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ABSTRACT

This monograph presents a collection of papers related to health issues and aging: "Introduction" (Paul Simon); "Memory, Aging, and Cognition" (Rita E. Arras); "Internet Resources for the Elderly and Their Caregivers" (Kathleen Doyle); "Unintentional Injuries in the Homes of the Elderly: A Look at Current Research and a Case Study of Home Care Recipients in a Rural Area" (Shally Gimenez, Dale O. Ritzel, and Mark J. Kittleson); "Social Policy and the Aged: Implications for Health Planning, Health Education, and Health Promotion" (Elaine T. Jurkowski and Martin B. Tracy); "The Need and Challenge To Address the Greatest Threat to Health and Well-Being in Our Time" (Daniel Leviton); "A Changing Landscape: Health Issues among Minority Elders in the United States" (Kim H. Miller); "Physical Activity and the Healthy Older Adult" (Sally Perkins); "Enhancing the Quality of the Later Years: Nutrition and Aging" (Lori W. Turner, Marjorie Fitch-Hilgenberg, Ro DiBrezzo, and Jeanne Bleeker); and "Medication Issues in Aging" (Barbara W. K. Yee and Gayle D. Weaver). (SM)

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Health Issues in Aging

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Foreword

The contributing authors for this issue of **The Health Education Monograph Series** address areas that influence the health and well-being of older Americans. Based upon Bureau of the Census projections, a significant increase in the number of older Americans will occur for the next 50 years. The most dramatic increase will occur between 2010 and 2030 when the Baby Boomers, born between 1946 and 1964, turn 65. Currently, one in thirteen people is 65 or older and projections for the year 2050 estimate that one in four people will be 65 or older. In their article on social policy and aging, Jurkowski and Tracy reveal implications of this graying of America phenomenon and discuss current health policies for the elderly. Miller provides us with a closer look at the changing racial/ethnic landscape of the older American population.

Along with the good news that many older Americans are healthier, more active, and experiencing positive aging, we recognize that there are two faces of aging. Increases will occur in the number of vulnerable older Americans, such as women in the oldest-old group (85 and older) who live alone. There will be an increase in the number who experience what many fear most about aging: loss of mental functioning. In her article on memory, cognition, and aging, Arras explains cognitive impairment and the various forms of dementias, including the most common, Alzheimer's Disease.

Many older Americas will live longer, be more active, and lead more productive lives than any previous generation due to medical, scientific, and technological advances as well as heightened public awareness of the importance of proper nutrition and physical activity. In their article, Turner and associates explain how proper nutrition can enhance the health, independence, and quality of the later years. Perkins follows with a discussion of the importance of physical activity in increasing independence by slowing the physiological aging process and reducing risks/effects of chronic conditions.

Because of the increased likelihood of experiencing chronic conditions which can lead to problems with medication use, Yee and Weaver offer some insight as to what these problems are and how health educators can help combat them. With aging there are changes in the most common types of unintentional injuries and death. Gimenez and associates explain why unintentional injuries are a serious threat to older Americans and set the stage for Leviton's commentary on what he considers to be the greatest threat of our time: horrendous death.

As health educators we have been and will continue to be responsible for much of the increased public awareness about aging and aging issues. Individuals have access to a vast amount of aging related information and resources via the Internet. In an effort to assist older Americans and those interested in aging issues, Doyle provides readers with a variety of Internet sites currently available.

The key to successful aging may be our ability to adapt to the changes that we experience. As individuals and as health educators it is essential to be aware of how we might enhance the quality of the later years. In the Introduction former Senator Paul Simon suggests that we meet the challenge of aging by getting involved in helping other people. In doing so, we may ultimately find aging to be enabling, not disabling.

We wish to express thanks to our contributing authors. It has been a pleasure to work with such an exceptional group of professionals. Special thanks go to Paul Simon for sharing his insights regarding the aging experience. Finally, we would like to thank Dr. Mohammad Torabi for extending the opportunity to edit this Monograph issue.

Sincerely,

Roberta J. Ogletree, HSD, CHES and Kathleen Doyle, Ph.D., CHES

Preface

On behalf of the National Executive Committee of Eta Sigma Gamma (ESG), I would like to express my sincere appreciation to the Guest Editors of this issue, Dr. Roberta Ogletree and Dr. Kathy Doyle for the significant contribution they have made to the profession and Eta Sigma Gamma. They have done an outstanding job preparing and editing this timely and needed issue which is essential for the aging population in the United States and other countries. For their contributions, they deserve our sincere thanks. This is an excellent issue examining the concept and different perspectives on aging. I also wish to thank all of the authors who ultimately made this monograph possible. I genuinely appreciate their contributions to the **Health Education Monograph Series.**

I would like to thank Ms. Kathy Finley for her assistance in preparing the publication and Ms. Joyce Arthur for her technical assistance. Also the assistance of Mr. Jay Javed from our National ESG office is appreciated. Last, but not least, I would like to offer my appreciation to each and every member of the National Executive Committee who are very committed to supporting the monograph series.

Finally, thank you for sharing your comments with me regarding the past Monograph series. As always, I am eager to hear your criticisms, comments, and suggestions regarding these publications. Your input is essential in improving the publication and ultimately serving our members and the profession in the most effective way. I do hope that you, as loyal members of this National Professional Health Education Honorary, check your college/university libraries to make sure they receive ***The Health Education Monograph Series***. If not, please request that they subscribe to these important publications by calling 1-800-715-2559. It is a privilege for me to serve the Eta Sigma Gamma members and our profession.

I look forward to hearing from you.

Mohammad R. Torabi, Ph.D., MPH, CHES
Editor, ***The Eta Sigma Gamma Monograph Series***

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Introduction

Paul Simon

I can't be objective in writing this introduction. I'm 71 years old and in another month I'll be 72. I'm becoming more familiar than I want to be with the problems of growing older. But there are also opportunities, and those of us who have crossed that magic barrier of 65 should seize the opportunities as well as help our society responsibly face the problems. Here are two major problems:

Social Security Funding

In the first years of Social Security we had 16 workers for each retiree. Today we have three workers for each retiree and in a few years it will be two. You don't have to be an Einstein to understand that will cause serious funding problems. Genuine answers are not popular. For that reason both political parties are ducking this, coming up with band aids that will help temporarily but not resolve the problem. At the request of three sitting United States Senators, our Public Policy Institute at Southern Illinois University pulled together former Senators Alan Simpson of Wyoming, John Danforth of Missouri, David Pryor of Arkansas and the deputy chief actuary for Social Security. We consulted first by phone and mail and then met in Carbondale where after lengthy discussion we recommended two things—both unpopular—that would solve the problem for 75 years, according to the actuary.

My theory is that the only way the problem will be solved is if it is bipartisan, with both political parties taking the heat for the unpopular portion and taking the credit for salvaging the system. If four of us—two Republicans, two Democrats, none of us ever seeking public office again—could reach an agreement maybe it could get off dead center.

We recommended:

1) Correct the Consumer Price Index, the measure we have for inflation. It does not take into consideration substitution (the use of chicken if the price of beef goes up, as one example), generic drugs, discount stores and other factors that cause a slight exaggeration of the price index. Doing this would mean that when we receive our Social Security checks they would continue to rise each year, but not quite as rapidly.

2) We should pay Social Security taxes on all earned income, not simply the first $74,000. If you make a million dollars a year, you should pay Social Security on the full amount, not just on 7 percent of your income.

Our ideas have been received favorably by serious students of the problem, but serious students of the problem are few indeed.

Health Research

My wife died from brain cancer so I have a special yearning for that research. But Alzheimer's is much more common and is even worse. Senator Tom Harkin of Iowa points out that the federal government has spent more on military research in seven years than we have on health research the entire last century. A small increase in research funding can mean so much to us, but even more to future generations.

Many other problems could be listed, including what will become a growing concern: physical and mental abuse of the frail elderly.

But aging frequently gives us the luxury of time which we should use to do more than entertain ourselves. There are young children in our communities who need love, need the touch of a foster grandparent. Political parties need volunteers, churches and other religious and social-concern groups need help. And in that strange way that life works, as we help others we end up helping ourselves.

I have always supported the programs for noon meals for seniors at centers. Part of the reason is obvious: It gives people a balanced meal who often wouldn't get one without this service. But a more important reason is that it gets people out of their apartments or houses, keeps them in touch with others, so they don't internalize every minor ache or pain.

I drive alone in my car and hear a medical adviser on the radio and say, "These are the signs of kidney disease." If I think about it for more than a few minutes I reach the conclusion that I may have kidney disease: My problem is simply that I'm thinking too much about myself, not enough about others.

As seniors we should take care of ourselves and our real problems, but one way to help is to be of assistance to others.

Memory, Cognition, and Aging

Rita E. Arras, RN, MS

We have all heard the statistics and read the headlines. Adults over 65 are the fastest growing segment of the American population. Combine this reality with "Baby-boomers" beginning to retire in 2010, and forecasters predict a tidal wave of disease and disability overwhelming the health care system (Administration on Aging, 1998; Desai, Zhang, & Hennessy, 1999). Are these dire predictions likely to come true? While more people are living long enough to celebrate their 100th birthday, most do not have the genetic structure, lifestyle, or the good fortune to function independently into their 9th or 10th decade (Perls, 1997). Problems with memory and thinking are significant contributors to declining functional capacity and loss of independence in older adults. This article will focus on some of the causes of memory and cognitive deficits in aging, as well as research on prevention.

Mild Cognitive Impairment

Memory loss and cognitive impairment without dementia are fairly common place among older adults. Mild cognitive impairment (MCI) has been defined as subjective complaints of memory impairment among older people, substantiated by psychometric testing, but insufficient in severity to interfere with functional ability (Ritchie & Touchon, 2000; Celsis, 2000). MCI has been associated with an increased risk for the development of dementia, especially Alzheimer's Disease. Peterson et al. (1999) tracked the progress of older adults without memory problems and older adults with MCI over a four-year period. During this interval, 1% of the normal controls developed MCI or Alzheimer's, while 12% of those with MCI developed Alzheimer's.

Another longitudinal study of 387 healthy individuals over the age of 70 explored the relationship of aging, cognition and health. After four years, the 195 individuals who continued to be healthy demonstrated a small, but significant cognitive decline. The individuals who developed health problems experienced an even greater degree of decline, indicating a possible interaction between aging, disease and cognitive decline. The authors concluded that these mild deficits might represent early Alzheimer's disease (Starr, Deary, Inch, Cross, & MacLennan, 1997).

A cross-sectional study of 1,360 adults (ages 24-81) examined the potential of disease as a predictor of cognitive performance. After those with dementia were excluded, the presence of other diseases predicted 3.5% of cognitive ability. Diabetes had an adverse effect on all cognitive performance tests. Chronic bronchitis contributed to lower scores on sensorimotor speed and cognitive flexibility, while poor hearing contributed to lower memory scores (Van Boxtel, et al., 1998).

High blood pressure was linked to cognitive decline in another large, longitudinal study. Individuals with inadequately treated and untreated high blood pressure had a greater cognitive decline than individuals with normal blood pressure or adequately treated hypertension (Tzourio, Dufouil, Duciemetiere, & Alperovitch, 1999).

Mild cognitive impairment and decline in cognitive status conferred an increased risk for mortality in a population-based cohort study. The group at highest risk were individuals with recently identified cognitive decline (Bassuk, Wypij, & Berkman, 2000).

Dementia

Memory and cognitive deficits often develop gradually and worsen with time. Dementia is characterized by memory loss and cognitive deficits that have progressed to the point of interfering with daily function (American Psychiatric Association, 1994; Foy & Starr, 2000). In addition to memory impairment, at least one other cognitive deficit must be present to meet the criteria for dementia. These deficits include agnosia (failure to recognize common objects), aphasia (deterioration of language function), or apraxia (difficulty with executing known acts). Common memory complaints include repetitive comments and questions, misplacing items, forgetting names, forgetting appointments, or forgetting medications. Symptoms of other cognitive deficits include getting lost while driving, word finding difficulty, difficulty with common tasks such as cooking, confusion about date or day of the week, and problems with managing personal finances. Personality or behavior changes might include deterioration in personal hygiene, reclusive behavior, withdrawal from social activities, irritability, or passivity (McCarten, 1997).

Dementia is not a normal part of aging. Age is the greatest risk factor for the development of dementia, the prevalence increasing with each decade of life (Foy & Starr, 2000; Slooter & Van Duijn, 1997). At the beginning of a Swedish longitudinal study, 30% of the 84-90 year-old subjects had cognitive deficits. Four years later, 43% of those who were

alive and able to be re-tested demonstrated cognitive deficits (Zarit, Johansson, & Malmberg, 1995).

In summary, some degree of cognitive impairment appears to be fairly common in individuals over the age of 65, the prevalence increasing with age. The presence of MCI represents a substantial risk for developing dementia in the future. These cognitive deficits are associated with an increased risk for mortality and may be related to the presence of other chronic conditions.

A thorough, accurate evaluation for people with cognitive decline or dementia is important for several reasons. While reversible causes of dementia are rare, other concomitant conditions such as vitamin deficiencies, drug intoxication, or depression, may cause the dementia to be more severe (Foy & Starr, 2000; Hogervorst, et al., 2000; Morris, 1997). These conditions should be identified and treated.

Alzheimer's Disease. Dementia can be caused by many different diseases. At least 75% of all dementias are caused by Alzheimer's Disease (AD), either alone or in combination with other conditions (Morris, 1997). AD affects an estimated four million U.S. citizens, imposing a $50 billion annual economic burden in the U.S. alone. While substantial progress has been made in understanding risk factors, genetics, and the pathology of AD, much of the disease remains shrouded in mystery (National Institute on Aging, 1999, Progress report).

There is a significant loss of neurons and brain mass in people with AD. Postmortem analysis of brain tissue usually reveals amyloid plaques (found outside of nerve cells), and neurofibrillary tangles (found inside of nerve cells). These structures are composed of abnormal protein substances (Dickson, 1997; Mouton, Martin, Calhoun, Dal-Forno, & Price, 1998; Tilley, Morgan, & Kalsheker, 1999). There is also a decreased amount of neurotransmitters, such as acetylcholine, needed for nerve cell communication. Cholinesterase inhibiting medications, such as Cognex and Aricept, have been somewhat helpful in treating AD. The medications work by preserving the supply of acetylcholine needed for nerve cell communication (Mayeax & Sano, 1999).

Most people develop AD after the age of 65. Rare familial forms of early AD are caused by autosomal dominant genetic mutations on chromosomes 1, 14, or 21(Slooter & Van Duijn, 1997; Tilley, Morgan & Kalsheker, 1999). The more common form of AD, occurring in those over age 65, suggests an interaction between genetics and environment. The relative risk of developing AD when a first order relative is affected is 3.5. If one identical twin develops AD, the other twin will develop AD 18-41% of the time. A double allele for the protein, apolipoprotein e4, controlled by chromosome 19, has been implicated in many cases of late onset AD. A person with a double e4 configuration is 8 times more likely to develop AD than an individual with other e-alleles. Chromosomes 3, 9, 12, & 14 have also been implicated in late onset AD (Goate, 1997; Tilley, Morgan & Kalsheker, 1999).

Studies are underway to investigate the possibility of preventing the advancement of MCI to dementia. A study launched in 1999 is the first the National Institute of Aging (NIA) clinical trial to prevent cognitive decline (NIA, 1999, NIA launches national study). Scientists at Elan Pharmaceutical are working on a vaccine that has shown promise in preventing the development and reducing amyloid plaques in mice (Schenk, et al., 1999). This is a promising new development that offers the potential to treat or even prevent AD.

Alzheimer's Disease is characterized by a long, inevitable, progressive decline with many global symptoms (Foy & Starr, 2000; McCarty, et al., 2000). This disease slowly robs people of their memories and ability to make sense out of the world around them. Families are often overburdened with the physical and emotional demands of caregiving. Until AD can be treated, halted, or prevented, efforts must be made to provide comfort for the affected individual, and education and support for caregivers (Ham, 1997). Medical treatment of psychosis or depression is often necessary, but must be undertaken with care because of undesirable side effects such as increasing confusion and sedation (Mayeax & Sano, 1999). Among the most essential therapies for AD are behavioral approaches to care and modifications in the environment. Caregivers can be taught to use more effective communication patterns, decreasing confusion, frustration, and ultimately agitation in the person with AD. The environment can be modified to avoid over-stimulation and to provide cues (for example, symbols on bathroom doors) for the confused person.

Other Causes of Dementia

Lewy Body Dementia. Lewy Body Dementia (LBD) is the second most common cause of dementia (McKeith, O'Brien, & Ballard 1999). Lewy bodies are the characteristic neuropathological lesion of this type of dementia. Lewy bodies are round, protein-containing lesions found inside neurons of the cerebral cortex. This same type of lesion is found in a section of the brain known as the substantia nigra in people with Parkinson's Disease. People with LBD also have symptoms of Parkinson's Disease including slow movements, tremor, stiffness, an abnormal shuffling gait, or stooped posture. This has led some to dispute whether LBD is a separate entity from Parkinson's, which can also cause dementia. To further confuse the situation, autopsies on people with dementia frequently reveal Lewy Bodies as well as plaques and tangles. This leads others to believe that Lewy Body Dementia is a variation of Alzheimer's Disease. It is unlikely that this dispute will be settled in the near future (Brown, 1999).

The symptoms that appear to distinguish LBD from Alzheimer's disease include the Parkinson-like symptoms described above, severe, persistent, visual hallucinations, fluctuations in course, and periodic loss of consciousness, associated with falls. The dementia either precedes or occurs within a year of the Parkinson's symptoms. In Parkinson's Disease, dementia may not occur at all, or occurs years after the onset of the other symptoms (Brown,

1999; Londos, Passant, Brun, & Gustafson, 2000; Walker, et al., 2000).

Vascular Dementia. Some sources describe vascular dementia, rather than LBD, as the second most common cause of dementia. Vascular dementia is preferred to the former term, multi-infarct dementia (American Psychiatric Association, 1994). The pathology of vascular dementia relates to one or more episodes of interrupted blood flow to the brain, caused by a major, apparent stroke, or the cumulative effect of many small, or silent strokes (Lewis, 1999). A computerized tomography (CT) scan or magnetic resonance image scan (MRI) of the brain may reveal small strokes or infarcts in the white matter below the cerebral cortex, giving rise to alternate term, subcortical dementia (Olsen & Clasen, 1998). Differentiating vascular dementia from Alzheimer's Disease has been the topic of numerous studies. A review of 45 studies on vascular dementia found that individuals with vascular dementia tend to have fewer problems with memory, but more severe problems with initiating tasks than individuals with Alzheimer's Disease (Looi & Sachdev, 1999). Vascular dementia may develop suddenly, have a widely fluctuating course or progress in a stepwise fashion. Other neurologic signs such as weakness or abnormal reflexes, urinary incontinence, or gait disturbances may be present (Scheltens & Hijdra, 1998). A careful history and MRI or CT scan can help differentiate Alzheimer's Disease from vascular dementia (Lewis, 1999). These two conditions may be difficult to distinguish because vascular dementia and Alzheimer's Disease frequently occur concomitantly (Breteler, Bots, Ott, & Hofman, 1998).

Risk factors for vascular dementia include hypertension, diabetes, smoking, elevated cholesterol, excessive alcohol intake, and atrial fibrillation (Breteler, Bots, Ott, & Hofman, 1998). While there is no known cure for vascular dementia, addressing the risk factors may be important in preventing this type of dementia or preventing further vascular events. Preventive strategies for vascular dementia include controlling high blood pressure, lowering cholesterol, limiting alcohol intake, smoking cessation, treating arrhythmias, and possibly aspirin therapy (Olsen & Clasen 1998). Health promotion would serve as primary prevention strategies, while screening for hypertension and hypercholesterolemia would be important secondary prevention strategies.

Hypothyroidism. Proper functioning of the thyroid gland is essential to the nervous system. In infants, low levels of thyroid hormone lead to profound mental retardation. Low level of thyroid hormone (hypothyroidism) is increasingly common with aging and can cause cognitive impairment (Prinz, et al., 1999). Dugbarty (1998) reviewed seven studies addressing the impact of hypothyroidism in adults. Each study concluded that hypothyroidism leads to cognitive impairment, although the seven studies found different areas of cognitive function effected. There was no clear consensus from the studies whether correcting hypothyroidism reverses cognitive deficits. However, screening for hypothyroidism is an essential part of the evaluation of adults with dementia.

Creutzfeld-Jacob Dementia. One type of dementia that has received considerable attention in recent years is Creutzfeld-Jacob Dementia (CJD). While CJD is rare, the effects are dramatic and devastating. CJD is fatal and untreatable. Symptoms include behavior changes, abnormal gait, and dementia. The course is rapid, with death usually occurring within a year of the onset of symptoms (Weihl & Roos, 1999). CJD is actually one type of subacute spongiform encephalopathy (SSE) believed to be caused by small proteinous substances known as prions. Prion diseases may be infectious, (transmitted through corneal transplantation, use of contaminated medical equipment, or injection of human growth hormone) sporadic (without a known cause), or even genetic. These diseases may actually reflect a new conceptual framework for the presentation of disease (Prusiner & Scott, 1997).

Subacute spongiform encephalopathy variants occur in animals including sheep, goats, mink, elk, and deer. Citizens of the United Kingdom were alarmed by the occurrence of Bovine Spongiform Encephalopathy (Mad Cow Disease) and the possibility of transmission to humans. The occurrence of a new variant of CJD (nvCJD) in humans is believed to be associated with ingestion of contaminated beef in the U.K. The appearance of Mad Cow Disease in U.K. cows during the late 1980's may have been caused by the SSE jumping species. The practice of using rendered animal parts (such as brain, spinal cord, tonsils, thymus, spleen and intestines) for animal feed was common. Cost-saving strategies in the processing of these products around 1981 may have provided the means by which prions from infected animals were introduced into feed and transmitted to cattle (Weihl & Roos, 1999). The evidence for nvCJD being related to the bovine disease was based on the timing of the epidemic among cattle and the appearance of a distinctly new variant form in humans. Even more compelling is the pathologic similarity of the brain lesions among infected cows and humans with nvCJD. Because of the long incubation period of SSE, the extent of this outbreak is unknown. Meat rendering policies, feeding practices, and restrictions on beef exports have been implemented as precautions. This interesting and frightening situation will bear watching over the years.

Space does not permit discussion of all possible causes of dementia. There are many more causes including vitamin deficiencies, syphilis, AIDS and others. The remainder of this article will be devoted to some recent thoughts on prevention and protective factors for dementia.

Factors That May Protect Against Dementia

Some interesting findings emerged from a unique study of Catholic nuns. This study examined the relationship of early life linguistic ability to later life cognitive performance. Nuns in this study provided a unique opportunity to control for

socioeconomic factors such as nutrition, health care, lifestyle, and education, as well as the opportunity to access comparable, reliable samples of writing from many years ago. Each sister in the study had written an autobiographical essay immediately before taking her final vows. Researchers analyzed the essays for idea density and grammatical complexity. The sisters each underwent annual physical and neuropsychological testing. Twenty-five sisters died during the study and had granted permission for an autopsy. Ninety percent of the deceased sisters who displayed low idea density in their essays, performed poorer on neurocognitive tests and had evidence of Alzheimer's on autopsy. Only 13% of those with high idea density had Alzheimer's. The authors theorized that high idea density could represent cognitive reserve, a protective factor against later life Alzheimer's Disease (Snowden, et al., 1996).

Cognitive reserve, demonstrated by higher education and occupational attainment, may delay initial symptoms of AD (Cummings, Vinters, Cole, & Khachaturian, 1998; Stern, Albert, Tang, & Tsai, 1999). In one study, individuals with more education and higher occupational attainment presented with *less* dementia than expected, given the degree of pathology seen on their brain scans. These individuals demonstrated a steeper rate of decline over four years than their less educated counterparts. Education may help compress morbidity of Alzheimer's or even serve a protective function against the disease (Stern, Albert, Tang, & Tsai, 1999). A French study found individuals who had never been married (or cohabited) had a substantially greater risk for dementia than individuals who had been married (or cohabited). The never married (or cohabited) group had fewer leisure activities and smaller social networks, which might explain this finding. The authors also theorized that older people living alone have sub-optimal nutrition, which can contribute to dementia (Helmer, et al., 1997).

Nutrition plays an important role in cognitive processes. Folic Acid, Vitamin B12 and B6 are needed for normal neurologic function. Deficiencies in these nutrients are fairly common among the elderly (Selhum, Bagley, Miller & Rosenburg, 2000).

The New Mexico Aging Process Study found vitamin C levels were associated with certain types of visual performance and serum protein levels and protein intake were associated with better performance on tests of abstraction and logical reasoning. Subjects taking vitamin E at the beginning of this longitudinal study, demonstrated better cognitive performance six years later (La Rue, et al., 1997).

Oxidative stress has been hypothesized as a contributing factor to dementias, especially AD. The neurologic system is susceptible to oxidative damage by free radicals, which may play a role in formation of amyloid plaque (Christen, 2000; Sinclair, Bayer, Johston, Warner, & Maxwell, 1998). A 20-year longitudinal study examined the impact of antioxidants on cognition. Levels of a-tochopherol, B-carotene, and ascorbic acid were measured in 1971 and again in 1993. Blood levels in 1971 were predictive of blood levels in 1993, revealing an amazing stability of these nutrients. Cognitive testing was also conducted in 1993. B-carotene and ascorbic acid were reliable predictors of performance on cognitive tests such as recall, speed in naming items, and vocabulary.

Antioxidants may also contribute to other types of dementia. Sinclair, Bayer, Johston, Warner, & Maxwell, (1998) compared serum levels of Vitamin C, Vitamin E, and beta-carotene in people with Alzheimer's, vascular dementia, and normal controls. Individuals with vascular dementia had significantly lower levels of Vitamin C. Vitamin E levels were significantly lower in the Alzheimer's group. These antioxidants are found primarily in fruits and vegetables, a powerful indication for adequate lifetime intake of these essential foods (Perrig, Perrig, & Stahelin, 1997).

The role of estrogen as a protective factor against Alzheimer's Disease has received attention in recent years. Estrogen may confer protection against AD by preserving acetylcholine, inhibiting the formation of amyloid, or decreasing oxidative stress (Inestrosa, Marzolo, & Bonnefont, 1998). Epidemiologic studies have produced inconsistent results because of differences in dosage, length of time of estrogen therapy, age of estrogen initiation, and the presence of other confounding variables. One such study by Matthews, Cauley, Yaffe, and Zmuda, (1999) found that women who had used estrogen prior to the study did better on one of the tests of memory function than women who had never been on estrogen, or women who started estrogen during the six year longitudinal study. The effects were most notable for women with less education. Prospective experimental-control studies are underway and will likely yield more reliable results (NIA, 1999, Progress report).

Some have suggested that novel activities, whether physical or mental, can help preserve cognitive function (Hirsch & Hirsch, 1998). Results of the Maastrich Aging Study suggest that aerobic capacity in older adults is associated with better scores on tasks that measure information processing speed (Van Boxtel, et al., 1997).

Implications for Health Education

Education will always be a key component in the arsenal of weapons against these devastating conditions. All health professionals need to understand the scope and significance of dementia and memory loss with aging.

Health educators are essential team members in addressing these conditions. Health behaviors such as exercise and adequate nutrition may lower the risk of dementia. Health educators working with older adults can develop programs to promote social activities and mental stimulation. Health educators may also design materials and programs that provide education on the multiple benefits of estrogen replacement therapy.

Effective public education should stress the need for accurate diagnosis and treatment. Many people wrongly as-

sume that memory loss and confusion are normal for aging. Individuals or family members may not seek treatment because of this misconception. Individuals with potentially treatable causes of dementia may go untreated. Voluntary agencies such as the Alzheimer's Association and official agencies such as the National Institute of Aging strive to debunk this myth through public education. Health educators can help these agencies accomplish their educational mission.

Perhaps the greatest need for education comes after an individual is diagnosed with dementia. Health educators can develop effective education programs and materials to help individuals and families deal with these devastating conditions.

Whether involved in primary, secondary, or tertiary prevention of dementia, health educators are instrumental in the efforts to care for those with dementia. Health education about memory loss and dementia should involve the steps of assessment, planning, delivery of programs, and reliable evaluation of education efforts.

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Internet Resources for Older Persons and Their Caregivers

Kathleen Doyle, PhD, CHES

The Internet has become the global "go- to" source for retrieval of a variety of health related information. This is true for the both the consumer and health professional. Users can have instant access to information from public and private databases to answer questions they may have. Physicians are using the technology to make long distance, on-line consultations and diagnoses (Internet assists heart patients, 2000). Recently, public health investigators used the Internet to trace a syphilis outbreak in which the individuals who contracted the disease reported they had met the majority of their sex partners over the previous year in an Internet chat room (Public health investigators use Internet, 2000).

The Internet and its appeal have broken through the age barrier. Baby boomers and seniors currently account for approximately 20% of on-line users, surpassing the 18-to-24 year olds who make up about 17.5% of users. Older people are the fastest-growing Internet demographic group (Montgomery, 2000). Whether it's an older person looking for information about a health concern, or a caregiver looking for services to assist in the care giving process, the Internet has become a tool for another generation.

The purpose of this article is to provide a reference list of web sites that specifically focus on older persons and related issues. It is organized alphabetically by site name with each URL address listed. A short description accompanies each site that will help identify the usefulness of the site for the consumer or practitioner. Before each description, in italics, is a category that connects the site to the articles in this monograph.

Some of the sites are very specific to a particular issue while others are broader in nature. At these sites, the category of *General* is used to indicate that you can probably find information about all of the topics addressed in this issue.

Age of Reason

http://www.ageofreason.com/

This site is specifically for people over 50. It is set up to assist seniors who don't want to spend a lot of time lost in the Internet. It provides practical information relative to senior's lifestyles with over 5,000 Links to sites of interest to the over 50-age group.

General

Age Net

URL: http://www.agenet.com caregiver_support_page.asp

This is a resource developed by the AgeNet Information and Referral network to provide support and information for people with the primary responsibility of caring for a loved one. It offers a wealth of information on caregiver support, including articles and a resource directory.

General

Alzheimer's Disease Education and Referral Center (ADEAR)

URL: www.alzheimers.org

ADEAR is a service of National Institute on Aging that supplies information on Alzheimer and related dementias. This site includes specific Alzheimer's Diseases publications including those online and a list of many free publications that can be ordered.

Memory/Cognition

American Academy of Neurology

URL: http://www.aan.com/

The American Academy of Neurology posts fact sheets on a range of neurological disorders including Alzheimer's disease, Parkinson's, Essential Tremor, Tremor, and Stroke. Each fact sheet includes a brief background on the disorder, symptoms, causes, treatment, and experimental treatments.

Memory/Cognition

American Health Care Association: The Association of the Long Term Care Community

URL: www.ahca.org/who/who.htm

On the site you can access "A Profile of an Aging Nation" which includes U.S. Census Bureau statistics, statistics on today's nursing facilities and the people they serve, and national data on nursing facilities.

General

American Heart Association

URL: www.americanheart.org/catalog/Health_catpage9.html

The "Physical Activity in Your Daily Life" page offers

information on managing your lifestyle for better health, risk factors for heart disease that can be controlled, diet and nutrition, cookbooks, tips for talking with your doctor. The "Physical Activity in Your Daily Life" section includes material on senior citizens and activity facts and exercise tips for older Americans.

Physical Activity

Assisted Living Website
URL: www.assistedliving.com

This website is committed to helping people find the best living solutions as they grow older. Visitors can search for assisted living and Alzheimer's disease facilities throughout the US, access a checklist for assisted living, and tips on how to select a nursing home.

Safety

Area Agencies on Aging (AAA)
URL: http://www.aoa.dhhs.gov/aoa/webres/area-agn.htm

To locate the AAA in your state, contact this site for up-todate, accurate information.

General

Association for Death Education and Counseling (ADEC)
http://www.adec.org/

Learn about ADEC and its role in helping people deal with death and grief. Want to become a certified counselor? The site provides information on the certification program.

Dying and Death

Centers for Disease Control Office of Women's Health: Health in Later Years
URL: www.cdc.gov/od/owh/whily.htm

This site is produced by the US Department of Health and Human Services, Centers for Disease Control, Office of Women's Health. It contains a small amount of statistical information, but identifies key health problems among older women, and offers suggestions for improving the health and quality of life.

Minority

Consumer Product Safety Commission
http://cpsc.gov/

If you need any type of safety information involving the elderly, this is an excellent site. It provides practical tips to improve living environments to the latest research on elderly safety issues.

Safety

Diet and Fitness: The Essential Sites
URL: www.thirdage.com/diet/index.html

Several diet and fitness website links are listed here with the unique interests of Third Agers in mind. Sites are selected based on these criteria: information/services related to third agers' needs/interests; clear, concise and attractively organized content; and useful high quality information and services.

Nutrition

Directory of State Long Term Care Ombudsman
URL: http://www.aoa.dhhs.gov/aoa/pages/ltcomb.html

This directory provides a state-by-state list of contact information for the individuals who would respond to and investigate complaints on behalf of nursing home residents, board and home care residents, and other adult living facilities.

Safety

Elder Action: Ideas for Older Persons and Their Families
URL: www.aoa.dhhs.gov/elderpage.html#ea

This site contains information for older persons and their families. It covers a wide range of topics such as talking with your doctor, information on prescription drugs, and information on key elderly housing concerns, and retirement and financial planning online resources.

Medications, Safety

Eldercare Locator
URL: http://www.aoa.dhhs.gov/elderpage/locator.html

Eldercare Locator is public services of the Administration on Aging. It is a nationwide directory assistance service to help older persons and caregivers locate support resources for aging Americans. The site gives the toll-free number for contacting Eldercare Locator

General

Fitness Programs for Older Adults
URL: www.healthy.net/fitness/special/older.htm

This site contains several articles dealing with fitness and older adults. It has some practical tips for the senior citizen as well as theory and facts for the practitioner

Physical Activity

Food and Nutrition Information Center (FNI)
URL: www.nal.usda.gov/fnic

FNI is one of several information centers of the National Agriculture Library, part of the USDA's Agriculture Research Service. Resource lists, databases, links to other food and nutrition related sites as well as food safety, food composition, dietary guidelines, and food guide pyramid information are given.

Nutrition

Funeral Humor
URL: http://vbiweb.champlain.edu/famsa/humor.htm

Need to take the lighter side of the road when it comes to dying

and death? This site provides some relief through humor, jokes, and anecdotes.

Dying and Death

Health Care Financing Administration
URL: www.hcfa.gov

This is the home page for HCFA administers the Medicare and Medicaid insurance programs. Information on M&M, FAQs and search options are available at this site.

General

Health Guide
URL: http://www.healthguide.com

This site has a **SeniorCareWeb** with links to a wide variety of topics related to aging. By linking to the "Index", a detailed listing of the issues within each topic area can be viewed and accessed.

General

Healthy Living, Active Lives
URL: www.aarp.org/health/home.html

The American Association of Retired Persons offers suggestions for taking control of your health, eating right, keeping in shape and staying sharp. Additional resources are listed involving things such as care giving, Medicare options, nursing home guidelines, and health legislation.

Nutrition, Physical Activity

The Male Andropause
URL: www.healthy.net/hwlibraryarticles/schacter/andropas.d.htm

This article comes from the Health World Online library. If offers a discussion of the controversy over of the concept of a male menopause (andropause). There is discussion of the metabolic effects of testosterone, changes that take place with aging, and testosterone treatment.

General

National Aging Information Center Website
URL: www.aoa.dhhs.gov/naic

NAIC is operated by the Administration on Aging. It is a central source for a variety of program and policy related materials and demographic and other statistical data on the health, economic, and social status of Americans. The site contains searchable databases, publications, and statistical resources.

Minority

The National Archive of Computerized Data on Aging
URL: http://www.icpsr.umich.edu/NACDA/index.html

The is one of the country's largest library of electronic data on aging. It has a searchable database and a user survey for your input.

General

National Council of Senior Citizens Website
URL: www.ncscinc.org

This is an advocacy organization for older Americans with stated positions on Social Security privatization, the SS "crisis", managed care, Medicare savings accounts, Medicare cost control, and affordable housing.

General

National Institute on Aging (NIA)
URL: http://www.nih.gov/nia/

This is a premier site for the latest research in the area of aging as well as useful information on health information about aging.

General

NIA Centers on the Demography of Aging
URL: http://www.psc.lsa.umich.edu/meca/meta.html

This is a research-based cite that specifically deals with the demography of aging. It will give you some of the latest innovative and policy-relevant information on issues that affect the U.S. older population.

General

National Institute of Mental Health
URL: http://www.nimh.nih.gov/home.cfm

This site is one of the federal government agencies geared specifically toward mental health and illness. You'll find the latest information on depressive disorders, their symptoms, diagnosis, and treatment.

Memory/Cognition

Native American Elder Population
URL: http://www.aoa.dhhs.gov/ain/naepop90.html

This link provides a quick and easy to read summary of demographic information about Native American elders.

Minority

Nutrition, Health, and Aging
URL: www.usc.edu/dept/gero/nutrition

This is part of the Andrus Gerontology Center at the University of Southern California in Los Angeles. Visitors to the site can take a quiz on "What is Your Nutritional Score?" to determine if your medications are interfering with what you eat, determine if they are drinking enough water, and learn about the relationship between diet and diseases of hypertension, cancer, osteoporosis, Parkinson's, and Alzheimer's disease.

Nutrition

Prescription Medicines and You
URL: http://www.ahcpr.gov/consumer/ncpiebro.htm

This guide helps identify typical medication use errors and provides information on how to recognize and avoid adverse drug reactions

Medications

A Report of the Surgeon General: Physical Activity and Health, Older Adults
URL: www.cdc.gov/nccdphp/sgr/olderad.htm

This fact sheet from the Surgeon General's Report gives key messages about physical activity and health for older adults. Also included are facts about physical activity and health, benefits, and what communities can do to promote physical activity in older adults.

Physical Activity

Was the Funeral Home an Ethical One?
URL: http://vbiweb.champlain.edu/famsa/ethical.htm

This site gives you 10 simple to questions to answer to determine of you might have been the victim of unethical practices. It also provides you with information on "How to File a Funeral Complaint".

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Unintentional Injuries in the Homes of the Elderly: A Look at Current Research and a Case Study of Home Care Recipients in a Rural Area

Shelly Gimenez, Ph.D., Dale O. Ritzel, Ph.D., Mark J. Kittleson, Ph.D.

Introduction

According to the U.S. Bureau of the Census (2000) 14.5% of the total population in 2000 are 65 years or older. The data also indicate that people age 85+ are the fastest-growing group of elderly, now representing 12% of those over 65. It is projected that by 2010, those 65 years or older will increase by 28% (U.S. Bureau of the Census, 2000). As stated by the U.S. Department of Health and Human Services (1990) by the year 2030, one out of every four Americans (22%) will be over the age of 65. Furthermore, according to Taub (1993), the old may outnumber the young 50 years from now.

The National Safety Council (1999) has reported that the most common types of unintentional injury deaths experienced by older Americans change with increasing age. Motor vehicle crashes are the most common type of unintentional injury death through the age of 79. For ages 80 and older, falls are the most common type of unintentional injury death. The age groups starting at 65 years have population unintentional injury death rates that are higher than the overall age average of 35.8 per 100,000 population. Studies show that, in reality, elders have twice the rate of fatal injuries as adolescents and young adults.

Although persons age 65 and above constitute only 14.5% of the population, they account for 23% of deaths from unintentional injuries, whereby 71% of those are due to falls. "Among the elderly, environmental factors have been estimated to cause up to one half of falls in the home. This is an important statistic that should guide our injury prevention efforts" (Freedman & Weber, 1990, p. 1). According to P. Jensen of the Shawnee Alliance for Seniors (a home health care agency) in southern Illinois, environmental factors in the home are critical issues that have not gotten much attention (personal communication, February 27, 1998). Jensen further stated that one of her agency's main goals is to keep the elderly person in the home as long as possible.

Most people want to believe that their homes are safe and secure. When the elderly are injured at home, it is due to a mixing of internal factors - those having to do with our bodies - and external factors - those having to do with our environment (Freedman & Weber, 1990). The elderly are more susceptible to injuries and take longer to recover.

Smith & Widiatmoko (1998) found that common risk factors for falls included nutritional status, environmental hazards, poly-pharmacy, lack of exercise, mental or physical changes associated with medical conditions, and aging. This study also attempted to provide some indications concerning the cost effectiveness of an assessment and home modification program for independent elderly. They found that interventions might reduce the severity of the injuries received during a fall in the home.

The perception of falls as a health problem for elders was assessed by Braun (1998) as well as characteristics and attitudes associated with perceived importance of fall-related risk factors among community-dwelling elderly people. Risk factors for falls among elderly people include environmental hazards, housing characteristics, and deterioration of the neuromuscular system. Individual factors that increase risk of falling include being female, older age, medications, comorbidities, physical and mobility limitations, limited vision, dizziness, and cognitive impairments.

The overall purpose of this study was to identify factors that influenced unintentional injuries in the home of older adult home care recipients in rural communities. More specifically, this study had several additional purposes: 1) to identify fears and perceived problems of older adult home care recipients in regard to injuries in the home; 2) to determine the safety hazards present in the home of these home care recipients; 3) to determine the relationship between fears and perceived problems in regard to injuries in the home and the safety hazards present in the home.

Methods

A sample of 120 older adults (60 years and older) through out 13 counties in southern Illinois was surveyed. Case managers who visited these older adults on a regular basis were given survey packets containing instructions, survey instruments, and informed consent papers to administer to identified clients of the Shawnee Alliance for Seniors.

The Home Injury Prevention Survey (HIPS) was developed by the authors to examine factors that influenced injuries in the homes of older adult home care recipients. The HIPS was developed from a combination of other surveys (Shawnee Alliance For Seniors, Case Coordinator Unit for Seniors, 1994; Craven, 1988; Freedman & Weber, 1990; Fleming-Moran, Kenworthy-Bennett, & Harlow, 1991).

Consensual validity was determined by the use of an expert panel. Cronbach alpha estimates of reliability coefficients for the HIPS yielded a reliability value of .747 for the total survey items.

The case managers were trained by the researchers to collect data. The two hour training included instructions on interviewing and observational techniques, a video tape of a person taking an elderly person through the HIPS, the case managers filling out the HIPS, and role playing/practice sessions with the case managers taking another case manager (participating both as respondent and interviewer) through the HIPS.

Results

Descriptive statistics indicated that more than 75% of the respondents were in the 70-89 age range, with majority female and White. More than half were widowed and lived alone. Eating, bathing, dressing, transferring, continence, telephoning, and routine health reflected low levels of impairment. More than half had high levels of impairment for doing laundry, housework, and activities outside the home. More than 70% rated their physical health as fair or poor and took more than four medications concurrently.

Thirty percent of the respondents had fallen or tripped in their homes during the previous year. More than 25% reported that they fell (at least once) or tripped (anywhere from 3-12 times) during the past year. The respondents were prone to fall in all areas of the home, did not always visit a doctor after the fall, and many times reduced their daily activities. Of those reporting injuries due to falls, five reported they broke a limb or a hip (see Table 1).

Content analysis was used to determine fears and perceived problems of older adults. The greatest single fear of the older adults was that of falling or tripping (26.7%). Table 2 also indicates that the combination fear of falling or tripping and fire or being burned was reflected by 11.7% of the older adults.

Perceived problems included some of the same categories as the fears problems, including a problem with falling or tripping, of not being able to get help, or of being left alone (Table 3). The perceived safety problem of greatest concern of older adults was getting in and out of the tub (8.3%). Having no phone or not being able to get help (6.7%) and falling and/or tripping (5.8%) were the other leading perceived problems of older adults.

As a result of Chi-square analysis, no relationship was found between the number of fears of older adults and types of home injuries. The same was the case between the number of perceived problems of older adults and types of home injuries. Results of Chi-square analysis revealed a significant relationship ($p=.023$) between safety hazards identified in the kitchen and the number of fears of the older adult recipients. The results of the relationship between the number of perceived problems of older adults and location of the safety hazards identified showed no significant relationships. No significant relationship existed between selected variables to the number of perceived problems of older adults in regard to home injuries. Further, results of Chi-square analysis indicated a significant relationship between race and the number of fears of older adult home care recipients in regard to types of home injuries.

Discussion

Results of this study both support and contradict previous research findings concerning fears, perceived problems, and unintentional injuries sustained by older adults. Results that are consistent substantiate previously held beliefs about reasons for unintentional injuries, and those that are inconsistent indicate areas where further research is needed.

Findings related to fears, problems, and safety hazards in the home were consistent with the findings of previous researchers except one (Liddel, Locker, & Burman, 1991; Wise, Anderson, and Jones, 1979; Tideiksaar, 1992). In our study we found that the kitchen had more unsafe conditions than any area of the home. This contradicts a study by Tideiksaar (1992) who indicated that 95% of the injuries reported in his study occurred primarily in the bedroom and bathroom. However, although not statistically significant in our study, findings indicated that the bedroom and bathroom did contain safety hazards such as non-skid mat in bathtubs, as well as the lack of well-secured grab bars. Unsafe conditions in the bedroom included no phone within reach of the bed and unsafe usage of electric blankets.

In examining the relationship between fears and types of home injuries, our study found relationships, although not statistically significant, existed between non-fall or non-burn injuries, and fears, falls and fears, and burns and fears. According to Hamrick, Molloy, and Jackson (1989), psychological trauma following a fall may contribute to self-imposed restrictions on activity. In addition, our study substantiates other studies that have examined falls. Northridge, Nevitt, Kelsey, and Link (1995) found that the relative contribution of intrinsic characteristics and the environment may differ according to a person's functional level.

When examining the relationship between perceived problems and types of home injuries, our study found relationships, although not statistically significant, existed between non-fall or non-burn injuries and problems, falls and problems, and burns and problems. In our study, a respondent may have indicated a problem falling or tripping and, in fact, did sustain an injury from a fall, although it may have gone unreported. Respondents in our study indicated they had a problem transferring from a bed, chair, or bathtub. This finding is consistent with Northridge, et al. (1995) who indicated that individuals who had trouble rising from a chair or bed or walking across a room without leaning on furniture for support experienced a significantly higher fall rate than older persons without such difficulties.

Table 1. Frequency and Percent of Unintentional Injuries of Older Adult Respondents Due to Falls (N=120)

Falls	Frequency	Percent
Fall or trip frequently		
Yes	36	30.0
No	78	65.0
No response	6	5.0
Times tripped in last year		
0-2	18	15.0
3-5	9	7.5
6-8	4	3.3
9-12	9	7.5
12+	6	5.0
No response	74	61.7
Times fallen in last year		
0	15	12.5
1	16	13.3
2	5	4.2
3	1	.8
4	4	3.3
5	3	2.5
5+	2	1.6
No response	74	61.7
Location of fall		
Outside	12	10.0
No response	108	90.0
In Bathroom	6	5.0
No response	114	95.0
In Living/Dining Room	11	9.2
No response	109	90.8
Location of fall		
In Bedroom	3	2.5
No response	117	97.5
Other in house	9	7.5
No response	111	92.5
Reduced activity		
Yes	22	18.3
No	11	9.2
No response	87	72.5
Required doctor's visit		
Yes	14	11.7
No	17	14.2
No response	89	74.2
Was hospitalized		
Yes	9	7.5
No	22	18.3
No response	89	74.2
Type of Injury		
Scrapes, bruises, sores to upper torso	14	11.7
Scrapes, bruises, sores to lower torso	6	5.0
Broken limb upper torso	1	.8
Sprain	1	.8
Broken hip	4	3.3
No response	94	78.3

Note: Total percent may not sum to 100.0 because of rounding

Table 2. Fears of Older Adult Home Care Recipients (N=120)

Value	Frequency	Percent
1	32	26.7
2	9	7.5
3	3	2.5
4	2	1.7
6	1	.8
1,2	14	11.7
1,3	1	.8
1,4	1	.8
1,5	4	3.3
1,6	2	1.7
1,7	1	.8
1,9	1	.8
2,1	1	.8
2,3	5	4.2
2,4	1	.8
2,5	1	.8
3,2	1	.8
3,5	1	.8
5,3	1	.8
8,1	1	.8
9,2	1	.8
1,2,4	2	1.7
1,2,5	1	.8
1,3,4	1	.8
1,5,3	2	1.7
1,5,6	2	1.7
2,1,3	1	.8
2,3,9	1	.8
2,8,3	1	.8
No response	25	20.8
Total	120	99.6

Note: Any combination of values represents multiple fears.
Legend of values: whereas each value corresponds to fears indicated below.

1 = falling, tripping
2 = fire, being burned
3 = being robbed, intruders
4 = physical disability
(i.e. stroke, heart attack)
5 = not being able to get
help/being alone/no phone
6 = breaking a hip
7 = dark
8 = stairs
9 = being electrocuted, storms, lightning

Table 3. Perceived Problems of Older Adult Home Care Recipients (120)

Value	Frequency	Percent
1	2	1.7
2	4	3.3
3	10	8.3
4	3	2.5
5	4	3.3
6	4	3.3
7	7	5.8
8	8	6.7
9	5	4.2
1,2	2	1.7
2,3	1	.8
2,9	1	.8
3,4	2	1.7
3,5	1	.8
3,7	1	.8
3,8	1	.8
4,3	1	.8
4,6	1	.8
6,8	1	.8
7,8	2	1.7
1,4,6	1	.8
2,5,4	1	.8
3,6,1	1	.8
3,7,6	1	.8
4,1,2	1	.8
No response	54	45.0
Total	120	99.6

Note: Any combination of values represents multiple perceived problems.
Legend of values: whereas each value corresponds to problems indicated below.

1 = getting on/off toilet
2 = getting out in case of fire
3 = getting in/out of tub
4 = going up or down stairs
5 = slipping
6 = getting in/out of a bed/chair/wheelchair
7 = falling and/or tripping
8 = no phone/not being able to get help
9 = getting in or out of the house

When examining the relationship between fears and location of safety hazards, findings in our study indicated that there was a significant relationship between the safety hazards identified in the kitchen and the number of fears of older adult home care recipients. Although not statistically significant, safety hazards in the bathroom were related to one or more fears for 74 of the respondents. According to the literature, a person's frailty or lack thereof has to be taken into consideration. Frail older persons experience more falls overall than do vigorous older persons. Respondents in our study reported multiple fears, safety hazards, and injuries. However, the results of the study did not predict a person's frailty or lack thereof relative to the locations of the safety hazards identified.

The relationship between perceived problems and the location of safety hazards revealed no statistical significance between the number of problems and any one area of the house. However, upon closer examination of the results, the bedroom proved to be an area that merited closer inspection. Tideiksaar (1992) noted that the bedroom was an area of concern.

Upon examining the relationship of selected variables to the number of fears of older adult home care recipients, findings indicated a statistically significant relationship between race and the number of fears expressed by the respondents in regard to home injuries. Findings revealed the majority of the respondents to be females between the ages of 70 and 89. This finding is consistent with the results of Arfken, Lach, Birge & Miller (1994) that indicated the prevalence of fear increased with age and was greater in women. The other variables in our study of age, sex, marital status, living with another person, and drugs were not statistically significant when examining their relationship to fear. However, according to Arfken, et al. (1994) after adjustment for age and gender in their study, being moderately fearful of falling is common in elderly persons and is associated with decreased satisfaction with life, increased frailty and depressed mood, and recent experience with falls.

Findings indicated no significant relationship between perceived problems in regard to home injuries and the variables of age, sex, race, marital status, living with another person and drugs. However, upon closer inspection, each variable was related to one or more problems for more than half of the respondents. Our study indicated that 72.6% of the respondents indicated problems in transferring from, for instance, a bed to a chair, and, in fact, according to the results had low levels of impairment for transfers. According to Tideiksaar (1992) nearly two thirds of the injuries occurred during transfers (moving to or from chairs, beds, and toilets, and in and out of bathtubs), when the person slipped on a wet or unstable surface or tripped.

Upon examining the relationship of selected variables considered individually (age, sex, race, marital status, living with another person, drugs) to the number of safety hazards in the homes of older adult home care recipients, findings indicated no significant relationship for any of the variables except one, race. Results indicated there was a statistical difference between the groups (Black, Hispanic and White). The mean for safety hazards present in the homes of Hispanics was 21 where only two Hispanics were respondents. In addition, the mean of safety hazards present in the homes of Black respondents was 15.18 hazards where there were 11 respondents. Between these two groups and the White respondents, who had a mean of 9.76 hazards, there seemed to be a wide disparity. The literature does not reflect this disparity, and cannot be compared to this finding when examining the variable race in relationship to safety hazards present in the homes of older adult recipients.

When reporting their fears, respondents were clear and articulate about the unsafe conditions of which they were most fearful. We speculate that sex, race, and functional status all play an integral role in the most feared situations relative to injuries in my study. Although race was shown to be significant in relationship to the number of fears of the older adult respondent and the number of safety hazards present in their homes, it is our opinion that sex and functional status both played roles as well in injuries sustained and the number of safety hazards present. Reinforced by this study and indicated in other studies was that if a respondent stated a fear of falling, it was most likely due to a history of tripping or falling within the past year plus a combination of other variables. The same held true for all other types of injuries.

An explanation for the disparity of safety hazards present in the homes of White, Black, and Hispanic respondents in this study could be a relatively small minority sample size, lack of socio-economic indications for the entire sample, and poorer living conditions for the people of color in our sample. The Hispanic and Black respondents may have been poorer than their White counterparts. Furthermore, since Blacks report fewer ADL limitations than Whites according to the literature, the assumption is that socio-economic status is an important indicator. It is not known from our study if the minority sample is poorer than their White counterparts.

From the results it became apparent that if a respondent reported a fear in relationship to a home injury, there was a likelihood that behavior was adjusted and activity was reduced. Also apparent was the fact that although an injury might have occurred, if it did not require medical attention, it went unreported.

As individuals become more frail, they may be at greater risk for an injury. In this study, it was found there was low to medium levels of impairment for the majority of the respondents. The more vigorous a respondent feels, the fewer precautions they may take and the less fearful they are. The frailer respondents who indicated problems, such as transferring, may have sustained an injury in trying to do so. Therefore, as the vigorous individual becomes frailer, what was once not considered a problem can become one as health and mobility change, thus creating a fearful situation.

In addressing safety hazards in the kitchen, it could be assumed that participants too weak to prepare their own meals would probably not report poor lighting over work areas in the kitchen, nor would they expose themselves to the potential risks involved in preparing meals, such as climbing on chairs to get to items that are out of reach. Since approximately three quarters of the respondents had low to medium levels of impairment for preparing meals, it seems reasonable to suggest they were moderately active in the kitchen, cognizant of the risks and fearful. Therefore, it could be assumed they went about their business of preparing the meals and eating, did not pay close attention to the safety hazards involved in these activities, although aware of them, adjusted their behavior accordingly. In other words, they knew safety hazards existed, remained fearful of getting hurt, did not correct the hazards, maintained unsafe behaviors, and adjusted their behavior to the situation. This may explain the significant relationship between safety hazards in the kitchen and number of fears.

Respondents expressed multiple fears relative to other areas of the home. It can be speculated that although fearful of certain situations in the rest of the house, respondents did not correct the unsafe conditions and adjusted behavior accordingly. The rest of the home in comparison to the kitchen remained relatively safer with fewer hazards. Since the functional level of these respondents was somewhat impaired, it is reasonable to suggest they were more inactive in the rest of the house in comparison to the kitchen. Activity seemed to center around transferring from one place to another or the preparation of meals. This study did not seek to find out if the most fearful respondents who were frail had the greatest frequencies of safety hazards and the most frequently occurring injuries.

The variables of age, sex, marital status, living with another person and drugs taken relative to fears, although not significant in my study, did play a role. Since findings indicated a statistically significant relationship between race and number of fears, it seems reasonable to suggest that White females are the most fearful. It also seems reasonable to speculate that a majority of these females take more than four drugs concurrently (which was indicted in the findings) and widowed (also indicated in the findings) and was over the age of 70, with the majority being 75+ years of age. Therefore, this researcher could speculate that an older White woman, living alone, on multiple medications, would be more fearful relative to the rest of the elderly population.

An article by Leslie and St. Pierre (1999) suggests the incorporation of an integrated risk assessment to examine the most common and influential factors that contribute to falls in the elderly population. A multidisciplinary approach can then offer strategies to reduce and prevent falls. The assessment must be inclusive of concurrent medical conditions, medications, and functional capacity. The assessment also should question any previous falls and causes related to these past falls. The majority of falls are due to complex problems. The most common environmental factors affecting the risk of falling include footwear, lighting, floor and walking surfaces, and tripping hazards such as pets, furniture, and stairs. Specific chronic conditions like Parkinson's disease, arthritis, osteoporosis, cardiovascular disease, stroke, depression, and sensory deficits affect falls. The fall assessment requires a team approach that involves all members of the health care profession. Preventing falls is one way to enhance the quality of life for the elderly population.

Gill, Williams, Robison, and Tinetti (1999) looked at environmental hazards present in the homes of older persons and determined that age-restricted housing appears to be less hazardous than community housing. Grab bars in the tub or shower were absent in most of the community housing compared with age-restricted housing. This was thought to be the first study to report population-based estimates of environmental hazards using a standardized assessment instrument rather than self-reported information or loosely structured home evaluations. Based on the findings of this study, it would be a mistake to presume that age-restricted housing is inherently safe and devoid of potential hazards.

What is clear from the results in this study is that respondents by race who expressed more fears had more safety hazards. By the same token, race influences the number of safety hazards and the number of fears. Since findings in this study indicated a higher number of hazards for relatively few Hispanic and Black respondents due to a small sample size and the lack of generalizability to all older persons of color, the variable race merits a closer look.

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Social Policy and the Aged: Implications for Health Planning, Health Education, and Health Promotion

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Federal and state programs that target the health needs of the elderly are the product of a complicated process related to health and social policies. The purpose of this article is to describe existing social policies which shape health services, health education, and program initiatives for the elderly in the United States. The article also describes current demographic, social, and economic issues which will play a role in guiding policy revision for the future. Lastly, challenges in policy development for the next century will be addressed and will include health care delivery, health education, and health promotion.

Health Policies for the Elderly: An Overview

Health policies related to aging in the United States provide a broad range of in-kind medical care services, supportive state and local social services, and anti-poverty benefits. The best known in-kind medical care for older persons is available under two federal and federal/state programs: Medicare and Medicaid. Community and local social services that help address physical and mental health needs are made possible under the Older Americans Act (OAA) and Title XX (Social Services Block Grant) of the Social Security Act. Anti-poverty benefits that also impact the health of the elderly include income payable under the Social Security Act's Old-Age, Survivors and Disability Insurance (OASDI) program for insured workers, as well as cash benefits for the uninsured poor under the federal/state Supplementary Security Insurance (SSI) program. In addition, there are numerous services and benefits for the elderly at the state and local level provided by voluntary groups, non-profit organizations, and related service agencies.

Medicare and Medicaid Policies for the Elderly

Public health care programs for the elderly have been given consideration in the United States since the 1930s when the provisions of the Social Security Act were being debated. In fact, early draft proposals of the Social Security Act of 1935 included health legislation for the elderly, but it was left out of the final version due to opposition, particularly that of the American Medical Association (Kronnenfeld, 2000). Nevertheless, the 1935 legislation paved the way for federal government involvement in health care for the elderly in the future. Proposals for national health insurance, including services for the elderly, were raised periodically over the years following the enactment of the Social Security Act, especially during the Truman administration. It would, however, not be until the early 1960s that legislation was enacted.

The early 1960s were an extremely active period for social policies related to health care, health insurance, and social services for the elderly. This development was the result of a number of interrelated social, economic, and political factors at that time. One influential factor was the wide-spread recognition of growing poverty rates, particularly among older persons. Both popular and academic literature contributed to raising the consciousness of the American public as to the high incidence of poverty among the elderly, estimated at over 35 percent in the late 1950s. Significantly, there was also recognition that poor health among impoverished elderly was also due to the lack of access to medical care and social services.

Another important factor was the political ascendancy of proponents of national health insurance and social service programs in the U.S. Congress following the election of President John F. Kennedy in 1960. With regard to health care for older persons, the first evidence of this was the passage of the Kerr-Mills Act of 1960 which provided grant-in-aid to states for medical assistance to the aged who met a financial test. By 1965, 25 states had opted to participate in the program. However, Kerr-Mills was the subject of intense debate and was largely viewed as an unsatisfactory approach for proponents of national health insurance who were opposed to a means-tested residual program (Derthick, 1979). In addition, there was significant opposition to virtually all forms of national health care programs by the American Medical Association with the support of conservative members of Congress.

The prospects for expanded federal involvement in health care for the elderly greatly increased with the landslide election of President Lyndon Johnson in 1964. While there was considerable concern about how a system would be financed, the problem of generating sufficient revenue was transcended by a more philosophical dispute as to the most acceptable means of government involvement. More specifically, consideration of expanding coverage raised the issue of a contributory (social insurance) versus a non-contributory (so-

cial assistance) system of medical care. While numerous factors influenced the eventual outcome of the debate on this issue, it was resolved by creating both a social insurance program (Medicare) and a social assistance program (Medicaid) which, together, comprised a national health insurance program for the elderly and the poor (Derthick, 1979). Both programs were enacted in 1965 under the Social Security Act as Title XVIII (Medicare) and Title XIX (Medicaid).

Medicare. Medicare covers all individuals age 65 and over who are eligible for Social Security or Railroad Retirement benefits and the spouse or former spouse of an eligible person. Individuals who have been receiving Social Security disability benefits for at least two years, or have end-stage renal (kidney) disease are also covered. Coverage includes hospital insurance often called Part A and a voluntary supplementary non-hospital medical insurance known as Part B. Part A is financed by compulsory payroll taxes (1.45% on all income). Part B is funded by participant monthly premiums ($45.50 in 2000) and a matching contribution out of general revenue.

While Medicare provides basic health insurance, it actually pays only about 52 percent of the health care costs due to individual cash outlays related to copayments and premiums (Kaiser Commission, 2001). In 2000, Part A requires a deductible of $776 per benefit period and a coinsurance payment of $194 a day for the 61st - 90th day each benefit period and $338 a day for the 91st - 150th day for each lifetime reserve day (total of 60 lifetime reserve days). Skilled nursing coinsurance is $97 a day for the 21st - 100th day each benefit period. Part B has a deductible of $100 per year, along with the monthly premium.

The additional out-of-pocket expenses that result from the co-payments and limited coverage creates a need for private supplemental insurance coverage known as Medigap. Medical care costs have continued to push up the cost of both public programs and private insurance, increasing medical expenses for the elderly. In 1998 the total Medicare spending for 38.8 million aged and disabled beneficiaries was $216.6 billion which was 19 percent of all health spending in that year. Over the period 1970-1998, Medicare benefits grew by an average of 10% a year compared to 11.2% in private health insurance programs (Highlights, National Health Expenditures, 1998).

Medicaid. Medicaid is a state and federal program that provides health care benefits for needy people, including low-income elderly. In 1998 there were over 40.6 million recipients nationwide. Medicaid pays for services that are determined to be medically necessary. This includes physician visits, hospital and nursing home care, adult day health services, home health care, and hospice care. Medicaid expenditures were $170.6 billion in 1998, accounting for 15% of all health spending.

Escalating expenditures for health care combined with projected increases in the proportion of the elderly population, especially non-working elderly, have become critical policy issues for Medicare and Medicaid which, combined, fund nearly two-thirds of health care for older Americans. With regard to Medicare, there is concern that funds for Part A will soon be exhausted without additional resources. Part B is more sustainable because it draws from both the monthly premium and general revenue. Medicaid is also threatened financially as part of the states' response to federal devolution which places more responsibility, and burden, for financing health and other programs on the state, resulting in various cost containment initiatives, in particular, managed care and managed competition.

Managed Care and Managed Competition

The effort to control the rising cost of health care through managed care and managed competition is perhaps the most critical policy issue facing health care for the elderly, raising concerns relative to access, choice of provider, specialist care, and limitations on prescription drugs. Managed care is designed to restrict spiraling expenditures by emphasizing preventive health care measures combined with controlled rationing of health care services through group plans, typically health maintenance organizations (HMOs) and preferred provider organizations (PPOs). The approach creates particular problems for the elderly with serious and chronic health illnesses who require more extensive and expensive care, as well as prescription medicines of which two-thirds are paid for out-of-pocket (Binstock, 1998).

Managed competition is intended to control costs by increasing consumer choice. This is based on the assumption that the market place determines where care is most needed, leading to dramatic changes in the role of hospitals towards ambulatory diagnostics and surgery centers.

Older Americans Act

In addition to in-kind medical benefits, health policy for the elderly has included social services under the 1965 Older Americans Act (OAA). This Act was passed in the recognition that local social services for the elderly were an important aspect of improving the health and quality of life for older Americans. The OAA makes grants available to state and community programs for the provision of ombudsman services, legal assistance, housing and transportation services, and employment training (Torres-Gil & Villa, 2000). This includes programs such as congregate meals and home-delivered meals (Meals on Wheels). The programs are particularly important for providing a network for seniors which contributes to the betterment of health by increasing access to information on health and healthy lifestyles, as well as providing social engagements.

In recent years, the OAA has gained popularity as an effective alternative to the centralized categorical health programs (Medicare and Medicaid) which are often perceived

as over regulated, top heavy, unaccountable, and inefficient (Torres-Gil, 1998). The OAA offers a proven model for community-based services that are more reflective of local and senior representation on state and local programs. The OAA model provides an acceptable mix of national standards and local accountability and policy transparency.

Title XX Social Services. Similarly, Title XX of the Social Security Act which provides social services through block grants to states for state determined eligible populations is viewed as a less regulated and more community administered program. First established in 1956, it was not until 1962 that this legislation became a meaningful program providing preventive and rehabilitative services for the poor. The elderly often benefit from services under Title XX in the form of adult day care, foster care, homemaker services, and in-home supportive services (Torres-Gil & Villa, 2000).

Anti-Poverty Policies Related to Health

Poverty or near-poverty income levels can directly impact the health of the elderly. Low-income severely limits access to health care that is available to the more affluent. The poverty rates of the most vulnerable populations among the elderly are widowed (18%), divorced (22%), and never married women (20%) who have significantly higher rates of poverty than that of all elderly women (13%) (GAO, 1997; Kinsella & Gist, 1998). Women of color are the most susceptible with poverty rates of over 28% for Black and Hispanic women age 65 and over compared to about 12% for white women.

While much of the public attention given to health care centers around Medicare and Medicaid, improved health among the elderly is also a product of national income and social service programs. For example, the Old Age Survivors and Disability Insurance (OASDI) that provides retirement income under Social Security prevents many Americans from falling into poverty which can threaten their health. The poverty rates for all elderly would be more than double the current levels if there was no OASDI system.

Another national anti-poverty program that plays a role in reducing the impact of low income on health is the Supplementary Security Income (SSI) program. This program provides cash assistance to anyone who is age 65 and over, blind, or disabled whose income falls below the poverty line. Initially implemented as various components under the Social Security Act of 1935, the provisions were consolidated in 1972. It is solely funded by general revenues and administered by the Social Security Administration with uniform eligibility conditions throughout the country (Segal & Brzuzy, 1998). In 1998, SSI had 6,556,000 recipients of whom 60% were women. Almost two and half million of these received both OASDI and SSI cash benefits (GAO, 1998; Hooyman & Kiyak, 1999).

The nation's changing demographic face will greatly influence health policies for the elderly and anti-poverty policies related to health. Demographics and philosophical changes will also present challenges to health and social policies in the areas of health planning, health education, and health promotion. This next section will describe the demographic changes, shifts in morbidity and mortality for people who are older adults, and examine the challenges and implications for policy development within the areas of health education and health promotion.

The Changing Demographic Structure and Graying Aging Population

Life expectancy has dramatically increased over the past century. At the turn of the 20th century (1900 A.D.), life expectancy was 47 years of age (Hanlon & Picket, 1995). In 1958 the life expectancy of adults increased to 68 years, and by 1991, the life expectancy was 76 years. Hand in hand with these changes, there has been an increase in the number of elderly living within the United States over the past century. In 1900 A.D., 4%of the population was over 65 years of age, while it reached 12.7% by 1997(Population Reference Bureau, 1999). The American Association of Retired Persons [AARP] (1998), based upon US Census, estimates that by the year 2010, at least 28% of the population will be over 65 years of age. Table 1 illustrates these demographic changes over time.

Table 1:
Demographic Changes of Aging Population in the United States Over Time

Year	% of the population 65 years of age or older
1900	4.0
1920	4.6
1940	6.8
1980	11.3
1990	12.4
1997	12.0

Source: US Bureau of the Census, 1900, 1920, 1940, 1980, 1990, 1997 (Assorted Years).

Changes in the Population Profile

During the 20th century in the United States there was a significant gender shift among the aging (65+ years). In 1900, The U.S. Bureau of the Census reported that there were 108.5 men for every 100 women. In 1950, this ratio declined slightly; however there were still more men per 100 women (102.3 men per 100 women). In 1960, there were equal numbers of women per men (100 men per 100 women). By 1980,

there were only 69.7 men per 100 women, and by 1990, the ratio had dropped to 64.1 men per 100 women, as shown in Table 2.

These dramatic shifts in numbers, especially over the past 40 years, will leave more women living alone and unmarried while men will be more likely to remain married or attended by women. Other implications of this will include the need to target income support mechanisms and social support programs for widowed and single women (Jurkowski, 1999). This will have multiple effects on policies related to supplementary security income (SSI), Disability Insurance (DI), and Medicare, especially funding.

Table 2:
Changes in Population Profile:
Males and Females 65 and Older

Year	# of males per 100 females
1870	111.4
1900	108.5
1950	102.3
1960	100
1980	69.7
1990	64.1

Source: US Bureau of the Census, 1870, 1900, 1950, 1960,

Changes in the Rural Population

Although there has been a well documented shift from agrarian/rural based population to urban settings, the proportion of people living in rural settings (<9,999 people) has remained relatively stable over the past 30 years. At the turn of the 20th century, 39.8 percent of the population lived in rural settings. This percentage increased steadily until 1950, when nearly three fourths of all Americans lived in rural settings (71.2%). Between 1950 & 1960, nearly 50 percent of people living in rural settings migrated to urban settings, dropping from 71.2 percent to 37.5 percent respectively. The percentages have remained relatively stable over the last forty years, with slight decreases in rural populations from year to year.

The rural demographic portrait becomes more descriptive, particularly when with regards to the proportion of people living in rural areas who are 65+ years of age, and who live in very small rural communities (<2500 people). Table 3 outlines this demographic shift.

This demographic picture is further compounded by those who were foreign born, and are living in rural areas/communities, as shown in Table 4. These are foreign born people who immigrated to the United States and are living in Frontier Rural Communities (<2,500 people) or who live in rural communities (2,500 - 9,999). While there has been a decrease (over 50%) of people foreign born living in rural areas (59.8% in areas of <2,500 people; 14.3% in areas of 2,500 - 9,999 in 1900 versus 24.8% in 1990 and 6.0%,

Table 3:
Shift in Percentage of People 65 and older Living in Rural Settings

Year	% age of the population living in rural settings
1900	59.8
1950	71.2
1960	37.5
1970	33.5
1980	32.7
1990	30.8

Source: US Bureau of the Census, 1900, 1950, 1960, 1970, 1980, 1990. (Assorted Years).

respectively), there have been more women than men 65+ years of age and more foreign born residing in smaller rural centers.

The number of foreign born residing in small rural areas (<2,500) who are over 65 years of age raises some serious concerns about the need for services which may need to be culturally sensitive and culturally diverse. These services may also need to address such issues as cultural expectations around help-seeking behaviors, the role of religion and mortality, the aging process, loss of independence, and expectations around social supports. Language barriers may also play a role in the delivery of services and access to services within rural communities.

Trends in Morbidity and Mortality

Over the last century there have been dramatic changes in the face of morbidity and older adults. This is due to technological advances, changes in quality of life and living conditions, and advances in medicine (Kover & Jonas, 1999). As shown in Table 5, in 1900 the leading cause of death for people 40 years of age and older was tuberculosis. For women it was childbirth (Hanlon & Picket. 1995). According to the National Health Interview Survey [NHIS], (1997) the leading cause of morbidity in1994 for people 65 years of age and over was arthritis (50 per 100). Hypertension was the second leading cause of morbidity (36 per 100) followed by heart disease (32 per 100). The changes in morbidity leads to a need for renewed public health, health promotion, and health education strategies. New approaches will be necessary in funding formulas within the current health policies to accommodate these health promotion efforts.

Recently there has been a change in perceptions about health among older adults. In 1995, 20.3%of the population 65+ rated their health as fair to poor, as compared to 9.4% for the general population. However, there was a difference between general perceived health status of African Americans 43% who reported their health as fair to poor. This compares to only 28% of Caucasians who reported their health as fair to poor (National Center for Health Statistics, 1995). This suggests that there is a growing percentage of the population over the age of 65 who perceive themselves to be

Table 4
Percentage of People 65 and Older Foreign Born

Year	<2,500	2,500-9,999	%65+	Males	Females	Rate:Males/Females
1900	59.8	14.3	9.2	8.8	9.7	108.5
1910	53.7	24.3				
1920	48.6	25.4	9.7	9.0	10.5	104.7
1930	43.8	26.6	12.0	11.6	12.5	
1950	43.5	27.7	26.3	26.2	26.5	100
1960	30.1	7.4	32.6	33.4	31.9	
1970	26.5	7.0				
1980	26.3	6.4	21.2	18.6	23.4	69.7
1990	24.8	6.0	13.6	10.9	16.3	64.1

Source: US Bureau of the Census, Assorted Years

Table 5:
Rates of Morbidity for People 65 and older

Type of illness	Rate per 100 in the population
Arthritis	50 per 100
Hypertension	36 per 100
Heart disease	32 per 100
Hearing	29 per 100
Cataracts	17 per 100
Orthopedic impairments	15 per 100

Source: National Health Interview Survey, 1997.

in poor health and an increase in disparity among people of color. These data serve to illustrate the importance of interventions which will target diverse groups. The differences in perceived health status will also have an impact on health promotion programs which can target older adults and reach minority groups in meaningful ways.

One's perceived health status is also compounded by difficulties reported with carrying out Activities of Daily Living (ADL's) by people 65 and over (Atchley, 2000). Respondents in the National Health Interview Survey (1995) who identified themselves as being over 65 years old and were living independently within their community reported difficulties with carrying out both Activities of Daily Living (ADL's) and Instrumental Activities of Daily Living (IADL's). Activities of Daily Living, characterized as bathing, dressing, feeding, mobility, toileting, and transferring were reported as problematic for 14% of the non-institutionalized population, who were over 65 years of age.

In addition, 6.5% of the population reported having difficulty with IADL's. These activities included meal preparation, shopping, managing money, taking medication, doing housework, and using the telephone. These difficulties will translate into needs for services to allow people to remain in their homes and communities (Jurkowski, 1999). Increasingly, there will be people living in communities who will require assistance with basic ADL's and services to promote functional status and healthy living (DeJong, 1979). Given that current health policies currently support services which are medically necessary, a challenge for health educators and health promotion experts will be the development of health policy provisions to include health education and health promotion programs.

Changes within the Social, Political, and Cultural Expectations of Communities

Up to this point, this article has highlighted some of the current health programs and policies in place and changes in demographic trends for older adults living within American society. In addition, there have been substantial changes within the social, political, and cultural expectations of communities over the past Century which will pose challenges for health education and health promotion needs of older adults.

Socially, health care has been impacted by numerous changes in gender roles and expectations over the last century. Women have become active members of the community within a range of fields including trade and commerce, as well as the helping professions. Women have also begun to outnumber males, as they grow older. Along with this demographic shift, there are growing numbers of women who are independent of their husbands or have been single or in same sex/gender relationships. These social changes have generated new health care needs for women.

As noted, there has been an increased mobility to urban centers from rural communities and a shift from agrarian to industrial communities. Despite this, many of the older foreign born and minorities have remained in rural communi-ties, especially those with more severe functional impairments and disabilities. Coupled with smaller and more mobile families, this will lead to the need for alternative care models for people in rural areas as they grow older.

Emerging service models that include community care and as-

sisted living care models will serve as alternatives to traditional care of elders. Many of the traditional cultural expectations for families have eroded away as a result of cross-cultural or interracial marriage, smaller families, and more mobile family units. These changes to the social structure of families are resulting in changes and the need for differences in service composition for the older adult.

The shift from family to community support systems is another social change which will impact health care services. Support provided by extended families and large families caring for the elderly have evolved into greater reliance on informal systems including the faith community and formal systems such as local community based service organizations. This leads to implications for the delivery of health education and health promotion efforts through informal systems such as local churches. Funding appropriations for such programming will need to be supported through existing health policy frameworks.

In summary, demographic changes, shifts in social, cultural, and service expectations of communities are contributing to changes in health care for the elderly in the 21st Century. The next section will address some of these areas for consideration in rural areas.

Challenges for Health Education and Health Promotion

Several issues emerge as challenges for the next century within the field of health education and health promotion for the rural elderly. These include: the need for an integrated services delivery system; improvements in access to care; a prevention focus throughout the public health system; adequate levels of funding for prevention services; services to address culturally diverse groups of people; the need for health education and health promotion programs; the need for specific health promotion and health education programs targeted towards older women.

1. *An integrated services delivery system for health promotion and prevention efforts* will be most helpful to rural based communities, where services may not necessarily be available to meet the needs of the elderly. Such an integrated service delivery system will call attention to the need for enhanced funding through Medicare and Medicaid and encompass screening, nutrition, dental and physical fitness activities.

2. *Improved strategies to improve access to care* will need to consider race, ethnicity, education and literacy levels when designing improved strategies to access care. The challenge that health educators will face will include an understanding of the elderly's perceived benefits and perceived susceptibilities. Many of the issues faced in a rural community area are not different than issues faced within lower socio-economic areas of urban centers. Transportation will also be a factor for consideration when designing health promotion and prevention programs, but will not necessarily guarantee access. Understanding the perceived benefits through a health education process will lead to improved access. Funding commensurate with the need should be a consideration in the plan to improve access to care.

3. *A prevention focus throughout the public health system* may take alternative forms in rural areas. Prevention efforts will need to partner with non-traditional health partners. Prevention education can occur as a compendium of the program offered through Senior Centers, or initiatives funded through the Older Americans Act. This will require cooperative and collaborative approaches to health care in rural areas. Senior Centers and day programs offered to Seniors, as well as the public education system, can also be utilized to promote cardiovascular health through exercise programs.

4. *Adequate levels of funding for health promotion and prevention services* will also be a challenge in the next century. Funding for prevention services through health policy initiatives will need to consider the distance and transportation issues that elderly within rural areas will face. Mobile resources may be a necessary reality within rural communities as a vehicle for the delivery of immunizations and health screening. Policy and program initiatives will need to factor in the costs associated with additional travel to and from rural communities from a home base when considering the prevention funding base.

5. *Culturally diverse health education and health promotion resources*: The changing demographic face of our elderly population will create a need to develop health policies and programs which will lead to services that address culturally diverse groups of people living in both urban and rural communities, especially African American and foreign born immigrants. Services in rural areas will need to address the cultural expectations around help-seeking, the role of religion and mortality, the aging process, loss of independence, and expectations related to social supports. Funding to support interpreter services and compensate for language barriers will also play a role in the delivery of services and access to services for culturally diverse groups of people.

6. *Initiatives to meet the needs of trends in morbidity*: Health education and health promotion programs which will address the fitness needs and health promotion needs of the elderly are also necessary and will be a challenge when developing and revising health policy. Trends in morbidity will be critical when considering priorities for such health promotion initiatives. Minimally, public policy will need to address and take into consideration arthritis and the conditions of hypertension.

7. *Health promotion and health education programs for women*: Lastly, a challenge to be addressed in health policy will include the need for specific health promotion and health education programs targeted towards older women. The changing demographics over the past century has led to more women outliving men. Health policy which speaks to the specific health care needs and health education issues facing older women will need to be considered. Funding for research and educational strategies which will address the older women and health needs will also be an integral component of the triad to formulate and advise health policy initiatives.

Directions for the 21st Century

In summary, health policies related to aging in the United States have focused on in-kind medical services, supportive state and local services, and anti-poverty benefits. Despite the availability of programs and services resulting from health policies, many programs are focused upon medically necessary services and lack a health promotion or health education focus. A challenge for health educators working with the elderly will be to lobby for social policies which will offer health education and health promotion options to maintain a healthy elderly population. The benefits of such advocacy efforts will include the development of a more active and healthy elderly population leading to cost containment and the preservation of current benefits/ programs available to the elderly living in the United States.

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The Need and Challenge to Address the Greatest Threat to Health and Well-Being In Our Time

Daniel Leviton, Ph.D.

Introduction

I appreciate the invitation to discuss a controversial topic germane to health and aging. Many topics would be appropriate including end of life issues such as active euthanasia (including physician-assisted death), suicide (a preventable death that is age related but particularly a risk for older men); or the economic-social plight of many formerly married older adults especially widows. Instead, I chose to write on the prevention and elimination of Horrendous Death (HD).

What is HD?

HD is the umbrella term given to those deaths caused by people. It is the greatest global health threat of our time affecting all generations including older people. Why? Because of their vested interest in the future health and well-being of their children and grandchildren (Leviton, 1995, 1997, 1991b, 1991c).

It is ironic that research-driven policies exist that would prevent HD, but are gathering dust on the shelves of think tanks, and governmental and non-governmental organizations. Individual forms of HD like war, homicide, and environmental degradation are being addressed but the approach tends to be one of intervention rather than prevention. Also needed is a systematic effort that deals with all forms of HD. Secondly, the approach tends to be one of intervention rather than prevention. Simply put, since HD is caused by people rather than bacteria, God, Nature, or virus, it could be prevented. Thus, HD provides a profound opportunity for all institutions, professions (including health education and health promotion – HEHP), and people, to act toward its prevention.

There are two types of HD. Type I is distinguished from Type II, in that it is motivated by the desire to kill another. Examples of HD, Type I are "conventional" and thermo-nuclear-bio-chemical warfare and terrorism, homicide, torture, genocide, death as a direct result of racism, intentioned environmental assault, and intentioned starvation of others.

HD, Type II lacks the motivation to kill others. Examples are death by means of accident, suicide, unintentional starvation caused by people, unintentional destruction of the environment, and abuse of drugs.

Two forms of HD make the prevention of HD a great, if not our greatest, challenge. They are systematic thermo-nuclear or bio-chemical warfare or terrorist attack, and environmental assault and/or the more insidious environmental degradation. Either could result in global devastation that would make all previous and ongoing epidemics including the Bubonic Plague of the 14th century, influenza in 1918-1919, HIV/AIDS, famines, and previous wars pale by comparison.

In this article I suggest that the health professions with special reference to HEHP have an obligation and opportunity to contribute to the prevention of HD (that is, both types) in a systematic way. My assumption is that any action that prevents premature mortality, morbidity, disability or suffering falls within the ethical, moral, and professional domain of HEHP. Second, I will suggest a process that might contribute to the prevention of HD. Third, I will make suggestions for preventive action including a possible role for higher education, HEHP programs, individuals, and organizations.

The Modern Horsemen of the Apocalypse

First, let me make the case that HD is, indeed, a health problem of the greatest magnitude. In 1959 the noted medical historian and commentator, Rene Dubos, published his *Mirage of Health*. At that time he wrote of the Four Horsemen, "War, Famine, and Pestilence still commonly ride in advance of Death in most of the world today. But these time-honored allies of the pale rider are now less feared than they used to be" (Dubos, 1961, p. 165).

I wonder why Dubos wrote what he did considering that six years before publication of his book, the 14 kiloton atomic bomb (with the innocent name, *Little Boy*) killed approximately 200,000 people in Hiroshima on August 6, 1945, followed by another attack five days later that destroyed another140,000 residents of Nagasaki (Rhodes, 1986). Perhaps he could not imagine the proliferation of nuclear weapons, and the stunning technology of violence that would be available to rich as well as impoverished countries.

One wonders what he would write today considering that the U.S. and Russia have over 12,000 nuclear warheads, enough to destroy the planet Earth. Add the 900 or so warheads held by France, China, and Britain, and the suspected arsenal of 277 warheads held by Israel, India, Pakistan, and North Korea, and one might conclude that the threat is quite real (NA, 2000).

Apparently, The Bulletin of Atomic Scientists did. In 1998

it moved its famous reminder of nuclear peril, "The dooms day clock," up to nine minutes to midnight (Bulletin of Atomic Scientists, 2000). The change was justified by the "failure of the international community to fully commit itself to control the spread of nuclear weapons – and to work toward substantial reductions in the numbers of these weapons" (Bulletin of Atomic Scientists, 2000, p. 1).

The Mortality and Economic Cost of War

What is the mortality cost of, say, just one form of HD – war?[1] Ruth Sivard and her colleagues reported that "With four years still to go, this modern century has already been responsible for 250 wars and 109,746,000 war-related deaths, a number somewhat larger than the total current population of France, Belgium, Denmark, Finland, Norway and Sweden" (Sivard, 1996, p. 7). In 1999 alone, approximately 8,439,000 people were killed worldwide (World Health Organization, 2000).

What about children and war? Health educators and promoters are stewards responsible for the health and well-being of children (Leviton, 1969). Machel (1996) estimates that 2 million children have been killed in armed conflicts, 6 million seriously injured or permanently disabled, and "countless others have been forced to witness or take part in horrifying acts of violence" (p. 7). Children, under age 18 years make good soldiers – and are expendable. They can clear land mines by using their bodies as detonators. Children also can easily fire automatic assault weapons such as the AK-47 (Boothby & Knudsen, 2000).

There is an economic cost to war as well. Several sources have documented the priority of military compared to social expenditures at the global and national levels (see Sivard, 1996). For example, half the world's governments spend more to guard their citizens against military attack than to protect them against all the enemies of good health (Sivard, 1996). In the U.S., for fiscal year 2001, President Clinton requested a Defense Department budget authority of $291 billion, an increase of over $11 billion for the previous year (Ricks & Suro, 2000).

Such an astronomical dollar amount is difficult to comprehend. Comparisons are often helpful. For example, the U.S. government's average annual expenditures on military research and development since the mid 1980s was $35.0 billion. On the other hand, its average expenditures on research and development to protect the environment: $1.4 billion. Another contrast: 1991 military expenditures of the developed nations amounted to $540 billion. Yet their expenditures, in the same year, in aid to the development of poor countries whose poverty arguably poses the greatest threat to global security, was only $50 billion (NA, 1994).

Obviously HD is costly, and a health and well-being risk. Again, the saving grace is that any and all forms of HD are preventable. Policies that would do that, if implemented, have been developed by individuals and at academic centers, the United Nations, by governments, and non-governmental organizations and think tanks.[2] A process is needed that would do just that. A description of such a process that had its origins in public health and thanatology[3] follows.

The Horrendous Death, Global Health & Well-being Concept (HDC)

The goal of the HDC is action to improve global health and well-being by implementing existing preventive policies – policies that give priority to addressing underlying root causes (Leviton, 1997, 1991b, 1991c).

The HDC is also a unifying concept because it transcends ideology, has survival value, and improves the quality of life for all. Since no one, regardless of economic or social class, is safe or immune from HD, its prevention may be a way of uniting people and organizations in common purpose.[4]

Additional Definitions

In order to understand the HDC, four definitions, other than HD, need to be defined: Lifegenic factors, quality of global health, health, and representatives of domains of influence and power.

Lifegenic Factors

Lifegenic factors (LF) increase the probability of living long and well. Examples are:

1. Meaningful education
2. Meaningful employment
3. Meaningful love and friendship relationships
4. Financial security
5. Quality health care
6. Opportunity for self-actualization
7. Opportunity for enjoyable recreation and play
8. Purpose and meaning in life
9. Opportunity to achieve spirituality needs
10. Opportunity to maximize health
11. Opportunity for artistic and creative expression

Quality of Global Health

With an understanding of HD and LF, Quality of Global Health (QGH) may be defined as an equation: $QGH = LF_{max} / HD_{min}$ or $_{elim}$ where high quality of global health and well-being is equated with a minimum or absence of HD, and a maximum of LF. Parenthetically, all institutions ultimately have or should have as their goal the improvement of the QGH as defined above.

Health

An understanding of HD suggests a modification of the World Health Organization's definition of health to consider

the meaning given perception and time, especially future expectations: Health is the process toward, and perception of acceptable physical, mental, and social well-being and not merely the absence of disease and infirmity here and now, and as expected in the future.

The person filled with "fear and trembling" and dread over what tomorrow might bring is not healthy according to this definition. Much of the anger evident in people within nation-states is due to anxiety about future prospects, that is the threat of HD and its correlates for themselves, their children, and grandchildren.

Domains of Influence and Power

Who are the actors in this drama powerful enough to integrate and implement existing health and social policy once they truly recognized the threat? They are the representatives of the domains of influence and power: Government, politics and law; finance; commerce; labor; the military; medicine and public health; religion; the media; education; science; philanthropy; non-governmental organizations; and, the community, that is, the grass roots representation. Some are as powerful as government-politics-law. What is their motivation to participate in the HDC? Their loved ones and themselves are as vulnerable to HD as anyone else. Presidents, and CEOs of multinational corporations have been murdered, mutilated and tortured, and are being poisoned by contaminated drinking water and air. It is in their best interest to have a healthy and peaceful physical, psychological, and social environment.

The HDC Process

Removal of the Denial of Personal Vulnerability and Mortality

The first step in the process is to remove the denial of mortality and vulnerability concerning ourselves and our loved ones.[5] No one, I repeat, no one expects to die, or that their loved ones can die in the next moment due to war, homicide, terrorist act, accident, or other forms of HD – until it happens. Once a person survives a HD, or is the survivor-victim of a loved one's HD, the person is more likely to act. HD has become real rather than an abstraction.

The HDC focuses on the beloved child (or grandchild) due to the powerful, protective bond of love that exists between parent and child but it could be any beloved including oneself, mate, or companion animal. Secondly, the death of a child is untimely, unexpected, and otherwise inappropriate. I hypothesize that when denial of the possible death of any loved one or oneself is high, action to prevent HD is low. It is this denial that oneself or loved ones, especially the beloved child, can die in such brutal ways, that reduces the probability of action to prevent HD. The denier rationalizes that if a child dies in war or is murdered it will be the amorphous other. It will not be, and cannot be his or hers.

Several years ago at a conference at King's College in London, Ontario, I asked the president of the organization, Parents of Murdered Children, whether, in her wildest imagination, she would have predicted the murder of her child. Her response was, "Never!" After her child was murdered, she started the organization. Prevention of murder had become salient for her. The same holds true for the parents and siblings of children killed by drunk drivers (e.g, MADD), by land mines in Afghanistan, or murder in the U.S.

A second hypothesis is that the more horrible the type or style of dying and/or death is perceived, the greater the fear; the greater the fear, the greater the denial; and, the greater the denial, the less chance of action to eliminate the very causes of such torturous deaths. Low and high fear of HD are associated with low probability of action. There is a middle knowledge (Weisman, 1974) that wafts and wanes between denial and awareness of HD that is likely associated with engaging in preventive action.

Anticipatory Grieving the HD of the Fantasized Beloved Child or Grandchild

Once denial of HD of the child (or other beloved including oneself) is removed, and the imagery of the torturous death confronted, intentioned anticipatory grieving must follow to increase the odds of preventive action.

The HD of a child is different from, say, death by means of childhood cancer. For our purposes, the difference between anticipatory grieving of the fantasized and actual HD of one's child lies in the modification and channeling of vengeance. If the child is literally killed, vengeance would be directed toward the killer or a killer-substitute (e.g., country, political leader, flag, etc.). Perhaps a few might channel their need for vengeance toward preventive, constructive outcomes but most of us have yet to achieve control over such primal drives.

On the other, hand anticipatory grieving over the fantasized HD of the beloved child elicits screams, fear and trembling of what might be.[6] Themes of hatred and vengeance toward the fantasized killer become subordinate to the need to prevent such a death, and to subsequently survive well. Thus, in the conceptual framework presented here, the probability of personal action to eliminate HD is thought to increase if the actor experiences the anticipatory grieving resulting from the imagery of the dead child killed by a form of HD.

Dealing With Underlying Root Causes

Any effective policy designed to prevent war or other forms of HD will have to remove their underlying root causes. If I had to list one priority it would be economic factors such as poverty, inadequate income, and the disparity between the economic haves and the have nots. Their relationship between poor individual and social health, as measured by life expectancy, mortality and morbidity rates, DALYs, Disability Adjusted Life Expectancy (DALE), homicide rates, or

causes of war, is well-known (Kaplan, Parmuk, Lynch, Cohen, & Balfour, 1996; Kawachi, Kennedy, & Wilkinson, 1999; Kennedy, Kawachi, Prothrow-Stith, Lochner, & Gupta, 1998; Lardner, 1998; Smith, Neaton, Wentworth, Stamler, & Stamler, 1996; Szwarcwald, Bastis, Viaacava, & Andrade, 1999; Veenestra, 2000; Weinberg, 1998). Michael Renner put it as well as anyone when he wrote,

The second challenge is to understand and address the underlying causes of today's conflicts. Those causes unquestionably included the continuing perpetuation of massive social and economic inequalities, ethnic tensions, population pressures, and environmental degradation. These phenomena appear to be accelerating in many societies, even as governance structures falter. Left unaddressed, it is likely that they will force heightened polarization and instability, which would trigger even more widespread violent conflict. (Renner, 2000, p. 39)

Action

Highest Level Action: The Manhattan-type Project

The question now becomes what can we do to prevent war or HD in general? Action may occur at different levels, and take different forms. Due to the urgency of the problem, I would hope for a Manhattan-type project similar to that which produced the atomic bomb during World War II. At that time, the finest scientific minds were mobilized for the task. Cost was no object. The HD variation would not produce a bomb. Instead the representatives of domains and power would review, evaluate, organize, and implement existing health and social policies to improve the quality of global health and well-being.

Former U.S. Secretary of Defense Robert McNamara had a similar idea. When he was offered the Ford Foundation's presidency he planned to spend "approximately $200 million a year to advance human welfare around the world." Then he added, "One can think of that as mobilizing 2000 of the world's most capable scholars and policy analysts (at $100,000 each in compensation, expenses and overhead) to focus on the most critical economic, political, social, and security problems facing humankind." (McNamara, 1995, p. 235). Unfortunately, he did not accept the position.

Higher Education

The academy with its diverse expertise, might serve as a catalyst to implement a smaller variation of the HDC. It represents a variety of disciplines necessary to the project, e.g., education and health education, economics, psychology, sociology, cultural anthropology, medicine, law, ecology, etc. One gain for any university is that the endeavor would serve to unite the campus in common purpose.

Service-learning and community outreach programs are another example of how higher education can address health and social problems. They, like intergenerational programs, have become academically correct. One problem is that they tend to "think globally and act locally," when they should be "thinking globally and acting both locally and globally."

An Example: The Adult Health & Development Program/ National Network for Intergenerational Health

One such effort is the 28 year old Adult Health & Development Program at the University of Maryland (AHDP). It is an intergenerational, service-learning, multi-disciplinary health promotion and rehabilitation program and health education course (Leviton, 1989, 1991a; Leviton, 1992; Leviton, 1998; Leviton & Santa Maria, 1979). Thanks to a series of training grants it has spread to other colleges in the U.S. (called the National Network for Intergenerational Health - NNIH).[7] One of its goals is to contribute to social harmony and well-being by bringing people together of diverse backgrounds, ethnic/racial roots, health and well-being and socio-economic status, to enjoy one another while reducing the probability of violence (see our web page: www.inform.umd.edu/AHDP). We know that working toward a common goal in an environment of trust, fun, and mutual support reduces or prevents negative stereotypes and labels. All NNIH members buy into the HDC, and the goals of the AHDP/NNIH.

What do the diverse group of 70-90 students and volunteers do in the AHDP every semester? They are trained to work on a one-to-one basis with a diverse group of older institutionalized and non-institutionalized adults to positively affect the latter's health and sense of well-being. Students serve as "friendly coaches" to their individually assigned older adult "members." At the same time they learn of history and different cultures while becoming friends. As the AHDP/NNIH spreads nationally and internationally, we hope to prevent HD by improving civil and peaceful relationships.

Action for the HEHP Professional and Related Organizations

To restore and maintain domestic tranquility and promote the general welfare for ourselves and our posterity requires that HD be eliminated. Only then can the quality of global health and well-being be improved. Since prevention is the stuff of HEHP the question is asked, what can we do to sensitize, educate, and collaborate with individuals, and groups to prevent this threat and risk of HD? Some suggestions are to:

-Sensitize and educate the public and others, especially those who represent the domains of influence and power

-Demand, do not ask, of politicians that the root causes of HD be addressed

-Mobilize older adults to action. They are a powerful voting and lobbying group. Their involvement would contribute to "purpose in life," a strong predictor of health and happiness of older adults (see Rowe & Kahn, 1998)

-Include the HDC, its variations or derivations, in one form or another, as a legitimate part of the health education and related curricula, K-College-Professional School. I include service-learning, and community outreach courses. In all cases self-efficacy and response efficacy ("action") are desired outcomes

-Motivate students to become activists. Have them write letters and meet with domain leaders to express their views on the need to prevent HD

-Present the HDC as a topic at educational-professional-scientific-medical conferences and write about it in your journals. Too often, however, the sessions are only poignant, powerful descriptions of say, the effects of land mines on children. What is needed is an action outcome that takes advantage of the audience's motivation to act in the here and now

-Lobby and otherwise support political candidates who have the prevention of HD in their platform

-Run for political office on a platform that includes the prevention of HD

-Develop coalitions between like-minded people and organizations such as The American Public Health Association (APHA), Society of Public Health Educators, American School Health Association, WHO and the UN, Children's Defense Fund, Parents of Murdered Children, RESULTS, Generations United, Physicians for Social Responsibility, Greenpeace, The Hague Appeal for Peace, and a host of others working in their own way to eliminate specific forms of HD.

-Work to develop collaboration within our professional organizations. For example, many, if not all APHA sections and caucuses, have a common interest in preventing HD. Why not collaborate on removing one root cause of HD such as inadequate income? How? By implementing policies that would provide job training and jobs, and a realistic minimum or liveable wage.

Conclusion

No one person has the answers to the complex problems associated with eliminating HD. The implementation, testing, and modification of the HDC or similar processes require the coming together of highly motivated people to address the issue of improving the quality of global health and well-being.

All of us have a contribution to make – the bottom line is always action. Whether it takes the form of advocacy for the Manhattan Project, mobilizing older adults to lobby, or teaching a health education class where aspects of the HDC are included, all are important. The ten second sound bite is, if we wish ourselves and our children and grandchildren to live long and well, we had best act.

End Notes

1. Excluded in this article is the cost in short- and long-term suffering and disability resulting from war For a good discussion from a public health perspective (see Leviton, 1995, 1997, 1991b; Leviton, 1991c; Levy & Sidel, 1997). Nor have I discussed the huge profits made from the sale of weapons often to unstable governments by the U.S., other developed countries, and the private sector (See Boutwell & Klare, 2000; Silverstein, 2000).

2. Venerable institutions that have been conducting preventive-focused research include the United Nations, the Stockholm International Peace Research Institute (SIPRI), and the Carnegie Endowment for International Peace. In the SIPRI's and EINIRAS (the European Information Network on International Relations and Area Studies) databases are listed hundreds of references under "peace policies."

3. Thanatology is the study of life ending in death (Kastenbaum, 1995).

4. This is not to suggest that everyone is supportive of the HDC, or even willing to act to prevent HD. My research suggests that a tiny minority feel that HD is "God's will," or that it is too complex for resolution. I do not know how to deal with those who accept HD as the Biblical manifestation of Armageddon or the Apocalypse, or whom Eric Fromm called the death lover (Fromm, 1973).

5. Denial can be removed by a variety of ways including guided mental imagery, films and videotapes, readings, testimony of victims and survivors of forms of HD and anti-HD activists, and the personal experience of peers. In my work that involves typical age university students and older adults, there is no difficulty in finding highly HD-experienced people who gladly speak before my large classes (n=200 students in a Death Education class, and around 120-200 participants in AHDP).

6. Think of your most beloved (including yourself) dying of napalm (burning) in war, or rape-murder-evisceration. Such powerful imagery requires preparation and follow-up (closure), and is not to be used cavalierly.

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A Changing Landscape: Health Issues Among Minority Elders in the United States

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The ethnic composition of the elderly in the United States is changing. Demographers project that over the next 50 years the elderly (65 and older) will represent 20% of the total population in the U.S., a growth of approximately 135% compared to 1995 census data. Representation of certain racial and ethnic groups among the elderly population is expected to undergo dramatic changes in the years to come. The proportion of non-Hispanic Whites among the elderly is expected to decrease from 85% to 66%, while the proportion of minority elders is projected to increase from 15% to 34% (Administration on Aging [AoA], 1997).

Latino/Hispanic elderly comprise the group expected to demonstrate the greatest increase in population. In 1995, the proportion of Latino elderly in the U.S. was 4.5%, by 2050 that proportion is expected to be as much as 17.5% of the total elderly population (AoA, 1997). This group includes Mexican Americans, Puerto Rican Americans, Cuban Americans, and people originating from Central and South America (American Association of Retired Persons [AARP] and National Resource Center on Health Promotion and Aging, 1990).

At 8.3% of the population of elderly, African-Americans are currently the largest minority group among the elderly. Projections are that this group will increase to 10.9% by 2050. Asian-Americans/Pacific Islanders (AAPI), and American Indian/Alaskan Natives (AIAN) represented 2.3% of the elderly in the U.S. in 1995. These groups are projected to increase to 7.4% of the population by 2050, according to demographers' calculations (AoA, 1997). AAPIs include Chinese, Japanese, Filipino, Korean, Vietnamese, Cambodian, Laotian, H'mong, and East Indian Americans. Hawaiians, Guamanians, Samoans, and Fijians are also included as AAPIs (AARP, 1990). In the Census 2000, Native Hawaiians and Pacific Islanders were, for the first time, a separate category. This was in compliance with recent Office of Management and Budget standards regarding classification of race and ethnicity (Ross, 2000b). Since existing data combines AAPIs together, this paper uses the AAPI grouping, as well.

Increases in the numbers of America's elderly are largely a result of the aging of baby boomers (those born between 1946 and 1964), who will begin celebrating their 65th birthdays in the year 2011. Advances in medical care have contributed to increases in life expectancy and decreases in mortality rates; people are living longer. While at a decreasing volume compared to years past, immigration by people from other countries continues to impact the U.S. population, as those who were among the earlier influx of immigrants are now aging U.S. citizens (AoA, 1997).

Projections of changing demographics among the elderly in the U.S. provide opportunity for a view into the future of health care, especially public health, as professionals attempt to cope with health issues particular to each of these groups. Elderly people tend to require more health services than their younger counterparts, and as more of the population enter the later years, need for health services certainly will grow. In this paper, I present a discussion of health issues specific to African-American, Latino/Hispanic, American Indian/Alaskan Native, and Asian/Pacific Islanders, especially as related to the elderly.

Before continuing with this discussion, three important caveats are proposed. First, health issues among minorities are often thought to relate to racial or ethnic factors. However, in a report issued by the Kaiser Family Foundation [KFF] (1999), researchers concluded that racial and ethnic disparities in health status among minorities in the U.S. are attributable, at least in part, to socio-economic factors rather than to race or ethnicity alone (KFF, 1999).

Second, most of the data on minority health compare minority groups to whites. Making these types of comparisons between minorities and whites implies that whites represent the standard for comparison even though such implications are probably unintended.

Third, in this paper I will address general issues related to four ethnic groups. Census and population data categorize people into only a few discrete ethnic groups, yet considerable diversity exists within these groups. Minimal data currently exist examining differences between and within subgroups. Whitfield and Baker-Thomas (1999) present an excellent argument supporting research studying within-group variability, stating that establishing broad categories of ethnicity in study samples results in loss of potentially valuable information regarding individual differences. The reader is referred to that article for a more in-depth discussion of this issue.

African-American Elderly

Among African-American elderly, the most prevalent

chronic diseases are the same as those found among Caucasians, specifically, heart disease, hypertension, diabetes, and kidney disease, yet in African-Americans, these diseases are more likely to lead to disability and death. Differences in disability and death rates from chronic disease may be due to detection at later stages of disease, lack of adequate insurance coverage, greater reliance on emergency care rather than on office visits to primary care physicians, and a general lack of resources with which to manage illness.

Elderly Blacks have been found to seek medical care at later stages of disease, making treatment outcomes less favorable (United States Department of Health and Human Services [USDHHS], 1996), and increasing likelihood of disability. Life expectancy is projected to continue to increase as much as a 68% by 2020 among all race and ethnic groups, but to be accompanied by high disability rates. This high rate of disability among the elderly will create a greater need for home health care and nursing homes.

Nearly 25% of elderly African-Americans rely on Medicare as their only source of insurance coverage whereas only about 10% of whites rely solely on Medicare (KFF, 1999). Inadequate insurance coverage limits type of care and access to care and has been shown to be correlated with negative health outcomes (Cornelius, 2000).

It has been reported that up to 40% of emergency department visits by elderly African-Americans are classified as nonurgent (McCaig, 1994). African-Americans of all ages have been found to be more than twice as likely as whites to utilize outpatient services (Franke & Ohene-Frempong, 1999). This tendency to rely on emergency services as opposed to office visits to primary care physicians means that elderly African-Americans are less likely to receive health education and information about preventive care, potentially leading to even greater reliance on medical services of every type (Franke & Ohene-Frempong, 1999).

Underlying each of these issues is the high level of poverty among the African-American elderly. According to the 1999 Kaiser Family Foundation report, 33% of elderly African-Americans are at or below the poverty level, a higher rate of poverty than in any other race. The cumulative effects of poverty and the stress of racism on this population are demonstrated by a generally poorer health status (KFF, 1999; USDHHS, 1996). Marion Wright-Edelman succinctly summarized the experience of Blacks in America when she said, "It is utterly exhausting being black in America-physically, mentally, and emotionally" (as cited in Franke & Ohene-Frempong, 1999, p. 165).

Asian Americans and Pacific Islanders

Asian American/Pacific Islanders (AAPIs) were the fastest growing ethnic minority in the U.S. over the past twenty years (Ma, 1999). The leading causes of death for AAPIs are heart disease, cancers, and cerebrovascular disease (National Center for Health Statistics, 1996).

As previously discussed, since considerable diversity exists within the AAPI group with more than 40 different ethnicities (Ross, 2000a), it follows that diversity also exists with regard to culture, socioeconomic status, and health issues. Each sub-group of AAPIs presents unique health concerns; however, there is a lack of data about the specific groups.

Hypertension and heart disease are common among Filipinos, Samoans, Japanese, and Southeast Asians. Lung cancer is prevalent among Chinese, Samoans, Guamanians, and Vietnamese men, consistent with higher rates of tobacco use among these groups (Aiu, 2000). Vietnamese women have a very high rate of cervical cancer, three times higher than among Korean women (Ross, 2000a). Diabetes is prevalent among Japanese, Filipinos, Chinese, Koreans, and Native Hawaiians (AARP, 1990).

Lack of adequate vaccinations among foreign-born AAPIs results in greater incidence of hepatitis B, tuberculosis, and pneumonia (USDHHS, 1990). Immigration to the U.S. incurs particular hardships for foreign-born AAPIs. A general lack of understanding of the health care system, changes in diet, and language barriers are some of the greatest challenges to this population of minority elders (Association of Asian Pacific Community Health Organizations, 1995).

AAPIs have been found to have the lowest rate of physician visits compared to other ethnic minority groups (Korean Health Survey Task Force, 1989; Yu & Cypress, 1982). This low rate of physician visits may be the result of overall better health among AAPIs compared to other groups. Other possible explanations for the difference is that social and cultural barriers prevent this group from accessing needed care, and that AAPIs are in a high-risk group of poor and underinsured people (Chin, Takeuchi, & Suh, 2000).

The inability to speak English is a considerable barrier to seeking necessary health care by elderly AAPIs. Language differences can lead to misunderstandings about physician instructions and missed diagnoses when the non-English speaking patient cannot accurately describe symptoms. Cultural norms may prevent or discourage AAPIs from obtaining certain medical treatments or screenings. For example, in a study of elderly AAPI women, cultural practices dictated strict modesty regarding breasts and reproductive organs, making pelvic examinations and mammograms taboo (Lum, 1995).

Research assessing levels of insurance coverage among elderly AAPIs is limited; however, available data indicate that this group is uninsured and underinsured. Findings from the Commonwealth Fund Minority Health Survey (1994) reveal that nearly 40% of Korean Americans and 20% of Chinese and Vietnamese Americans had no insurance coverage. The complicated and confusing nature of insurance policies may prohibit non-English speaking AAPI elderly from pursuing insurance coverage (Chin, Takeuchi, & Suh, 2000). The large numbers of Korean Americans owning small businesses may likely be a factor in the lack of insurance coverage among

this subgroup of AAPIs.

American Indians/Alaskan Natives

Issues specific to the elderly AIAN population are related to inaccessibility to health care and to socio-cultural factors (Jones-Saumty, 1999). Reservations, where the majority of AIANs live, tend to be isolated from urban areas where medical services and job opportunities exist for younger people who can help support the community. The Indian Health Service (IHS) was established to administer health services to AIANs and has made great strides in enhancing the health status of that population. Yet, IHS is not yet able to cover the vast geographic areas where most reservations are located (Jones-Saumty, 1999).

Inaccessibility of adequate medical care is a critical dilemma for AIANs. Of the nearly 300 reservations in the U.S., only 15 provide long-term care facilities for their elderly, placing the burden of care for disabled elderly on the community, family, and friends (Kingfisher, 1996). However, these informal caregiving settings may not always have resources available to adequately care for the needs of the elderly.

In studies of utilization of medical care by AIANs it has been found that this group is less likely than some others to seek medical care, in part due to socio-cultural barriers. AIANs report a lack of trust in the medical system. Behaviors demonstrated in the medical care system are sometimes objectionable to this group. "Getting right down to business," addressing strangers in loud, confident tones, and frequently interrupting speakers, (USDHHS, 1996, p. 29) among other types of behavior sometimes exhibited in medical care facilities, can create an environment of disrespect with which many elderly AIANs are uncomfortable and therefore avoid.

Diabetes is one of the most serious health concerns among American Indians/Alaskan Natives (AIANs), who die of diabetes at three times the rate of whites (Ross, 2000a). According to the National Indian Council on Aging, poor diet and lack of exercise are contributing factors to the high rate of the disease. As with medical care in general, care for diabetes is not always readily available to those living on reservations. Although Medicaid provides long term care for diabetes, health care providers are often not accessible in remote areas (AoA, 1997).

In addition to diabetes, leading causes of death among this population are heart disease, cancers, and cerebrovascular diseases (AARP, 1990), all of which are impacted by the high incidence of alcoholism and alcohol abuse among AIANs (AARP, 1990). As many as 95% of the AIAN population are in some way affected by alcohol abuse (AARP, 1990). Westermeyer and Neider (1994) found AIANs were more likely to have a close relative who was a substance abuser, more likely to have received inpatient care for substance abuse, and more likely to have undergone detoxification than other groups. These types of health issues which impact the general AIANs population, have an even greater impact on elderly AIANs who, as within all ethnic groups, tend to be more vulnerable and dependent on others for assistance with daily living.

Latino/Hispanic

Since Latino/Hispanics will soon be the largest minority group in the U.S., the health needs of their elderly certainly will influence public health and health education in the future. As with the African American population, poverty is a major obstacle in improving the health status of elderly Latino/Hispanics; it has been estimated that approximately 30% of Latino/Hispanic elderly are at or below the poverty rate (KFF, 1999). The proportion of poor among Latino/Hispanic elderly living alone was 65% in 1990, compared to 36% among white elderly living alone (Lewin/ICF Series, 1990, as cited in AoA, 1997).

Similar to whites and other ethnic groups, leading causes of death among Latino/Hispanics include heart disease, diabetes, and cancers. Hypertension is also very prevalent among this group, particularly in older Mexican men (AARP, 1990). In data reported by Schick and Schick (1991), Latino/Hispanic elderly were nearly twice as likely to have one or more limitations in activities of daily living such as bathing, toileting, dressing, and eating, than other groups of elderly. These limitations typically require increased dependence on others—family, community, or formal institutions—for assistance with basic functions of everyday life.

Latino/Hispanic elderly tend to live in communities rather than in long-term care institutions and tend to have greater familial support than other groups do (Sotomayor, 1992; Greene & Monahan, 1984). However, the ability of Latino/Hispanic families to continue to provide support for their elderly may diminish in the coming years due to economic constraints and changes in lifestyle (Jimenez-Velasquez, 1992; Rothman, 1992). As the numbers of elderly Latino/Hispanic increase, added public health resources are likely to be needed if families are no longer able to act in the traditional role of caregiver.

One study of Latino/Hispanic elderly living in a rural setting found that this group was more likely to have nutritional deficiencies compared to other non-Hispanic elderly groups (Marshall, et al, 1999). The researchers reported that participants in their study had an inadequate intake of vegetables, problems with teeth or dentures, difficulties preparing meals, and a lack of money to buy food. Data from this study revealed that over 63% of Latino/Hispanic elderly in the study sample were at moderate to high risk for nutritional deficiencies, potentially leading to poorer overall health status (Marshall, et al, 1999).

Recent research suggests that elderly Latino/Hispanic experience several barriers to obtaining health care. Lack of or insufficient health insurance coverage, and the health care system are among the greatest obstacles reported

(Guendelman & Wagner, 2000). The Kaiser Family Foundation Report (1999) indicated that as many as 45% of Latino/Hispanics in the U. S. were uninsured, 29% were covered under Medicaid, while only 26% had private insurance coverage.

Within the health care system, language barriers are common (Guendelman & Wagner, 2000). As with elderly Asian American/Pacific Islanders, Latino/Hispanic elderly who do not speak English often are confused about medical procedures and about their rights as patients. This confusion can lead to frustration, thus discouraging further involvement even when the need for care is urgent.

Challenges and Opportunities for Health Education

As most health educators and others in health-related professions are aware, the population of the U.S. is aging but what may be less clear is how the changing ethnic composition of our elderly will impact the rest of society. Demographic transitions may produce a need for greater accessibility to health care for elderly minorities and increases in economic assistance for the potentially large numbers of elderly living in poverty. A more positive environment for cultural acceptance and awareness and enhanced communication between those of diverse ethnic origins may be a few of the benefits to be gained from projected changes.

Improving accessibility to adequate health care for minority elders should be a key objective of planning for the needs of this population. Elderly minority may be more apt to utilize health care services if health practitioners integrate culturally-traditional healing practices with Western approaches (Ross, 2000b). Prevention and education programs are critical to increase knowledge of health-enhancing behaviors including proper nutrition, importance of physical activity, even if limited, and the need for social support. Encouraging use of health care services will help maintain health status and decrease reliance on urgent care, which is more costly and is often utilized very late in the disease process.

Poverty presents serious and profound barriers to health among people of all ages and ethnic groups. Elderly poor already require a large share of social services; increases in those populations will result in even greater need in the future. In particular, housing, transportation, nutrition intervention, and assistance with daily activities will be necessary on an even larger scale as the numbers of elderly poor grow. One possible solution is to create more support systems for informal caregivers to reduce reliance by the elderly on institutions for care. Educating caregivers of resources available to them such as daycare centers for the elderly and financial assistance programs might delay entry by the elderly into nursing homes and public health facilities.

Health educators need to continue efforts to develop not only cultural awareness but also respect for the traditions of other cultures when planning programs. Program planning for minority elderly should always be conducted with input from those being served. Building tradition and culture into programs would encourage greater participation, hopefully benefiting those in need.

The changing landscape of America's minority elderly will most assuredly present many challenges for health educators and health professionals in the future. At the same time the changes could influence social transformation. Expanding diversity among people offers an opportunity for greater depth and breadth of experience. Perhaps as the number of minority elderly increase, interactions between ethnic groups will become more positive. Heightened interpersonal communication and understanding between people of various ethnicities may serve to improve communication and acceptance among people of all ages.

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Physical Activity and the Healthy Older Adult

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Currently there are 34.7 million people over the age of 65 which represents 13% of the population of the United States. The population of the oldest old, over 85, has increased to 4 million (Administration on Aging, 1999). In 1998 almost 1.9 million celebrated their 65th birthday but in the same year about 1.75 million persons 65 or older died (Administration on Aging, 1999). The life expectancy has increased dramatically since the 20th century and those who reach the age of 65 can expect to live an average of 18 more years or into their 80's, according to Healthy People, 2010 (U.S. Department of Health and Human Services [USDHHS], 2000). It is expected by the year 2030 people over the age of 65 will make up 20% or 70 million of the population (Administration on Aging, 1999).

It is estimated that over 51% of the people between the ages of 65-74 and 65% of those aged 75 and older do not participate in any leisure activity. Even more distressing is less than 19% of persons aged 65 and older participate in vigorous activity and only 28% participate in moderate physical activity (USDDHS, 2000). There has been a slight increase in the activity of older adults but greater participation is needed. Physical activity can increase strength, cardiovascular endurance, flexibility, bone density and decrease the incidence of obesity. There may also be benefits related to better balance, coordination, and locomotion. The leading causes of death in persons aged 65 and older include heart disease, cancer and stroke (USDHHS, 2000). Many other conditions are common in older adults such as osteoporosis and arthritis that affect the quality of life of older adults but do not cause death. The key ingredient to healthy aging is physical activity (USDHHS, 1990).

The purpose of this article is to enlighten the reader on the benefits of exercise for healthy older adults. The focus is on physiological (i.e. heart rate, blood pressure, oxygen utilization, muscle mass, strength, flexibility) and psychosocial aspects.

Heart rate

The normal resting heart rate in an adult is about 80 beats per minute (bpm). This varies with age and activity level. Very active individuals and elite athletes have lower resting heart rates than the average adult. Resting heart rate remains about the same as younger adults as you age. There does appear to be a decline of maximum heart rate with age. Maximum heart rate decreases 5-10 (bpm) per decade (Spiroduso, 1995). The maximum heart rates during training indicate this decline from younger values of 195 bpm to 155-160 bpm at age 65 (Shephard, 1987). The reasons for this decline have yet to be determined. One possible theory states that there is lack of myocardial oxygen that is responsible for the decline.

Another possible theory blames the decline on stiffness of the heart wall (Shephard, 1987). Young adults increase cardiac output by increasing heart rate where older adults increase cardiac output by increasing heart rate slowly and relying on the Frank-Starling mechanism which states, when a muscle is stretched it contracts with more force. As the volume of blood returning to the heart increases, the amount of blood ejected from the ventricles with each beat of the heart increases. This increase stretches the walls of the ventricle and causes a more forceful contraction. Heart rates remain higher and recover more slowly after maximal exercise in older adults (Spiroduso, 1995). In a study by Stratton, Levy, Cergueira, Schwartz, and Abrass (1994) heart rate at rest showed no differences between the 18-32 year old group and the above 60 year old group. The response to exercise result in this same study was a +105% increase in heart rate for the older group and a + 166% increase for the younger group. It has also been found that exercise programs at submaximal levels lower exercising heart rates and improve recovery time (Smith & Serfass, 1981). A lowered resting heart rate helps to prevent cardiovascular disease and reduces the stress placed on the heart during normal daily function. Since the heart is a muscle, as it is exposed to various levels of exercise, it will adapt and become stronger thus allowing it to function more efficiently.

Blood pressure

The normal blood pressure for the average adult is 120/80 mm Hg although anything over 140 mm Hg systolic or 90 mm Hg diastolic needs to be evaluated by a physician. Blood pressure, especially systolic pressure, changes with age. The major blood vessels become more rigid and arteries accept the amount of blood pumped by the heart less quickly which causes an increase in systolic pressure. It has been found through exercise that systolic pressure can be reduced (Reaven, Barrett-Connor & Edelstein, 1991; Spiroduso, 1995). A reduction of systemic blood pressure as much as

30 mm Hg in systolic and 3-8 mm Hg in diastolic with training has been noted (Shephard, 1987). A greater change in systolic and diastolic blood pressure becomes evident in older adults with hypertension who are exercising.

Many physicians recommend exercise to help control hypertension. A high systolic blood pressure can also be related to postural hypotension which is fairly common in older adults. It has been discovered that blood pressure during maximal effort is slightly higher in older adults than in younger individuals. In fact, one study found systolic maximums of 217 and 206 mm Hg in elderly men and women respectively as compared to 180 mm Hg in young adults with maximal effort during exercise (Smith & Serfass, 1981). A decrease in blood pressure because of exercise can reduce the risk of hypertension in older adults. In addition there is also a reduced risk of heart attack and stroke. A regular, moderate to vigorous exercise program will augment cardiovascular function, body composition, metabolic function, and assist in reducing tension and anxiety (Spiroduso, 1995).

Oxygen utilization

Maximal O_2 uptake (VO_{2max}) is defined as "the greatest rate at which oxygen can be consumed during exercise or the maximal rate at which oxygen can be taken up, distributed and used by the body during physical activity" (Nieman, 1999 p. 185). VO_{2max} declines 9-10% each decade after 20 years (White, Fehlauer, Hayover, Johnson, & Dustman, 1998). This decline is affected by a decrease in physical activity, weight gain, as well as changes to the cardiovascular system. Healthy 50 year olds who exercise vigorously have $VO_{2max's}$ that are 20-30% higher than sedentary young adults (Lenfant & Wettenberg, 1989). One study reported only a 13% decline in VO_{2max} in men aged 45-68 who trained over an 18 year period in comparison to a 41% decline in sedentary men over that same period of time (Spiroduso, 1995). A study of older adults aged 60-75 by Boileau, et al. (1999) showed a significant increase in absolute and relative VO_{2max} after a six-month aerobic exercise training program of 3 times per week as compared to a stretching/toning program of the same frequency. In the same study there were no significant changes in resting heart rate or resting blood pressure in the control versus exercising groups. A study by Bazzano, Cunningham, Coma, & Falconio, (1995) found that older persons aged 56-76 were able to utilize 74% of their VO_{2max} working at 91% of their maximum heart rate in comparison to a 41% decline in sedentary men over that same period of time. Also, a 12 month endurance training program of 61 to 67 year olds showed an increase in VO_{2max} of equal or greater amount than reported for young or middle age groups (Seals, Hagberg, Hurley, Ehsani, & Holloszy, 1984).

By participating in physical activity, older adults will require less effort in performing demanding tasks, increase respiratory function and have increased energy because of the ability to better utilize oxygen. In addition there will be an increased ability to deliver blood to muscles, which results in an increased ability of the muscle to extract and utilize oxygen from the blood. Significant improvements in cardiovascular function can occur when changing from a sedentary to a physically active lifestyle even in ages over 70.

Muscle mass

After the age of 30 there is a decrease in muscle mass because of a change in the structure of the muscle (Mazzeo, et al., 1998). Changes occur to muscle fibers as well as to motor units. The muscle fibers that are predominately affected in older adults are type II fibers which are fast twitch that control quick movements. Larsson (1978) has reported as much as a 42% decrease in type II fibers which translates to a 26-38% decrease in strength. It appears that there may be atrophy in 30% of these fibers in sedentary men aged 80 and above (Larsson, 1983). Borkan, Hults, and Glyn (1983) reported an 11.7% decrease in lean body mass in men aged 46-49. This atrophy of muscle fibers has a direct relationship to loss of strength in the older adult (Larsson, 1983).

The decrease in body mass may be as much as 33% from ages 30-80 as compared to a 30-40% decrease in muscle strength (Asmussen, 1980). It has been shown that muscle strength decreases as lean body mass decreases (Aniansson, Grimby, Hedbert, & Krotkiewski, 1981). A study by Frontera, Meredith, O'Reilly, Knuttgen, & Evans, (1988) reports a hypertrophy of both type I, 33.5% fiber area, and type II fibers, 27.6% fiber area, following a 12 week vigorous strength training program. It is apparent that with physical activity muscle mass will not deteriorate as quickly as in sedentary individuals. Without the loss of muscle mass, greater strength will be maintained which will lead to increased independence and less reliance on others for care.

Strength

As we age, relative strength declines because there is a decrease in lean body mass and an increase in body fat. The same amount of strength loss does not occur to every muscle. Studies have shown that lower body strength decreases faster than upper body strength (Spiroduso, 1995). These losses are accentuated by disuse. Isometric strength appears to be maintained better than dynamic strength and eccentric, lengthening of the muscle, better than concentric, shortening of the muscle. Both isometric strength and dynamic strength have been reported to decline after the age of 50 (Larsson, Grimby, & Karlsson, 1979). The isometric tension that can be generated declines with age (Asmussen, 1980). This may be the result of an overall decline in strength or a reduction in lean body mass. Resistance training can produce strength gains no matter what age. The amount of gain is directly related to the intensity, duration, and frequency of the resistance training.

It appears that muscle strength declines by approximately

15% in the 6th and 7th decade and about 30% thereafter (Mazzeo, et al., 1998). Maximal muscle strength is achiev- able in the early 20's and 30's and then decreases with age (Spiruduso, 1995). Adequate muscle strength is extremely important in walking as well as in activities of daily living (ADL) which have been shown to be affected by the age of 70 or earlier (Fiatarone & Evans, 1993). Progressive resistive exercises have been shown to increase strength, thus allowing ADL's to be accomplished into later years. ADL's such as carrying groceries, cleaning the house and yard, walking, and climbing stairs necessitate good upper and lower body strength. For older persons to maintain good functional capacity and freedom it is necessary that they be able to perform these ADL's.

In a study by Mikalko and McAuley (1996) of subjects aged 70-101 years, with a variety of ambulation levels, an increase occurred in upper body strength after performing a strength training program focusing on all upper body muscles for 8 weeks. This is consistent with other studies by Brown, McCartney, and Sale (1990) and Frontera, et al., (1988) showing strength increases of 48% and 227% respectively. Verfaillie, Nichols, Turkey, & Hovell, (1997) found that a twelve week resistance training program for older men and women increased strength and gait speed. It was also determined in the same study that balance can be improved with a combination of resistance training and balance training (Verfaillie, et al., 1997). Physical activity that includes a progressive resistive strength training program at 60% of one repetition max (rpm) or above has been shown to increase muscle strength in older adults (MacDougall, 1986). In a study by Frontera et al. (1988) men between the ages of 60 and 72 improved their knee flexor strength by 227% and extensor strength by 107% over a 12-week strength training program. In 1990 Fiatarone, et al., found significant increases in knee extensor strength, 174% on the right and 180% on the left, in 86-96 year old subjects during an eight week strength training program.

There also appears to be an overall positive affect on gait, speed, sway, and balance after a strength training program. Even low intensity exercise has been found to have a positive result on balance (Spiroduso, 1995). In subjects with a mean age of 67.8 years Nichols, Hitzelberger, Sherman, and Patterson (1995) reported strength gains in upper and lower body exercise ranging from 9-55% with resistance exercise. Those that performed the resistance exercises with eccentric loads showed greater improvements in all but the chest press. It appears from this study that resistance training programs of moderate intensity twice a week will increase muscular strength and improve functional capacity if performed over a twelve week period of time. Older persons are able to have the same rate of strength gains even if they have led a sedentary lifestyle. Low intensity exercise, 50% of maximum or below, does not have the same benefits as moderate to high intensity exercise although low intensity exercise has been found to improve balance in women aged 60-71 (Spiroduso, 1995). The American College of Sportsmedicine discourages the use of high intensity exercise programs that include isometric exercise because of high pressures that can develop within the chest cavity (Mazzeo, et al., 1998). By increasing upper and lower body strength through low, moderate or high intensity exercise older adults will be able to maintain their independence. Many ADLs such as lifting, moving and carrying objects require strength. If strength is not maintained or increased, older adults will become more dependent on others for assistance. Balance and coordination is also affected by strength loss. Increasing strength will assist in the prevention of falls and other musculoskeletal injuries as well as to improve ambulation.

Flexibility

Flexibility, the ability to move a joint through its entire range of motion, becomes increasingly difficult in sedentary individuals. The old adage of "Use it or lose it" is very applicable when addressing joint mobility. As we age flexibility decreases as a result of collagen cross-linkage, arthritis, joint anklylosis, inactivity, and disuse so it may become impossible to perform some ADLs. The activities that seem to be the most affected are overhead activities such as putting clothing on over your head and reaching into cabinets as well as walking, stair climbing and getting up out of a chair. It appears that the maximum range of motion occurs in the mid to late 20's (Mazzeo, et al., 1998).

There have been mixed results on the ability to increase flexibility in older adults. In one study scores on the sit and reach test, measuring lumbosacral and hamstring flexibility, decreased 18% in women and 23% in men through 65 years of age (Canada Fitness Survey, 1983). There have been reported increases in range of motion of the ankle, shoulder, elbow, wrist, hip, and knee in older adults following a variety of exercise programs (Smith & Serfass, 1981). There also appears to be some correlation with the length of the exercise program and the amount of improvement.

In a study by Walker, Sue, Miles-Elkousy, Ford, and Trevelyan (1984) there does not appear to be a difference in range of motion in young old, 60-69 years and middle old, 75-84 years. Older adults who are community dwellers exhibit increased flexibility, strength, walking speed and score higher on ADL's (Cunningham, Paterson, Hinnan & Rechnitzer, 1993; Sonn and Asberg, 1991). In 1988, Schroeder, Nau, Osness, & Potteiger, reported that older adults aged 75-85 who lived independently had greater strength, flexibility, and functional ability scores. There are many factors that affect these results. Older adults who are active and perform their own housework, shopping, and yard work maintain better strength and thus are able to do more activity. Those that are confined to nursing homes may not have access to physical activity programs and may depend on caretakers for assistance with ADL's. Stretching programs help increase flexibility and allow more of the muscles to be utilized during daily activity. Good flexibility assists in pre-

venting excessive amounts of strain on tendons, which decreases the incidence of musculoskeletal injury and pain. Proprioception and balance are also enhanced with good flexibility. By maintaining good flexibility, older adults will be able to perform ADL's, thus allowing for a better quality of life and greater independence.

Psychosocial

One major concern in older adults is depression which has been noted in about 15% of the older population (Mazzeo, et al., 1998). Exercise has been reported to reduce the signs and symptoms of depression when changing from a sedentary to active lifestyle (McNeil, Leblanc, & Joyner, 1991). In a study of older adults, aged 60-80, who participated in an exercise program twice a week for 9 months, 70% reported less depression than when they began the program (Spiroduso, 1995). In another study using the Beck Depression Inventory, scores improved whether the exercise was of moderate or high intensity or 3 hours versus 2 ° hours a week during a one-year program. It was found through this study that older adults who participated in an exercise program of shorter duration did not report a change in depression. Older adults who participate in low levels of physical activity reported more symptoms of depression than those in high activity levels but this may be the result of a very low level of activity (Moore, et al., 1999). Use of exercise has many advantages in the treatment of depression. These advantages are that exercise is inexpensive, it can be performed by a large group, can cause fewer side effects than antidepressant medication and can possibly prevent depression (Moore, et al., 1999).

Exercise programs to increase strength have resulted in older adults being able to walk who previously were confined to a wheelchair because of muscle disuse and atrophy. A person who is ambulatory has more freedom and independence which in return enhances their quality of life. Through organized exercise programs older adults are able to interact with each other and develop friendships and support groups. This assists with self-confidence, self-esteem, and the feeling of not being isolated. In the Bonn Longitudinal Study on Aging, results support a close relationship between "objective health state"(i.e. blood pressure, vital capacity, intellectual abilities, memory, psychomotor abilities and stress tolerance and well being) (Lehr, 1992). Those that participate in sports enjoy better physical well being, sleep better, and can relax more easily (Lehr, 1992).

There are mixed results in the literature regarding psychological well being and personal satisfaction after physical activity. It appears that an exercise program lasting longer than 10 weeks may have a greater increase in psychological well being even though some positive effects have been found in less than 10 weeks (McAuley & Rudolf, 1995). Factors that may affect this response are whether the exercise program is anaerobic, aerobic or strength/resistive training. It has been reported that anaerobic training has a better effect on reducing depression than aerobic training (North, McCullach, & Tran, 1990). On the other hand Landers and Petruzzello (1994) reported greater anxiety with anaerobic exercise.

It is unclear whether the positive psychological affects of well being are a result of the affects of exercise training or because of participation (McAuley & Rudolph, 1995). One theory suggests that physical activity may distract the older adult from daily stressors in their lives (Bahrke & Morgan, 1978). Also the social nature of physical activity may account for the affects of psychological well being and personal satisfaction.

Two barriers to physical activity in older adults are " I'm too old" and "physical activity is too risky" (O'Neill & Reid, 1991; Vertinsky, 1995). Negative social influence seems to occur less often than does positive in research that does not involve exercise (Finch, Okun, Zautra, & Reich, 1989; Rook, 1992). It does not appear that negative social influences are as strong as positive and are as long lasting. Positive social influences for persons over the age of 60 seem to be spouses, family members, friends and physicians (Chogahara, O Brien Cousins, & Wankel, 1998).

Conclusion

Older adults can lead long, healthy productive lives over the age of 65 years. The effects of physical activity assist in a slowing of the physiological aging process, thereby allow ing more independence and freedom as well as reducing the risk factors of chronic disease. Physical activity need not be expensive or time consuming and can also assist in the management of some medical conditions such as hypertension. Even low intensity exercise results in physical benefits. Physical activity also allows older persons to socialize and have better support groups resulting in better self-esteem and a decreased feeling of being isolated.

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Enhancing The Quality of the Later Years: Nutrition and Aging

Lori W. Turner, Marjori Fitch-Hilgenberg, Ro DiBrezzo, & Jeanne Bleeker

Only in this century have human beings achieved a life expectancy that permits science to study aging. The aging process is associated with many physiological, cellular, molecular, and psychological changes that may affect overall health and nutritional status. Scientific evidence indicates that good nutrition is essential for health, independence, and positive life quality of older people (Position of the American Dietetic Association, 2000). The purpose of this paper is to explore the many roles that nutrition plays in the aging process, and how positive nutrition can enhance the quality of the later years.

Figure 1: Risk Factors for Malnutrition in Older Adults

Disease
Poor food intake
Tooth loss or oral pain
Economic hardship
Reduced social contact
Multiple medications
Involuntary weight loss or gain
Requiring assistance with self care
Over 80 years of age

Physiological Changes

As people age, the effects of nutrition, genetics, physical activity, and everyday stress become more pronounced. Each of these factors can interact with one or more of the others, and each can affect the aging process positively or negatively. As aging progresses, inevitable changes in each of the body's organs contribute to physiological changes. These physiological changes influence nutrition status, and nutrition status can impact the extent of these changes.

Changes in body composition occur as people age but optimal nutrition and physical activity can minimize these changes (Guo, Zeller, Chumlea & Siervogel, 1999). Older people tend to lose bone and lean body mass and gain body fat (Paolisso, 1995). Many of these changes in body composition occur because of altered hormone activity. The action of insulin, for example, is subtly impaired in the aging population (Tessari, 2000). Growth hormone and androgens decline with age; this contributes to reduced lean mass. The hormone prolactin increases with age and helps to maintain body fat.

Older people tend to lose height and body weight as they age (Dey, Rothenberg, Sundh, Bosaeus, & Steen, 1999). When people age they become vulnerable to unintentional weight loss, which is associated with increased morbidity and mortality (Roberts, 2000). To prevent this type of aging anorexia, older people need to monitor their body weights and be aware of this and other risk factors for malnutrition in older adults (see Figure 1).

Changes in the immune system bring declining function with age. The immune system is compromised by nutrient deficiencies, and so the combination of age and malnutrition makes older people vulnerable to infectious diseases (Lesourd & Mazari, 1999). Physical activity enhances the immune response (Pederson, et al., 1999) and many older people are inactive. Nutritional status appears to be a greater predictor of compromised immunity than age (Krause, et al., 1999).

Undernutrition is not uncommon among the elderly; more than 50% of elderly who are hopitalized or experiencing a disease have protein-energy malnutrition (Lesourd, 1999). Micronutrient deficiencies are common among other older people. These nutrient deficits can weaken immune responses. The weakened immune responses among the older population are not attributed to the aging process itself, but are due to malnutrition that is observed among the aged (Kawakami, et al., 1999).

In the GI tract, the intestinal wall loses strength and elasticity with age, and this slows motility. Constipation is four to eight times more common in the elderly than in the young (Hosoda, 1992). Atrophic gastritis, a condition that affects almost one-third of those over 60, can impair the digestion and absorption of nutrients, most notably, vitamin B_{12}, biotin, calcium, and iron (Blechman & Gelb, 1999).

The incidence of tooth loss and gum disease are common in old age. These conditions make chewing difficult or painful. Dentures, even when they fit properly, are less effective than natural teeth, and inefficient chewing can cause choking. People with tooth loss, gum disease, and ill-fitting dentures tend to limit their food selections to those that are soft. If they omit food groups and limit variety in their diets, nutrient deficiencies follow.

A multitude of other physical problems can also interfere with an older person's ability to obtain adequate nourishment. Failing eyesight, for example, can make driving to the grocery store impossible and shopping for food a frustrating experience. It may become so difficult to read food labels and count money that the person's food purchases are not health-enhancing. People with limited mobility may find food procurement and preparation beyond their capabilities. Sensory losses can also interfere with a person's ability or willingness to eat. Taste and smell sensitivities tend to diminish with age and may make eating less enjoyable (Schiffman, 2000).

Other Changes

In addition to the physiological changes that accompany aging, older adults are changing in many other ways that influence their nutrition status. Psychological, economic, and social factors contribute to a person's ability and willingness to eat.

Although not an inevitable component of aging, depression is common among older adults. Loss of appetite and of motivation to cook often accompanies depression. When a person is suffering the heartache and loneliness of bereavement, cooking meals may not seem worthwhile. The support and companionship of family and friends, especially at mealtimes, can help overcome depression and enhance appetite.

Overall, the older population today has a higher income than its cohorts of previous generations. Still, poverty is a major problem for about 20 percent of people over age 65. Factors such as living arrangements and income influence the food choices, eating habits, and nutrition status of older adults, especially those over age 80 (White, 1991). People of low socioeconomic status are likely to have inadequate food and nutrient intakes.

Refusal to eat and the resulting malnutrition occurs for several reasons, including social and cultural situations (Marcus & Berry, 1998). Malnutrition among older adults is most likely to occur among those with the least education, those living alone in federally-funded housing, and those who have recently experienced a lifestyle change.

Energy and Nutrient Needs During Late Adulthood

Knowledge about the nutrient needs and nutrition status of older adults has grown considerably in the last decade. Setting standards for older people is difficult, though, because individual differences become more pronounced as people grow older. Energy needs are based on height, weight, gender, age, and physical activity.

Energy needs decline with advancing age. Adult energy needs decline an estimated 5 percent per decade. One reaon is that people usually reduce their physical activity as they age. Another reason is that lean body mass diminishes, slowing the basal metabolic rate. At least one researcher contends that if older adults could avoid changes in body composition (by way of physical activity), they would show little decrease in basal metabolic rate (Durnin, 1992). Physical activity not only increases energy expenditure but, along with sound nutrition, enhances bone density and supports many body functions.

The lower energy expenditure of many older adults requires that they obtain less food energy to maintain their weights. Accordingly, the energy Recommended Dietary Allowance (RDA) for adults decreases slightly after age 50. Energy intakes typically decline in parallel with needs (Imai, et al., 2000). Still, many older adults are overweight, indicating that food intakes of some do not decline enough to compensate for reduced energy expenditure (Poehlman & Horton, 1990). On limited energy allowances, older people must select mostly nutrient-dense foods.

A known connection between osteoarthritis and nutrition is being overweight. Weight loss is important for overweight people with osteoarthritis, partly because the joints affected are often weight-bearing joints that are stressed and irritated by having to carry excess weight. Nutrition quackery to treat osteoarthritis is abundant, but no known diet, food, or supplement prevents, relieves, or cures it. Weight control and adsequate nutrition are the most effective interventions (Kee, 2000).

Protein. The protein needs of older adults seem to be about the same as, or even greater than, those of younger people (Campbell, 1996). Because energy needs decrease, protein must be obtained from low-kcalorie sources of high-quality protein, such as lean meats, poultry, fish, and eggs; nonfat and low-fat milk products; and legumes. The RDA for protein for both younger and older adults is 0.8 grams of protein per milogram of body weight (Whitney & Rolfes, 1999).

Carbohydrate and Fiber. Abundant carbohydrate is needed to protect protein from being used as an energy source. Sources of complex carbohydrates such as vegetables, whole grains, and fruits are also rich in fiber and essential vitamins and minerals.

Abnormal carbohydrate metabolism affects more than 60% of people over age 60 (Gilden, 1999). Decreased insulin sensitivity is a contributing factor. Dietary treatment for diabetes is an important part of successful aging for many older adults.

The combination of ample water and high-fiber foods can alleviate constipation, a condition common among older adults. Physical inactivity and medications along with low water and fiber intakes, contribute to the high incidence of constipation. A diet rich in whole grains and cereal fiber is protective against constipation and type 2 diabetes (Meyer, t al., 2000). Fifty to 60% of the diet should be carbohydrate or 15 grams of carbohydrate for each 100 kcalories of food (Whitney & Rolfes, 1999). A person consuming 2000 kcalories per day should have 1100 to 1200 kcalories of car-

bohydrate or 275-300 grams.

As many as 50% of nursing-home residents may be malnourished and underweight (Abbase & Rudman, 1994). For these people, a diet that emphasizes fiber-rich foods may be too low in protein and energy. Protein- and energy-dense snacks such as hard-boiled eggs, tuna fish and crackers, and peanut butter on graham crackers are valuable additions to the diets of underweight or malnourished older adults.

Fat. For most older adults fat needs to be limited. Cutting fat may help reduce the risk of cancer, atherosclerosis, and other degenerative diseases. This should not be overdone, however; for some older adults, limiting fat intake too severely may lead to nutrient deficiencies and weight loss—two problems that carry greater health risks in the elderly than overweight (Nestel, 1992). Small amounts of fat (30% of kcalories) are needed to provide energy and fat-soluble vitamins.

Water. Dehydration is a risk for older adults, who may not notice or pay attention to their thirst, or who find it difficult and bothersome to get a drink. Older adults who have lost bladder control may be afraid to drink too much water. Despite real fluid needs, many older people do not seem to feel ethirsty or notice mouth dryness (Rolls & Phillips, 1990). Total body water decreases as people age, so that even mild stresses such as fever or hot weather can precipitate rapid dehydration in older adults (Chidester & Spangler, 1997). Dehydrated older adults seem to be more susceptible to urinary tract infections, pneumonia, pressure ulcers, and confusion and disorientation (Gilmore, 1995). Six to eight glasses of water a day is recommended.

Vitamins

Vitamin A. Only vitamin A is absorbed and stored *more* efficiently by the aging GI tract and liver, although its processing within the body slows slightly (Chernoff, 1990). Several studies have reported that healthy older adults have normal concentrations of plasma vitamin A even when their dietary intakes fall below the RDA (Russell & Suter, 1993). Some benefits of vitamin A and aging are attributed to the beneficial effects of the antioxidant properties of this nutrient and its effects on free radicals. During metabolism, several highly reactive, free radicals are formed that can cause cellular damage. Free radicals are highly unstable and their formation sets off a chain reaction that can cause oxidative damage to DNA, proteins, lipids and carbohydrates (Gaziano, 2000). Antioxidant nutrients can scavenge free radicals. Vitamins involved in the removal of free radicals include vitamin E, vitamin C, vitamin A and perhaps beta-carotene, a precursor of vitamin A.

Vitamins E and C. The fat-soluble vitamin, vitamin E and vitamin C, a water-soluble vitamin, are effective antioxidants. Through its antioxidant function, vitamin E contributes to membrane stability by protecting cellular structures from oxygen free radicals (Meydani, 1995). Vitamin E and vitamin C may also reduce the risk of cardiovascular disease by preventing oxidation of low density lipoproteins (Meydani, 1995). Dincer, Akcay, Konokoglu, & Hatemi (1999) reported that patients diagnosed with atherosclerosis had lower levels of plasma vitamin E and vitamin C than did healthy control subjects.

Oxidative stress appears to play a significant role in the development of cataracts, and antioxidant nutrients may help minimize the damage. Studies report an inverse relationship between cataracts and dietary intakes of vitamin C, vitamin E, and carotenoids (Bunce, 1993). However, some studies have shown inconclusive effects for these nutrients. Maintenance of sufficient plasma vitamin C is needed to prevent oxidative damage of the eye lens (van der Pols, 1999). Sixty (60) milligrams of vitamin C and 10 milligrams of vitamin E are required each day (Whitney & Rolfes, 1999).

Vitamin D. Older adults face a greater risk of vitamin D deficiency than younger people do. Only vitamin D-fortified milk provides significant vitamin D, and many older adults drink little or no milk. Further compromising the vitamin D status of many older people is their limited exposure to sunlight. Aging reduces the skin's capacity to make vitamin D and the kidneys' ability to convert it to its active form. Vitamin D enhances calcium absorption; it is crucial for preventing bone loss. Recommendations for vitamin D are 10 micrograms per day for those aged 51-70. The Daily Recommended Intake (DRI) for adults over age 70 is 15 micrograms per day (Whitney and Rolfes, 1999).

B Vitamins. Studies on vitamin B_6 reveal that its metabolism is altered with age, resulting in a higher requirement. Many older adults consume far less than the RDA for vitamin B_6 (Tucker, 1995). Research suggests that vitamin B_6 deficiency impairs immune response. The current vitamin B_6 DRI for all people over 50 is 1.5 micrograms per day. Another approach to determining the vitamin B_6 requirements of older adults, as well as the requirements for vitamin B_{12} and folate, focuses on the amino acid homocysteine. Homocysteine is recognized as an independent risk factor for heart disease and stroke in the United States (Selhub, 1995). Homocysteine concentrations rise with vitamin B_6, vitamin B_{12}, or folate deficiencies.

Vitamin B_{12} deficiency damages nerve cells, aggravates nervous system disorders and is a risk factor for heart disease, stroke and poor aging outcomes (Wynn & Wynn, 1998). Approximately 10-15% of people over age 60 have vitamin B_{12} deficiency (Baik & Russell, 1999). The prevalence of trophic gastritis among those 60 years of age and over is high. People with atrophic gastritis are particularly vulnerable to vitamin B_{12} deficiency for two reasons. First, digestion in the inflamed stomach is inefficient. Second, the bacterial overgrowth that accompanies this condition uses up the vitamin. Many older adults take in less vitamin B_{12} than the RDA and many deficiency cases go undetected (Tucker, 1995). Some authorities recommend screening for B_{12} deficiency in all older persons. Given the devastating neuro-

logical effects of a vitamin B_{12} deficiency, obtaining adequate B_{12} is crucial. The DRI for all people over age 50 is 2.4 micrograms per day (Whitney and Rolfes, 1999).

As is true of vitamin B_6 and vitamin B_{12}, folate intakes of older adults fall short of recommendations (Tucker, 1995). Folate absorption, too, may be compromised by atrophic gastritis. Many older adults take medications that influence folate absorption, use, and excretion. Antacids, diuretics, and anti-inflammatory drugs may alter folate metabolism. All adults need 400 micrograms of folate daily (Whitney & Rolfes, 1999).

Minerals

Iron. Iron-deficiency anemia is not a problem for most elderly populations (Fleming, et al., 1998); however it still occurs in some, especially in people with low food energy intakes. Aside from diet, chronic blood loss from disease conditions and medicines, and poor iron absorption due to reduced stomach acid secretion and antacid use may bring on iron defeciencies. Another concern for elderly people is accumulation of excessive iron stores that could disturb glucose metabolism and increase heart disease and cancer risk (Garry, Hunt, & Baumgartner, 2000). Iron status screening is recommended. Older adults require approximateley 10 milligrams of iron daily (Whitney and Rolfes, 1999).

Zinc. Zinc intake is commonly low in older people, with many receiving less than half of the recommended amount (Wood, Suter, & Russell, 1995). In addition, older adults may absorb zinc less effficiently than younger people do. A number of different factors, including medications that older adults commonly use (diuretics, antacids, and laxatives), can impair zinc absorption or enhance its excretion and lead to deficiency. Older adults who do not make special efforts to eat zinc-rich foods such as meats, fish, and poultry will have difficulty meeting their zinc requirements of 12 milligrams per day. Some symptoms of zinc deficiency resemble symptoms associated with aging—for example, decline in taste acuity and dermatitis.

Calcium. Osteoporosis is one of the most prevalent diseases of aging, affecting more than 25 million people in the United States, most of them women (Kulak & Bilezikian, 1998). In addition to genetics and hormones, many outside factors influence the progression of osteoporosis. Nutrition and physical activity can maximize bone density, whereas in life (Slemenda, 1994). Low body weight is a risk factor for osteoporotic fractures; therefore, achievement and maintenance of healthy body weight is vital (Turner, Fu, Taylor, & Wang, 1998).

A National Institutes of Health panel has concluded that women over 50 who are not on estrogen replacement therapy and all adults over 65 should receive 1,500 milligrams of calcium daily (Porter, 1994). The DRI Committee recommends 1,200 milligrams of calcium a day for older adults. Some older adults avoid dairy products. These people need to eat other calcium-rich foods. For those who do not consume milk, dairy products can be concealed in foods. Powdered nonfat milk, which is an excellent and inexpensive source of calcium can be added when preparing casseroles, meatloaf, and other mixed dishes; five heaping tablespoons offer the equivalent of a cup of milk.

Those who are allergic to milk or who are lactose intolerant need to find nonmilk sources of calcium to help meet their calcium needs. Oysters and small canned fish prepared with their bones, such as sardines, are also rich sources of calcium. Some foods offer large amounts of calcium because they are fortified.

People who do not consume milk products or other calcium-rich foods in amounts that provide even half the recommended calcium may benefit from calcium supplements (Dawson-Hughes, 1990). During the menopausal years, calcium supplements of I gram daily may slow the inevitable bone loss. Supplements are commonly used as a part of therapy for osteoporosis, along with gentle exercise for women. Calcium supplements should include vitamin D to enhance calcium absorption (Nordin, et al., 1998).

Food Choices During Late Adulthood

Older people are an incredibly diverse group, and for the most part they are independent, socially sophisticated, mentally lucid, fully participating members of society who report themselves to be happy and healthy. In fact, chronic disabilities among the elderly have declined dramatically over the past decade (Manton, Corder, & Stallard, 1997).

Gerrior (1999) reported that, overall, nutrient intake of older Americans improved between 1977 and 1996. However, inadequacies still exist. The higher prevalences of lower than recommended nutrient intakes were found for women than for men. Zinc intake was lower than recommended intake levels for older people. Thirty percent of older people did not obtain enough calcium, vitamin E, vitamin B_6, phosphorus, and magnesium (Cid-Tuzafa, Caulfield, Barron & West, 1999).

Dietary Guidelines

The Food Guide Pyramid provides general guidelines for healthy eating for the adult population. A modified Food Guide Pyramid was recently designed to meet the energy and nutrient needs for people over age 70 years (Russell, Rasmussen, & Lichtenstein, 1999). This pyramid is consistent with the changes in nutrient and energy needs of older adults. Figure 2 compares the modified pyramid with the original pyramid.

The modified Pyramid has a narrower base that indicates decreased energy needs. It emphasizes nutrient-dense foods, fiber, and water. The base of the Pyramid includes at least 8 glasses of water per day. Six or more servings of nutrient-

*Figure 2: Modified Food Guide Pyramid for Older Adults Compared with Original Food Guide Pyramid **

ITEM	MODIFIED FOOD GUIDE PYRAMID	ORIGINAL FOOD GUIDE PYRAMID
Supplements	Calcium, Vitamin D, and B_{12}	None
Fats, Oils, and Seets	Use Sparingly	Use Sparingly
Milk, Yogurt, and Cheese group	3 servings	2 – 3 servings
Meat, Poultry, Fish, Dry Beans, Eggs, and Nut group	≥2 servings	2 – 3 servings
Vegetable group	≥3 servings	3 – 5 servings
Fruit group	≥2 servings	2 – 4 servings
Bread, Cereal, Rice, and Pasta group	≥6 servings	6 – 11 servings
Water	≥8 servings	None

*Adapted from Russell, R.M., Rasmussen, H. & Lichtenstein, A.H. (1999). Modified food guide pyramid for people over Seventy years of age. *Journal of Nutrition, 129,* 751-753.

dense whole grains are recommended along with 3 or more servings of vegetables and 2 or more servings of fruit. Three servings of low-fat dairy products and 2 or more servings of meat products are required. The older person's diet should be low in high-fat foods; however, a higher fat intake may be needed for underweight older people. The modified Pyramid also contains a recommendation for supplements for specific nutrients (calcium, vitamin D, and vitamin B_{12}).

Additional factors should be considered when planning meals. (Figure 3 lists more nutrition strategies.) Familiarity, taste, and health beliefs are most influential on older people's food choices. Eating foods that are familiar, especially those that recall family meals and pleasant times, can be comforting.

Nutrient Supplements For Older Adults

Many older adults use nutrient supplements. About half of all women over 65 years of age and about one-fifth of older men take some type of nutrient supplement. Certain diseases or health problems may necessitate taking supplements.

When recommended by a health professional, vitamin D and calcium supplements for osteoporosis or iron for iron-deficiency anemia may be beneficial. Older adults with food energy intakes less than about 1,500 kcalories per day should take the once-daily type of vitamin-mineral supplement.

People should select vitamin/mineral supplements that contain RDA levels for micronutrients (Lesourd, 1999). Supple-

Figure 3: Strategies for Enhancing Quality of Life of Later Years Through Nutrition

- Select foods according to the Modified Food Guide Pyramid for 70 years and older.
- Choose nutrient-dense foods.
- Maintain appropriate body weight.
- Manage life stressors.
- Consume alcohol in moderation, if at all.
- Use drugs only as prescribed, be aware of nutrient-drug interactions.
- If confusion occurs, seek a diagnosis.
- Obtain appropriate nutrition screenings.
- Be physically active, engage in activities you enjoy.
- Be socially active—nurture friendships.
- Stay involved, pursue a hobby.
- Cultivate spiritual health.
- Drink 6-8 glasses of water per day
- If you smoke, quit.
- For women, obtain a bone mineral density exam. For women, consult a physician about hormone replacement therapy

ments should include antioxidant nutrients, zinc, and selenium to prevent accelerated aging (Richard & Roussel, 1999). Older people should also be aware that certain drugs can impair nutrient absorption (Schumann, 1999). People can minimize the negative effects of drug-vitamin interactions by adequate supplementation and adaptation of drug dosing.

People with small allowances would do well to become more active so they can afford to eat more food. Food is the best source of nutrients for all people. Excess nutrient intakes, especially with over-supplementation, are known to have adverse effects.

In summary, nutrition plays an important role in achieving and maintaining optimal health status during the aging process. Health educators can help people achieve positive nutrition status that is essential for independence and positive life quality for older people. Health educators can also assist people in learning to eat well, exercise regularly, and adopt other positive lifestyle changes.

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Medication Issues in Aging: Challenges in the 21st Century

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Optimal practices in the use of prescribed, over-the-counter, and complementary medications, as well as the enjoyment of an occasional drink, may significantly enhance the quality of life for older persons. However, optimal medication use for the elderly is a tremendous challenge because numerous health and psychosocial characteristics put them at great risk and complicate drug therapy. Perhaps one of the greatest challenges for health educators is to educate health professionals, geriatric patients, and their families about safer medication management. Systematic efforts to reduce medication errors among the elderly can result in significant reductions in preventable morbidity, disability, or mortality. This paper will highlight major geriatric drug therapy issues, suggest interventions to reduce medication errors in the elderly population, and conclude with critical issues for the 21st century.

The Institute of Medicine (Kohn, Corrigan, & Donaldson, 1999) estimates that medical errors account for between 44,000 to 98,000 American deaths each year. About one-half of these deaths are preventable and represent the 8th leading cause of death among Americans. Adverse drug errors account for approximately 3 to 11% of hospital admissions (Beard, 1992) and visits to emergency departments (Schneitman-McIntire, Farnen, Gordon, Chan, & Toy, 1996), while an estimate of 18 to 30% drug errors occur during hospitalization (Swonger & Burbank, 1995). In a meta-analysis of seven hospitals, Sullivan, Kreling, and Hazlet (1990) found that 5.5% of hospital admissions were due to medication errors in non-compliance that translates into 1.94 million admissions and $8.5 billion in hospital expenditures for 1986. In 51 randomly chosen non-psychiatric hospitals in New York in 1984 (Kohn, et al., 1999), adverse events accounted for 3.7% of admissions. Negligence was markedly high among elderly patients and drug complications (19%) were the most common adverse condition, followed by wound infections (14%), and technical difficulties (13%). Medication errors result in costly and serious health outcomes for the elderly and the Institute of Medicine (IOM) suggests that many medication errors are preventable (Kohn et al., 1999).

Risk Factors for Medication Errors

A variety of internal and external factors place older persons at high risk for poor medication safety and management (Ryan, 1999).

Internal factors. The elderly have more chronic health conditions and take twice the medications to treat these conditions than do younger people. An average of 10.7 drugs is prescribed to non-institutionalized elderly each year (Weaver, Looney, Yee & Williams, 1999; Yee & Williams, in press) that places them at high risk for adverse drug reactions or dangerous drug interactions. Interactions can occur between two drugs by changes in drug metabolism, enhancement of drug metabolism, competition for protein binding sites, or enhanced excretion of drugs (Yee & Williams, in press).

Pharmacokinetic changes in how the aging body handles drugs put the elderly at high risk for adverse outcomes. For instance, poor nutrition may increase drug absorption or excessive laxative/antacid use may retard drug absorption. Changes in the lean body mass and the fat percentage of total body mass influence drug distribution in the elderly. There is a narrow window of drug safety and even small miscalculations may bring drug levels to toxic concentrations in the elderly. The greatest amount of drug metabolism occurs in the liver. Aging produces decreased liver blood flow and a decline in the ability of the liver to recover from disease or injury (e.g., alcohol abuse, hepatitis, nutritional deficiencies, congestive heart failure), thereby reducing the ability of the liver to metabolize drugs. The kidney is a major organ that removes drugs from the body, but renal function declines with increasing age and certain health conditions (e.g., hypertension). This results in a decreased excretion of drugs and their metabolites with higher potential for toxic accumulation. Compensatory reflexes like homeostatic mechanisms become blunted with age. Therefore, drugs that evoke compensatory changes will appear overly effective in the elderly and putting them at higher risk for toxic conditions.

Inherited traits that influence the absorption, metabolism, distribution, and excretion of a drug may become more devastating in old age because the elderly have less reserve capacity to bounce back from health problems or drug-induced complications. Woosley (1998) suggests that the beneficial effects of a drug may be found in men but not in women, may be equivalent, or the reverse. For instance, the CYP family of enzymes, responsible for metabolism of most drugs, has consistently high activity in females and result in lower

plasma concentrations of many drugs among females. This may lead to gender differences in efficacy and potential side effects of medications. The majority of studies have examined racial/ethnic differences in cardiovascular, psychotropic, and central nervous system drugs (Lin, Poland & Nagasaki, 1993). Two major polymorphisms, for oxidation drug metabolism resulting in altered plasma drug concentrations, show marked interethnic variation—CYP2D6 and CYP2C19 (Wood, 1998; Lin, Poland, Wan, Smith & Lessar, 1996). Levy's (1998) literature review showed that pharmacokinetic factors are largely responsible for interindividual differences in the effect produced by a particular dose of a drug. Science must improve our predictions of pharmacokinetic variations across human populations beyond merely accounting for demographic characteristics as age, gender, race, bodyweight, or smoking habits.

Drug-food-herb interactions have only begun to be examined (Barrett, Kiefer, & Rabago, 1999; Beers, 1997; Graedon & Graedon, 1999; Miller, 1998; Wolfe, Sasich & Hope, 1999). Food and nutritional habits influence both health status and efficacy of drug regimens, and vice versa. The elderly use a higher proportion of over-the-counter medicines than younger people, or about one third of their medication expenditures (Weaver, et al., 1999; Yee & Williams, in press). A dangerous situation for the elderly consumer is that nearly 80% of daily OTC drug users take them in combination with alcohol, prescribed drugs or both (Kofoed, 1984). Alternative and complementary medicines or herbal preparations have the reputation that just because they are natural, they are harmless. Nothing could be further than the truth. These alternative and complementary medicines or herbs can be helpful or be quite harmful. Such medicines can interfere with the efficacy of prescriptions, have additive effects, and/or inhibit the effects of other medications. All drugs, including complementary medicines, should be reported to physicians on a regular basis especially each time a new drug is prescribed, changed, or as soon as unusual symptoms appear.

External factors. Several external factors increase the medication errors among the elderly. First, there is still a lack of core geriatric training in physician education (Geriatric White Paper, 1995; Reuben, et al., 1993). The U.S. Senate Committee on Aging (2000b) estimates that between 34,000 to 53,000 geriatricians will be needed in the U.S. by 2010. There are currently only 8,966 geriatricians in the U.S. and the numbers of geriatricians are declining because of retirement attrition. Medical education and geriatric training has not kept up with the looming demographic demand that will come with the aging of the baby boomers. Only a small number of medical education programs in the U.S. have mainstreamed geriatrics in their curriculum. The large majority of newly trained physicians get their geriatrics education on the job. Clearly, there is concern that physicians and possibly other health professions will not be prepared to provide high quality care for this population.

A major medication issue is the absence of a comprehensive body of knowledge on drug usage in the elderly population. Some physicians recommend doses that are 30-50% of those for younger adults. A preferable method is to calculate the dose carefully on an individual basis and, when possible, to monitor drug concentrations in the blood. When monitoring is not possible, a useful rule of thumb when prescribing for a patient over 70 years of age is to use one third the amount used for a subject of the same weight who is half the elderly patient's age (Kane & Garrard, 1994). Overmedicating is often cited as an example of lack of geriatric training. Undermedicating for common, but under diagnosed conditions (e.g., depression, diabetes mellitus, hypertension, & osteoporosis) or undermedication via too low doses in the elderly may also be problematic (Lipton, Bero, Bird, & McPhee, 1992).

Another medication issue that has major implications for the elderly is societal, governmental, or regulatory in nature. The Food and Drug Administration amended its regulations pertaining to new drug applications so that drug companies are now required to present effectiveness and safety data for important demographic subgroups, specifically gender, age, and racial subgroups (U.S. Committee on Aging, 2000a). Drug investigation applications are required to tabulate in their annual reports the numbers of subjects enrolled to date in clinical studies for drug and biological products according to age, gender, and race. Improved prescription and over-the-counter drug labeling has been suggested by the FDA (e.g., bulleted format, minimum type size and style, simplified language, and uniform, standardized headings).

A critical societal concern is the impact of advertising upon consumer demands. Bell, Dravitz and Wilkes (1999) examined consumer awareness and understanding, attitudes towards and susceptibility to direct-to-consumer drug advertising. Consumers felt that when the FDA gave its approval, these drugs were "completely safe" and "extremely effective." They assumed that there were far more safeguards in place than were actually present.

Another societal issue is Medicare coverage for outpatient prescriptions. The cost of prescription medications in the U.S. far exceeds the cost of research and development and inflation. Significantly lower drug costs for animal use by veterinarians in the U.S. and our neighbors in Canada or Mexico revealed that U.S. elderly people appeared to be shouldering an unfair burden of drug profits. For instance, drug price markups for drugs commonly used by Medicare users range from 1446% to 93% (Minority Staff Report, Committee on Government Reform, U.S. House of Representatives, 1998). There is strong support to pass some prescription cost drug relief by President Clinton; however, there might not be a critical mass of votes in the current Congress.

Al Gore and George W. Bush, the 2000 Presidential candidates, both have Medicare prescription drug proposals in their campaigns. According to R.G. Ratcliffe (Houston Chronicle, Wednesday, Sept. 6, 2000), Gore proposes to in

corporate a drug plan into Medicare that will provide drugs free to seniors earning up to 135% of poverty (approximately $11,300/single person). Also, the government would pay part of premiums for seniors earning 135-150% of poverty ($11,300-$12,450) and catastrophic coverage for any senior paying more than $4,000 a year for drugs. Gore's plan would pay a maximum of $1,000 per year that would rise to $2,500 over 10 years. Elders would pay a premium of about $25 a month in the first year rising over 10 years to more than $40 a month with no deductibles. In contrast, Bush would give elders a choice of plans from no drug coverage to expensive options including drug coverage, free drug coverage for seniors at 135% of poverty, where the government would pay part of premiums for seniors earning 135-175% of poverty ($11,300-$14,600), during the first four years catastrophic drug cap of $6,000, and, thereafter, the catastrophic cap for all health expenses (including drugs) would be $6,000 under Medicare for all seniors. Under Bush's plan, the government would guarantee access to prescription drug benefits and may pay 25% of the premium. Because features of the Medicare plans varied, there are no guarantees on how much drugs would cost, nor what proportion of drug purchases would be covered under Bush's plan.

Medication Management

Proper management of drug therapies for elders presents many challenges to health professionals from physicians and pharmacists to health educators. Equally important is the careful attention of elders and informal caregivers to drug management. As the elderly population continues its dramatic growth with the longevity revolution and becomes increasingly diverse, there will be an imperative for moving away from the concept of a "standard regimen for a standard patient" in favor of a client-centered model that is tailored to patients' personality, lifestyle, and priorities (Chewning & Sleath, 1996). Thus, selection and management of appropriate drug therapies will require individualized regimens and monitoring by the health care team managing the older person's care. Health educators can be a critical part of this team.

Medication management entails a complex process that includes a broad range of decision-making behaviors at a number of levels (i.e., physicians and the health care team, elderly patients and their families or caretakers). Major decision-making behaviors identified in the literature include: a) define goal of drug therapy; b) weigh drug's risks and benefits; c) assess elder's physical and mental status; d) consider non-drug alternatives; e) contact other physicians involved in elder's care; f) elder's drug-taking behavior; g) drug prescribing [modality, schedule, dosage]; h) drug monitoring for adherance, side effects and efficacy; i) drug use education and counseling; and j) other substance use monitoring (Chewning & Sleath, 1996; French, 1996). These behaviors represent those of the physician, elder, pharmacist, informal caregiver, health educator, nurse, and other health providers. Most important in this process is that elders are able to: read and comprehend the drug regimen and the therapeutic goal; recognize side effects; administer drugs; communicate the adverse effects; and remember to take medications as scheduled (Weaver, et al., 1999). Health providers need to have access to accurate information about geriatric pharmacology and be familiar with the aging process, the diseases common to late life, and their variability across different gender, race/ethnic, and age groups. Finally, they need to take the necessary time to counsel older patients about medications and their benefits and potential side effects (Stewart & Cooper, 1994).

Geriatric drug therapy management requires vigilance as this group often presents with multiple chronic diseases and long-term drug usage that complicate the entire decision-making process. The therapeutic reality is that older persons generally take three or more prescriptions in addition to OTC drugs and folk medicines. Optimally, the goal is to prescribe only medications for which there is a diagnosed condition at lowest possible dose, and that are compatible with other medications taken by the patient. Bosker (1999) suggests that effective drug management strategies should not only aim to reduce dosage, but also eliminate unnecessary medications thereby increasing simplification and consolidation. Essentially, he recommends using as few medications as possible to treat as many of the patient's conditions as possible.

Adherence Issues

Estimates of nonadherence to drug regimens by elders have ranged from 2 to 95 percent (Simonson, 1984). Although findings have been mixed, it is agreed that the elderly are potentially at greater risk for nonadherence than any other segment of the population. The consequences of nonadherence in the elderly may be more severe and less easily resolved than in younger persons (Everitt & Avorn, 1986). It engenders many physical, social, and economic consequences. Economically, it has been reported that 15 percent of geriatric hospital admissions result from noncompliance (Bergman & Wilholm, 1981). Other costs include impaired health, less than ideal quality of life, and premature death (Lipton & Lee, 1988).

Medication adherence is a complex phenomenon that involves a continuum of behaviors. Finchman and Wertheimer (1985) proposed four behavior points on this adherence continuum: a) *initial* nonadherence refers to patients who do not have their new prescriptions filled or do not pick up new prescriptions; b) *varying* nonadherence refers to patients who intermittently consume prescribed medications as instructed; c) *appropriate* compliance refers to patients who consistently consume medications exactly as prescribed; and d) *hypercompliance* refers to patients who consume more than the prescribed dosage. The Center for the Advancement of Health (1999) outlined three basic types of nonadherence:

a) when patients agree to the drug therapy, but barriers to their ability to adhere are present; b) when patients believe they are adhering to drug therapy, but lack information or comprehension about the regimen; and c) when patients deliberately decide not to adhere.

Studies have shown that 20% of the elderly do not get their prescriptions filled *initially*. Kendrick and Bayne (1982) found an average compliance rate of 57% in their study on *varying* compliance. It has been suggested that some elderly patients deliberately underused medications to avoid overmedicating themselves (Ascione, 1994). There are also adherence concerns linked to: a) patients' beliefs about their illness; b) severity and nature of the illness; c) number and complexity of medications; d) inadequate information or instructions; e) cultural background; f) social isolation; g) cognitive and memory deficits; and h) cost of drugs (Morrow, Leier, & Sheikh, 1988; Park, et al., 1999; Roccella, 1989). Additionally, adherance is affected by elderly patients' long and complicated medical histories involving several physicians. These patients may not remember or volunteer all the relevant facts, which makes the physician's job much more difficult. Communication must be improved between the health care providers of each patient. More time must be devoted to collecting the critical information on elderly patients to improve their quality of health care.

The available literature on the relationship between noncompliance and drug costs indicates that cost is a major issue (Sullivan, Gardner & Strandberg, 1994; Waldo, 1987). Because many elderly live on fixed incomes, and drug costs are high, some patients may discontinue medication "when they feel better," instead of waiting for a physician's order. In some cases, such behavior can be disastrous. For example, hypertension is normally without overt symptoms, but its danger is the possible sequelae of stroke, heart attack, and kidney failure. Elders are also prone to drug hoarding as a cost-saving measure. Saving the last few unused tablets from an antibiotic prescription is not uncommon in the elderly. These "saved pills" may be used later when elderly people have what they consider to be the "same problem," or may be "shared" with a friend who has "the same thing." Problems associated with these practices include: the conditions may not be the same for each person, in which case the drug may have no beneficial effect; the drug may be outdated and ineffective, and toxic; and the drug may give the person a false sense of security, and prevent him or her from seeking proper attention.

Prevention of Nonadherence

A literature review on interventions to reduce geriatric nonadherance by Green and associates (1986) revealed that interpersonal communication methods, together with written or audiovisual materials and self-help memory aids, are effective in increasing knowledge and reducing nonadherence. Other strategies include: a) simplify the drug regimen; b) provide proper patient education; c) use special medication packaging and labeling techniques; d) use computerized calling systems via pagers or telephones to prompt patients; and e) use compliance aids such as memory aids (Simonson, 1994). The key to improving medication adherence is that the provider must consider the patient's own goals and the therapies the patient is willing to embrace (Center for the Advancement of Health, 1999). Optimally, the provider and the patient will act as partners in managing the drug therapy.

Haynes and associates (1999) identified eight factors that tend to be present in non-compliant patients. These include: a) illness fails to respond to therapy; b) patient is socially isolated; c) patient is forgetful or confused; d) sensory deficits are present; e) drug therapy is complex; f) patient fails to keep appointments; g) drug therapy is expensive; and h) patient fails to obtain timely prescription refills. Although much of the responsibility for adherence lies with the older person or his or her family, physicians, pharmacists, and other health providers should not minimize their own importance as a source of influence. Rehabilitation therapists, in many instances, are likely to spend more time with elderly people due to chronic health events and, thus, have the opportunity to observe the physical and psychological effects of medications on the elderly and can then notify the appropriate health care provider.

Alcohol Use and Implications for Medications

Excessive or prolonged consumption of alcohol by older people can lead to serious health problems. Even consumption that begins in late life has serious health implications. Alcohol produces greater blood concentration because, with increasing age, lean body mass and total water volume decreases and adipose tissue increases (Dufour & Fuller, 1995). Approximately one drink generates a blood-alcohol concentration that is 20% higher in a 60 year-old as compared to a young adult. Despite the well-publicized health benefits of light to moderate alcohol consumption, alcohol use and abuse in the elderly is a cause for concern particularly when combined with medication use. It is of great concern for future generations of elders because they have been exposed to less stigmatized notions about alcohol use than previous elderly cohorts.

Willenbring and Spring (1988) found that health professionals, especially physicians, fail to screen older patients for alcohol use because of their professional attitudes. Some reasons that explain this failure include: a) inadequate medical education about alcoholism; b) lack of training in addictions; c) ambivalent cultural perceptions about alcohol use, thus, leading to treatment alcoholism as a health problem until the patient is a late-stage alcoholic or the problem is revealed in a crisis situation such as a DUI arrest; d) denial may be more intense among the elderly due to the cohort's stigmatization of alcoholics; and e) other medical problems may mask alcohol dependence. They suggest that elders be screened for alcohol use problems routinely using the HEAT screening method (Rathbone-McCuan, 1988).

A positive response on any one of four items is a reason to obtain a fuller history: (1.) How do you use alcohol? (2.) Have you ever thought you used alcohol to excess? (3.) Has anyone else ever thought you used too much alcohol? and (4.) Have you ever had any trouble resulting from your alcohol use?

Research demonstrates favorable health outcomes for moderate alcohol consumption. Since this research was not based exclusively on older populations, the benefits for this age group are not certain. According to Swonger and Burbank (1995), there are drawbacks for the elderly. For example, alcohol is believed to promote sleep, but it actually suppresses REM sleep as well as Stages 3 and 4 of sleep. With increasing age, these latter stages that are restorative in nature are already reduced. As a chief complaint of the elderly, clearly insomnia is not relieved by alcohol consumption. Experts admit that alcohol use disorders or inappropriate use of OTC and prescription medications with alcohol pose dangers such as hospitalizations, major injuries such as hip fractures and even death may be the outcome among the older populations.

To help reduce the risk for alcohol misuse and the potential adverse effect on medication use, health providers must become familiar with the medication and alcohol histories of their clients. This information may contain critical factors about the patient's adherence to his or her drug regimen. Health educators and, particularly, nurses often have the role of ensuring that patients comprehend the medication regimen and have a unique role in making a final assessment of patients' knowledge about and use of the medications before they leave the hospital or clinic. Health providers who care for elderly clients on a long-term basis are in an ideal position to identify and monitor behavioral indicators of negative side effects drugs or alcohol, and to do so before hospitalization or permanent damage results.

Conclusion

In this article, we outlined major issues that contribute to the complexity of medication management among the elderly. These issues range from bodily changes with increasing age that affect drug disposition to medication errors by health providers to the use of alcohol in combination with medication use. Also discussed was the complexity of the medicating process because of elders' long-term medication use, chronic diseases, and diversity, the numerous people involved in the decision making, the high drug costs, and the constant introduction of new drugs that are not clinically tested in the elderly population. Throughout the paper suggestions were made for reducing older people's heightened risk for medication errors.

Several challenges for health providers and researchers will become more evident in the next fifty years. The fact that the older population is growing and becoming increasingly diverse creates challenges for effective drug treatment across racial, ethnic, and gender groups. Diverse study populations will be needed to clinically test the efficacy of drugs, as well as to understand health beliefs and behaviors. The direct marketing, access to pharmaceuticals via retail stores, and the Internet increase the potential for medication misuse as we are seeing with the increasing popularity of complementary and over-the-counter medicines. Of particular importance is the growing population of the very old (80+). Because we know very little about this group's medication use practices, more studies are needed to determine who, within this group, is at risk for drug misuse. In view of all these issues, a clear challenge for health educators and health providers is to educate a key resource for improving medication use - the elderly.

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