based on statistical definitions from the 2000 Census of the Population data set forth by the Office of Management and Budget (Bachtel, 2007). Briefly, Georgia counties are classified into the following five areas based on analysis of various population statistics: Urban, Urbanizing, Suburban, Rural Growth, and Rural Decline (Bachtel, 2007). According to these definitions, approximately 38% of counties in Georgia are rural by definition (Bachtel, 2007). Rural growth areas often attract tourism, retirees, or are the location of a military base. Counties labeled as rural decline are in economic downturn and possibly despair (Bachtel, 2007). Rural decline areas have poor infrastructure, decreasing job opportunities, and limited access to medical care (Bachtel, 2007). Older adults living in rural areas are more likely to be of lower income and lower educational attainment level, report more disability, and are more likely to self report poor health (Rosenthal and Fox, 2000). Previous studies of Georgia OAANP participants indicate that older adults living in rural areas, especially "rural decline", have higher body mass index (BMI) and poorer diet quality than their counterparts living in non-rural areas (Hendrix et al., 2007).

Studies by Rosenthal and Fox (2000), Chan et al. (2006) and Marshall et al. (2001) indicate that older adults living in rural areas face more barriers to accessing health care than do

those living in urban areas. The travel time to specialist care, which may negatively impact health care utilization, for older adults living in rural areas is estimated to be two to three times greater than that required for older adults living in urban areas (Chan et al., 2006). Furthermore, these studies found that older adults living in rural areas made fewer visits to health professionals compared with those living in urban areas (Chan et al., 2006). Understanding of the "Five Georgias'" economies, population characteristics, resources, and challenges including health care access, can help program planners of OAANP and similar programs target their efforts and meet the most critical needs of their service populations in these differing areas (Bachtel, 2007).

Overweight and Obesity Identification

Body mass index (BMI) is the most widely accepted measure of body weight status used to assess disease risk and is calculated as weight in kilograms divided by height in meters squared (kg/m^2) (NIH, 1998). The measurement provides an assessment of an individual's body weight compared to individuals of the same height. The National Institutes of Health (NIH), National Heart, Lung, and Blood Institute (NHLBI) in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (1998) established ranges of BMI to indicate four weight classes and corresponding risk for disease: underweight (BMI <18.5 kg/m^2), normal (BMI 18.5-24.9 kg/m^2), overweight (BMI 25.0-29.9 kg/m^2), or obese (BMI $\geq$ 30 kg/m^2). Waist circumference (WC), a measure of central or abdominal obesity, is also used to assess body weight status. Increasing BMI above normal ranges is associated with increasing risk for mortality and numerous diseases and WC is an independent risk factor for hypertension and cardiovascular disease (NIH, 1998).

Older Adults, Overweight, Obesity, and Chronic Disease

The prevalence of overweight and obesity is rising in the U.S. population and, especially in older adults (Must et al., 1999; Ogden et al., 2006; CDC, 2007). Currently, 40.7% of older adults in the US are overweight and 23.0% are obese (CDC, 2007). In Georgia, 40.3% of older adults are overweight and 23.4% are obese (CDC, 2007). Forty-two percent of older adults at senior centers in Georgia are obese (Speer et al., 2007). More women are obese than men, and more blacks are obese than whites (Federal Interagency Forum on Aging Related Statistics, 2008; CDC, 2007). Educational attainment level is inversely associated with obesity, with the highest rates of obesity seen in those individuals without a high school education (CDC, 2007).

Overweight and obesity are multi-factorial with genetic, metabolic, environmental, psychological, and social influences. Overweight and obesity increase one's relative risk for numerous chronic diseases including hypertension, cardiovascular disease, some cancers, type 2 diabetes, osteoarthritis, sleep apnea, dyslipidemia, and metabolic syndrome (NIH, 1998; Wannamethee and Shaper, 1999, Must et al., 1999). Chronic diseases currently account for 70% of all deaths in the U.S., and cardiovascular disease is the leading cause (Heron, 2007, CDC, 2007). Most older adults have at least one chronic disease, and older adults in Georgia senior centers have a higher prevalence of chronic disease, namely diabetes, high blood pressure, and arthritis, than those of the general older adult population in Georgia (Johnson et al., 2006).

The risk for these chronic conditions generally increases with extent of excess weight, such that obese individuals are at higher risk for chronic conditions than overweight individuals (Must et al., 1999, NIH, 1998). One study by Janssen and Mark (2006) of individuals 65 years of age and older who participated in the Cardiovascular Health Study found that obese adults are at significantly increased relative risk for osteoarthritis of the hips or knees (92%), observed

sleep apnea (48%), physical disability (51%), and type 2 diabetes (415%) compared with their normal weight counterparts. Overweight adults were also at significant risk for most of these conditions, but to a lesser extent: osteoarthritis of the hips and knees (49%), physical disability (11%), and type 2 diabetes (78%) (Janssen and Mark, 2006). A study of approximately 4500 men aged 60 to 79 years old showed significant increases in risk for hypertension and diabetes in both overweight and obese individuals, and the obese men were at significantly greater risk for heart attack, angina, and stroke (Wannammathee et al., 2004).

Older Adults, Overweight, Obesity, and Mortality

Obesity is positively associated with all-cause mortality in adults and with three of the five leading causes of death for adults aged 65 and older: cancer, heart disease, and stroke (Heron, 2007). Most studies examining the relationship between body weight and mortality in adults have demonstrated a U-shaped curve with the highest relative risks in extremely underweight and obese populations (Janssen, 2007, McTigue et al., 2006, Corrada et al., 2006). This relationship appears to dissipate with age, as an increased mortality risk associated with obesity has been demonstrated in older adults up to approximately age 75 after which the relationship is unclear (McTigue et al., 2006, Corrada et al., 2006, Villareal et al., 2005, Heiat et al., 2001). Interestingly, some studies of older adults show no increase or even a decrease in mortality risk in the overweight range of BMI (25.0-29.9) when compared to the normal weight range (20.0-24.9), which may suggest a possible protective effect of overweight in mortality for older adults (Janssen, 2007, Locher et al., 2007). Therefore, researchers of BMI and mortality in older adults generally propose a reverse J-shaped curve for the relationship between BMI and all-cause mortality, with underweight individuals at highest relative risk (McTigue et al., 2006, Corrada et al., 2006, Villareal et al., 2005, Heiat et al., 2001).

Currently, the Federal Interagency Forum on Aging-Related statistics (2006) cited obesity as second only to smoking as a preventable risk factor contributing to mortality in the United States. In 2005, 8.3% of all physician office visits by individuals 18 years of age and older were for obesity (Cherry et al., 2005). One study estimates that 19.1%, or approximately 22.5 billion dollars, of total aggregate medical spending for Medicare (US government sponsored insurance for older adults) recipients is attributable to overweight and obesity (Finkelstein et al., 2003).

Older Adults, Obesity, and Physical Function

In 2005, 37.6% of adults aged 65 and older experienced some physical limitation (CDC, 2009). While past research in older adults often focused on underweight BMI contributing to physical limitation, current research has also shown obesity to be associated with declines in physical function and increasing disability (Larrieu et al., 2004, Baumgartner et al., 2004, Jensen and Friedmann, 2002). Studies by both Jensen and Friedmann (2002) and Larrieu et al. (2004) showed a significant association in obese BMI ($\geq$ 30 kg/m^2) and report of functional decline. Furthermore, both studies showed a significant increase in risk for obese men and women to report declines in instrumental activities of daily living (IADL), including walking, traveling, preparing food, and shopping, which are functions that contribute to an individual's ability to remain in the community.

Some physical limitation associated with aging can be attributed to sarcopenia: the decline in fat free mass that is commonly seen in older adults (Roubenoff, 2000). Sarcopenia can contribute to frailty, arthritis, functional decline, and disability (Baumgartner et al., 1998). Obesity can intensify these effects because the decline in fat-free mass relative to fat mass decreases an individual's ability to support his own skeleton and thus stresses the joints (Larrieu

et al., 2004, Baumgartner et al., 2004, Villareal et al., 2004). Sarcopenic obesity is a newly recognized condition that occurs when a person with sarcopenia has an extremely high ratio of fat mass to fat-free mass (Baumgartner et al., 2004). Sarcopenic obesity is increasingly prevalent in obese older adults and can exacerbate the effects of osteoarthritis, especially that of the hips and knees (Janssen and Mark, 2006). Studies by Jensen (2004) and Larrieu et al. (2004) observed highest risks for declines in mobility, activities of daily living (ADL) (bathing, dressing, eating, etc.), and IADL in obese older adults, and this relationship was stronger for women than men. These studies did not show a significant association between overweight and declines in physical function and increasing disability.

Frailty, or generalized physical impairment and vulnerability (Rockwood, 2005), was previously thought to only occur in underweight individuals or individuals who had lost weight. However, high rates of frailty have recently been observed in the obese older adult population and older adults who have gained greater than 20 pounds in a 3 to 4 year period (Villareal et al., 2005, Jensen and Friedmann, 2002, Villareal et al., 2006). In one study, 96% of obese older adults met the criteria for mild to moderate frailty, which was associated with decreases in quality of life (Villareal et al., 2006). Despite concerns that weight loss may contribute further to frailty and declines in physical function in obese subjects, studies by Villareal et al. (2006) and Jensen et al. (2004) demonstrated that weight loss which includes exercise training and minimizes loss of fat-free mass can improve physical function and performance in obese older women. Similarly, Messier et al. (2004) demonstrated that modest weight loss resulting from a diet and exercise regimen could reduce pain and improve physical function in overweight and obese older adults with knee osteoarthritis.

Overweight and Obesity Treatment

The National Institutes of Health, National Heart Lung Blood Institute's (NHLBI) *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (1998) ("NIH *Guidelines*") indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference (WC) (women > 35 inches, men: > 40 inches). These risk factors include type 2 diabetes, established coronary heart disease (CHD), other atherosclerotic diseases, sleep apnea, osteoarthritis, gallstones, hypertension, certain cholesterol abnormalities, family history of premature CHD, and older age: men $\geq$ 45 years and women $\geq$ 55 years or postmenopausal (NIH, 1998). This recommendation is based on research that shows increases in all-cause and cardiovascular mortality for adults ($\geq$ 18 years) in these two groups that can be effectively reduced with weight loss. Weight loss in overweight and obese adults has been shown to reduce hypertension and cholesterol levels, decrease risk for type 2 diabetes and heart disease, and alleviate knee pain in subjects with knee osteoarthritis (NIH, 1998). However, less research has been conducted to confirm the effects of weight loss therapy in the overweight and obese older adult population ($\geq$ 65 years). Decreases in appetite, decline in the digestive system's ability to absorb and metabolize nutrients, and problems with teeth, gums, and swallowing commonly accompany aging and may contribute to unintentional weight loss and increased mortality risk in older adults (Corrada et al., 2006, Locher et al., 2007). Therefore, advising older adults to intentionally lose weight is controversial. Nonetheless, previous studies (Locher et al., 2007, Messier et al., 2004) have shown that intentional weight loss does not increase mortality risk in overweight and obese older adults and that intentional weight loss can have a positive effect on physical function.

The NIH *Guidelines* (1998), as written, qualify all obese older adults and overweight older adults with one risk factor (all meet older age risk factor: men $\geq$ 45 years and women $\geq$ 55 years or postmenopausal) for weight loss treatment. However, when addressing implementation of the recommendations, the NIH *Guidelines* cite older adults ($\geq$ 65 years) as a special population in which the risks and benefits of weight loss should be evaluated, and no clear recommendation for or against weight loss is made. The determination of whether or not to recommend weight loss for obese and overweight adults with risk factors is, therefore, assigned to the health practitioner.

The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) specifically addressed the issues of treatment for overweight and obesity in older adults ($\geq$ 65 years) in a position statement released in 2005 (Villareal et al.). The ASN/NAASO position statement recommends weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal, et al., 2005). Crediting a lack of evidence for increased mortality risk associated with increasing BMI in older adults and also for benefits of weight loss for obese and overweight individuals in the older adult population, ASN/NAASO does not recommend weight loss for overweight older adults with functional impairments or medical complications.

The NIH *Guidelines* (1998) identify the primary care physician as being in a unique position to diagnose, evaluate, and recommend treatment for overweight and obesity. Currently, health care professionals under-diagnose obesity in all age groups, and even with diagnosis, guidance for treatment is deficient (Galuska et al., 1999, Stafford et al., 2000, Sciamanna et al., 2000). Studies of the general adult population ($\geq$ 18 years) report that obese individuals who are

middle-aged, female, highly educated, diagnosed with type 2 diabetes, and live in the northeast are more likely to receive advice to lose weight than their counterparts of equivalent BMI who are older, male, not highly educated, have not been diagnosed with type 2 diabetes, and/or live in other geographical regions of the US (Galuska et al., 1999, Sciamanna et al., 2000, Lemay et al., 2003). Little is known regarding the current practices of health professionals in the treatment of overweight and obesity older adults.

Health Belief Model

The Health Belief Model (HBM) is a prominent conceptual framework of health behavior and serves as a guide for many public health interventions, including those previously administered through Live Healthy Georgia (LHG). The HBM proposes that an individual's health beliefs, composed of *perceived susceptibility* and *perceived severity*, contribute to his/her willingness to engage in a particular health behavior. Often, the desired health behavior reduces the risk for or complications of a particular disease or mortality. In the treatment of overweight and obesity, the desired health behavior is weight loss, because weight loss reduces the risk for all-cause mortality and complications of obesity-associated medical conditions, such as type 2 diabetes, cardiovascular disease, and sleep apnea (Must et al., 1999, NIH, 1998, CDC, 2007).

According to the HBM, before an individual will engage in a particular health behavior, he/she must believe that it is possible for him/her to have the condition (is *susceptible*) and that the disease or condition and its possible outcomes are serious (the *severity* is great) (Glanz and Rimer, 1995). In relation to a specific disease or health condition, *perceived susceptibility* involves defining populations at risk and identifying personal characteristics and/or behavior that contribute to risk (Janz and Becker, 1984). *Perceived severity* involves defining the disease, complications, and possible influences on health, mortality, and quality of life (Janz and Becker,

1984). Therefore, an obese individual must believe that he/she is overweight or obese and that personal characteristics such as excessive body weight and behaviors like poor diet and lack of exercise contribute to his/her risk for obesity. Furthermore, he/she must perceive that being overweight or obese increases the risk for mortality, obesity-related conditions and diseases, and complications of these conditions and diseases. The individual must also believe that these consequences are severe enough to impact quality of life, before he/she will attempt weight loss.

Research confirms that health beliefs are positively related to health behavior and that this relationship does not decrease with age (Ferrini et al., 1994). Nevertheless, factors such as socio-economics, symptoms, and media information can modify the impact that perceived susceptibility and severity have on an individual's willingness to engage in a particular health behavior. The likelihood of engaging in health behavior increases when external cues, such as recommendations from a physician, to engage in a health behavior are present (Janz and Becker, 1984). Thus, health professionals are in a unique position to modify the health beliefs of overweight and obese older adults and thereby influence the likelihood of engaging in behaviors that promote weight loss. Currently, physicians are insufficiently diagnosing obesity and are, therefore, missing the opportunity to enhance perceived susceptibility and severity of obesity which would contribute to the likelihood of obese individuals engaging in weight-loss promoting behavior (Stafford et al., 2000, Sciamanna et al., 2000, Simkin-Silverman et al., 2005).

Rationale, Specific Aims, and Hypothesis

Overweight and obesity increase the risk for development and complications of chronic conditions that are the cause of death for so many older adults. Furthermore, obesity increases the risk for all-cause mortality. According to recommendations from the National Institutes of Health (NIH), National Heart Lung Blood Institute's (NHLBI) *Clinical Guidelines on the*

Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (1998) ("NIH *Guidelines*") and a position statement by the American Society for Nutrition (ASN) and North American Association for the Study of Obesity (NAASO) (Villareal et al., 2005), health professionals should be diagnosing, evaluating, and communicating treatment strategies for overweight and obese older adults with obesity-related chronic conditions and/or functional impairments. However, previous research indicates that health care professionals inadequately recommend weight loss treatment for obese adults or target weight loss advice only to selected groups, such as younger adults and the well-educated. Few studies have examined the prevalence and predictors of health professional recommendations to lose weight in overweight and obese older adults.

OAANP participants in Georgia senior centers are an excellent population to study because they embody many of the characteristics associated with decreased levels of obesity diagnosis and weight-loss advice from health professionals: older age, low educational attainment levels, and living in the Southeast. Furthermore, the high prevalence of obesity, functional impairment, and chronic disease, suggest that many overweight and/or obese OAANP participants should be advised to lose weight according to the NIH *Guidelines* (1998) and ASN/NAASO recommendations. In addition to determining the prevalence of health professional recommendations to lose weight in this population, the current study will explore possible predictors, including demographic and health characteristics, of recommending weight loss to OAANP participants who meet the ASN/NAASO (Villareal et al., 2005) and/or NIH *Guidelines* (1998) criteria for weight loss recommendation.

We hypothesize that overweight and obese OAANP participants who meet the ASN/NAASO and/or NIH *Guidelines* (1998) criteria for weight loss recommendation are

inadequately (<50%) receiving advice from a health care professional to lose weight and that disparities with regard to age, gender or educational attainment in giving recommendations may exist. The first specific aim of this study is to determine the prevalence of health professional recommendations to lose weight in subgroups of overweight and obese participants meeting ASN/NAASO and/or NIH criteria. The second specific aim is to determine the prevalence of health professional recommendations to lose weight in subgroups of overweight and obese participants by gender, race/ethnicity, degree of ruralness, and educational attainment level. The third specific aim is to determine potential predictors, including demographic and health factors, of health professional recommendations to lose weight in subgroups of overweight and obese participants.

CHAPTER 3

PREVALENCE AND PREDICTORS OF RECOMMENDATIONS TO LOSE WEIGHT

IN OVERWEIGHT AND OBESE OLDER ADULTS IN GEORGIA SENIOR CENTERS[1]

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Abstract

Objectives

The purpose of this study was to examine the prevalence and predicting factors of doctor or health professional recommendations to lose weight in overweight and obese older adults in Georgia senior centers who met the North American Society for the Study of Obesity (ASN/NAASO) and/or the National Institutes of Health, National Heart Lung Blood Institute's (NIH) criteria for weight loss recommendation.

Design

Cross-sectional.

Setting

General community; State of Georgia, USA.

Participants

Community-dwelling convenience sample (n=793, mean age 75.9; 82% female; 37% black) recruited as part of the "Live Healthy Georgia" (LHG) program.

Measurements

Demographic, health, and weight loss recommendation information obtained via interviewer administered questionnaires.

Results

69.4% of participants met ASN/NAASO and/or NIH weight loss criteria, and only 36.2% of them received advice to lose weight in the past year. Report of doctor or health care professional weight loss recommendation was 52.5% for obese participants with risk factors and 19.9% for overweight participants with risk factors. Recommendation to lose weight was significantly ($p< 0.05$) associated with high body mass index (BMI, kg/m^2), self-reported

disability, younger age, and living in an urban area. Unadjusted logistic regression models indicated that recommendation to lose weight was significantly associated with several weight-related chronic conditions. When controlled for other health and demographic factors, recommendation to lose weight was significantly associated only with heart disease, but not with other chronic conditions including diabetes, hypertension or joint pain.

Conclusions

Most individuals who may benefit from weight loss are not receiving advice to lose weight from a health professional. LHG and other educational intervention programs for community dwelling older adults could increase awareness of this problem and improve health-related quality of life.

KEYWORDS: Older adults, overweight, obesity, and weight loss.

Introduction

By 2050, older adults ($\geq$ 60 years) will comprise approximately 33% of the total population in the United States and Europe (United Nations, 2007). The state of Georgia ranks ninth in the US in growth rate of the population aged 60 and older. Previous studies revealed that community-dwelling older adults receiving nutrition and related health services through Older Americans Act (AOA, 2006) grant programs in Georgia senior centers have a particularly high prevalence of chronic conditions, and that approximately 70% of older adults in Georgia senior centers are overweight or obese (Hendrix et al., 2007, Speer et al., 2007).

The relationship of overweight and obesity with morbidity and mortality is well established in the general adult ($\geq$ 18 years) population, and weight loss therapy is the recommended treatment (NIH, 1998, Janssen, 2007, McTigue et al., 2006, Corrada et al., 2006). Overweight and obese older adults ($\geq$ 65 years) are also at high risk for morbidity, including type 2 diabetes,

osteoarthritis, and physical disability, and studies show that weight loss which includes exercise training and minimizes loss of fat-free mass can improve obesity related co-morbidities and physical function in older adults (Villareal et al., 2006, McTigue, 2006, Jensen, 2004, Messier et al., 2004). Studies of mortality in older adults show no increase or even a decrease in mortality risk in the overweight range of BMI (25.0-29.9) when compared to the normal weight range (20.0-24.9) (Janssen, 2007, Locher et al., 2007). Because older adults are also at risk for unintentional weight loss, controversy exists over the appropriateness of recommending weight loss to this group.

The National Institutes of Health (NIH), National Heart Lung Blood Institute's (NHLBI) *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity* (1998) ("NIH Guidelines") recommend weight loss for all obese older adults and all overweight older adults, or those with a high waist circumference (women > 35 inches; men > 45 inches), with one or more risk factors (type 2 diabetes, high blood pressure, heart disease, etc.). The American Society for Nutrition and The North American Association for the Study of Obesity (ASN/NAASO) recommend weight loss only for obese older adults with weight-related co-morbidities and/or functional limitations (Villareal et al., 2005). These varying guidelines leave health professionals in a difficult position to determine appropriate treatment for overweight and obese older adults.

Therefore, the purpose of this study was to examine the prevalence and predictors of health professional recommendations to lose weight in overweight and obese older adults in Georgia senior centers who met NIH (1998) and ASN/NAASO (Villareal et al., 2005) criteria for weight loss recommendation. Based on previous studies in the general adult population (Galuska et al., 1999, Stafford et al., 2000, Sciamanna et al., 2000, Lemay et al., 2003), it was hypothesized that

obese and overweight adults at Georgia senior centers who met ASN/NAASO and/or NIH criteria for weight loss recommendation would be inadequately (<50%) receiving advice from health care professionals to lose weight, and that disparities with regard to age, gender or educational attainment in giving recommendations may exist. The findings from this study can contribute to addressing the issues of overweight and obesity in community-dwelling older adults, and thus, help to reduce overweight and obesity-associated health care costs and promote healthy aging in this growing population.

Methods

Sample

In the fall of 2007, wellness coordinators, senior center directors, and their staff recruited older adults across the 12 Area Agencies on Aging (AAA) of Georgia to participate in a nutrition education program, Live Healthy Georgia (LHG). Similar to previous studies (Bell et al., 2009, Fitzpatrick et al., 2007, Hendrix et al., 2007, Penn et. al, 2009), this process resulted in a convenience sample of 815 individuals ages 50 years and older from the 12 AAAs. Most subjects were recipients of Older Americans Act Nutrition Program (OAANP) congregate meals. Homebound elders were excluded. As per interviewer assessment, individuals unable to understand the written consent, answer questions, or participate in the educational program were excluded from the sample. Written informed consent was obtained from all participants included in the sample, and the Institutional Review Boards of the University of Georgia and the Georgia Department of Human Resources approved all procedures.

The recruited sample of 815 older adults is 37% black, 81% female, and the average age is approximately 76 years (mean= 75.5, SD= 8.2). Of the 815 participants, 798 were at least 60 years of age at pre-test, and of those individuals 793 completed interviewer administered

questionnaires including answering question 80 (WQ80): "In the past year, have you been told by a doctor or health care professional to reduce your weight?" (0 = no, 1 = yes).

Questionnaires

The questionnaires for the 2007-2008 Live Healthy Georgia (LHG) Study are updated versions of questionnaires administered to LHG participants in previous years. Experts in nutrition and physical activity (faculty members and registered dietitians in the Department of Foods and Nutrition, University of Georgia, and the Georgia Division of Aging Services) reviewed and edited the pre-test questionnaires (health, nutrition, physical activity and physical function) to ensure content validity and cultural appropriateness based on their collective experience working with the target population (Bell et al., 2009, Fitzpatrick et al., 2007, Hendrix et al., 2007). Input from the Division of Aging Services staff and the wellness coordinators was solicited and incorporated into the questionnaires. Dorothy Hausman PhD, Mary Ann Johnson, PhD, and Alison Clune, BSFCS designed the questions pertaining to weight management (# 76-83c., Appendix A). These questions were adapted from validated questions regarding weight management from the Behavioral Risk Factors Surveillance System (CDC), the National Health and Nutrition Examination Survey III (CDC, 2005-2006), and the National Ambulatory Medical Care Survey (NAMCS) (CDC, 2005) and from previous research concerning self-reported weight status and physician or health care professional recommendations to lose weight (Galuska et al., 1999, Stafford et al., 2000, Sciamanna et al., 2000). Questionnaires are available online.

For each participant, approximately one hour was required to explain the study, obtain informed consent, and complete the questionnaire. In each AAA, trained staff read the questions to participants and recorded their responses (Bell et al., 2009, Fitzpatrick et al., 2007, Hendrix et al., 2007). Assessments included demographic information, general health including current

illnesses (yes/no, diabetes, high blood pressure, heart disease, high cholesterol, and joint pain), physical function and anthropometrics (height, weight, and waist circumference).

Classifications

According to census data analysis conducted by the US Office of Management and Budget Categorization (2000) and expanded upon by Bachtel (2007), the counties in Georgia are grouped into five areas, the Five Georgias: Urban, Urbanizing, Suburban, Rural Growth, and Rural Decline. Briefly, each area has a distinct pattern of population change during the 1970 to 1990 time period and displays certain economic and social characteristics (Bachtel, 2007). Urban and rural areas are studied in contrast (Bachtel, 2007).

Height and weight were either measured (height: 37.8%, weight: 82.9%) or self-reported (height: 62.2%, weight: 17.1%). Body Mass Index, the chosen measure of body fatness used in the National Institutes of Health (NIH) National Heart Lung Blood Institute (NHLBI) *Clinical Guidelines for the Identification, Evaluation, and Treatment of Overweight and Obesity* (1998, "NIH *Guidelines*"), was calculated using the formula: BMI = [weight (lb) /height (in^2)] x 703. Based on this calculated BMI (kg/m^2) individuals were identified as one of the weight classifications defined by the NIH: (<18.5 = underweight; 18.5-24.9= normal; 25.0-29.9 = overweight; $\geq$ 30 = obese). Obese participants (BMI $\geq$ 30 kg/m^2) were further classified into three categories by BMI (kg/m^2): 30.0-34.9 = obese class I; 35.0-39.9 = obese class II; $\geq$ 40 = obese class III or extreme obesity (NIH, 1998). In addition to BMI, waist circumference (WC) was used to measure body fatness. Following the guidelines of the NIH, waist circumference was assessed using a tape measure either over (90.1%) or under (9.9%) the participant's clothes (Penn et al., 2009). The NIH *Guidelines* define a waist circumference of greater than 35 inches

for women and greater than 40 inches for men as "high risk" and in this study a high risk waist circumference is also referred to as "a risk qualified waist circumference".

Participants reported the presence of obesity associated medical conditions by responding "yes" to the questions regarding diabetes ("Do you have diabetes?"), high blood pressure ("Do you have high blood pressure?"), heart disease ("Do you have heart disease such as angina, congestive heart failure, heart attack or other heart problems?"), and high cholesterol ("Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is high?") (Appendix A). Participants also reported the presence of joint pain by responding "yes" to the question regarding joint pain: "During the past 30 days, have you had symptoms of pain, aching, or stiffness in or around a joint?" (Appendix A).

Participant's physical function was objectively assessed with the Short Physical Performance Battery test (SPPB) (Guralnik et al., 1994).   Poor performance on this test has been shown to predict future nursing home placement, disability and death (Guralnik et al., 1994). The SPPB test measures older adults' mobility by measuring the three categories of balance, strength, and gait speed as an individual performs a standing balance, chair stands, and an 8-foot walk, respectively, with performance in each category scored on a scale of 0 to 4. A summary score is calculated, ranging from 0 to 12, where higher scores indicate higher performance: poor function (0 to 5), moderate function (6 to 9), and good function (10 to 12) (Guralnik et al., 1994). In this study, the categorized SPPB score is referred to as "physical function". Disability refers to difficulty or an inability to perform socially defined roles or tasks in areas such as employment, education, community living, and self-care (Nagi, 1976). Participants self-reported disability due to weight by a response of "yes" to weight question 79 (WQ79): "Does your current weight

affect your ability to do daily activities such as walk, do housework, shop, etc.?" (Appendix A). In this study, WQ79 is referred to as "self-reported disability".

For the purpose of assessing factors predicting weight loss advice from a health professional, a subset of overweight/obese individuals were identified who met the criteria for weight loss recommendation outlined by the American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) *Technical Review and Position Statement* (Villareal et al., 2005) and/or the NIH *Guidelines* (1998) (Group 1, n=550). The NIH criteria for weight loss are: classification by BMI (kg/m^2) as obese ($\geq$ 30.0), classification by BMI (kg/m^2) as overweight (25.0-29.9) plus presence of two risk factors, or having a high risk qualified waist circumference plus the presence of two risk factors (NIH, 1998). Risk factors indicated in the NIH *Guidelines* (1998) and reported in our questionnaire include older age (>45 years for men, >55 years for women (or postmenopausal)), diabetes, high cholesterol, high blood pressure, and heart disease, (NHLBI 1998) (Appendix A). The ASN/NAASO criteria for weight loss recommendation (Villareal et al., 2005), which are more conservative than the NIH criteria, are: classification by BMI as obese (kg/m^2) ($\geq$ 30.0) plus presence of one risk factor or functional impairment (Villareal et al., 2005). The ASN/NAASO criteria refer to risk factors as "metabolic complications that can benefit from weight loss" (Villareal et al., 2005). Risk factors indicated in the ASN/NAASO *Technical Review and Position Statement* (Villareal et al., 2005) and reported in our questionnaire include diabetes, high blood pressure, high cholesterol, heart disease, and joint pain (Appendix A). A physical function summary score that indicates poor function (SPPB: 0 to 5) (Guralnik et al., 1994) was used to identify individuals with functional impairment.

To examine the factors predicting weight loss recommendation by severity of overweight, we subsequently divided Group 1 into two subgroups: Group 2: individuals meeting both the NIH and the ASN/NAASO criteria (obese with risk factor or functional impairment, n=276), and Group 3: individuals meeting only the NIH criteria (overweight with risk factor or obese without risk factor, n=272). Two individuals included in Group 1 were excluded from the subdivision due to missing data and a resulting inability to classify them as belonging to Group 2 or Group 3.

The following question (Appendix A, WQ80) was used to determine incidence of physician or other health care professional recommendations to lose weight: "In the past year, have you been told by a doctor or health care professional to reduce your weight?" Possible answers were: yes, no, don't know/not sure, or refused. An answer of "yes" corresponds to having received advice to lose weight, and these individuals were defined as "weight-loss advised". An answer of "no" corresponded to not having received advice to lose weight. This question was adapted from validated questions used in the CDC (2007) and studies by Sciamanna et al. (2002), Scheiman et al. (2007), and Simkin-Silverman et al. (2005).

Statistical Analysis

The questionnaires were sent to the University of Georgia for analysis. Data was coded and entered into secure files with access restricted to key personnel and was analyzed using the Statistical Analysis System (SAS, Version 9.1, SAS Institute, Cary, NC). Descriptive statistics, including frequencies, means, and standard deviations were calculated. Categorical data within each subset of the sample (Group 1, n=550; Group 2, n=276; Group 3, n=272) was explored using chi-square analyses. Unadjusted logistic regression analyses were used to determine odds ratios (OR) for the various chronic conditions and their association with the variable of interest (WQ80). Multivariate logistic regression analyses and stepwise regression analyses were used to

identify factors, such as demographics and presence of risk factors that influence receipt of advice to lose weight from a health care professional. *P<0.05* was considered statistically significant relationships.

Results

Of the 815 participants recruited into the study, 793 were ages 60 years and older and completed the questionnaire including WQ80: In the past year, have you been told by a doctor or health care professional to reduce your weight? (0 = no, 1 = yes). Of the participants age 60 years and older, unpaired t-tests revealed that there were no significant differences in age, education, and BMI (kg/m^2), between completers of WQ80 (n=793), Total Live Healthy Georgia (LHG) population and non-completers of WQ80 (n=5, not shown). Non-completers (n=5) were all female, 60% black, and each of the five areas of Georgia (Bachtel, 2007) was represented by one participant (data not shown). Comparatively, the non-completers (n=5) reported more diabetes (60%) and high blood pressure (100%), but less heart disease (20%), less high cholesterol (40%), and had better physical function (20% good, 80% moderate). The total LHG population (n=793) had a mean age of 75.9 years (SD 7.8) and were 82% female, 37% black, had a mean educational attainment of 10.5 years (SD 3.3), 26% lived in counties identified as urban, and 24% lived in counties identified as rural (Bachtel, 2007) (Table 3.1). Ninety five percent (n=759) of these individuals provided a measured or self-reported height and weight from which Body Mass Index (BMI) was calculated, and the mean BMI was 29.4 kg/m^2 (SD 6.6).

Factors predicting weight loss advice from a health professional (WQ80) were subsequently examined in subsets of the LHG population (**Table 3.2**): Group 1= those who met the American Society for Nutrition and the North American Association for the Study of Obesity (ASN/NAASO) and/or the National Institutes of Health (NIH) criteria for weight loss

recommendation (n=550) , Group 2= those who met both the ASN/NAASO and the NIH criteria for weight loss recommendation (n= 276), and Group 3= those who met the NIH criteria for weight loss recommendation but did not meet the ASN/NAASO criteria for weight loss recommendation (n=272) (NIH, 1998 and Villareal et al., 2005) (**Table 3.2**). Receiving advice to lose weight from a health professional was determined by the participant's response to WQ80: "In the past year, have you been told by a doctor or health care professional to reduce your weight?" (0 = no: Not Advised, 1 = yes: Advised).

In bivariate analysis of Group 1 (n=550) (**Table 3.2**), Chi-square analysis and unpaired t-tests revealed that receiving advice to lose weight (WQ80) was significantly ($p<.05$) associated with demographic characteristics: age (Not advised: mean 76.8 years, SD 7.5; Advised: mean 71.8 years, SD 6.7), ethnicity, and living in an urban area. Receiving weight loss advice was also significantly associated with measures of body fatness: BMI (Not advised: mean 29.9 kg/m^2, SD 4.1, Advised: mean 35.4 kg/m^2, SD 5.9; $p<.0001$) and having a risk qualified waist circumference ($p<.001$). Report of diabetes, heart disease, high cholesterol, and joint pain were significantly related to receiving advice to lose weight. Both the physical function measure and the self-reported disability (WQ79) measure were significantly related to receiving advice to lose weight.

In bivariate analysis of Group 2 (n=276), receiving advice to lose weight was not significantly associated with gender or ethnicity, but was significantly associated with age (Not advised: mean 74.5 years, SD 7.5; Advised: mean 71.3 years, SD 6.3), degree of ruralness (Bachtel, 2007), and living in an urban area (Table 3.2). Receiving advice to lose weight was also related significantly ($p<.05$) to BMI (Not advised: mean 34.0 kg/m^2, SD 3.7; Advised: mean 38.0 kg/m^2, SD 5.9), report of diabetes and heart disease, and self-reported disability (WQ79).

In Group 3 (n=272), bivariate analysis revealed that receiving advice to lose weight was not significantly associated with gender, ethnicity, education, degree of ruralness, or living in an urban area, (**Table 3.2**). Receiving advice to lose weight was significantly associated with age (Not advised: mean 78.2 years, SD 7.1; Advised: mean 72.9, SD 7.5; p<.0001) and BMI (Not advised: mean 27.5 kg/m², SD 1.5; Advised: mean 28.4 kg/m², SD 1.9; p<.01). Receiving advice to lose weight was significantly (p<.05) related to having a risk qualified waist circumference, report of high cholesterol, physical function, and self-reported disability (WQ79).

Logistic regression analyses exploring possible predictors of receiving advice to lose weight (WQ80: 1=yes: Advised) were subsequently performed within all groups (**Table 3.3-3.6**). The various regression models included only participants within each group who provided answers to all questions regarding selected demographic (age, gender, race, education, urban/rural) and health (BMI, waist circumference, diabetes, heart disease, high blood pressure, high cholesterol, joint pain, physical function and self reported disability) characteristics in the questionnaire (Group 1, n=500; Group 2, n=252; Group 3, n= 248) (**Table 3.3-3.6**). Individuals excluded from the final regression model due to missing values (n=50) were significantly more likely than those included in the model to be black (p<.001), have lower levels of educational attainment (Included: mean= 10.7 years, SD=3.0; Excluded: mean= 8.5 years, SD 4.5; p<.01), live in an urban area (p<.05), and have moderate physical functioning (p<.01) (Data not shown). There were no significant differences between those included in the regression models (n=500) and those excluded from the models (n=50) with regard to age, gender, BMI, waist circumference, or report of chronic conditions.

Unadjusted regression models exploring each individual chronic condition and its relationship with receiving advice to lose weight from a health professional revealed that in

Group 1 (n=500) (Table 3.3) weight loss advice was 1.5 to 5 times more likely among those with heart disease, high cholesterol, or joint pain (>1.5-fold increase), diabetes (>2-fold increase), or self-reported disability (5-fold increase). When adjusting for demographic variables (age, gender, race, education, urban/rural), high cholesterol was no longer significant (p=.06) in predicting the variable of interest, WQ80. Further adjustment for BMI revealed that weight loss advice from a health professional was more likely among those with heart disease (>1.5-fold increase) and self-reported disability (>2.5-fold increase) (Table 3.3).

Within Group 1 (n=500) (Table 3.6), the fully adjusted logistic regression model indicated that when controlling for other demographic and health variables receiving advice to lose weight was independently and significantly related to increasing BMI (kg/m^2) (p<.0001), younger age (p<.01), self-reported disability (WQ79) (p<.01), and living in an urban area (p<.05) (Table 3.6). A step-wise logistic regression analysis (**Table 3.7**) of Group 1 at the 0.05 significance level indicated four variables that were predictive of receiving advice to lose weight: BMI (kg/m^2) (p<.0001), age (p<.0001), self-reported disability (p<.001), and living in an urban area (p<.05). At a 0.10 significance level, two additional variables were indicated: heart disease (p=0.07) and having a risk qualified waist circumference (p=0.09).

Within Group 2 (n=252) (**Table 3.4**) unadjusted regression models exploring each individual chronic condition and its relationship with receiving advice to lose weight revealed that weight loss advice from a health professional was 1.5 to 3.5 times more likely among those with diabetes or heart disease (>1.5-fold increase), or self-reported disability (>3-fold increase). When adjusting the individual models for demographic variables (age, gender, race, education, urban/rural), diabetes was no longer significant (p=.06) in predicting the variable of interest, WQ80. In models that included the demographic variables, BMI, and the selected chronic

conditions, those with heart disease and self-reported disability were more than 2 times as likely to receive weight loss advice (**Table 3.4**).

Within Group 2 (n=252), the fully adjusted logistic regression model indicated that receiving advice to lose weight was independently and significantly related to increasing BMI (kg/m^2) ($p<.0001$), living in an urban area ($p<.01$), self-reported disability (WQ79) ($p<.05$), and heart disease ($p<.05$) (**Table 3.6**). A second step-wise regression analysis of Group 2 (Table 3.8) at the 0.05 significance level indicated five variables that were predictive of receiving advice to lose weight: BMI ($p<.0001$), self-reported disability (WQ79) ($p<.01$), living in an urban area ($p<.01$), heart disease ($p<.05$), and age ($p<.05$). Stepwise regression analysis at a significance level of 0.10 for entry into the model indicated no additional variables.

In Group 3 (n=248) (**Table 3.5**), unadjusted regression models exploring each individual chronic condition and its relationship with WQ80, revealed that advice to lose weight from a health professional was 2 to 4 times more likely among those who self-reported disability (>4-fold increase). When adjusting for demographic variables (age, gender, race, education, urban/rural), self-reported disability remained significant ($p=.06$) in predicting the variable of interest, WQ80. In a model adjusting for demographic variables and BMI, weight loss advice was more likely among those with high cholesterol (>2-fold increase) or self-reported disability (>3-fold increase).

Within Group 3 (n= 248), the fully adjusted logistic regression model indicated that receiving advice to lose weight was independently and most significantly related to younger age ($p<.01$) (**Table 3.6**). In this model, receiving advice to lose weight was also independently and significantly related to increasing BMI, having a risk qualified waist circumference, and self-reported disability, WQ79 ($p<.05$). A step-wise regression analysis of Group 3 (**Table 3.9**) at

the 0.05 significance level indicated four variables that were predictive of receiving advice to lose weight: age (p<.0001), BMI (p<.01), self-reported disability (WQ79) (p<.05), and having a risk qualified waist circumference (p <.05). At a 0.10 significance level for entry, stepwise regression analysis indicated high cholesterol (p=0.07) as an additional variable predictive of receiving weight loss recommendation.

Discussion

The purpose of this study was to examine the prevalence and predicting factors of doctor or health professional recommendations to lose weight in overweight and obese Older Americans Act Nutrition Program (OAANP) participants in Georgia senior centers who met the American Society for Nutrition and the North American Society for the Study of Obesity (ASN/NAASO) and/or the National Institutes of Health, National Heart Lung Blood Institute's (NIH NHLBI) criteria for weight loss recommendation. The results of this study confirmed our hypothesis that health professionals are recommending weight loss to less than half (36.2%) of the older adults in this population who meet the ASN/NAASO or NIH criteria (Group 1: n=550, 48% overweight, 52% obese). Our findings indicate that report of doctor or health professional weight loss recommendation is higher in the obese with risk factors (52.5%) than the overweight with risk factors (Group 3) (19.9%), and in agreement, increasing BMI was positively related to receiving advice to lose weight in all analyses within groups. Of the other demographic and health variables we explored, younger age, self-reported disability, and living in an urban area were most associated with receiving advice to lose weight. To our knowledge, this is the first study to examine report of doctor or health professional recommendations to lose weight by older adults (≥ 60 years) who meet ASN/NAASO and/or NIH criteria for weight loss recommendation.

The ASN/NAASO criteria are specifically targeted toward older adults and are more cautious in recommending weight loss (Villareal et al., 2005). The ASN/NAASO criteria indicate weight loss for obese older adults with chronic conditions or functional impairment. The NIH criteria for weight loss (NIH, 1998), intended to address all adults (≥ 18 years), indicate weight loss for all obese individuals, regardless of health or functional status, and also include overweight adults with risk factors for chronic conditions. Therefore, we explored relationships between demographic and health variables and predictors of recommendations to lose weight within subsets of the sample (n=793), based on the ASN/NAASO or NIH criteria met: Group 1: those who met the either ASN/NAASO or NIH criteria, (n=550: 48% overweight, 52% obese); Group 2: those who met the ASN/NAASO and NIH criteria, (n=276, 100% obese); and Group 3: those who met NIH criteria only, (n=272; 97% overweight, 3% obese). According to our analysis, most of the resulting statistically significant predictors were similar across groups. However, the study design did not lend itself to direct comparison between groups.

One of the major findings of this study was that the self-reported disability measure (WQ79): Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc? (No=0, Yes=1) emerged as a significant predictor of receiving advice to lose weight within all groups meeting the various combinations of weight loss criteria (Group 1: NIH and/or ASN/NAASO, Group 2: NIH and ASN/NAASO, Group 3: NIH only). Previous studies of older adults (Guralnik et al., 1994) ascertained that the Short Physical Performance Battery (SPPB) score, an objective measure, was a more useful measure of physical function than was a subjective (self-report) measure. In our study, advice to lose weight was more consistently associated with the self-reported (subjective) disability measure (WQ79) than with the objective physical function (SPPB) measure. Due to the complexity and possible variability

in administration of the SPPB, our results of the SPPB may be flawed and further, this objective measure may be impractical for use in a non-medical community setting such as ours. Nonetheless, health professionals need a measure to identify the individuals that may be experiencing the functional limitation criteria described by the ASN/NAASO position statement, and thus, determine whether or not to recommend weight loss. Based on our findings, a subjective or self-report measure of disability, like WQ79 may be a relatively practical way to screen for limitations in independent functioning due to weight and thus, identify overweight and obese older adults who might benefit from weight loss therapy.

Another major finding of this study was the significant inverse association between age and receiving advice to lose weight. We anticipated this finding based on conclusions of previous studies that the beneficial effects of weight loss on morbidity and mortality in overweight and obese adults may not apply to those aged 75 years and older, (Villareal et al., 2005; Corrada et al., 2006; Locher et al., 2007). The only instance in which age was not a significant predictor of receiving advice to lose weight was in the logistical regression analysis of Group 2 (obese with risk factor or functional impairment). It is possible that these individuals are at such high risk of morbidity and mortality because they are more obese and have at least one risk factor that the benefits exceed the age-related risks of weight loss in this group.

Although previous studies report that obese individuals who are female and highly educated are more likely to receive advice to lose weight (Galuska et al., 1999, Sciamanna et al., 2000, Simkin-Silverman et al., 2004), our study did not confirm gender, race or education to be significantly related to receiving weight loss advice. Our study population is 81.5% female (n=646), which limits our power to detect significant differences between genders. Therefore, in a larger population with a higher percentage of males, gender may become statistically

significant. Because the OAANP targets individuals at greatest economic need, OAANP participants, and thus our study participants, are more likely to be of lower educational attainment level (Bell et al., 2009, Beauchamp and Trebino, 2007). Therefore, in a population where the mean educational attainment level is high school graduate or higher (our study: years of school completed: mean 10.5 years, SD 3.3) or in a group that is more educationally diverse, education may become statistically significant.

Receiving advice to lose weight also appeared to be related to living in an urban area. Participants living in urban areas tended to be black (Urban: 62.4%; Non-urban: 30.0%), and have a statistically significant higher mean education (Urban: 10.9 years, SD 3.3; Non-urban: 10.4 years, SD 3.4). However, when controlling for other variables, neither race nor education were independently predictive of receiving advice to lose weight. Participants living in urban areas were more likely to have a risk qualified waist circumferences (Urban 61.0%; Non-urban 47.1%), but there were no significant differences in other risk factors. Previous studies of urban and rural older adults (Rosenthal and Fox 2000, Chan et al., 2006, Marshall et al., 2001) indicate that older adults living in rural areas face more barriers to accessing health care than do those living in urban areas, and older adults living in rural areas make less visits to the health care professional than do older adults living in urban areas (Chan et al., 2006). Because there is not a considerable contrast in prevalence of disease between study participants from urban and non-urban areas, we hypothesize that better access to health care, such as mass transit systems commonly available in urban, but not in non-urban areas or rural, areas may contribute to the higher prevalence of weight loss recommendation in this group. However, future research is needed in this area to explore this hypothesis.

In addition to demographic variables, previous research has indicated that chronic conditions are associated with advice to lose weight in younger populations (Galuska et al., 1999, Stafford et al., 2000, Sciamanna et al., 2000). Research provides evidence that glucose tolerance in overweight/obese older adults with type 2 diabetes, high blood pressure, high cholesterol, and joint pain associated with osteoarthritis can be improved with weight loss therapy (Wannamethee and Shaper, 1999, Corrada et al., 2006, Villareal et al., 2006, Locher et al., 2007). Our results indicate these obesity-associated chronic conditions as only moderately associated with receiving advice to lose weight. Un-adjusted regression analyses within each group revealed diabetes, heart disease, high cholesterol, and joint pain were significantly associated with advice to lose weight in at least one of three groups. However, when adjusting for demographics and BMI, only heart disease remained (Group 1, Group 2) significant. Furthermore, heart disease was the only chronic condition in the fully adjusted model to significantly increase the likelihood of receiving advice to lose weight (Table 3.6). Although studies show that weight loss in obese older adults can decrease blood pressure levels improving coronary heart disease risk factors (Villareal et al., 2006) high blood pressure was not significantly related to receiving a weight loss recommendation. These results may imply that physicians possibly view established heart disease in older adults as a more critical risk to address with weight loss therapy than the risk factors of heart disease, such as high blood pressure, high cholesterol, and diabetes. Future studies may wish to explore which individual obesity related co-morbidities are associated with weight loss advice and why.

This study is not without limitations. The use of self-reported height and weight and possible errors in measurement of waist circumference (WC) is a limitation. Previous studies (Sayhoun et al., 2008, Gunnell et al., 2000, Rowland, 1990) show that self-reported height and

weight may be inaccurate when compared to measured height and weight, and that the extent of inaccuracy increases with increasing age and BMI. Using self-reported height and weight, we may have classified some individuals as overweight when they were, in fact, obese. This may result in the exclusion of some participants who are borderline obese and an underestimation of obesity prevalence. Nonetheless, differences between self-report and measured height and weight are often too small to influence overall calculation of BMI and resultant classification of weight status (Sayhoun et al., 2008, Gunnell et al., 2000, Rowland, 1990). When a correction factor was applied to the study participants' BMI, mean corrected BMI was higher than uncorrected BMI and prevalence of obesity was lower in uncorrected compared to the corrected BMI (Penn et al., 2009). The mean WC was slightly lower in both men and women when a correction factor was applied (Penn et al., 2009). However, the relationships of BMI or WC with obesity-associated comorbidities were similar for the uncorrected and the corrected measures (Penn et al. 2009).

The ambiguous language in some of the questions is another limitation. First, our question related to weight loss advice (WQ80) asks whether the individual received a recommendation to lose weight by a doctor or health care professional in the past year. However, from the information gathered, it is not known if the participant had seen a doctor or health care professional within this time period. This issue was addressed in a subsequent, though smaller, study in the Northeast Georgia OAANP participants who are similar in demographics and health status to those of the present study (Bengle et al., 2009, unpublished data). For that study, the participants were first asked: "In the past 12 months, has a doctor, nurse or other health professional given you advice about your weight?" If the participant responded, "No," interview administrators were directed to continue to ask a second question to

clarify: "If no, then was this because: 1) Did not see a doctor, nurse or other health professional, 2) Did not receive advice about your weight, 7) Don't Know, 9) Refused, (Bengle et al., 2009, unpublished data). In this group, of the individuals who answered "No," (n=97), only 5 % reported that this was because: "Did not see a doctor, nurse, or other health professional" (Bengle et al., 2009, unpublished data).

The question regarding high cholesterol asks: "Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is high?" Therefore, the response does not account for individuals who have resolved cholesterol problems, and thus, our percentages may be inflated. Similarly, question 13 regarding joint pain asks: "During the past 30 days, have you had symptoms of pain, aching, or stiffness in our around a joint?" (Appendix A). Research demonstrates that obesity is related to osteoarthritis (OA) of the knees and possibly other weight bearing joints such as the hips, and joint pain is the most common symptom of knee OA (Janssen and Mark, 2006, Merk and Co. Inc., 2008). Therefore, using joint pain as an indicator of OA may have inflated the prevalence of diagnosed osteoarthritis in this population. However, we also may have underestimated the prevalence of osteoarthritis because of the time restraint (30 days) included.

Lastly, generalizations of the findings of this study may be applicable only to congregate meal participants of OAANP programs in Georgia. Nonetheless, the participants in this program share many of the same characteristics as the general community-dwelling older adult population who are trying to manage chronic disease and maintain physical function. Therefore, the findings of this study could be valuable to health professionals working with older adults, caregivers and families who help older adults maintain health-related quality of life, and obese older adults themselves who must advocate for their own medical care. Furthermore, gaps in

knowledge and disparities may be addressed by various educational intervention programs targeted at community dwelling older adults to increase awareness of overweight and obesity associated health risks and thus, promote increased health-related quality of life.

Table 3.1 Selected Participant Characteristics: Total Live Healthy Georgia Population and those meeting NAASO and/or NIH criteria for weight loss recommendation: Georgia Senior Centers, 2007 [1,2]

Variable	n	Total LHG Population % or Mean (SD)	n	Group 1[3] % or Mean (SD)	n	Group 2[4] % or Mean (SD)	n	Group 3[5] % or Mean (SD)
Age (years)	793	75.9 (7.8)	550	75.0 (7.6)	276	72.9(7.1)	272	77.2 (7.5)
Sex	793		550		276		272	
Male		18.5		18.4		18.1		18.8
Female		81.5		81.6		81.9		81.2
Race	784		547		275		270	
White		62.6		59.7		55.3		64.4
Black		37.4		40.3		44.7		35.6
Education (years)	778	10.5 (3.3)	541	10.5 (3.2)	272	10.5 (3.1)	267	10.5 (3.3)
Five Georgia's[6]	793		550		276		272	
1-Urban		25.6		26.2		26.1		26.5
2-Suburban		32.8		31.4		28.6		34.6
3-Urbanizing		17.4		17.0		17.0		16.9
4-Rural Growth		15.6		15.9		19.2		12.5
5- Rural Decline		8.3		9.6		9.1		9.6
Body Mass Index (kg/m^2)	754	29.4 (6.6)	550	31.9 (5.8)	276	36.1 (5.4)	272	27.6 (1.6)
Underweight (<18.5)		1.46		-		-		-
Normal (1.85-24.9)		24.7		-		-		-
Overweight (25.0-29.9)		35.8		47.8		-		96.7
Obese (>30.0)		38.1		52.2		100		3.3
Weight Question 80 (%Yes)[7]	793	27.9	550	36.2	276	52.5	272	19.9

Values reported as percent (%) or mean (standard deviation).
1. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference (NIH, 1998).
2. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).

3. Group 1= individuals meeting the ASN/NAASO and/or NIH criteria for weight loss recommendation.

4. Group 2= individuals meeting the ASN/NAASO and NIH criteria for weight loss recommendation.

5. Group 3= individuals meeting only the NIH criteria for weight loss recommendation.

6. County grouping by degree of ruralness (Bachtel, 2007).

7. Weight Question 80 (WQ80): "In the past year, have you been told by a doctor or health care professional to reduce your weight?" (0 = no, 1 = yes)

Table 3.2. Relationship between receiving weight loss advice and selected characteristics in older adults who meet NIH or NAASO criteria for weight loss recommendation: Georgia Senior Centers, 2007 [1,2,3]

Variable	Group 1*			Group 2[†]			Group 3[‡]		
	N	Persons Receiving Advice, % [3]	p [4]	N	Persons Receiving Advice, % [3]	p [4]	N	Persons Receiving Advice, % [3]	p [4]
Age (years)			<.0001			<.001			<.0001
60.0-69.9	150	54.7		102	59.8		47	44.7	
70.0-79.9	247	37.6		125	56.8		121	18.2	
80.0-89.9	137	16.1		43	27.9		94	10.6	
90.0-99.9	16	12.5		6	16.7		10	10.0	
Sex			0.56			0.93			0.41
Male	101	33.7		50	52.0		51	15.7	
Female	449	36.8		226	52.6		221	20.8	
Race			<.05			0.11			0.49
White	327	32.1		152	48.0		174	18.4	
Black	220	41.8		123	57.7		96	21.9	
Education (years)			0.61			0.18			0.51
0-8, %	124	39.5		60	63.3		64	17.2	
9-11, %	151	33.8		82	48.8		68	16.2	
12-22, %	266	36.1		130	45.8		135	22.2	
Five Georgias[5]			0.14			<.05			0.39
1-Urban	145	43.5		72	63.9		72	23.6	
2-Suburban	173	34.1		79	46.8		94	23.4	
3-Urbanizing	93	34.4		47	55.3		46	13.0	
4-Rural Growth	87	27.6		53	37.7		34	11.8	
5- Rural Decline	52	40.4		25	64.0		26	19.2	
Urban[5]			<.05			<.05			0.35
No	405	33.6		204	48.5		200	18.5	
Yes	145	43.5		72	63.9		72	23.6	
Body mass index (kg/m²)			<.0001			<.0001			<.001
Overweight (25.0-29.9)	263	18.3		-	-		263	18.3	
Obese Class I (30.0-34.9)	154	37.0		144	35.4		9	66.7	
Obese Class II (35.0-39.9)	76	63.2		75	64.0		-	-	
Obese Class III (≥40.0)	57	80.7		57	80.7		-	-	
Waist Circumference Risk[6]			<.001			0.11			<.05
No	184	25.4		70	44.3		114	14.0	
Yes	366	41.5		206	55.3		158	24.0	
Diabetes			<.0001			<.01			0.08
No	345	29.0		146	45.2		197	17.3	

	n	%	p	n	%	p	n	%	p
Yes	203	48.3		128	60.9		75	26.7	
High Blood Pressure			.10			0.22			0.38
No	115	29.6		39	43.6		74	23.0	
Yes	433	37.9		236	54.2		197	18.3	
Heart Disease			<.05			<.05			0.95
No	382	33.2		186	47.3		194	20.1	
Yes	166	43.4		90	63.3		76	19.7	
High Cholesterol			<.01			0.15			<.05
No	214	28.5		96	45.8		118	14.4	
Yes	318	41.2		171	55.0		147	25.2	
Joint Pain			<.05			0.38			0.27
No	138	28.3		55	47.3		82	15.8	
Yes	411	38.9		221	53.8		189	21.7	
Physical Function[7]			<.05			0.44			<.05
Poor (0 to 5)	127	29.9		64	51.6		63	7.9	
Moderate (6 to 9)	268	41.4		140	55.7		126	26.2	
Good (10-12)	147	32.0		69	46.4		78	19.2	
Self-reported Disability[8]			<.0001			<.0001			<.001
No	422	27.5		177	42.3		244	16.8	
Yes	120	65.9		94	71.3		26	46.2	

1. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference (NIH, 1998).
2. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).
3. Receiving advice to lose weight corresponds to an answer of "yes" to WQ80: In the past year, have you been told by a doctor or health care professional to reduce your weight? (0 = no, 1 = yes)
4. P-value for chi-square statistical analysis examining relationship of demographic and health variables and receiving advice from a health professional to lose weight within specified group.
5. County grouping by degree of ruralness; Urban=Metropolitan, Non-Metropolitan = Suburban, Urbanizing, Rural Growth and Rural Decline. (Bachtel, 2007).
6. Waist Circumference Risk = Measured waist circumference greater than 35 inches for women and greater than 40 inches for men.
7. As assessed by the Short Physical Performance Battery test (SPPB), Total Domain Score Category (tdscat).
8. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)
* Group 1= individuals meeting the ASN/NAASO and/or NIH criteria for weight loss recommendation.
† Group 2= individuals meeting the ASN/NAASO and NIH criteria for weight loss recommendation.
‡ Group 3= individuals meeting only the NIH criteria for weight loss recommendation.

Table 3.3; Logistic regression models exploring predictors of receiving advice to lose weight among individuals meeting NAASO and/or NIH criteria for weight loss recommendation: Unadjusted, Adjusted, Group 1 [1,2,3]

Weight Related Condition	Unadjusted OR (95%CI) [4]	p	Demographic-adjusted OR (95%CI) [5]	p	Demographic and BMI-adjusted OR (95%CI) [6]	p
Diabetes	2.28 (1.56, 3.33)	<.0001	1.70 (1.13, 2.55)	<.05	1.42 (0.91, 2.22)	0.12
Heart Disease	1.53 (1.03, 2.25)	<.05	1.84 (1.20, 2.82)	<.01	1.72 (1.08, 2.74)	<.05
High Blood Pressure	1.36 (0.86, 2.16)	p=.18	1.19 (0.73, 1.94)	p= 0.49	0.91 (0.54, 1.53)	p=0.73
High Cholesterol	1.72 (1.17, 2.52)	<.01	1.49 (0.98,2.25)	p=.06	1.37 (0.88, 2.13)	p=0.17
Joint Pain	1.81 (1.15, 2.85)	<.05	1.76 (1.09, 2.85)	<.05	1.37 (0.82, 2.28)	p=0.23
Physical Function	0.98 (0.78,1.27)	0.88	0.88 (0.66, 1.17)	0.39	1.04 (0.76, 1.43)	P=0.81
Self-reported Disability[7]	5.30 (3.34, 8.41)	<.0001	4.62 (2.84, 7.52)	<.0001	2.71 (1.59, 4.61)	<.001

1. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).

2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).

3. Group 1= individuals meeting the NAASO and/or NIH criteria for weight loss recommendation (n=500)

4. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition

5. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?" Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban).

6. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban) and Body Mass Index (BMI)

7. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)

Table 3.4: Logistic regression models exploring predictors of receiving advice to lose weight among individuals meeting NAASO and NIH criteria for weight loss recommendation: Unadjusted, Adjusted, Group 2 [1,2,3]

Weight Related Condition	Unadjusted OR (95%CI) [4]	p	Demographic-adjusted OR (95%CI) [5]	p	Demographic and BMI adjusted OR (95%CI) [6]	p
Diabetes	2.00 (1.21, 3.31)	<.01	1.71 (1.00, 2.94)	0.051	1.44 (0.82, 2.56)	0.21
Heart Disease	1.97 (1.15, 3.38)	< .05	2.31 (1.30, 4.10)	<.01	2.37 (1.27, 4.40)	<.01
High Blood Pressure	1.51 (0.75, 3.05)	0.25	1.22 (0.57, 2.60)	0.61	1.05 (0.48, 2.32)	0.90
High Cholesterol	1.44 (0.86, 2.42)	0.16	1.29 (0.74, 2.25)	0.37	1.15 (0.64, 2.06)	0.65
Joint Pain	1.50 (0.80, 2.83)	0.21	1.36 (0.70, 2.63)	0.36	1.09 (0.54, 2.19)	0.80
Physical Function	0.89 (0.62, 1.26)	0.50	0.86 (0.58, 1.27)	0.44	1.04 (0.68, 1.59)	0.86
Self-reported Disability[7]	3.80 (2.14, 6.76)	<.0001	3.70 (2.03, 6.75)	<.0001	2.54 (1.34, 4.81)	<.01

1. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).
2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).
3. Group 2= individuals meeting the NAASO and NIH criteria for weight loss recommendation (obese with risk factor or functional impairment); n=252
4. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition
5. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban).
6. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban) and Body Mass Index (BMI)
7. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)

Table 3.5: Logistic regression models exploring predictors of receiving advice to lose weight among individuals meeting only NIH criteria for weight loss recommendation: Unadjusted, Adjusted, Group 3 [1,2,3]

Weight Related Condition	Unadjusted OR (95%CI)[4]	p	Demographic-adjusted OR (95%CI)[5]	p	Demographic and BMI adjusted OR (95%CI)[6]	p
Diabetes	1.68 (0.87, 3.27)	0.12	1.25 (0.62, 2.55)	0.54	1.53 (0.73, 3.19)	0.25
Heart Disease	0.90 (0.44, 1.82)	0.77	1.06 (0.50, 2.26)	0.87	1.16 (0.54, 2.47)	0.71
High Blood Pressure	0.70 (0.36, 1.36)	0.30	0.73 (0.36, 1.46)	0.37	0.99 (0.46, 2.11)	0.98
High Cholesterol	1.88 (1.06, 3.77)	.06	1.67 (0.83, 3.35)	0.15	2.13 (1.01, 4.49)	< .05
Joint Pain	1.60 (0.77, 3.34)	0.21	1.78 (0.82, 3.87)	0.14	1.83 (0.82, 4.04)	0.14
Physical Function	1.22 (0.79, 1.88)	0.37	1.05 (0.66, 1.67)	0.85	1.06 (0.65, 1.72)	0.82
Self-reported Disability[7]	4.14 (1.73, 9.94)	<.01	3.54 (1.38, 9.08)	<.01	3.20 (1.22, 8.39)	< .05

1. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).
2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).
3. Group 3= individuals meeting only the NIH criteria for weight loss recommendation (overweight with risk factor or obese without risk factor); n=248
4. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition
5. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban).
6. Logistic Regression Model: Dependent Variable: WQ80=yes, "In the past year has your doctor or other health care professional told you to lose weight?", Independent: Weight Related Condition adjusted for demographic variables (age, gender, race, education, urban) and Body Mass Index (BMI)
7. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)

Table 3.6 Logistic regression models exploring predictors of receiving advice to lose weight among individuals meeting NAASO and/or NIH criteria for weight loss recommendation [1,2]

Variable	Group 1[3]		Group 2[4]		Group 3[5]	
	Odds Ratios	(95% CI)	Odds Ratios	(95% CI)	Odds Ratios	(95% CI)
Age	0.94**	(0.91, 0.98)	0.96	(0.92, 1.01)	0.92**	(0.87, 0.97)
Female	0.68	(0.29, 1.61)	0.75	(0.20, 2.75)	0.63	(0.17, 2.38)
Black	1.25	(0.76, 2.05)	1.09	(0.56, 2.12)	1.47	(0.63, 3.32)
Education	0.98	(0.90, 1.05)	0.98	(0.89, 1.10)	0.98	(0.86, 1.11)
Urban[6]	1.71*	(1.01, 2.88)	2.68**	(1.28, 5.61)	1.03	(0.46, 2.34)
Body Mass Index (kg/m^2)	1.15***	(1.09, 1.21)	1.16***	(1.08, 1.26)	1.27*	(1.01, 1.58)
Waist Circumference Risk[7]	1.99	(0.95, 4.21)	1.41	(0.43, 4.61)	3.28*	(1.12, 9.62)
Diabetes	1.38	(0.87, 2.18)	1.45	(0.73, 2.67)	1.22	(0.56, 2.68)
Heart Disease	1.48	(0.91, 2.42)	2.09*	(1.10, 3.96)	0.82	(0.35, 1.90)
High blood pressure	0.86	(0.50, 1.50)	1.08	(0.47, 2.48)	0.81	(0.35, 1.89)
High Cholesterol	1.18	(0.74, 1.88)	0.99	(0.54, 1.84)	2.19	(0.95, 5.04)
Joint Pain	1.39	(0.82, 2.36)	1.04	(0.50, 1.86)	2.06	(0.89, 4.73)
Physical Function[8]	1.16	(0.83, 1.61)	1.14	(0.72, 1.78)	1.22	(0.72, 2.07)
Self-reported Disability[9]	2.52**	(1.45, 4.37)	2.34*	(1.20, 4.58)	3.38*	(1.21, 9.46)

1. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).
2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).
3. Group 1= individuals meeting the ASN/NAASO and/or NIH criteria for weight loss recommendation; Logistic Regression Analysis n= 500.
4. Group 2= individuals meeting the ASN/NAASO and NIH criteria for weight loss recommendation (obese with risk factor or functional impairment); Logistic Regression Analysis n= 252.
5. Group 3= individuals meeting only the NIH criteria for weight loss recommendation (overweight with risk factor or obese without risk factor); Logistic Regression Analysis n=248
6. Based on county grouping by degree of ruralness (Bachtel, 2007).
7. Waist circumference risk = measured waist circumference greater than 35 inches for women and greater than 40 inches for men
8. As assessed by the Short Physical Performance Battery test (SPPB), Total Domain Score Category (tdscat).
9. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)
* (p<.05)
** (p<.01)
*** (p<.001)

Table 3.7 Stepwise logistic regression model exploring predictors of receiving advice to lose weight among individuals meeting ASN/NAASO and/or NIH criteria for weight loss recommendation: Group 1[1,2,3]

Step Entered	Variable	Odds Ratios	(95% CI)	p
1	BMI	1.17	(1.11, 1.22)	<.0001
2	Age	0.94	(0.91, 0.97)	<.0001
3	Self-reported Disability[4]	2.64	(1.56, 4.44)	<.001
4	Urban	1.78	(1.10, 2.88)	<.05
5	Heart Disease	1.57	(0.98, 2.53)	0.07
6	Waist Risk[5]	1.53	(0.94, 2.48)	0.09

[1.] The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).

2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).

3. Logistic Regression Analysis n= 500.

4. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)

5. Waist circumference risk = measured waist circumference greater than 35 inches for women and greater than 40 inches for men

Table 3.8 Stepwise logistic regression model exploring predictors of receiving advice to lose weight among individuals meeting ASN/NAASO and NIH criteria for weight loss recommendation: Group 2 [1, 2,3]

Step Entered	Variable	Odds Ratios	(95% CI)	p
1	BMI	1.17	(1.09. 1.26)	<.0001
2	Self-reported Disability[4]	2.29	(1.19, 4.39)	<.01
3	Urban[5]	2.79	(1.42, 5.48)	<.01
4	Heart Disease	2.15	(1.15, 4.05)	<.05
5	Age	0.95	(0.91, 1.00)	<.05

1. The American Society for Nutrition (ASN) and the North American Association for the Study of Obesity (NAASO) recommend weight-loss therapy that minimizes muscle and bone loss for older persons who are "obese and have functional impairments or medical complications that can benefit from weight loss" (Villareal et al., 2005).
2. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).
3. Logistic Regression Analysis n= 252.
4. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)
5. Based on county grouping by degree of ruralness (Bachtel, 2007).

Table 3.9 Stepwise logistic regression model exploring predictors of receiving advice to lose weight among individuals meeting only NIH criteria for weight loss recommendation: Group 3[1, 2]

Step Entered	Variable	Odds Ratios	(95% CI)	p
1	Age	0.92	(0.87, 0.96)	<.0001
2	BMI	1.25	(1.02, 1.53)	<.01
3	Self-reported Disability [3]	3.53	(1.33, 9.33)	<.05
4	Waist Circumference Risk[4]	2.31	(1.08, 4.97)	<.05
5	High Cholesterol	1.98	(0.94, 2.24)	0.07

1. The National Institute of Health's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults indicate weight loss for all obese adults and for overweight adults with two or more risk factors or a high waist circumference, (NIH, 1998).
2. Logistic Regression Analysis n= 248.
3. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.? (0=no, 1=yes)
4. Waist circumference risk = measured waist circumference greater than 35 inches for women and greater than 40 inches for men

CHAPTER 4

CONCLUSION

The goals of this study were to: 1) determine the prevalence of health professional recommendations to lose weight by gender, race/ethnicity, degree of ruralness, and educational attainment level, and 2) determine potential predictors, including demographic and health factors, of health professional recommendations to lose weight in three subgroups of overweight and obese older adults. It was hypothesized that: 1) overweight and obese Older Americans Act Nutrition Program (OAANP) participants in Georgia senior centers who met the ASN/NAASO and/or NIH *Guidelines* (1998) criteria for weight loss recommendation were inadequately (<50%) receiving advice from a health care professional to lose weight, and 2) disparities with regard to age, gender or educational attainment in giving recommendations may exist.

The results of this study confirmed our first hypothesis in that less than half (36.2%) of the older adults in this population who met the ASN/NAASO and/or NIH criteria for weight loss recommendation received a recommendation to lose weight from a health professional in the past year. Contrary to our second hypothesis and studies reported in younger adults (Galuska et al., 1999; Sciamanna et al., 2000), disparities in recommendations to lose weight based on gender, race, or educational attainment level (p≥ .05) were not observed among the subgroups of older adults who met the ASN/NAASO and/or NIH criteria in the present study. Our findings did indicate that report of doctor or health professional weight loss recommendation is higher in the obese with risk factors (Group 2), (52.5%) than the overweight with risk factors and obese

without risk factors (Group 3) (19.9%), and in agreement, increasing body mass index (BMI, kg/m^2) was positively related to receiving advice to lose weight in all analyses within all groups.

Regression models allowed us to explore independent predictors of recommendations to lose weight within the three subgroups. Analysis within groups revealed that younger age, self-reported disability (WQ79), and living in an urban area were independently associated with receiving advice to lose weight at varying levels of significance (p<.05) within all three subgroups.

Our results regarding the inverse association of age with receiving advice to lose weight in Group 1 (overweight with risk factors and all obese) and Group 3 (overweight with risk factors and obese without risk factors) complements previous research indicating that the association between BMI and mortality dissipates after age 75, especially in the overweight population (McTigue et al., 2006; Corrada et al., 2006; Villareal et al., 2005; Heiat et al., 2001). Concurrent with ASN/NAASO criteria for weight loss recommendation, older age did not significantly decrease the likelihood of receiving weight loss advice within Group 2 (obese with risk factors) (Villareal et al., 2005).

The more conservative ASN/NAASO criteria specifically targeted toward older adults (Villareal et al., 2005) indicate weight loss for obese older adults with "functional impairments or medical complications that can benefit from weight loss." From the ASN/NAASO position paper we concluded "medical complications that can benefit from weight loss" to mean chronic conditions known to benefit from weight loss, including diabetes, established heart disease, and heart disease risk factors such as high blood pressure and high cholesterol. These items are well-defined and easily identifiable. Our results indicate that these chronic conditions that are known to benefit from weight loss, were only moderately associated with advice to lose weight in the

overweight/obese older adult population. Multivariate logistic regression analysis revealed that heart disease was the only chronic condition to significantly increase the likelihood of receiving advice to lose weight. These results may imply that physicians possibly view established heart disease in older adults as a more critical risk to address with weight loss therapy than the risk factors of heart disease, such as high blood pressure, high cholesterol, diabetes, and high waist circumference. For older adults living in the state of Georgia, this finding is especially alarming considering that the state, as part of the "stroke buckle," has one of the three highest rates of stroke in the U.S. and high blood pressure, diabetes, and high cholesterol are all risk factors for stroke that could possibly improve with weight loss. Health professionals may be missing an important opportunity to improve quality of life in older adults with chronic conditions that may benefit from weight loss and to help to decrease death rates and associated medical costs of such conditions, especially stroke. Future guidelines for treatment of overweight and obesity in older adults may need to specify which chronic conditions or risk factors, possibly including biochemical measures, should qualify an individual for recommended weight loss therapy.

The criteria "functional limitations" is not defined by a particular measure in the ASN/NAASO guidelines. In our study, an objective measure of physical function (Short Physical Performance Battery, SPPB) was a poor predictor of receiving weight loss advice from a health professional. Self-reported disability, a subjective measure of functional limitation indicated by an answer of "yes" to the following question (WQ79): "Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc.?" (Appendix A), was a highly significant predictor of receiving weight loss advice in all groups. Therefore, health professionals may be relying on the overt confirmation of functional limitation by an overweight/obese older adult to recommend weight loss. Consequently, health professionals

may be missing an opportunity to improve quality of life in older adults with less pronounced functional limitations that may benefit from weight loss. Nonetheless, a subjective measure such as the self-reported disability measure used in this study may provide meaningful information and be a relatively practical way to screen for functional limitation to identify overweight and obese older adults who might benefit from weight loss therapy.   As previously mentioned regarding chronic conditions, future guidelines for treatment of overweight and obesity in older adults may need to specify a measurement of "functional limitation" to determine if weight loss should be recommended for an overweight or obese older adult.

Lastly, living an urban area was consistently a significant predictor of receiving advice to lose weight. This may be the result of individuals living in urban having better access to medical care when compared to rural individuals (Chan et al., 2006). Research demonstrates that individuals living in rural areas face more barriers to accessing health care than do those living in urban areas (Rosenthal and Fox, 2000; Chan et al., 2006; Marshall et al., 2001). Considering this information, programs targeted toward older adults living in rural areas such as OAANP may be integral in raising awareness of the problems associated with overweight and obesity in older adults, and encouraging overweight and obese older adults to contact their health professional to assess their weight and possible benefits of weight loss.

The prevalence of obesity is increasing dramatically in the US and older adults are not immune to this trend. The costs of obesity are tremendous, and the disease can contribute to development and complications of chronic conditions and functional limitations, which can adversely affect quality of life. In fact, the Federal Interagency Forum on Aging-Related statistics (2006) cited obesity as second only to smoking as a preventable risk factor contributing to mortality in the United States.

Currently, guidelines for treatment of overweight and obesity in older adults are not unanimous among professional and government organizations. In our population, recommendations for weight loss are reserved primarily for the obese with chronic conditions, the young old, those with functional limitations, and individuals living in urban areas. In an effort to decrease obesity associated medical costs and to improve the quality of life for overweight and obese older adults, physicians and health professionals need clear, evidence-based guidelines identifying specific factors necessary to recommend weight loss treatment to overweight and obese older adults.

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APPENDICES

APPENDIX A

LIVE HEALTHY GEORGIA: CONSENT FORM

APPENDIX A

LIVE HEALTHY GEORGIA! CONSENT FORM

I, _____, agree to participate in the research study titled "Live Healthy Georgia!" conducted by Dr. Mary Ann Johnson in the Department of Foods and Nutrition at the University of Georgia and at my local Senior Center. I understand that participation is voluntary and I do not have to take part if I do not want to. I can refuse to participate and stop taking part anytime without giving any reason and without penalty. I can ask to have all information concerning me removed from the research records, returned to me, or destroyed. My decision to participate will not affect the services that I receive at the Senior Center.

By participating in this study, I may improve my nutrition and physical activity habits and self-management of diabetes and other chronic conditions. This study will also help the investigators learn more about good ways to help older adults improve their nutrition and physical activity habits and self-management of diabetes and other chronic conditions. This study will be conducted at my local Senior Center. If I volunteer to take part in this study, I will be asked to do the following things:

1) Answer questions about my health, nutrition and physical activity.

2) Obtain physician clearance to participate in a physical activity program.

3) Provide information about my health, nutrition, and physical activity and complete a physical measurement of weight and waist circumference in a pre-test and post-test. The pre-test will last up to 60 minutes that may be divided into two sessions. The post-test will last up to 30 minutes that also may be divided into two sessions.

4) Attend up to 12 health, nutrition and physical activity programs that will last about 30 to 60 minutes each over a four-month period. I will learn how to use a step counter and record my daily number of steps and minutes of physical activity.

5) Take part in a physical activity program of chair exercises and walking to improve my strength, balance, endurance, and flexibility.

6) **<u>If I have diabetes</u>**, then I may be asked if I would like to provide blood samples for hemoglobin A1c. A licensed nurse, medical technologist, or phlebotomist will obtain 2-3 drops (about 35 microliters) of whole blood via finger stick and/or up to 3 ml of whole blood via venipuncture on two occasions about four to six months apart. Or, I can provide a hemoglobin A1c value from my physician, health department, clinical laboratory, or hospital. This test will help determine if 12 lessons at my senior center are helping me manage my diabetes. The risks of drawing blood from my finger or arm include the unlikely possibilities of a small bruise or localized infection, bleeding and fainting. These risks will be reduced in the following ways: my blood will be drawn only by a qualified and experienced person who will follow standard sterile techniques, who will observe me after the blood draw, and who will apply pressure and a Band-Aid to the blood draw site. My blood will not be tested for HIV-AIDS. Any unused portion of my blood sample will be discarded. I understand that these questions and blood tests are not for diagnostic purposes. I should see a physician if I have questions about my test results. In the event that I have any health problems associated with the blood draw or my blood sample, my insurance or I will be responsible for any related medical expenses.

7) Someone from the study may contact me to clarify my information throughout the study.

The instructor may provide food to taste. Mild to no risk is expected by tasting food. However, I will not taste foods that I should not eat because of swallowing difficulties, allergic reactions, dietary restrictions, or other food-related problems.

There is minimal risk to participation in this study. I may experience some discomfort or stress when the researchers ask me questions about my nutrition, health, and physical activity habits. There is a possibility that I could temporarily injure a muscle or be sore from physical exertion. This risk is minimized by ability to rest at any time. The leaders will advise me to stop exercising if I experience any discomfort or chest pains. If additional care is needed, then my insurance company or myself will be responsible for any expense that may be incurred. As a participant, I assume certain risks of physical injury. The researchers will exercise all reasonable care to protect me from harm as a result of my participation. However, I do not give up or waive any of my rights to file a claim with the University of Georgia's insurer (Department of Administrative Services) or pursue legal action by signing this form.

In case of a research-related injury, please contact Dr. Mary Ann Johnson at 706-542-2292.

No information concerning myself or provided by myself during this study will be shared with others without my written permission, unless law requires it. I may choose not to answer any question or questions that may make me uncomfortable. I will be assigned an identifying number and this number will be used on all of the questionnaires I fill out. Data will be stored in locked file cabinets under the supervision of Dr. Mary Ann Johnson at the University of Georgia; only the staff involved in the study will have access to these data and only for the purpose of data analyses and interpretation of results. My identity will not be revealed in any reports or published materials that might result from this study. The data will be destroyed by January 1, 2015.

If I have any further questions about the study, now or during the course of the study I can call Ms. Tiffany Sellers Lommel (706-542-4838) or Dr. Mary Ann Johnson (706-542-2292). I will sign two copies of this form. I understand that I am agreeing by my signature on this form to take part in this study. I will receive a signed copy of this consent form for my records.

_____   _____   _____
Signature of Participant   Participant's Printed Name   Date

_____
Participant Address and Phone

_____   Mary Ann Johnson   Oct 19, 2007
Signature of Investigator   Printed Name of Investigator   Date
Email: mjohnson@fcs.uga.edu

_____   _____   _____
Signature of Staff who Reads   Printed Name of Staff   Date
Consent Form to Participant

For questions or problems about your rights as a research participant please call or write: The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu.

Project # _____070702_____
Consent Form Approval Period
From: _9-11-07_ To: _9-1-08_
Authorization: _____m.P_____

University of Georgia
Institutional Review Board
Approved: _9-10-07_
Expires _6-4-08_

UGA project number: #2006-10842   DHR project number: #070702

APPENDIX B

LIVE HEALTHY GEORGIA: QUESTIONNAIRE

LIVE HEALTHY GEORGIA

	Line 1
Name of Interviewer:	
ID of Participant:	1-4
Phone number to use to clarify information and get step counts:	
1. County/Senior Center	10-12
2. Date (M/D/Y): ___/___/___	13-18
3. Age of Participant: ___ ___ ___	19-21
4. Gender: Male (0) Female (1)	22
5. Ethnicity: White (1) Black (2) Hispanic/Latino (3) Asian (4) Other (5)	23
6. How many years did you complete in school: ____ years	24-25

		Line 1
7. How would you rate your overall health? Circle one: Poor (0) Fair (1) Good (2) Very good (3) Excellent (4)		26
8. Do you use any tobacco products such as cigarettes, cigars, pipe, or chewing tobacco?	No (0) Yes (1)	27
9. Do you have diabetes?	No (0) Yes (1)	28
10. Do you have high blood pressure?	No (0) Yes (1)	29
11. Do you have heart disease such as angina, congestive heart failure, heart attack or other heart problems?	No (0) Yes (1)	30
12. Do you have arthritis?	No (0) Yes (1)	31
13. During the past 30 days, have you had symptoms of pain, aching, or stiffness in or around a joint?	No (0) Yes (1)	32
MEDICATION MANAGEMENT		X
14. How many prescription medications, including insulin, do you take?		34-35
15. How many over the counter medications do you take? *(such as a daily multivitamin, supplements, Aspirin®, etc.)*		36-37
16. Do you go to one pharmacy for **all** of your medications?	No (0) Yes (1)	38
17. Do you have a written list of **all** of your prescription medications, non-prescription medications, and dietary supplements?	No (0) Yes (1)	39
18. Do you carry this written list with you in your purse or wallet?	No (0) Yes (1)	40
19. Have you had a physician, pharmacist, or other health professional look at all of your medications in the past 6 months?	No (0) Yes (1)	41
20. Do you **always** throw out your medications when they are expired (past their "use by" date)?	No (0) Yes (1)	42
21. Do you use a pillbox or other system to help you take your medications?	No (0) Yes (1)	43
22. Do you know the name of **each** of your medications?	No (0) Yes (1)	44
23. Do you know what **each** of your medications is for?	No (0) Yes (1)	45
24. Do you know the possible side effects of **each** of your medications?	No (0) Yes (1)	46

Emotional Support, Life Satisfaction, and Depression		
25. Do you attend a support group for health conditions, such as diabetes, heart disease, cancer, grief, or other conditions?	No (0)　　Yes (1)	47
26. How often do you get the social and emotional support that you need?	1) Always 4) Rarely 2) Usually 5) Never 3) Sometimes	7 Don't know/ not sure 9 Refused 48
27. Has a doctor or other health care provider EVER told you that you have a depressive disorder?	No (0)　　Yes (1)	7 Don't know/ not sure 9 Refused 49

Read Questions to Participants and Circle their Answers			
DIET AND PHYSICAL ACTIVITY			Line 1
28. How many fruits and vegetables should older people eat each day? (Circle the participant's response) 0 1 2 3 4 5 6 7 8 9 10 "5 a day" "5 or more a day" "7 to 10 a day" DK Missing			50-52
29. How many servings of fruits and 100% fruit juices do you usually have each day?	0 1 2 3 4 5 6 7		53
30. How many servings of vegetables do you usually eat each day?	0 1 2 3 4 5 6 7		54
31. On how many DAYS of the last WEEK (seven days) did you eat five or more servings of fruits and vegetables?	0 1 2 3 4 5 6 7		55
32. How many DAYS of the last WEEK (seven days) have you followed a healthful eating plan?	0 1 2 3 4 5 6 7		56
33. How many DAYS of the last WEEK (seven days) did you participate in at least **30 minutes** of **moderate** physical activity? Examples of **moderate** activities are regular walking, housework, yard work, lawn mowing, painting, repairing, light carpentry, ballroom dancing, light sports, golf, or bicycling on level ground.	0 1 2 3 4 5 6 7		57
34. How many days of the week do you participate in any physical activity (light or moderate)?	0 1 2 3 4 5 6 7		58
35. About how many minutes of physical activity do you do on the days you are physically active?	____ minutes		59-61
36. How many DAYS of the last WEEK (seven days) did you participate in a specific **exercise session** other than what you do around the house or as a part of your daily activities *(e.g., chair exercises, yoga, aerobics, organized walking programs, using workout machines, etc.)*?	0 1 2 3 4 5 6 7		62
HOME FOOD SAFETY			
37. In the past month, did you **always** wash your hands with **warm water** and **soap** for **20 seconds** before eating food?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused	63
38. In the past month, did you **always** rinse fresh fruits and vegetables with cold running water before eating them??	No (0) Yes (1)	7 Don't know/ not sure 9 Refused	64
39. In the past month, have you checked the temperature of your refrigerator?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused	65
40. Do you cook, reheat or prepare meals in your home?	No (0) Yes (1)	7 Don't Know/ not sure 9 Refused	66
41. Do you own a meat thermometer?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused	67

Read Questions to Participants and Circle their Answers			
FALLS AND FRACTURES			
42. Have you had a fracture or broken bone after age 50?	No (0)	Yes (1)	68
43. Have you fallen in the past year?	No (0)	Yes (1)	69
44. Do you feel limited in your daily life by a fear of falling?	No (0)	Yes (1)	70
45. Have you ever been told by a doctor or other health professional that you have osteoporosis?	No (0)	Yes (1)	71
FOODS AND SUPPLEMENTS			Line 1
46. Do you get a stomachache, gas, or diarrhea after drinking milk?	No (0)	Yes (1)	72
47. How many servings of milk products should most older people eat daily?	0 1 2 3 4 DK		73
48. How many whole grain servings should people eat each day?	0 1 2 3 4 DK		74

How often do you eat or drink or take these items? (*includes 3 or more per day)	Line 2
49. Whole wheat or whole grain bread (such as 100% whole wheat bread)? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	1-2
50. Whole grain cereals (such as oatmeal, Cheerios®, bran flakes or bran cereal)? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	3-4
51. Milk as a beverage (including soy milk)? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	5-6
52. Milk on cereal (including soy milk)? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	7-8
53. Calcium-fortified orange juice? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	9-10
54. Calcium supplement? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	11-12
55. Calcium supplement with vitamin D? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	13-14
56. Multivitamin with vitamin D? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	15-16
57. Vitamin D-only supplement? <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK	17-18
For the data coder: <1/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 1-2/day 2/day 2-3/day 3/day* DK/Miss 00 01 02 03 04 05 06 07 10 14 17 21 99 19-20	

Read Questions to Participants and Circle their Answers		
FOOD SECURITY		
58. Do you always have enough money to buy the food you need?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 21
59. In the past month, have you received food from a food pantry or food bank?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 22
60. Do you currently receive food stamps?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 23
Think about the past 30 days. I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for you since last (name of current month).		
61. The food that you bought just didn't last, and you didn't have money to buy more.	1) Often 2) Sometimes 3) Never	7 Don't know/ not sure 9 Refused 24
62. You couldn't choose the right food and meals for your health because you couldn't afford them.	1) Often 2) Sometimes 3) Never	7 Don't know/ not sure 9 Refused 25
63. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 26
63a. If yes, in the last 30 days, how many days did this happen? (*interviewer-please write in participant's response*)	_____days	7 Don't know/ not sure 9 Refused 27- 28
64. Did you ever eat less than you felt you should because there wasn't enough money to buy food?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 29
65. Were you ever hungry but didn't eat because you couldn't afford enough food?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 30

Get Checked Questions
(Adapted from **CDC,** http://www.cdc.gov/CDC/questionnaires/pdf-ques/2005CDC.pdf)

Question	Write or Circle Answer	Code
		Line 2
66. About how long has it been since you last had a bone mineral density test?	1) Within the past year 2) Within the past 2 yr 3) Within the past 5 yr 4) 5 or more yrs ago 5) Never	7 Don't know/not sure 9 Refused 31
67. About how long has it been since you last had your blood cholesterol checked?	1) Within the past year 2) Within the past 2 yr 3) Within the past 5 yr 4) 5 or more yrs ago 5) Never	7 Don't know/not sure 9 Refused 32
68. Have you ever been told by a doctor, nurse, or other health professional that your blood cholesterol is high?	1) Yes 2) No	7 Don't know/not sure 9 Refused 33
69. Are you cutting down on saturated fat in your diet (to help manage or lower your risks of developing heart disease)?	1) Yes 2) No	7 Don't know/not sure 8 Refused 34
70. About how long has it been since you last had your blood pressure checked?	1) Within past month 2) Within past year 3) Within past 2 yrs 4) 2 or more years ago 5) Never	7 Don't know/not sure 9 Refused 35
71. Are you cutting down on sodium or salt (to help lower or control your blood pressure)?	1) Yes 2) No 3) Do not use salt	7 Don't know/not sure 9 Refused 36
72. When was the last time you visited ANY eye care professional? (To have your eyes and vision checked?)	1) Within past month 2) Within past year 3) Within past 2 yrs 4) 2 or more years ago 5) Never	7 Don't know/not sure 9 Refused 37
73. When was the last time you visited ANY ear care professional? (To have your hearing or hearing aids checked?)	1) Within past month 2) Within past year 3) Within past 2 yrs 4) 2 or more years ago 5) Never	7 Don't know/not sure 9 Refused 38
74. When was the last time you had your feet checked by a health care	1) Within past month 2) Within past year	7 Don't know/not sure

professional, such as a doctor or nurse?	3) Within past 2 yrs 4) 2 or more years ago 5) Never	9 Refused 39
75. If you thought someone was having a heart attack or a stroke, what is the first thing you would do? *Read list to participant and circle their answer.*	1-Take them to the hospital 2-Tell them to call their doctor 3-Call 911 4-Call their spouse or a family member 5-Do something else	7 Don't know/not sure 9 Refused 40

WEIGHT QUESTIONS		
76. Do you consider yourself to be:	1) Underweight? 2) Overweight? 3) About the right weight?	7 Don't know/ not sure 9 Refused 41
77. Would you like to weigh:	1) More 2) Less 3) Stay about the same	7 Don't know/ not sure 9 Refused 42
78. Your primary concern about your current weight is:	1) My health 2) My appearance 3) My weight is about right, no concerns	7 Don't know/ not sure 9 Refused 43
79. Does your current weight affect your ability to do daily activities such as walk, do housework, shop, etc?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 44
80. In the past year, have you been told by a doctor or health care professional to reduce your weight?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 45
81. What do you think is the best way to lose weight? *(interviewer-please write in participant's response)*		7 Don't know/ not sure 9 Refused 46
82. In the past year, have you lost weight?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 47
82a. If you have lost weight in the past year, how much? *(interviewer-please write in participant's response)*		7 Don't know/ not sure 9 Refused 48
82b. Was the weight loss intentional? That is, were you trying to lose weight?	No (0) Yes, trying to change it (1) No loss (2)	7 Don't know/ not sure 9 Refused 49
82c. What method(s) did you use to lose weight? *(interviewer-please write in participant's response)*		50-51
83. In the past year, have you gained weight?	No (0) Yes (1)	7 Don't know/ not sure 9 Refused 52
83a. If you have gained weight in the past year, how much? *(interviewer-please write in participant's response)*		53-54
83b. Was the weight gain intentional? That is, were you trying to gain weight?	No (0) Yes, trying to change it (1) No gain (2)	7 Don't know/ not sure 9 Refused 55
83c. What method(s) did you use to gain weight? *(interviewer-please write in participant's response)*		7 Don't know/ not sure 9 Refused 56-57

7 = Don't know/not sure, 9 = Refused

FOR THOSE WITH DIABETES		Line 2
1. What kind of effect does diabetes have on your daily activities? No effect (1)　　　Little effect (2)　　　Large effect (3)	1　2　3	58
2. Thinking about your diet, on how many DAYS of the last WEEK (seven days) did you space carbohydrates evenly?	0 1 2 3 4 5 6 7	59
3. On how many DAYS of the last WEEK (seven days) did you test your blood sugar?	0 1 2 3 4 5 6 7	60
4. What medications do you take for your diabetes? 0-None　　1-pills only　2-insulin only　3-pills and insulin		61
5. On how many DAYS of the last WEEK (seven days), did you take your diabetes medication as prescribed by your doctor?	0 1 2 3 4 5 6 7	62
6. On how many DAYS of the last WEEK (seven days) did you check your feet?	0 1 2 3 4 5 6 7	63
7. On how many DAYS of the last WEEK (seven days) did you inspect the inside of your shoes?	0 1 2 3 4 5 6 7	64
8. What should your hemoglobin A1c level be? ___% *(interviewer-please write in participant's response)*	77 Don't know/ not sure 99 Refused 65-66	
9. What things are the hardest for you to do when managing your diabetes? *(interviewer-please write in participant's response)*		67-68

ID: _____ DATE (M/D/Year): _____ STAFF NAME: _____ PHYSICAL PERFORMANCE

WAIST CIRCUMFERENCE:

Instructions for Measuring Waist Circumference

<u>The measurement should be made under the clothes</u>.

To measure waist circumference, locate the upper hipbone and the top of the right iliac crest. Place a measuring tape in a horizontal plane around the abdomen at the level of the iliac crest. Before reading the tape measure, ensure that the tape is snug, but does not compress the skin, and is parallel to the floor. The measurement is made at the end of a normal expiration.
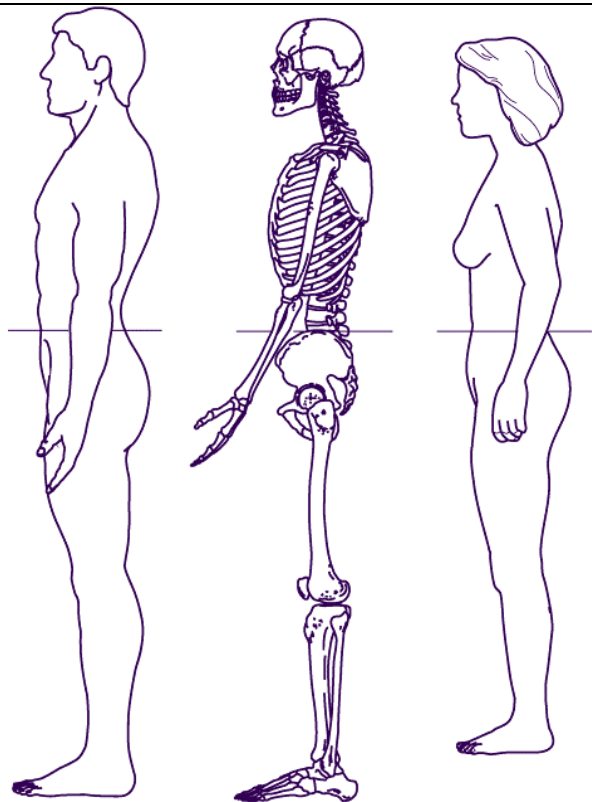
A high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension, and CVD in patients with a BMI between 25 and 34.9 kg/m2.

High-Risk Waist Circumference
Men: > 40 in (> 102 cm)
Women: > 35 in (> 88 cm)
http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf

84. Waist Circumference = _____ INCHES		Line 3 1-3
85. How was measurement made? (1) Under clothes OR (2) Over clothes	1 2	4
86. What is your current height without shoes? _____ feet and _____ inches		5-7
87. How was the measurement made? (1) With a tape measure OR (2) Self-report	1 2	8
88. What is your current weight without clothes? _____ pounds		9-11
89. How was weight measurement made? PREFERRED: With a scale and without shoes (1) With a scale and with shoes (2) Self-report (3)		12
90. Chair Sit-and-Reach: sit in stable chair, knees straight, bend over, reach with arms straight to toes, then measure with a ruler: Number of inches person is short of reaching the toes: ___ ___ . ___ (-) *or* *Number of inches person reaches beyond toes:* ___ ___ . ___ *(+)* *Measure to the nearest ½ inch*		13-16 17-20

	Physical Performance Test-Task Descriptions Equipment: <u>Stopwatch</u>, 8-Ft Tape Measure, Ruler, Folding Chair	RECORD TIME IN SECONDS	LINE 4 UGA Staff can score with open coding
ASB	**STANDING BALANCE:** **Time each item until >10.0 sec. OR** **until participant moves feet or reaches for support.** **1a) SEMI-TANDEM** (heel of one foot placed at mid-position of the other) *If can hold for 10 seconds, move to **1b)** *If can NOT hold for 10 seconds, move to **1c)** **1b) TANDEM** (heel to toe, one foot directly in front of the other) **1c) SIDE-BY-SIDE** (toes lined up evenly and feet touching)	**Time to the nearest 10th second:** **a)** ___ ___ · ___ > 10.0 sec. Go to **b)** < 10.0 sec. Go to **c)** **b)** ___ ___ · ___ **c)** ___ ___ · ___	1-4 5-8 9-12
ASB D	**DOMAIN SCORE:** If A= <10 & C= 0-9, score= 0 A= <10 & C= 10, score=1 A= ≥10 & B= 0-2, score= 2 A= ≥10 & B= 3-9, score= 3 A= ≥10 & B= ≥10, score= 4	**SCORE:** _____	13
AFW	**8 FOOT WALK:** **Participant begins at standing position and will walk a straight distance of 8-feet, measured with tape on the floor.** **Instruct the participant to walk at normal gait using any assistive devices. If possible, have them begin walking a few feet before starting mark, and continue walking a few feet past the 8-foot mark. Tester will start and stop watch at the distance marks.** **Complete the walk twice.**	**Time to the nearest 10th second:** **1)** ___ ___ · ___ **2)** ___ ___ · ___ Use best (lowest) time **Assistive device used?** NO (0) YES (1) Describe	14-17 18
AFW D	**DOMAIN SCORE:** 1= ≥5.7 2= 4.1-5.6 3= 3.2-4.0 4= ≤3.1	**SCORE:** _____	19
ACS	**CHAIR STANDS:** **Participant is asked to stand one time from a seated position in an armless, straight-backed chair (such as a folding metal chair) with their arms folded across their chest.** **If able, participant is asked to stand-up and sit-down 5 times as quickly as possible while being timed.** **If not able to perform, then the test is complete.**	**Time to the nearest 10th second:** **1)** ___ ___ · ___	20-23
ACS D	**DOMAIN SCORE:** 1= ≥16.7 2= 13.7-16.6 3= 11.2-13.6 4= ≤11.1	**SCORE:** _____	24
TDS	**TOTAL SCORE: Add all 3 domain scores (1-12)**	**TOTAL SCORE:__**	25-26

Coding: 8 = physically unable, 9=refused, 7=not applicable. Good function (score of 10 to 12); moderate function (score of 6 to 9); poor function (score of 0 to 5).

THE END