

**Nutrition Education and the Elderly Nutrition Program
of Seattle-King County: Reviewing Current Research
for Program Recommendations**

Jennifer J. Tucci

Prepared for:

NUTR 531 Public Health Nutrition, University of Washington

and

Aging & Disability Services, Seattle-King County

March 2008

This page intentionally left blank

Table of Contents

I. Introduction and Background	1
Introduction	1
Purpose.....	2
Background	2
Elderly Nutrition Program.....	2
Seattle-King County Elderly Nutrition Program	3
Nutrition Education in Seattle-King County ENP	4
II. Current Knowledge	6
Needs Assessment	6
Nutrition Assessments and Health Screenings	6
Surveys and Focus Groups	7
Adult Learning and Theory	7
Adult Learning	7
Education Theory	8
Subject Matter	9
Malnutrition	9
Overweight and Obesity	10
Dehydration	10
Digestive Problems.....	10
Osteoporosis	11
Hypertension	11
Changes in Flavor Sensations.....	11
Health Disparities	12
Lessons Learned form Centenarians.....	12
Format.....	12
Simplicity	12
Frequency.....	13
Hands-on Activities	13
Goal Setting.....	13
Incentives	14
Print Materials / Newsletters.....	14
Content	14
Format	14
Frequency of Newsletters	15
Pros and Cons of Newsletters	15
Alternative Educators	15
Peer Educators	15
Train-the-Trainer.....	17

Examples of Successful Evidenced-Based Programs.....	18
Conclusion	18
Discussion.....	19
Limitations and Uncertainties of the Science	19
III. Existing Policies.....	20
Current Washington State Policy	20
Seattle-King County Policies and Practices	21
Discussion.....	21
Policy vs. Science.....	21
Current Practices vs. Policy.....	21
Impact of Current Policies and Practices	21
IV. Program Recommendations.....	22
Needs Assessment	22
Content and Format	22
Nutrition Messages	23
Reinforcement	23
Print Materials / Newsletters.....	23
Expand Network of Educators.....	24
Incorporate Physical Activity	24
Using a Pre-designed Evidence-based Curriculum.....	25
V. Conclusion	26
Appendix A: Modified MyPyramid for Older Adults	27
Appendix B: Case Studies	28
Case Study 1: Healthy Eating for Life Program (HELP)	28
Program Description	28
Evaluation.....	28
Outcomes	29
Case Study 2: Eat Better & Move More	30
Program Description.....	30
Study/Evaluation Description.....	31
Outcomes: Dietary Intake	32
Outcomes: Physical Activity.....	33
Outcomes: Health, Satisfaction and Stages of Change.....	33
Conclusion.....	34
References	35

I. Introduction and Background

INTRODUCTION

By 2030, due to longer life spans and aging baby boomers, the number of Americans aged 65 and older will more than double to 71 million, comprising roughly 20% of the U.S. population (1). Currently, 80% of older Americans are living with at least one chronic condition, and 50% have at least two (1). With these demographic shifts, the continual rise of several chronic diseases, and the special nutrient needs of older adults, it is important to consider the effectiveness of nutrition intervention programming for this population. The cost of providing health care for an older American is three to five times greater than the cost for someone younger than 65 (1) and the nation's health care spending is projected to increase by 25% (1) due to "graying of America". Seniors who routinely eat nutritious food and drink adequate amounts of fluids are less likely to have complications from chronic disease and are less apt to require care in a hospital, nursing home, or other facility (2). Simply put, healthy lifestyle behaviors help older adults avoid the health and functional declines traditionally associated with aging.

Like people of all ages living in the U.S., older adults are exposed to nutrition messages from many different sources: newspapers and magazines, television and radio, friends and family, health care providers, the Internet, advertisers and salespeople. All of this information, which varies widely in its scope and reliability, leaves many older adults confused and often misguided (3). The nutrition educators' role is to help these older consumers sort out the relevant and useful information, and facilitate the application of knowledge to daily nutrition behaviors, thereby protecting or improving an older adult's personal health and well-being (3). Health benefits and reduced medical costs are likely if the rapidly expanding cohort of older adults receive effective nutrition education.

PURPOSE

In an effort to assist Aging & Disability Services (ADS) in preparing a diverse population of older adults to make informed nutrition related choices, this paper identifies effective approaches for providing nutrition education to older adult participants in the Elderly Nutrition Program. It focuses mainly on group nutrition education strategies but some of the evidence and program recommendations also apply to homebound and isolated rural elders. To embrace Seattle/King County's multicultural and ethnic diversity, some alternative approaches that have been used for serving these communities in other states are described.

As a result of researching various nutrition education interventions offered to older adults throughout the United States, I have generated a list of program recommendations based on common successful components. This information is provided to assist ADS in best targeting their program funds as they petition and review Requests for Proposals (RFPs) from service providers.

BACKGROUND

Elderly Nutrition Program

The U.S. Department of Health and Human Services Administration on Aging's (AoA) Elderly Nutrition Program (ENP) provides grants under the Older Americans Act to support community-based nutrition services for adults 60 and over.* The program's primary function is to improve the dietary intakes of participants by serving meals that provide at least one-third of the recommended dietary allowances established by the Institute of Medicine and outlined in the Dietary Guidelines for Americans (4). The Elderly Nutrition Program provides both home-delivered meals (often referred to as "Meals on Wheels") and

** Disabled persons under 60 years of age, spouses and caretakers may also receive services. Tribal Organizations are given the option at setting the age minimum of participants due to lower life expectancies and higher rates of chronic diseases at younger ages.*

congregate meals that are served in a variety of group settings such as senior centers, faith-based venues and other community facilities. While there is no income eligibility, the program is targeted to older people with the greatest economic or social need, with special attention given to low-income minorities, the frail elderly and those living in rural communities. Many of the adults served by the Elderly Nutritional Program are at high-nutritional risk and in danger of losing their independence.

The congregate meal programs afford several opportunities for socialization and homebound participants are visited by volunteers and staff to help decrease their feelings of isolation. Other benefits of the Elderly Nutrition Program in some, but not all, communities are nutrition assessments, health screenings, physical activity programs, connection to support services, education and counseling. Currently, about 87% of ENPs include a nutrition education component (4, 5). These are as diverse as the populations they serve but they all share a common vision: to improve the knowledge, skills and behavior of older adults in order to enhance their health and well-being.

Seattle-King County Elderly Nutrition Program

Elderly Nutrition Program Services are provided through local Area Agencies on Aging (AAA)— usually part of county governments, regional councils and nonprofit organizations—or Tribal Senior Services. Aging & Disability Services (ADS), a division of the Seattle Human Services Department, serves as the Area Agency on Aging for the Seattle-King County region. Currently eight sub-agencies manage 43 nutrition sites at various senior centers and cultural centers located throughout King County. Oversight and distribution of funds is provided by ADS. Twenty of the sites serve ethnic meals at least once per week (including soul food and Kosher meals), including 15 sites that provide only ethnic-specific meals to Latin, Native-American and Asian community members. Cultural groups served include: African-American,

Mexican, Japanese, Jewish, Indian, Chinese, Korean, Vietnamese, Laotian, Hmong, Filipino, Native-American, Polynesian, Somali, Oromo and Ukrainian.

Nutrition Education in Seattle-King County ENP

A nutrition education component is offered at all Seattle-King County congregate meal sites. One part-time consulting dietitian provides all the nutrition education for the entire ethnic-specific nutrition program, in addition to her other duties regarding menu planning and food safety/sanitation of congregate meal sites and nutrition assessment/screening of ethnic homebound seniors. Each ethnic meal site receives three 30-minute education sessions per year, with topics ranging from *trans* fats to the health benefits of fruits and vegetables. All classes are conducted in English through a native-speaking interpreter and several visual aids are used.

Two part-time nutritionists from the Chronic Disease Prevention & Healthy Aging division of Seattle-King County's Department of Public Health provide nutrition education for both senior centers and ethnic meal program sites administered by Senior Services. Their Healthy Eating for Healthy Aging (HEHA) program utilizes two different formats, both based on the 2005 Dietary Guidelines for Americans and MyPyramid, in order to assist seniors in identifying strategies to incorporate healthy choices into daily meal planning and food preparation. The first format consists of a series of six one-hour classes that may either be conducted weekly, bi-weekly or monthly. An informal group needs assessment is conducted at the first class and each series is tailor-made according to the dietary concerns and nutritional inquisitiveness of the participants. There is no cooking involved but all modules offer the opportunity for participants to taste new foods. HEHA's other format, Come Taste! is a weekly series of four classes featuring cooking demonstrations, each lasting 1.5 hours, that emphasizes simple, low-cost ingredients and the benefits of eating more fruits, vegetables and whole grains. Oils, fats, protein and dairy are also among the topics

covered. The nutrition educator prepares a variety of recipes from different cultures, using ingredients commonly found in the markets and food banks that serve the neighborhood, and each person in the audience is provided with a recipe card and a sample of the finished dish. In both programs, nutrition and food safety messages are delivered using an interactive approach with plenty of opportunity for in-class discussions. Funding for HEHA comes from the Basic Foods Nutrition Education Program, through USDA Food Nutrition Services.

Nutrition education for homebound Seattle-King County seniors is primarily via the "Mealtime Memo", a quarterly newsletter that features tips for healthy eating, recipes, news about the community dining program, and contact information. This newsletter is also distributed at 25+ congregate meal sites and for some participants, is the only nutrition education they receive.

II. Current Knowledge

NEEDS ASSESSMENT

The diversity of older adults in calendar years, health status, physical and cognitive abilities, race, culture, ethnicity, social class, literacy levels, years of formal education, financial resources, social support, experiential living, emotional health, personal living skills, lifestyle, rural versus urban living setting, etc., is extreme (6). This presents both a challenge and an opportunity as nutrition education programs are more effective when they are structured with consideration for the special and diverse characteristics of older adults (6).

In a literature review of recent journal articles evaluating nutrition education programs geared toward older adults, Sahyoun *et al.* (5) found that successful interventions delivered nutrition messages that were targeted to the specific needs of the group served. However, interests should also be taken into consideration, as not all topics regarding healthy aging will be well received by all audiences. This is one of the lessons learned from the attempt to transfer a successful senior nutrition education program (Take Charge of Your Health) from Georgia to Washington (7). Defining common nutritional needs and interests of facilitates the design of educational objectives and strategies.

Nutrition Assessments and Health Screenings

When designing an education program to address specific nutrition-related issues, data from nutrition assessment and health screenings are very useful determinants. Food intake surveys, or more detailed food frequency questionnaires and diet logs, can identify common food groups or nutrients that may be lacking amongst members of the intervention group. Health screenings such as blood pressure checks and cholesterol tests can also provide information for designing nutrition education interventions that are

targeted to chronic disease prevention and/or management. Such assessments and screenings are sometimes performed as part of public health services to ENP participants.

Surveys and Focus Groups

Something as easy as asking participants' about their interests prior to beginning an education program, or even on the first day of a multi-session series, assists in making sure that an education program will be relevant to that particular group. This can be done through surveys (either written, by telephone or face-to-face), focus groups or informal group discussions. The needs and wants of an intended audience can also be determined by consulting congregate meal site managers, home health care providers and health professionals working with that population.

In the Minority Peer Educator Project (described later in this paper), the problems addressed in the intervention were identified from research literature and from interviews and surveys conducted with the local Department on Aging's Minority Elderly Task Force, County Extension Agents, Senior Nutrition Site Managers, and Area Agency on Aging Staff. Focus groups with older minority participants and service providers validated information needs (8). In working with Native-American men and women, Griffin *et al.* (9) found focus groups to be instrumental in articulating successful features to tailor programs to their culture.

ADULT LEARNING AND THEORY

Adult Learning

Most elderly people continue to engage in learning throughout their lifetimes and they tend to be more receptive to nutrition education. In a review of conceptual and research literature on general adult education and adult learning as it applied to diabetes education, Walker *et al.* (10) concluded that: adults must feel a need to know; problem-oriented learning is more acceptable to adults than just learning

information about a subject; incorporating life experiences enhances motivation; and active participation is essential for behavior change (10).

The most successful educational interventions appear to be ones that emphasize learner and community participation with instructors who are facilitators and collaborators (11). Independent-living older adults are responsible for their self-management and education that focuses on self-care enhances this autonomy.

The nutrition educator's role, then, is to provide expertise related to self-management, help persons acquire knowledge necessary to make informed decisions about self-management, teach self-care techniques, help identify barriers as well as social and emotional supports, offer suggestions for behavior change and coping strategies, problem solve, and create opportunities for individuals to reflect on choices they make and goals they hope to achieve.

Education Theory

It is often suggested that a theoretical framework be used for designing nutrition education interventions. Theory helps to define clear educational objectives and teaching strategies. Two of the most widely used models in education theory are the Health Belief Model and the Transtheoretical Model.

The Health Belief Model relies on a person's perception of his/her chance of developing a condition, and of how serious the condition and its consequences would be, as motivating factors for behavior changes. This model is well adapted to older adults because of the heightened possibility of ill health. Sahyoun *et al.* discovered that participants with specific health conditions were generally more successful in making dietary changes as a result of a targeted education intervention based on the Health Belief Model (5).

The Transtheoretical Model proposes that health behavior change is a gradual, continuous and dynamic process that can be seen as occurring through five stages or phases: pre-contemplation, contemplation, preparation, action and maintenance (12). Knowledge of the readiness of individuals and groups to adopt

healthful behaviors can assist in tailoring an education intervention applicable to the participant(s)' stage— i.e., those in the pre-contemplation stage are often uninformed, underinformed or misinformed and need “why to” knowledge; and those in the contemplation or action stages need action-oriented strategies, or “how to” skills. Participants in the preparation stage are generally more successful in making dietary changes (5, 13).

SUBJECT MATTER

Older adults want information that is relevant to challenges they face (11). They desire nutrition information regarding: behaviors that impact their overall health; disease-specific management; food choice strategies; food shopping, selection and preparation; and food resource management (6). A brief summary of common nutrition-related issues for older, low-income and ethnic adults follows.

Malnutrition

Many members of the older age group consume insufficient calories and have low-quality diets (14).

Primary determinants include: decreased appetite (due to reduced physical activity, medications, chronic gastrointestinal ailments and loneliness, among others); reduced (physical or cognitive) ability to prepare food; and food insecurity. A decrease in energy intake is often accompanied by a decline in micronutrient intakes, especially calcium, zinc, iron, and B vitamins (15).

Hunger and food insecurity places low-income older adults at risk for poor nutritional status. The Third National Health and Examination Survey (NHANES III) found that older adults from food-insufficient families had lower intakes of energy, vitamin B-6, magnesium, iron, and zinc; and had lower serum concentrations of high-density lipoprotein cholesterol (the “good cholesterol”) and vitamins A and E (antioxidants) (16).

Overweight and Obesity

Just as detrimental to healthy aging as being underweight is being overweight. Among Americans 60 and older, an astounding 70% are overweight and approximately one third are obese (17). Older African-American women have the highest prevalence for both overweight (80.2%) and obesity (50.3%) compared to white and Mexican-American men and women, and African-American men (17). Overweight and obesity is associated with excess morbidity and mortality, and elevates the risk of heart disease, stroke, type 2 diabetes and some types of cancer (18). Surplus body weight also increases the severity of disease associated with hypertension, arthritis and other musculoskeletal problems.

Dehydration

Dehydration, a form of malnutrition, is a major problem in older adults (15). Dehydration risk increases because of the kidney's decreased ability to concentrate urine, blunted thirst sensation, deficiencies in hormone regulation, delirium and dementia, medication adverse effects, and mobility disorders (15). Fear of incontinence and disrupted sleep (due to numerous trips to the bathroom) also interferes with consumption of adequate fluid intake.

Digestive Problems

Constipation may affect up to 20% of people over 65 years of age (19). Besides inadequate dietary fiber intake, other causes of constipation among this age group include drug interactions with laxation and lack of appropriate hydration (19).

An estimated 10% to 30% of adults over 50 have atrophic gastritis (chronic inflammation of the stomach) that is characterized by inadequate hydrochloric acid and intrinsic factor, which are both necessary for vitamin B-12 absorption. Vitamin B-12 deficiency is associated with poor cognition, anemia and devastating neurological effects (20).

Osteoporosis

Osteoporosis and low bone density affects almost 44 million U.S. women and men aged 50 years and older, and is expected to affect half the population over the age of 50 y in 2020 (21). A lack of public knowledge or understanding may be a contributing factor. The recommendations to improve and maintain healthy bones include: consuming recommended amounts of calcium and vitamin D, maintaining a healthful body weight, and being physically active (weight-bearing exercises plus strength-training, and balance training to minimize risk of falls). Vitamin K, phosphorus, magnesium and potassium also play a role in optimum bone health.

Hypertension

The increased prevalence of hypertension in the U.S. over the past decade is associated with the increase in obesity and in the numbers of older adults. Sixty percent of men and 70% of women aged 65 to 74 years, and 68% of men and 84% of women aged 75 years and older have hypertension (15). The rise in blood pressure from increased salt intake can be thwarted by a diet high in potassium and other minerals, such as the DASH diet (Dietary Approaches to Stop Hypertension).

Changes in Flavor Sensations

A decline in taste sensitivity with age occurs in virtually every older adult—taste thresholds increase two to nine times with aging (15). Consequently, older persons prefer flavor-enhanced foods. Flavor-enhanced diets have been shown to promote higher food intakes and enhance immune function. Odor perception also declines with age and older women with reduced olfaction have a reduced interest in cooking and consuming a variety of foods (15).

Health Disparities

Compared with whites, Native Americans and Alaskan Natives are 2.6 times, African Americans and Pacific Islanders are 2.0 times, and Hispanics are 1.9 times more likely to be diagnosed with type 2 diabetes (22). Only 18% of Hispanics with high blood pressure have this condition under control, compared with 30% of whites (22). Death rates from heart disease are 30% higher for African Americans than for whites, and stroke death rates are 41% higher (22).

Lessons Learned from Centenarians

Research studying centenarians has attributed many nutrition-related factors to their longevity (15). These include:

- Elevated high-density lipoprotein levels (the “good cholesterol”)
- Decreased platelet activation (a protective effect against atherosclerosis)
- High levels of vitamins A and E (dietary sources of antioxidants)
- Decreased activity of plasma and red blood cell superoxide dismutase (an enzyme that synthesizes free radicals)
- Reduced susceptibility to lipid peroxidation (which also contributes to free radical formation)
- Increased favorable unsaturated/saturated fatty acid ratios (a protective effect against cardiovascular disease)
- Higher levels of the omega-3 fatty acids eicosapentaenoic and docosahexaenoic acid (which are protective against chronic and acute diseases of hyper-inflammation such as asthma, atherosclerosis, rheumatoid arthritis, hay fever, psoriasis, eczema, anaphylaxis, myocardial infarction and tumor formation (23)).

FORMAT

Simplicity

In the literature review by Sahyoun *et al.*, besides the need to deliver targeted messages to specific needs (i.e. how to lower sodium intakes in persons with hypertension), another characteristic shared by successful

programs is limiting content to just one or two take-home messages (i.e. how to increase dairy consumption). In some programs, one simple and practical message was the focus for each session while some entire series centered on just one or two key points. Both strategies were shown to increase participant knowledge.

Frequency

When reviewing nine different multi-session nutrition education programs for older adults, Higgins and Barkley (3) revealed that the attendance rate of any given session was just 43% to 63% (3). With such low attendance rates, many participants did not gain exposure to the nutrition information provided in any single class session. The programs that successfully surmounted this barrier were ones that presented the same topic in more than one session. Repeating the same messages in different ways in more than one session not only introduced all concepts to more members of the groups, but also reinforced them to those who attend sessions more frequently. This also led to increased knowledge.

Hands-on Activities

Hands-on activities allow participants to acquire skills in order to incorporate behavior change into their lives (6). Activities can include: preparing and tasting food, participating in small group discussions, solving in-class problems, reading nutrition labels, physical activity, playing games, maintaining food diaries and activity logs and being a peer educator.

Goal Setting

Use of a goal-setting process was found to be an effective strategy for promoting dietary behavior change among adults (24). It is one of the key elements of success in chronic illness education and behavioral self-management programs (11). This process includes recognizing a need for change, assessing

readiness for change, setting achievable goals (participants should set their own goals), adopting goal-directed activities, self-monitoring, and self-rewarding the goal attainment (24).

Incentives

In Sahyoun's review, she found that incentives were seldom used as motivational tools, but whenever incorporated in the program design, incentives appeared to be ingredients for success (5). Attrition rates were also lower in programs that used incentives.

PRINT MATERIALS / NEWSLETTERS

Content

The same strategies used for delivering nutrition messages in an in-person education session have also proven to be efficacious when designing written education materials. These include: providing practical, to-the-point, "how to" information; and presenting only one or two messages at a time. Focusing an entire newsletter on a single topic by using multiple components helps generate awareness, interest, practice and reinforcement (25).

To increase information recall and to accommodate low-literacy audiences (including non-native English readers), print materials should use simple words, short sentences, concrete concepts and graphic illustrations (25, 26).

Format

In a telephone survey assessing preferences for specific sections and topics in a biweekly newsletter sent to rural elders, interactive elements such as quizzes, dietary self-assessments, and a question and answer section were the most popular features (27). Presenting content in a question and answer format is a

senior-friendly problem-centered approach to learning (27), and quizzes and self-assessments promote involvement and enhance memory through active engagement (27).

Frequency of Newsletters

A study that examined how altering text and graphics of a nutrition brochure could affect the reader's ability to remember the content of the message found that older women were able to immediately recall up to 38% of the original concepts but knowledge gains were lost by 30 days (26). These results emphasize the need to allow for more frequent exposure with less information presented in each piece (25, 26).

Pros and Cons of Newsletters

For some older adults, newsletters are the desired mode of nutrition education because of their convenience, accessibility and promotion of self-paced learning (25). They enable readers to control the rate and amount of information they receive. However, the availability of translation services, as well as differences in literacy levels and vision impairment are barriers to relying on printed materials alone. Also, the question of whether printed nutrition educational materials are actually read, comprehended, retained and subsequently used appears to be unresolved (26).

Newsletters can lead to changes in cognition and (to some extent) attitudes, but they have been shown to only slightly affect behavioral measures (25). To bring about improvements in outcomes, written communications generally need to be combined with other interventions (25).

ALTERNATIVE EDUCATORS

Peer Educators

Based on evidence of its effectiveness in nutrition education programs designed for younger ethnic participants, peer education may prove to be a successful tool in reaching more multicultural seniors. It has

been recognized that some ethnic populations present more obstacles for nutrition education including: limited resources, the need for child care, transportation, time, language, culture, literacy, health beliefs, and, in some cases, transience (28).

In a program designed to help low-income Hispanic mothers of preschool children provide for their children's nutritional needs, *abuelas* (Hispanic grandmothers who are well-respected by younger generations) were trained as peer educators. The program was evaluated using a knowledge, skills and behavior pre-test, post-test and six-month follow-up survey of both the mothers who took the class and the *abuelas*. As a result, the program was found to be effective in increasing nutrition-related knowledge, skills and behaviors of the participants and the educators (28). This benefit to peer educators is common (3, 5).

By recognizing the strong cultural role of family for this audience, peer education can be effective in engaging older Hispanic women (who often rely on often rely on kinship ties for transportation, mealtime companionship and dietary information (29)) to change dietary habits. In another multicultural intervention—a church-based weight-loss program for African American women—peer education was also shown to increase participant attendance and program completion rates (30).

There is one documented example older minorities teaching their age cohorts at congregate nutrition sites. In the Minority Peer Educator Project, Hispanic and African-American elders were trained to give a short lesson after playing a 5-minute video, which focused on a nutrition-related health problem posing a risk to members of their community (8). Each series featured one topic (which was spread out over six different sessions), with six different videos about the same (fictional) minority family. The two topics for African-American elders were hypertension and type 2 diabetes. The two topics for Hispanic elders were depression following widowhood and overweight as a risk for high blood pressure. The videos for Hispanic elders were in Spanish only. Program results were based on in-depth pre- and post-program interviews.

Participants identified closely with the family-theme used in each of the videos and indicated that the stories were "realistic," "interesting" and "gave good advice." Results are as follows:

Demonstrated Increased Knowledge	Weight loss/weight control	63%
	How to control high blood pressure	49%
Behavior Changes	Limited salt, fat, sugar and/or the amount eaten	47%
	Indicated that they "should change" or "plan to change or have changed" their diets	49%
	Increased time spent walking	33%

Besides delivering specific, culturally-relevant and sensitive messages that were reinforced through multiple sessions, this program incorporated many other educational strategies that have been found to be effective with Native Americans. These include mentoring, informal environments, storytelling with culturally-specific themes, videos and small group discussions (9).

Train-the-Trainer

If limited budgets or agency downsizing make it increasingly difficult to engage nutrition professionals as educators, a train-the-trainer approach may be a possible strategy in extending the reach of nutrition education. Paraprofessionals such as nurses, health care professionals, food industry workers and community service providers can be trained by nutrition professionals to deliver basic nutrition knowledge that is not too detailed or complex.

A pilot study by North Carolina Cooperative Extension demonstrated the feasibility of such a program by training congregate nutrition site (CNS) managers to teach a module on food budgeting. Although they are typically not health professionals, it was believed that the groups would accept the managers in this new educational role because of their previously established relationships. Another foreseeable benefit was that given their continuous presence at the CNS setting, managers may be in a better position to encourage follow-up of behavior change than are professional educators who appear occasionally (31).

After 4 hours of training, the CNS managers taught eight 15 to 30 minute weekly lessons at their respective meal sites but took difficult participant questions to their trainer (via scheduled weekly telephone calls).

Each manager was also observed on at least two occasions to ensure fidelity to the key elements contained in the curriculum.

In summary, the CNS managers felt comfortable teaching their modules and 94% of the seniors were either “very comfortable” or “comfortable” (6% were “somewhat comfortable”) (31) with the CNS manager taking on the educator role. When asked about their satisfaction with the program, 94% were also “very satisfied” or “satisfied” (6% were “somewhat satisfied”) (31). Although this study focused on participant satisfaction and comfort and not on behavior change, it shows support for using existing peer networks to disseminate knowledge in order to promote favorable behavior changes.

EXAMPLES OF SUCCESSFUL EVIDENCED-BASED PROGRAMS

Case studies presented in Appendix B describe two nutrition education programs for older adults, Healthy Eating for Life Program (HELP) and Eat Better & Move More, that incorporate many of the successful components listed above. Both programs are pre-designed curricula, easily adapted to any setting, cost-effective, and available for use. However, HELP has not been updated with the new food guide pyramid.

CONCLUSION

Successful nutrition education interventions have common characteristics. These include: nutrition messages limited to one or two; simple and practical messages targeted to specific needs (i.e., how to choose high-fiber foods or to how to increase milk consumption); reinforcement and personalization of messages; hands-on activities; goal setting and self-assessment, incentives and access to health professionals (3, 5).

DISCUSSION

Limitations and Uncertainties of the Science

Three extensive literature reviews conducted since 1995 (3, 5, 32) revealed a scarcity of peer-reviewed journal articles that evaluated nutrition education programs geared solely toward older adults. Of the evaluations found, increased nutrition knowledge was the most common outcome analyzed. Behavior change was only looked at in a few studies and biochemical/anthropometric outcomes were rarely measured. Most program evaluation was done by survey of self-reported habits, attitudes and knowledge, which makes the level of evidence weak to moderate at best when they are not corroborated by other measures.

More sensitive indicators of change in nutrition knowledge, attitudes and behaviors among older adults need to be employed. Longer follow-up after interventions is needed to assess permanency of changes. Additionally, further research is needed in these areas: comparing participants of ENP nutrition education programs to non-participants; studying the learning time needed before any long-lasting behavior change can be expected from older adults (3) and comparing different educational theories to determine the most effective framework for nutrition education interventions.

III. Existing Policies

CURRENT WASHINGTON STATE POLICY

The Older Americans Act, Title III Part C provides grants to Area Agencies on Aging for the establishment and operation of nutrition projects, including nutrition education services for individuals attending congregate meal sites and receiving home-delivered meals. Since grants are received and administered by the AAAs, there is no official national policy. Aging & Disability Services (ADS) of Seattle-King County follows the Senior Nutrition Program Standards (33) outlined by the Washington State Department of Social and Health Services Aging and Disability Services Administration. This state policy declares that nutrition service providers must conduct nutrition education activities at a minimum of two times per calendar year at each site. Nutrition education is defined as “any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well-being”. The 2005 Dietary Guidelines should serve as the framework for all nutrition education activities and, although there is no set content or curriculum, providers are encouraged to use existing nutrition education resources from the Basic Food Nutrition Education Program, Washington State University Cooperative Extension, Senior Farmers Market Nutrition Program or the Department of Health’s 5-a-Day Program. The policy also states that nutrition education should include information on physical activity. Education activities can take any verbal or visual format and the minimum length of one nutrition education presentation is five minutes. A Registered Dietitian (RD) or an individual with comparable expertise (ICE), or someone else overseen by an RD or ICE, should lead presentations or activities.

SEATTLE-KING COUNTY POLICIES AND PRACTICES

Seattle-King County follows the Washington State standards, as described above, but the current local programs are in excess of what is required from the state. *Refer to Background: Nutrition Education in Seattle-King County ENP on page 4.*

DISCUSSION

Policy vs. Science

Although there is no research on the most effective length of time for education interventions, repetition of messages was a key component of successful programs. This cannot be achieved using Washington State's minimum guidelines of ten minutes per year. The 5-minute minimum (assumably) comes from the length of time required to read one newsletter article. However, delivering these messages only twice per year is not sufficient.

Current Practices vs. Policy

The state guideline of including information on physical activity may not be followed in every setting. Physical activity programs, such as EnhanceFitness®, are only offered at selected congregate meal sites. The ethnic meal sites had a previous, separate contract for a physical fitness program based on EnhanceFitness® but those contract funds have ended. Only a few ethnic sites still offer any type of physical activity.

Impact of Current Policies and Practices

There is no evidence that shows the impact of the Washington State policy. There is also little documentation of the effectiveness of Seattle-King County's current practices but informal feedback is reported to be positive.

IV. Program Recommendations

Based on the evidence of the common strategies of successful nutrition education interventions, the following are recommendations of key items that could be integrated into the existing framework of Seattle-King County's Elderly Nutrition Education Programs. It is recognized that some of these strategies are already being used.

NEEDS ASSESSMENT

- Use self-reported nutrition risk assessment data from congregate meal program enrollment form. Although not always completely filled out, it offers some baseline information and can help identify nutritional needs
- Continue to do focus groups and surveys, especially with ethnic meal program. Ideally, they should be conducted once per year (per group) following one of the education sessions.

CONTENT AND FORMAT

- Use information collected from risk assessments, focus groups and surveys in order to target each audience with appropriate nutrition messages based on their actual identified needs.
- Structure the program to increase retention by presenting multiple sessions on a single topic.
- Consider shortening current education sessions in exchange for frequency.
- Define expected outcomes/target behaviors for each session and each intervention. These may include changes in knowledge, attitudes and beliefs; self-efficacy; intentions to change; actual behavior change; or anthropometric/physiological measurements (blood pressure, cholesterol levels, weight, etc.).
- For multi-session education programs, incorporate goal setting as an in-class or take-home activity.
- Remain active in assessing goals throughout the intervention.
- Create opportunities for participants to practice and/or discuss ways to overcome barriers to change.
- Continue to use adult learning theory and multiple educational techniques that appeal to different senses such as taste, smell, touch, and vision.

- Implement evaluation measures in order to analyze program effectiveness.

Nutrition Messages

Topics should be relevant to the nutrition-related issues of older adults. The modified MyPyramid for Older Adults (34), designed by nutrition experts at Tufts University, is an excellent visual representation of these recommendations and is included in *Appendix A*.

Messages should be simple and specific, limiting nutrition information to just one or two practical, to-the-point messages. These should include both “why to” and “how to” knowledge in order to accommodate participants at different stages of change. Examples of session topics include: How to reduce salt intake, portion control, selecting foods with fiber, etc.

Reinforcement

To reinforce messages delivered at education sessions, hang nutrition information posters at meal sites.

This will also get the basic facts out to seniors who do not attend education programs. The quarterly newsletter (Mealtime Memo) should also repeat messages learned in education sessions that quarter, and feature some of the recipes demonstrated in classes.

PRINT MATERIALS / NEWSLETTERS

- Limit nutrition messages to one or two simple, practical “how to” messages.
- Use printed materials with concrete words, graphics and illustrations.
- Include interactive features such as quizzes and dietary self-assessments.
- Present content in a question-and-answer format.
- Pre-test print materials with the intended audience to determine its appropriateness and comprehensibility.

- Distribute monthly, if possible, focusing on homebound and isolated rural elders. But first, conduct survey to determine if current Mealtime Memo is currently read, retained and used by this population.

EXPAND NETWORK OF EDUCATORS

- For non-technical education interventions such as food budgeting and basic food safety, train willing congregate meal site managers to teach short (30-minute) simple lessons focusing on just one or two key messages.
- Find health professionals willing to donate their time and talents. (Retired nurses may be a good pool to draw from.) They can be trained to teach very basic nutrition information with a dietitian or public health nutritionist available to answer complex questions brought up by participants.
- Embrace the strength of social and kinship ties that already exist within some communities by implementing peer education at ethnic meal sites.

INCORPORATE PHYSICAL ACTIVITY

- Expand partnership with EnhanceFitness®.
- Expand partnership with Seattle Parks & Recreation to offer Sound Steps Walking Program before meal times in vicinity of congregate meal sites.
- Offer transportation to Sound Steps areas to/from lunch spots using Senior Shuttle.
- Partner with local health clubs that offer the SilverSneakers® Fitness Program or expand partnership if one already exists.
- Have physical activity fairs once/year that invite partners to promote free and low-cost fitness programs geared toward seniors.
- Teach, demonstrate and/or promote physical activity:
 - Walking (weight bearing exercise to increase bone density, and low-to-moderate intensity exercise for improved cardiovascular endurance). Offer low-cost pedometers, which can be used as both a goal-setting tool and an incentive.
 - Functional resistance training (to increase bone density, strength and independence). Examples: squats to get out of a chair, wrist curls for opening jars, etc.
 - Balance training (to prevent falls) counteracts the decrease in balance usually seen with aging.

USING A PRE-DESIGNED EVIDENCE-BASED CURRICULUM

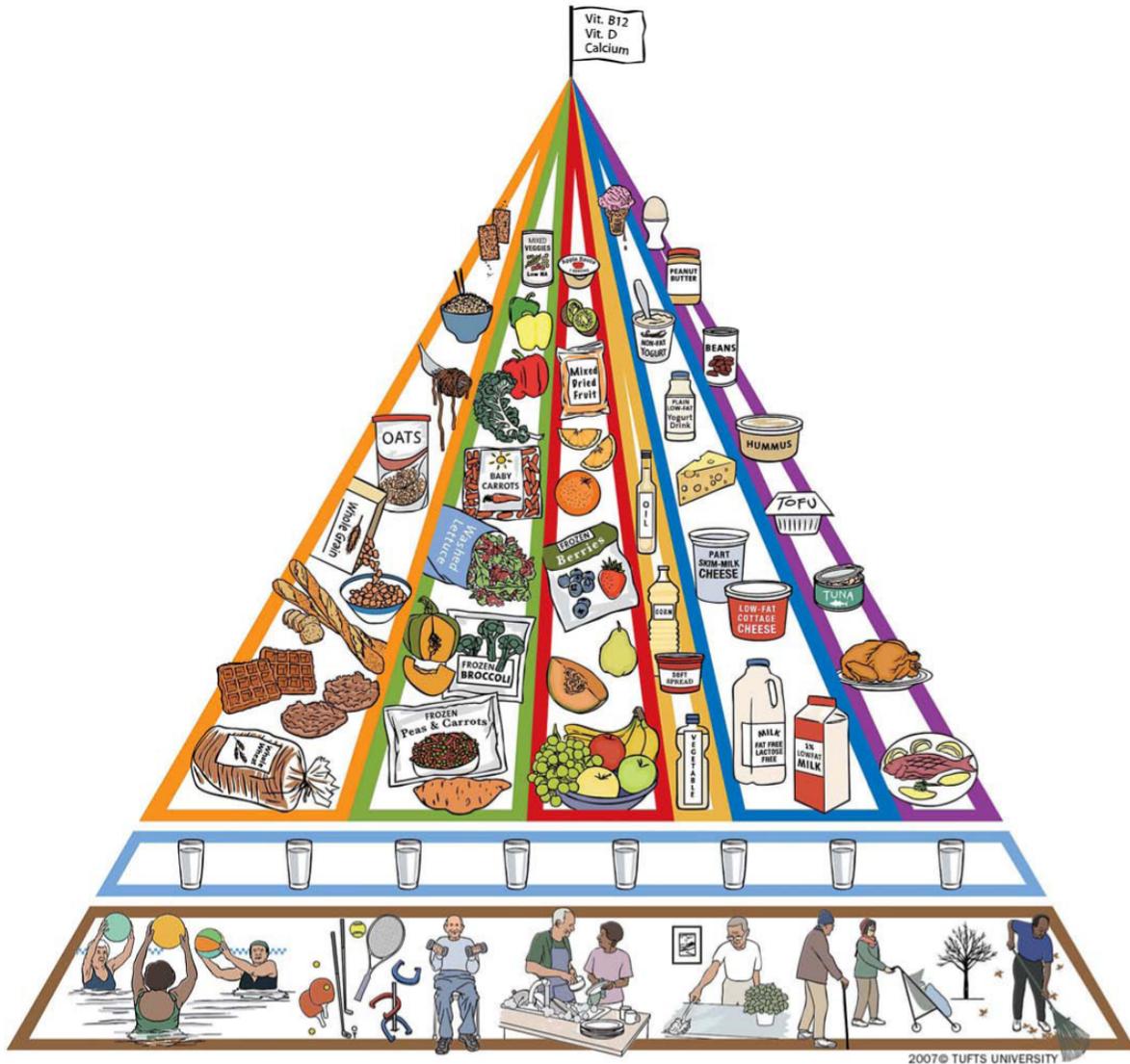
Incorporating several program recommendations at once can be simplified and streamlined by implementing a turnkey nutrition education program. Eat Better & Move More is an available program that encompasses many of the strategies proven to be successful in providing nutrition education for older adults. It combines nutrition education with physical activity and is designed to be easy to use, inexpensive to implement, tailored to the needs of older adults, and geared toward changing behaviors (35). It uses a comprehensive guidebook to help program leaders engage participants to set goals, overcome barriers, receive accurate nutrition information, plan behavior changes and record progress (35). The guidebook also describes how to set up a walking program in community settings, recruit and motivate participants, and measure program effectiveness. For a more detailed description and evaluation results, refer to *Appendix B: Case Study 2.*

V. Conclusion

The purpose of this paper was to identify effective approaches for providing nutrition education to older adult participants in the Elderly Nutrition Program in order to assist Aging & Disability Services (ADS) to best target their program funds. I believe that some of my program recommendations can be made within the existing framework without additional staffing or funding.

If only one or two of my program/policy suggestions are implemented and proven to be effective, then this research and this paper were worth the time and effort. Hopefully I was able to make ADS, their partners and their providers aware of some different strategies and new ideas.

Appendix A: Modified MyPyramid for Older Adults



Only 37% of Americans age 65 and over use the Internet (36) and therefore will not be able to access the USDA's interactive MyPyramid web site. This prompted researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University to create this printable graphic representation that caters to the unique dietary needs of older adults (34).

Features of the Modified MyPyramid for Older Adults:

- The foundation depicts physical activities characteristic of older adults.
- The row of glasses at the bottom stresses the importance of consuming enough fluids.
- Mostly whole grains are shown to promote consumption of fiber-rich foods.
- Brightly-colored fruits and vegetables are shown to emphasize nutrient-rich foods.
- Frozen vegetables are pictured because bags of frozen pre-cut vegetables can be resealed (good if cooking for one), are easier to prepare (especially for arthritic individuals) and have a longer shelf life, minimizing waste (for low-income seniors).
- No juice is shown in the fruit group in order to promote fiber-rich whole fruits.
- The flag at the top indicates the potential need for supplemental forms of calcium, vitamin D and vitamin B-12.

Appendix B: Case Studies

CASE STUDY 1: HEALTHY EATING FOR LIFE PROGRAM (HELP)

Program Description

The Healthy Eating for Life Program (HELP) for Mature Adults is a nutrition education curriculum designed by Kansas State University Agricultural Experiment Station and Cooperative Extension Service. It features a series of 16 food and nutrition lessons that can be mixed and matched dependent on program and participant needs.

Evaluation

A prospective cohort study comparing the effect of a 4-week nutrition education program on fruit and vegetable intake was conducted at four different non-metropolitan and rural congregate meal sites (37). Three groups received lessons that specifically addressed the nutritional needs of older adults and the connection between healthful eating habits and good health. The lessons for the first 2 weeks focused on vegetables, while the second 2 weeks focused on fruits. The objectives of the lessons related to the following: suggested number and sizes of servings; vegetables and fruits as sources of various nutrients and few calories; links between eating vegetables and fruits and decreased risk for some diseases; cost-effective purchasing, storage, and preparation of vegetables and fruits (especially methods that allow for easy chewing). A dish featuring vegetables or fruits was brought to each class for participants to taste, chosen for their ability to appeal to the changing taste buds of many older adults. Also, at each of the four sessions, the participants were given handouts of the lessons, “challenges” for planning behavior changes and copies of recipes. The control group did not receive any lessons, tastings or handouts during the study but the handouts and recipes were made available to all control participants after the post-intervention questionnaires were completed.

Outcomes

The Stages of Change construct of the Transtheoretical Model was used to identify separate stages of change related to fruit- and vegetable-eating behaviors.

The tables below indicate which state of change (*refer to Transtheoretical Model on page 8*) participants were at prior to and upon completion of the study.

INTERVENTION GROUP	Fruits		Vegetables	
Stage of Change	Pre-test	Post-test	Pre-test	Post-test
Maintenance	32 %	32 %	28 %	46 %
Action	0 %	8 %	4 %	10 %
Preparation	20 %	20 %	24 %	26 %
Contemplation	4 %	8 %	0 %	0 %
Precontemplation	24 %	28 %	30 %	12 %
Cannot categorize	20 %	4 %	14 %	6 %
CONTROL GROUP	Fruits		Vegetables	
Stage of Change	Pre-test	Post-test	Pre-test	Post-test
Maintenance	20 %	18 %	47 %	33 %
Action	2 %	6 %	0 %	4 %
Preparation	25 %	19 %	8 %	18 %
Contemplation	2 %	4 %	2 %	2 %
Precontemplation	43 %	49 %	33 %	33 %
Cannot categorize	8 %	4 %	10 %	10 %

Pre- versus post-test results showed that the intervention group’s consumption of vegetables changed significantly, a positive movement from a lower stage of change (i.e., from precontemplation, which was 30% at pre-test and 12% at post-test) to a higher category at post-test (i.e., taking action to change, or maintaining, their fruit- and vegetable-eating behaviors) (37).

CASE STUDY 2: EAT BETTER & MOVE MORE

Evidence suggests that even modest increases in physical activity can lead to improvements in health, functioning, and quality of life (38, 39). Integrated programs of nutrition and activity help enable older adults to take better charge of their health and prolong their independence. Eat Better & Move More is a good example of such a program (13).

Program Description

Eat Better & Move More (EBMM) is a 12-week nutrition and exercise program designed to improve diets and increase physical activity among older Americans. As part of the Administration on Aging's national You Can! Steps to Healthier Aging social marketing campaign, EBMM teaches older adults how to eat healthier, exercise safely, stay motivated, and develop a physical activity plan. Each weekly 30-minute session incorporates both nutrition and physical activity and includes a combination of "mini-talks," activities, resources and take-home assignments that involve dietary self-assessment. Nutrition topics include: the benefits of eating more fruits and vegetables, calcium-rich foods, dietary fiber and sensible portion sizes. Each topic is introduced one week, and then reviewed and expanded on in the following session. Physical activity is promoted through a walking program. Participants are given pedometers and are encouraged to track the number of steps walked each day. The physical activity education component covers everything to do with walking: health benefits, how to use step counters, logging steps, stretching, tips to increase steps, staying hydrated and dressing for all-weather walking. Self-monitoring and goal setting is another important aspect of the program. EBMM is promoted as being a simple, inexpensive, ready to use program designed to fit modest local agency resources and fitting the interests and needs of community-dwelling older adults.

Note: Since the evaluation, a second series of classes has been implemented. Designed to be a continuation of the first program, topics are more health-specific and include sodium, potassium and the DASH diet; diabetes; vitamin D and osteoporosis; and vitamin B-12. Walking is still encouraged but new physical activity components includes instruction on balance exercises and resistance training using Thera-band ® elastic tubing.

Study/Evaluation Description

For this study, 10 program sites across the U.S. were recruited (of among 106 applicants) and given grant money for the extra staffing required for program implementation, methods training, study data collection and recordkeeping. The site selection process emphasized diversity in population, program size and location. Sites currently offering a physical activity program were excluded. For participant eligibility, the ability to walk without assistive devices was a requirement as was a physician's approval form (if one or more health screening questions were answered affirmatively). One of the 10 study sites included Senior Services of Snohomish County in Mukilteo, Washington.

999 participants started the study and 620 (62%) were considered “completers” (having both pre-intervention and post-intervention data on either nutrition, physical activity, or both). Rates of program completion differed significantly according to study site, ranging from 35% to 85%. Completion rates did not differ according to ethnicity. The lowest participant completion rate (35%) occurred at a high-rise housing site, whose participants had the highest mean nutrition risk score (which is often the case in older adults residing in subsidized high-rise apartments) (13). Mean age was 74.6, 82% were women and 41% were members of racial/ethnic minority groups (13). This was representative of the usual demographics of the OAA congregate meal program. Completers tended to have significantly fewer health conditions than did non-completers and fewer were at high nutritional risk (15% compared to 30%).

Outcomes: Dietary Intake

Number of Servings at Pre-intervention	Change in Number of Servings at Post-intervention				
	Increased 2 or more (%)	Increased by 1 (%)	No Change	Decreased by 1 (%)	Decreased 2 or more (%)
Fruit					
0	1.4	1.9	0.2	–	–
1	2.2	15.6	10.5	0.8	–
2	–	9.5	23.1	5.4	0.0
3	–	–	17.8	10.5	1.2
Total	3.6	27.0	51.6	16.7	1.2
Vegetables					
0	1.5	1.7	0.0	–	–
1	3.4	14.8	8.1	0.2	–
2	–	15.3	24.4	4.6	0.2
3	–	–	17.5	7.0	1.2
Total	4.9	31.8	50.0	11.8	1.4
Fiber (defined as whole grains or high-fiber products)					
0	1.7	1.7	0.2	–	–
1	6.1	10.1	9.9	0.0	–
2	–	13.4	23.0	7.4	0.2
3	–	–	17.6	7.2	1.7
Total	7.8	25.2	50.7	14.6	1.9
Calcium-rich foods (defined as milk, cheese, yogurt, and calcium-rich soy products)					
0	2.3	5.1	1.4	–	–
1	3.4	15.5	13.1	0.7	–
2	–	15.4	18.3	5.8	0.2
3	–	–	11.8	5.8	1.2
Total	5.7	36.0	44.6	12.3	1.4
Water (defined as non-alcoholic fluids, including water)					
0	1.1	0.0	0.0	–	–
1–2	1.0	3.5	2.0	0.2	–
3–4	1.8	12.4	14.0	1.1	0.0
5–6	–	11.5	19.4	7.4	1.0
≥7	–	–	15.0	6.7	2.1
Total	3.9	27.4	50.4	15.4	3.1

Outcomes: Physical Activity

Physical Activity Indicators (mean values)	Pre-intervention (week 2)	Post-intervention (week 11)	% Change
Steps walked per day	3110	4183	+ 35%
Blocks walked each time	10.0	14.5	+ 45%
Flights of stairs climbed/day	4.6	5.7	+ 24%
Days walked per week	5.7	6.2	+ 9%
Timed Up and Go score (seconds) ^a	11.7	10.6	- 10%
Exertion level ^b	4.9	5.4	+ 10%

- a Timed “Up and Go” was measured by trained program staff and refers to the amount of time a person takes to rise from an arm chair, walk 3 meters, turn, walk back, and sit down again. The norm is 7 to 10 seconds, and individuals requiring more than 10 seconds are considered to have limited physical mobility and to be at increased risk of falling; those requiring more than 20 seconds are considered to be at high risk of falling (40).
- b Exertion level was self-reported and refers to the degree of effort expended “when exercising in your usual fashion” (1 = none, 9 = very, very strong).

Outcomes: Health, Satisfaction and Stages of Change

At pre-intervention, 6% of the participants perceived their health as “excellent”. Of the 94% of participants not reporting excellent health, 24% made a significant advance of 1 or more categories toward excellent, including 3% who advanced 2 or more categories. Categories included: excellent, very good, good, fair and poor. Almost all of the participants (99%) indicated that they would recommend the program to others, 93% percent reported that it helped them “eat better” and 90% reported that it helped them “move more.”

There was significant movement of participants through the stages of change. These include: pre-contemplation, contemplation, preparation, action and maintenance. Nutritional state of change was assessed by asking participants to select a statement that best describes themselves in reference to calcium intake (35). At pre-intervention, 59% of the participants were at the maintenance stage, reporting that they had been eating 2 or 3 servings of calcium-rich foods daily for more than 6 months. Of the 41% not at the maintenance stage at pre-intervention, 73% made a significant advance of 1 or more stages toward maintenance, including 47% who advanced 2 or more stages (13). In assessing pre-intervention physical activity status, 58% of participants were at the maintenance stage in terms of regular physical

activity. Of the 42% who were not at this stage, 75% made a significant advance of 1 or more stages toward maintenance, including 38% who advanced 2 or more stages (13).

Conclusion

EBBM outcomes were positive at all ten program sites. However, all of the participants were self-selected volunteers as it was felt that randomization into a control group would be an upset that would deter future participation in congregate meal programs. Attributable to the success was the enthusiasm of local staff, especially site directors and managers, and the involvement of health professionals and facilitators (8 registered dietitians and 1 registered nurse) who were culturally sensitive and, in many cases, able to answer questions beyond the intervention's scope.

References

1. Centers for Disease Control and Prevention and The Merck Company Foundation. The State of Aging and Health in America 2007. Whitehouse Station, NJ: The Merck Company Foundation; 2007.
2. Watts M. Improving nutrition for American seniors: a new look at the Older Americans Act. *J Am Diet Assoc.* 2005 Apr;105(4):527-9.
3. Meck Higgins M, Clarke Barkley M. Group nutrition education classes for older adults. *J Nutr Elder.* 2004;23(4):67-98.
4. AOA. U.S. Department of Health and Human Services Administration on Aging. Elderly Nutrition Program Fact Sheet. 08/27/03.
5. Sahyoun N, Pratt C, Anderson A. Evaluation of nutrition education interventions for older adults: a proposed framework. *J Am Diet Assoc.* 2004 Jan;104(1):58-69.
6. Higgins M, Barkley M. Tailoring nutrition education intervention programs to meet needs and interests of older adults. *J Nutr Elder.* 2003;23(1):59-79.
7. Burm J. Impact of the Take Charge of Your Health Senior Nutrition Education Program. Seattle: University of Washington; 2006.
8. Minority Peer Educator Project Executive Summary. Texas AgriLife Extension Service; 1990 [updated 1990; cited 2008 Feb 23]; Available from: http://fcs.tamu.edu/families/aging/health_and_aging/mpep.php.
9. Griffin J, Gilliland S, Perez G, Helitzer D, Carter J. Participant satisfaction with a culturally appropriate diabetes education program: The Native American diabetes project. *The Diabetes Educator.* 1999;25:351-63.
10. Walker E. Characteristics of the adult learner. *Diabetes Educ.* 1999 Nov-Dec;25(6 Suppl):16-24.
11. Higgins M, Barkley M. Concepts, theories and design components for nutrition education programs aimed at older adults. *J Nutr Elder.* 2003;23(2):57-75.
12. Contento IR. Nutrition education : linking research, theory, and practice. Sudbury, Mass.: Jones and Bartlett Publishers; 2007.
13. Wellman N, Kamp B, Kirk-Sanchez N, Johnson P. Eat better & move more: a community-based program designed to improve diets and increase physical activity among older Americans. *Am J Public Health.* 2007 Apr;97(4):710-7.
14. Position of the American Dietetic Association: nutrition, aging, and the continuum of care. *J Am Diet Assoc.* 2000 May;100(5):580-95.
15. Kuczmarski M, Weddle D. Position paper of the American Dietetic Association: nutrition across the spectrum of aging. *J Am Diet Assoc.* 2005 Apr;105(4):616-33.
16. Dixon L, Winkleby M, Radimer K. Dietary intakes and serum nutrients differ between adults from food-insufficient and food-sufficient families: Third National Health and Nutrition Examination Survey, 1988-1994. *J Nutr.* 2001 Apr;131(4):1232-46.

17. Hedley A, Ogden C, Johnson C, Carroll M, Curtin L, Flegal K. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA*. 2004 Jun;291(23):2847-50.
18. U.S. Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. Rockville, MD: U.S. Department of Health and Human Services; 2001.
19. U.S. Department of Health and Human Services; U.S. Department of Agriculture. *Dietary Guidelines for Americans*, 2005. 6th ed. Washington, DC: Government Printing Office; 2005.
20. Rolfes SR, Pinna K, Whitney E. *Understanding Normal and Clinical Nutrition*. 7th ed.: Brooks Cole; 2005.
21. US Department of Health and Human Services. *Bone Health and Osteoporosis: A report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services, Office of the Surgeon General; 2004.
22. Centers for Disease Control and Prevention. *Racial and Ethnic Approaches to Community Health (REACH) U.S. Finding Solutions to Health Disparities*. April 2007.
23. Moffatt RJ, Stamford BA. *Lipid metabolism and health*. Boca Raton, FL: CRC/Taylor & Francis; 2006.
24. Cullen K, Baranowski T, Smith S. Using goal setting as a strategy for dietary behavior change. *J Am Diet Assoc*. 2001 May;101(5):562-6.
25. Higgins M, Barkley M. Improving effectiveness of nutrition education resources for older adults. *J Nutr Elder*. 2004;23(3):19-54.
26. Clark K, AbuSabha R, von Eye A, Achterberg C. Text and graphics: manipulating nutrition brochures to maximize recall. *Health Educ Res*. 1999 Aug;14(4):555-64.
27. Taylor-Davis S, Smiciklas-Wright H, Warland R, Achterberg C, Jensen G, Sayer A, Shannon B. Responses of older adults to theory-based nutrition newsletters. *J Am Diet Assoc*. 2000 Jun;100(6):656-64.
28. Taylor T, Serrano E, Anderson J, Kendall P. Knowledge, skills, and behavior improvements on peer educators and low-income Hispanic participants after a stage of change-based bilingual nutrition education program. *J Community Health*. 2000 Jun;25(3):241-62.
29. Oomen J, Owen L, Suggs L. Culture counts: why current treatment models fail Hispanic women with type 2 diabetes. *Diabetes Educ*. 1999 Mar-Apr;25(2):220-5.
30. Quinn M, McNabb W. Training lay health educators to conduct a church-based weight-loss program for African American women. *Diabetes Educ*. 2001 Mar-Apr;27(2):231-8.
31. McClelland J, Irving L, Mitchell R, Bearon L, Webber K. Extending the reach of nutrition education for older adults: feasibility of a Train-the-Trainer approach in congregated nutrition sites. *J Nutr Educ Behav*. 2002 Mar-Apr;34 Suppl 1:S48-52.
32. Contento I, Balch G, Bronner Y, Lytle L, Maloney S, Olson C, Swadener S. The effectiveness of nutrition education and implications for nutrition education policy, programs, and research: A review of research. *Journal of Nutrition Education*. 1995;27.

33. Senior Nutrition Program Standards. Washington State Department of Social and Health Services Aging and Disability Services Administration; 2004.
34. Lichtenstein A, Rasmussen H, Yu W, Epstein S, Russell R. Modified MyPyramid for Older Adults. *J Nutr.* 2008 Jan;138(1):5-11.
35. Wellman N, Friedberg B, D W, Cuervo L, NK S, L R, Smith B. Eat Better & Move More: A Guidebook for Community Programs. National Resource Center on Nutrition, Physical Activity & Aging; 07/2004.
36. Pew Internet & American Life Project. 2007 [updated 2007 02/15/2008; cited 02/28/2008]; Available from: <http://www.pewinternet.org/trends/>.
37. Long C, Saddam A, Conklin N, Scheer S. The influence of the healthy eating for life program on eating behaviors of nonmetropolitan congregational meal participants. *Family Economics and Nutrition Review.* (Wntr 2003).
38. DiPietro L. Physical activity in aging: changes in patterns and their relationship to health and function. *J Gerontol A Biol Sci Med Sci.* 2001 Oct;56 Spec No 2:13-22.
39. Rejeski W, Mihalko S. Physical activity and quality of life in older adults. *J Gerontol A Biol Sci Med Sci.* 2001 Oct;56 Spec No 2:23-35.
40. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *J Am Geriatr Soc.* 1991 Feb;39(2):142-8.