

AN ABSTRACT OF THE THESIS OF

Yao-Lin Weng for the degree of Master of Science in Nutrition and Food Management
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Residents: Factors that Predict Usage

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Carolyn A. Raab

The prevalence of herbal supplement use by the elderly and factors that influence regular versus occasional use were investigated in a group of independent residents of a continuing care retirement community in Salem, Oregon. A nine-page questionnaire was delivered to 402 residents of Capital Manor; 318 questionnaires were usable (84% response rate). The majority of respondents were female (68%) and Caucasian (88%) with an age range of 65 to 100 (average 82.2 years).

Twenty percent of all respondents (n=65) were herbal supplement users. Sixty-two percent of them were regular users and 39% were occasional users. The majority of users were female (68%), Caucasian (85%), and non-smokers (78%). Their age range was 65 to 91 years (mean of 79.6 years). Sixty-nine percent reported living with a spouse. They had more than a high school education (78%) and had annual household incomes above \$50,000 (49%).

“Books, newspapers, and magazines” (84%) were the information sources most frequently relied on for herbal supplement information, followed by “medical

doctor/nurse” (72%). Forty-four percent of user households spent more than \$10 per month on herbal supplements. Supermarkets (41%) and health food stores (41%) were the most popular places to purchase herbal supplements.

The majority of herbal supplement users strongly agreed/agreed that taking herbal supplements would “make you feel less stress” (88%), “protect you from getting a cold” (81%), and “improve your memory” (81%). Fifty-two percent of users strongly agreed/agreed that “herbal supplements may cause side effects” and 24% strongly agreed/agreed that “herbal supplement shouldn't be taken with other medications”.

Ginkgo biloba was the most frequently used of eight herbal supplements (71% of respondents) followed by echinacea (39%) and ginseng (29%). Males were significantly more likely to use saw palmetto (claimed to prevent enlargement of the prostate gland).

Eighty-three percent of herbal supplement users reported having some knowledge about possible benefits of ginkgo biloba (claimed to reduce memory loss). A belief that herbal supplements “improve your memory” was significantly associated with usage. Regular herbal supplement users were significantly more likely to agree that taking herbal supplements reduces severity of memory loss.

Four factors were significantly related to herbal supplement use: age group (with age group of 75 to 84 years old more likely to be users than age groups of 65 to 74 years and age group of 85 years and over); living status (with those living with spouses being more likely to be users than those living alone), health status changes in the past year (with users being more likely to report their health status as “improved” than non-users); and physical exercise participation (with users being more likely to exercise than non-users).

The fundamental hypothesis of this study was that the frequency of use of herbal supplements among older adults would be mediated by several factors including: perceived susceptibility to and severity of chronic diseases (i.e., heart disease and cancer); perceived benefits of and barriers to herbal supplement usage; information sources; vitamin/mineral supplement usage; and perceived preventive lifestyle factors. Of these, only vitamin/mineral supplement usage was significantly associated with herbal supplement usage. Ninety-seven percent of herbal supplement users also used vitamin/mineral supplements. In addition, perception of control over health (a measure of self-efficacy) was significantly associated with herbal supplement use. The more control perceived, the more likely respondents were to be herbal supplement users.

In general, the Health Belief Model did not predict frequency of herbal supplement usage (i.e., regular vs. occasional). Hence, further research is needed to focus on factors predicting herbal supplement use versus non-use. In addition, lack of awareness about risks and benefits of herbal supplement use suggests a need for education targeted at older adults.

Herbal Supplements and Retirement Facility Residents:
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by

Yao-Lin Weng

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Master of Science thesis of Yao-Lin Weng presented on June 14, 2000

APPROVED:

Major Professor, representing Nutrition and Food Management

Chair of Department of Nutrition and Food Management

Dean of Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Yao-Lin Weng, Author

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Herbal Supplements and Retirement Facility Residents: Factors that Predict Usage

INTRODUCTION

Today, complementary and alternative practices are being integrating into the medical mainstream (1). Research has indicated that more than 40% of Americans now use some sort of complementary or alternative therapy, spending about \$13 billion on these therapies each year (2). The most common form of complementary practice is dietary supplement treatment. Among dietary supplements, vitamin and mineral supplements have been widely studied and well documented for many years (2,3,4,5,6,7,8). However, the other forms of dietary supplements have not been well studied yet.

Other forms of dietary supplements, called “nonvitamin, nonmineral (NVNM) supplements” in the Third National Health and Nutrition Examination Survey (NHANES III) (9), currently receive extensive media attention on their effectiveness and treatment quality. According to the results from the NHANES III, herbal products were one of the six classifications of the NVNM. For people who answered taking NVNM, the majority of them (about 37%) reported using herbal products (9).

A recent telephone survey about alternative medical practices conducted by Eisenberg et al. reported 12% of respondents using herbal products (10). Moreover, another study conducted by the Gallup Organization (11) in 1996 found that about 20% of respondents were taking herbal supplements. Within the adult category, herbal supplement users were more likely to be female, 35 to 49 year old, college educated, and living in the West. Garlic and ginseng were the most widely used herbal products (11).

In spite of the popularity of herbal supplement use, there are only limited studies, which have examined the prevalence of usage and demographic information about users. Thus, the study of herbal supplement usage has become necessary due to an increasing population using herbal products. This study assessed both vitamin/mineral supplement and herbal supplement usage among the elderly, and determined what factors might influence herbal supplement usage.

Aging is accompanied by a variety of physiologic, psychological, economic, and social changes that compromise nutritional status. Nutritional status surveys of the elderly have shown a low-to-moderate prevalence of nutrient deficiencies (12,13). As a vulnerable high-risk group, older people have become an important target group for study. Moreover, low incomes, social isolation, and physical limitations make this age group particularly likely to have inadequate diets. Thus, this is the age group that may be likely to use nutritional supplements in an attempt to prevent or cure chronic diseases and prolong life.

These facts account for the increased interest in recent years in the elderly due to the recognition that this segment of the U.S population is rapidly increasing. There have been several studies of free-living elderly (living in an apartment or a house with family or alone) besides the senior or continuing care center (7,14,15,16). Nevertheless, few studies have focused on the elderly living in a retirement community. According to Gregory et al., older people usually join a retirement community while they are still in good health and live independently. They are well educated and have less social isolation, compared to most elderly populations. Also, they are more likely to change their health-

related behavior (17). For these reasons, we decided to recruit the elderly as the subjects in this study.

Although herbal remedies are becoming more popular across the country and many older adults report using them (2,13,18,19,20), there is no clear evidence about what might influence their usage and which theoretical model could provide a framework to predict that motivation. Thus, the purpose of this study will focus on examining attitude and demographic factors related to herbal supplement use among retirement facility residents by using the Health Belief Model (HBM).

In the HBM, it is believed that for health-related behavior change to occur, people must feel threatened by their current situation, such as feeling sick or having potential illness (perceived susceptibility and severity). They believe that change of a specific kind will be beneficial by resulting in a valued outcome at an acceptable cost, but they must also feel themselves competent (self-efficacy) to overcome perceived barriers to taking action (21). In this study, we hoped that by use of the HBM would help us to measure the factors that predict the herbal supplement use among the elderly.

Null Hypotheses

H₀1: Perceptions of degree of susceptibility to chronic disease will not be associated with the frequency of herbal supplement usage.

H₀2: Perceptions of degree of severity of chronic disease will not be associated with the frequency of herbal supplement usage.

H₀3: Perceptions of health risks of herbal supplement use will not be associated with the frequency of herbal supplement usage.

H₀4: Practice of preventive lifestyle factors (such as low-fat diet, low sodium diet, low cholesterol diet, and high fiber diet; physical exercise; no smoking,) will not be associated with the frequency of herbal supplement usage.

H₀5: Vitamin/mineral supplement usage will not be associated with herbal supplement usage.

H₀6: Attitudes toward efficacy of herbal supplements will not be associated with the frequency of herbal supplement usage.

H₀7: Herbal supplement information sources (e.g. physician, dietitian, friends/family, spouse/partner, mass media) will not be associated with the frequency of herbal supplement usage.

Operational Terms

1. Supplement usage: users versus non-users
2. The frequency of supplement usage: regular users versus occasional users

LITERATURE REVIEW

Complementary and Alternative Medicine

Prevalence of Complementary and Alternative Medicine

The “complementary” and “alternative” medicine treatments are widely used by the public and accepted by medical practitioners as suitable therapy for a variety of health conditions today (2). According to Eisenberg (19), the prevalence of use of at least 1 of 16 specific alternative therapies among the U.S. adult population during the previous 12 months has increased significantly from 34% (60 million people) in 1990 to 42% (83 million people) in 1997. It is also predicted that, by the year 2010, two-thirds of Americans will use some form of what we now think of as complementary and alternative medicine (10). Thus, it appears that complementary and alternative medicine has now become the newest medical mainstream in the United States.

Definition of Complementary and Alternative Medicine

Despite increasing use of alternative and complementary medicine, no clear definition of alternative medicine has been established. Alternative medicine has been defined as what is not taught at United States medical schools, not available at United States hospitals, or not covered by insurance (2,18,20). However, these definitions have drawbacks because their reference criteria are changing rapidly and are not consistent across the country any more. For example, 75% of U.S. medical schools have begun to

teach about alternative medicine practices, hospitals are creating complementary and integrated medicine programs, and health suppliers are offering expanded benefits packages that include the services of alternative practitioners (1).

Complementary and alternative therapy includes many different treatment techniques. These are based on systems practiced thousands of years ago and can in fact be considered to be the original forms of medicine (14). Complementary and alternative therapy include, but are not limited to the following disciplines: folk medicine, herbal therapy, vitamin and mineral supplements, nutrition, intravenous infusions, acupuncture, behavioral and relaxation techniques, and music therapy (2,18).

Reasons for Using Complementary and Alternative Medicine

Studies have shown that most people choose to use complementary and alternative therapy in a wide variety of situations, from health promotion and disease prevention, to the treatment of serious diseases. For instance, people use alternative therapy most frequently for chronic conditions, including back problems, anxiety, depression, memory loss, allergies, cold protection, and headaches (18). They want to maintain or regain control over their health by using alternative therapy. Often, people with life-threatening illness develop a sense of helplessness and feel that alternative therapy might afford them a greater sense of personal involvement in decision making (2,18,22,23). Among these many different kinds of complementary and alternative therapies, some, such as acupuncture for nausea, and behavioral and relaxation techniques for chronic pain, have been documented as safe and efficient (18). Others, such as high-dose vitamins and minerals, and some herbal supplements, have

documented side effects although these are popular among alternative therapy (8,24).

Thus, we should pay special attention to dietary supplement therapies.

Dietary Supplement Therapy

Definition of Dietary Supplements

Use of dietary supplements is one big practice of complementary medicine. The term “dietary supplements” was more formally defined in 1994 with the passage by the United States Congress of the Dietary Supplements Health Education Act (DSHEA) as “a product, other than tobacco, intended to supplement the diet that contains at least one or more of the following ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, or a dietary substance for use to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, or extract or combination of any of the previously mentioned ingredients” (8,25).

These dietary supplements are provided in many forms, including tablets, capsules, powders, gellabs, extracts, liquids (8). They are available widely through many commercial sources including health food stores, grocery stores, drug stores, pharmacies, TV programs, the Internet, direct sales, and mail-order catalog. For those who declared using supplements, most purchase them from the health food store (6).

Classification of Dietary Supplements

Vitamin and Mineral Dietary Supplements

The main kind of dietary supplement used are nutritional supplements, such as vitamin and mineral supplements. According to the dietary supplement industry sales data

(26) from FDA, consumers spent an estimated \$4.9 billion (48% of the supplement market) on vitamin supplements and \$600 million (18% of the supplement market) on mineral supplements in 1996. For nearly half the sales in 1996, vitamin and mineral supplements still dominated the U.S. dietary supplement market.

Vitamin and mineral supplement usage has been widely studied in several national nutrition surveys and academic institutions for many years. For instance, in the Seven Western States Study (also known as the W-153 survey), about 54% of the respondents said that they had taken some type of vitamin and mineral supplements within a week of completing the questionnaire (3). Also, from the results of the 1992 National Health Interview Survey (NHIS), about half of the respondents reported taking a vitamin or mineral supplement in the year preceding the survey; and nearly a quarter reported taking at least one supplement daily (27).

Those studies have indicated that from 40% to 66% of adult Americans regularly use vitamin and mineral supplements. These supplement users share some common characteristics (3,10,11,17,26,27,28,29). For instance, the majority of them were white, female, and middle-aged adults. The more health conscious respondents are, the more they tend to be supplement users. The most popular type of dietary supplement was a multivitamin or multimineral tablet that was available over-the-counter.

Nonvitamin, Nonmineral Dietary Supplements

In the NHANES III (1988-1994) survey, people were asked about their supplement usage (9). Although specifically only asked about vitamin and mineral supplement use, respondents often mentioned other types of dietary supplements at the

same time. For the analysis, these other types of dietary supplements were called “nonvitamin, nonmineral dietary supplements (NVNM)”. They were classified into 6 categories; including herbal supplements. Among the 1,093 subjects who reported using “other” supplements, 403 subjects (37%, the highest percentage among 6 categories) said they were using herbal products. Garlic was reported far more frequently than any other product (9).

Herbal/Botanical Supplements

Other kinds of dietary supplements, such as herbal or botanical supplements, have become more popular in the last decade; however, they have not yet been widely studied (18). Even though herbal supplement retail is a huge marketing business, there are only a few studies concentrated on herbal supplement usage. According to recent studies, there is some evidence that the same people who use nutritional supplements might also use herbal supplements (13,30). Therefore, the study of herbal supplement usage is necessary.

Definition of Herbal Supplements

There are several definitions of herbal/botanical supplements. According to the definition of the 1994 DSHEA, an herb is a plant with leaves, seeds, flowers, or roots used for enhancing health status rather than as seasoning while botanical refers to these parts in addition to roots, seeds, and fruits. Thus, the herbal products are those made from the leaves and stems of plants, and botanical products are those made from any part of the plant (25). Also, from Varro Tyler’s *Herbs of Choice*, “Here it is most accurately defined

as crude drugs of vegetable origin utilized for the treatment of disease states, often of a chronic nature, or to attain or maintain a condition of improved health (31).”

Herbals and botanicals are available in many forms including teas, powders, tinctures, extracts, syrups, dried or solid extracts, oil, tablets, loose leaves or roots, salves, and liquids (25). Herbal supplements are generally used for self-care to treat less life-threatening conditions such as nausea, colds, stress, sleeplessness, memory loss, headache, and dry skin. They are also taken in hope of preventing illness from occurring. Increasingly, they are being taken with the goal of preventing heart attack, strengthening the immune system, promoting feelings of well-being, and preventing aging (32).

Marketing Sale of Herbal Supplements

Although there was information about herbal supplement usage in NHANES III survey (33), data on the prevalence and use of herbal products is limited in academic research. One excellent source is the sales data. In 1993, Americans spent an estimated \$1 billion on herbal products (34). However, herbs/botanical sales increased nearly 70% between 1994 and 1997 (35). National sales of botanical supplements are currently in excess of \$1.5 billion per year (36). According to industry data, the market for dietary supplements in the US in 1997 was valued at \$11.8 billion. Vitamin and minerals made up the major part of market (51% of the sales), but sales of herbal products amounted to 33% of the market and represented the fastest growing segment (37,38). Moreover, recent sales data from the FDA show that herbal and botanical products totaled \$3 billion in sales for a 28% share of the dietary supplement market and the growth rate of 20% (from 1995 to 1996) - the highest of all dietary supplement products (39).

Popular Herbal Supplement Products

Although a number of herbal products are sold, only a dozen or so account for most of the sales. According to the FDA report on herbal and botanical supplement sales in 1996, ginkgo biloba, echinacea, garlic, and saw palmetto were the best-selling herbal products. St. John's Wort, a newcomer to the herbal industry in 1997, was becoming a best-selling herbal product as well (38,39).

Why are these herbal supplements in demand (40)? Herbal supplements are said to have beneficial uses. For instance, *Ginkgo Biloba*, the world's oldest living species of trees, has been used for many circulatory problems, particularly those associated with aging, such as poor blood circulation, mental confusion, and memory loss (38,41,42,43). *Echinacea*, a pink wildflower native to North American, was used by American Indians for a variety of conditions. It may help support the immune system and fight off colds and flu (40,42,43). *Ginseng*, the root of a plant native to China and Korea, has been used as an energy-enhancer for more than 2,000 years. It contains compounds called ginsenosides, which have been shown to boost energy and endurance. Thus, it was suggested by studies that it would beat fatigue by improving oxygen delivery to the muscles and help distance runners preference better (38,42,43).

St. John's Wort, is currently the most popular herbal supplement. It is found in Europe and the United States and is especially abundant in northern California and southern Oregon. The flowering tops are used in the herbal compound. According to a 1996 report in the British Medical Journal (44), it is more than twice as likely as a placebo to reduce mild depression, and anxiety. It also is used externally for first-degree burns and muscle pain (41,42,43). *Chamomile*, a member of the daisy family, is native to

Europe and western Asia. It has been used for centuries as a medicinal plant and mostly has been used to help relaxation for quality sleep, aid digestive and bowel complaints, and ease vomiting (41,42,45). *Kava Kava*, is a member of the pepper family which has been part of the natural healing tradition in South Pacific for 3,000 years. It is used to treat anxiety, muscle pain, restlessness and stress (38,42). *Saw Palmetto*, native to North America, is commonly recommended for protecting against prostate trouble, which affects two out of three men over age 65. (38,41,42,45). *Feverfew* grows widely across Europe. The leaves are used to help relieve headaches, arthritis, indigestion, colds fever, and muscle tension (38,41,42).

Prevalence of Herbal Supplement Usage

A study of 1500 American adults conducted in November 1997 showed that 42% had used some form of alternative therapies in the past year. Seventeen percent of the adults who used some forms of alternative therapies used herbal therapy, which was the second most widely used form of alternative therapy (vitamin and mineral therapies was the first one) (46).

According to a 1999 National Gallup Survey in Canada (47), more than two-thirds of 1,003 adult Canadians interviewed by phone believe that natural herbal supplements can be just as effective as prescription drugs or over the counter products. More than half say they are very likely or somewhat likely to try an herbal supplement to treat a cold. Moreover, about 94% of Canadians think that herbal supplements are becoming more accepted today by consumers; and 62% believed that herbal supplements are becoming more accepted in the medical community as well (47).

Older Adults

Vitamin/mineral supplement and herbal supplement use range is higher in older Americans when compared to other age groups (3,48,49). Therefore, this study focused on this older population.

The Elderly Population

In the United States, age 65 is viewed as the mark of the older population and they are divided into 3 categories by the National Institutes on Aging: the young-old, the old-old, and the oldest-old. The young-old group comprised persons aged 65-74 years old; the old-old group comprised persons aged 75-84 years old; and the oldest-old group comprised persons aged 85 years and older (50). In 1997, the 65-74 age group (18.5 million) was eight times larger than in 1900, the 75-84 group (11.7 million) was 16 times larger and the 85 + group (3.9 million) was 31 times larger. Therefore the entire older population itself is getting older (51).

In 1997, persons 65 years or older numbered 34.1 million, and they represented 13% of the U.S. population, about one in every eight Americans (51,52). By 2030, as the baby boomers age, there will be about 70 million older people in the United States, more than twice the number in 1997 and they will represent 20% of the population. It is also estimated that by the time year 2030, 20 out of 100 persons will be 65 years of age and over, and 2 out of 100 will be 85 years of age and over (53). The number of older Americans increased by 2.8 million or 9% since 1990, compared to an increase of 7% for the population under age 65 (52).

According to the “Health and Aging Chart book” (53), there are more women than men at every age among the elderly population. This chart book also indicated that approximately one-third of all noninstitutionalized older persons lived alone in 1997. The proportion of all persons 85 years of age and over living alone rose from 39 percent in 1980 to 49 percent in 1997 (53).

Elderly Nutritional Problems

Although improvements in nutrition, quality of the environment, and in health care have led to an increase in life expectancy in such a way that today most of the population survives to old age, old age still presents a greater risk of suffering nutritional problems. Why? Older people are generally identified as being at particular risk of poor dietary intake and nutritional problems, not only because of impaired digestion, absorption or utilization of nutrients due to chronic diseases, but also because of various physical, socioeconomic, and behavioral factors that can influence the quality or quantity of food intake (54).

In addition, because of decreasing appetite and a decline in physical activity, the elderly are at increased risk of vitamin inadequacies and other nutritional problems. In general, food intake data from two national surveys, NHANES III and CSFII (12,13), suggested that the elderly surveyed consumed less food than required to meet energy and nutrient recommendations. They also demonstrated that a substantial percentage of the population age 51 and older had vitamin and mineral intakes below two-thirds the RDA (13). Therefore, if older people do not make a special effort to increase the nutrient density of their diets as their appetites decrease, then their vitamin and mineral intake will

also decrease. In order to achieve the goal of adequate nutrients intake, older people generally tend to spend more time and money on looking for supplement products than younger people do (7).

Health Status of Older Adults

The health of the older population varies greatly and the rates of illness increase sharply among the elderly, compared with younger people. Older adults consider themselves to be in worse health than do young or middle-aged adults according to the self-assessed health (53) The results show that from 1994 to 1996, 28% of persons 65 years of age and over reported their health status as fair or poor, compared to 17% of persons 45-64 years of age. The percent of older adults reported themselves to be in fair or poor health status increased with age, which means that the older they are, the worst health status they reported. One-fourth of persons age 65-74 years said they are in fair or poor health status when compared to over one-third of persons age 85 years and over. However, there was no health status difference among same age group of women and men (53).

Chronic Conditions Among Older Adults

According to "Health, United States, 1999 (53)," chronic conditions are prevalent among the older population. Chronic diseases are prolonged illnesses that are rarely cured completely. These diseases affect the quality of life of older persons and contribute to disability and the decline of independent living (55). Seventy-nine percent of free-living persons 70 years of age and over reported at least one of seven common chronic diseases

in 1997 (arthritis, hypertension, heart disease, diabetes, respiratory disease, stroke, and cancer) (53).

The majority (63% of women compared to 50% of men) of people age 70 and over reported arthritis, approximately one-third (40% of women, and 31% of men) reported hypertension, more than one fourth (24% of women, and 30% of men) reported having heart disease and about eleven percent (women and men have similar levels) reported diabetes. Nine percent of people 70 years of age and over had had a stroke, and 4 percent reported that they currently had some form of cancer. Levels of stroke and cancer were higher among men than women (53).

Dietary Supplement Usage Among Elderly

Elderly people experience higher rates of chronic illness, functional limitations, and nutritional problems than young adults. Thus, many elderly may be attempting to improve their health by using dietary supplements. Changes in nutrient needs due to age have been addressed by a revised Food Guide Pyramid for Adults over 70 (56). This revised Food Guide Pyramid suggested that a supplement flag should appear at the peak of the pyramid. According to R.M. Russell, although older people might be able to get enough calcium, vitamin B-12, and Vitamin D from their normal diets to achieve the recommended intake of these nutrients, they may not be able to absorb these nutrients due to low stomach acid, which is part of the aging process. As a result, many older adults many have to take supplements to fulfill these nutritional needs (56).

Studies of Vitamin and Mineral Supplement Usage Among Elderly

Early Studies

W-153 Study

Research studies have shown that 40% to 75% of the elderly take vitamin and/or mineral supplements daily (7,27,28,57,58). The results from the W-153 study (48) revealed that 60% of non-institutionalized subjects over 60 years reported using one or more supplement. Among these supplements, multiple vitamin (57%), vitamin C (51%) and Vitamin E (43%) were the most frequently used by both genders. Women have been reported to be more frequent supplement users than men. Reasons for use of vitamin and/or mineral supplements included supplementing inadequate food intake and ensuring high energy level. Sources of nutrition information most frequently were from newspapers and books. Moreover, these older subjects (over 60 years old) generally rated their health status as either fair or poor, which was similar to the results of the *Health, United States, 1999*.

Southern California Retirement Community Study

There have a number of dietary supplement studies of elderly populations; however, not many of them use retirement community residents as the subjects. Gregory E.G. et al. conducted a cohort study (17) of dietary intake and nutrient supplement use among 17,900 residents of a retirement community in Orange County, CA. They found that 68% of males and 75% of females took some type of supplement. Twelve percent of subjects took a multivitamin alone; 37% used individual supplements; and 24% used

both. The supplement used most was vitamin C, related to a desire to prevent colds. About one-fifth of subjects were taking supplements on the advice of their physician, either for treatment or for insurance (17).

In this study, the proportion of subjects consuming vitamin and/or mineral supplements, 72% for both men and women together was one of the highest reported in studies of the elderly. The authors explained that the high socioeconomic status and the high level of awareness and interest in health-related matters among this specific population might have resulted in such high usage. From the demographic data, this study showed several features of the population. For instance, the population of the retirement community was relatively affluent and well educated when compared to most elderly populations previously reported. In addition, social isolation was less common because there were numerous opportunities for recreational and social activities where the majority of the residents of the community participate. This was a very health-conscious community, with many of the residents attending fitness classes and lectures regarding to health (17).

Current Studies

Georgia Centenarian Study

A recent study, the Georgia Centenarian Study (7), focused on investigating the demographic characteristics of supplement use among 257 elderly people in their 60s, 80s, and 100s. The authors found that 41% of the respondents used a specific vitamin or mineral supplement. They were more likely to use supplements in their 60s and 80s. Women were about twice as likely as men to report consuming any vitamin/mineral

supplements. According to Salktonstall (59), this is because women are more likely to seek health care and advice, willing to try products that might enhance youth and beauty, and aware of nutrition-related problems. The Georgia Centenarian Study (7) also indicated that multivitamins/minerals, vitamin C, and Vitamin E were the most common vitamins used; calcium and potassium were the most common minerals used.

South Carolina Study

Another recent study (13) was conducted to examine the vitamin and mineral supplement use among non-institutionalized older Americans of age 60 years and older in South Carolina. This study determined the type, frequency, and dosage of supplement use; reasons for supplement use; health status and health-related behaviors; and cognitive and environmental independent variables among the older Americans. About 61% of the subjects were found to be regular users of vitamin and/or mineral supplements. Fifty percent consumed multivitamin/mineral supplements, 41% consumed only individual micronutrient supplements, and 30% consumed both individual and multivitamin/mineral supplements (13).

The two most frequently cited reasons for taking vitamin and mineral supplements were for health (33%) and not getting enough vitamins from diet (21%). When asked from where did they get their main nutrition information, the majority (37%) said that they learned about nutrition from written materials, following by consulting their doctors (27%) and family members (12%). It also was concluded that older adults were more likely to be regular users of supplements if they revealed a more favorable attitude toward supplement use, had less dependence on physician intervention, had

greater environmental influence, and perceived fewer barriers to supplement use.

Moreover, socioeconomic status and race were found to be significantly associated with supplement use. Sixty-five percent of supplement users reported being high or middle socioeconomic status and 87% of them were Caucasian (13).

Studies of Herbal Supplement Usage Among Elderly

Several studies have shown that the herbal supplement use among the older population is growing year by year (2,13,18,19,20).

South Carolina Study

Freeman, Sargent et. al. surveyed 300 free-living adults age 60 years and older to investigate correlation between vitamin and mineral supplement use and health behaviors. Thirty-five subjects (12%) claimed to take herbal supplements regularly. This survey reported a variety of herbal supplements used. Benefits thought to be provided by these herbal supplements included ginkgo biloba for memory improvement, saw palmetto for prostate enlargement treatment, ginseng for energy improvement, garlic for blood pressure reduction, and echinacea for immunity improvement. However, the motivation for the use of herbal supplements was not examined in this study (13).

NPR/Kaiser Family Foundation/Kennedy School of Government Study

A NPR/Kaiser Family Foundation/Kennedy School of Government telephone survey reported attitudes of 1200 American adults 18 years or older nationwide regarding herbal supplements (30). About 36% of interviewees reported that they were very/fairly

closely following the news of Americans' use of herbal products and other dietary supplements. Fifty-five percent were very/somewhat familiar with herbal products. Approximately 33% of interviewees reported regularly (18%), or sometimes (15%), using these herbal supplements. Among those 18% who used supplements regularly, 24% of them were age 50-64 and 22% of them were age 65 and older, compared to 16% age 18-29 and 15% age 30-49. Women were more likely than men to be regular herbal supplement users (55% for women and 46% for men).

Fifty-two percent of subjects reported that they think these supplements, including herbal supplements, are good for people's health and well-being. For regular herbal supplement users, 85% of them think that herbal supplements could promote health. Some of them also thought these herbal supplements can generally help people with certain illnesses, such as: flu (49%), colds (61%), arthritis (53%), and depression (52%) (30). However, when asked if they think that the government regulates these herbal supplements to make sure that they are safe and will do what they claim to do, 53% of subjects answered "no".

Food Marketing Institute Report

The Food Marketing Institute reports that between 1998 and 1999, herbal remedies usage increased among three groups: Generation X (aged 18-34), Baby Boomers (aged 35-53), Matures (aged 54 and over). For Generation X, the rate increased 10% (from 26% to 36%); for Baby Boomers, the rate increased 8% (from 31% to 39%); and for Matures, the rate increased 9% (from 23% to 32%). This data showed that

although baby boomers represented the higher ratio of herbal remedies use among three age groups, generation X is growing the fastest (60).

Prevention Magazine Survey

Prevention Magazine interviewed a nationally representative sample of 2000 adults living in the continental United States about the use of dietary supplements during the period of April 27 to May 16, 1999 (61). This telephone survey revealed that the older population has an increased desire for self-care. They tend to be the population using dietary supplements to help them achieve their self-care goals.

Among an estimated 158 million older consumers who use dietary supplements, 22.8 million of them use herbal remedies instead of prescription medicine and 19.6 million use them with a prescription product. Similarly, an estimated 30.3 million use herbal supplements instead of an over-the counter drug, while about 19 million use them with the over-the counter drug together (61).

Reasons for Taking Dietary Supplements Among Older Adults

One of the many concerns of older people is how to improve and maintain health so that they may continue to enjoy life and be free of diseases that are commonly associated with, and accepted as, part of aging. Therefore, the major reason for dietary supplement use among the elderly is the increasingly prevalent belief that high doses of supplements promote good health or prevent disease (6,22,62). Recent studies suggest that the elderly are now more than 3 times as likely to use dietary supplements compared

to 10 years ago (12). This increase in supplement use has, perhaps, been influenced by claims made in media advertisements that large dosages of supplements may prevent disease and slow the aging process (12).

The other common reasons for the elderly using dietary supplements include the advice of their physician; the need of supplements to treat specific symptoms or prevent illness; and the need to increase energy (8,17,28,62,63). There is some evidence that elderly who use supplements are more health conscious than non-users, and that they may differ from nonusers in many dietary practices that may influence their health (8,64).

Safety Issue about Using Herbal Supplements

Speaking to the combination of dietary supplements with prescription and over-the-counter products, there is another concern that most people would like to know: are these herbal supplements safe? The business of selling herbal supplements has changed dramatically since 1994, the year the U.S. Congress passed DSHEA. Under the law, manufacturers do not need to obtain any sort of license or approval from the FDA (because the law regulates herbal products as if they were foods) before marketing a dietary supplement; the FDA requires no proof of safety or effectiveness (65). Therefore, the vast majority of herbal products are unlicensed and are not required to demonstrate safety or quality. Even though they often are promoted as natural and therefore harmless, herbal products are not by any means free from adverse effects.

According to the Prevention Magazine Survey (61), an estimated 11.9 million consumers reported that they have experienced adverse reactions from using herbal supplements. So, the potential safety concern does exist when mixing herbal supplements

with drugs. Moreover, this survey found that only 24% of consumers think herbal supplement are very safe when compared to 41% of consumers who have this perception about vitamin and mineral supplements. The public should therefore support increased government investigation to ensure that herbal supplements are safe and regulations which determine what can be claimed on herbal supplement label. Meanwhile, consumers should be aware that herbs may be natural, but they do have drug-like effects, and there is certain potential risk. Thus, it is important to consult with physicians before taking herbal supplements (61).

Health Belief Model

Vitamin and mineral supplement use among the elderly population is already well documented and researched. However, there is only limited research about herbal supplement use among the elderly population. Therefore, this study focused on that issue. The literature reviews shows that herbal remedies are becoming more popular across the country. Nevertheless, there is no clear evidence or research about what might influence the elderly to take herbal supplements and which theoretical model could provide a framework to predict that motivation.

Traditionally, health education has been focused on behavior change by using the Health Belief Model, the Theory of Reasoned Action, and Social Learning/Cognitive Theory. These theories are used either separately or in concert to provide the framework to understand why people do or do not choose to pursue healthful behavior change (21). These theories also provide the foundations by which skills needed to pursue such changes are learned and retained.

The use of herbal supplements appears to be on the increase among the elderly, thus there is a need for understanding behavior in the use of herbal supplements, including how users perceive sources of information that have an impact on their attitudes and intentions concerning the use of herbal supplements and whether or not the subjects feel in control of this activity. Estimates of perceived attitudes, and other benefits involved in taking herbal supplements or perceived barriers in relation to the health-related behavior are should also be considered into this study. The Health Belief Model is based on established behavioral theory; therefore, it is the appropriate theoretical model to understand which factors lead the elderly to seek, or not to seek herbal remedy.

Value Expectancy Theory

In the research for explanations of health-related behavior, the Health Belief Model provides one theoretical framework for explaining change and maintenance of that health behavior. The Health Belief Model is a value expectancy theory. When value expectancy concepts were gradually reformulated in the context of health-related behavior, the translation was the desire to avoid illness or to get well (value) and the belief that a specific health action available to a person would prevent illness (expectancy) (21,49).

Components of the HBM

It is believed that individuals will take action to control an ill-health condition if they regard themselves as susceptible to the condition, if they believe it might result in potentially serious consequences, if they believe that an action against an ill-health

condition would be beneficial in reducing either their susceptibility to or the severity of the condition, or if they believe that the barriers to or cost of taking the action are less than its benefits (21). There are six key components in the HBM (see Figure).

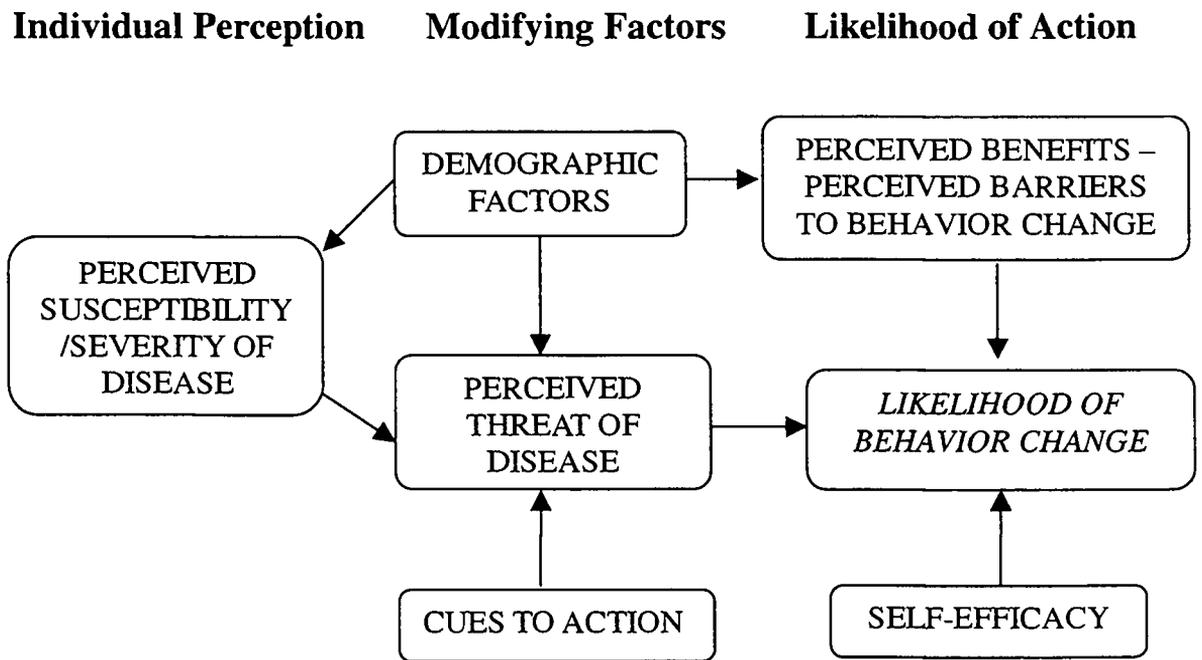


Figure. The Health Belief Model

Perceived Susceptibility

Perceived susceptibility means one's opinion about the chances of getting a condition. It measures an individual's subjective perception of his or her risk of contracting a health problem. The process of how it has been formed includes the individual's acceptance of the diagnosis, personal estimates of susceptibility, and susceptibility to illness.

Perceived Severity

Perceived severity means one's opinion of how serious a condition and its consequence are. It explains the feelings that an individual feels about the seriousness of contracting an illness or of leaving it untreated. It includes evaluation of both medical and clinical consequence, (such as: pain, disability, or death) and social consequence (such as: effect on their work, family life, or social relationship). The combination of perceived susceptibility and severity is what is called "perceived threat".

Perceived Benefits

One's opinion of the efficacy of the advised action to reduce risk or seriousness of impact is what is called "perceived benefits." People may feel susceptible to a perceived threat, but still are not ready or willing to take particular action because of the low potential effectiveness. For these people who finally decide to take action, they usually expect the positive effects. Thus, the higher perceived benefits toward action (in this study, such as: taking herbal supplements), the more likely they are to take action.

Perceived Barriers

Perceived barriers mean one's opinion of the negative effects or costs of the advised action. In contrast to the perceived benefits, perceived barriers act like an impediment to undertaking action. If an individual thinks the action's expected effectiveness against perceptions may be expensive, dangerous, painful, difficult, inconvenient, or time consuming, they might refuse to take such action.

Cues to Action

Even though people *think* they are willing to make behavior change due to high susceptibility of perceived threat and great expectation of perceived effectiveness, they might not *take* action because of lack of trigger. Cues act like the trigger that push people to action. Cues may come from the bodily event (such as a sudden illness) and environmental events (such as the media information). Cues to action will have a greater influence on behavior in situations where the perceived threat is great.

Self-Efficacy

Self-efficacy is defined as “the confidence in one’s ability to take action.” It is a strong predictor of behavior change among those with a strong perception of threat and of the benefits of taking action. Lack of efficacy is a perceived barrier to take action. The more confidence people have toward taking action, the more they tend to maintain that behavioral change.

No study in the literature has investigated herbal supplement usage among the retirement community center residents by using a theoretical model. Therefore, in this study, we want to measure not only the prevalence of herbal supplement usage among the residents of a retirement community center, but also the factors predicting why they are taking or not taking herbal supplements. Using the HBM to predict what factors might influence the elderly to take herbal supplements will help us to understand better why they are taking or not taking herbal supplements. For each specific component we measured, we are able to explain which components play a significant role in taking herbal supplements while others do not.

METHODOLOGY

Design and Procedure

Capital Manor Continuing Care Retirement Community

The survey was conducted at Capital Manor, a continuing care retirement community, in Salem, Oregon in collaboration with Nancy Dunton, foodservice director. Capital Manor is a fully accredited continuing care retirement community with long-term care. It includes the medical nursing facility for residents who need 24 hours care (Health Care Center), the residential care facility (Personal Care Center), and the fully independent homes and apartments (Terrace Apartments or Tower Apartments, Townhomes or Villas). There are about 475 residents living there and the average age of residents is about 83 years old.

Round Table Discussion

A round-table discussion was held at Capital Manor on October 19, 1999 to identify existing dietary and supplement practices of residents. From this conversation with 7 residents (3 women and 4 men), we found out that most are eating a better diet than when they were younger. They try to exercise more and eat as healthy a diet, such as low-fat and low-cholesterol meals, as possible. They said that the older they are, the more nutrition conscious they have become and the more willing they are to try to live a healthy lifestyle.

Some of them did consume vitamin and mineral supplements from either the advice of their doctors or information in magazines. They suggested that the major reason for them to take supplements is aging health concerns. One of the men mentioned that he was taking vitamin supplements to please his wife, even though he had no idea what he was taking. They mentioned that some of their supplements were over-the-counter products sold in a nearby drug store and many of them were mail order or gifts from friends or family. We also asked if they were aware of herbal supplements and if they had taken them during the past two years. Some of them responded that they did know some residents who were taking herbal supplements, even though there were not many.

Survey Instrument Development

Based on the information from round-table discussion, we developed our questionnaire and decided to focus our study on herbal supplements. A 9-page questionnaire was developed. It was designed to assess five areas of interest: (a) Perceived health status and health behaviors. (b) Health and diet information sources. (c) Vitamin/mineral supplement usage and information sources. (d) Herbal supplement usage, attitude toward use, and information sources. (e) Demographic information.

This questionnaire was designed to identify the extent of herbal supplement use; motivations behind taking herbal supplements; and what types of people are more likely to take herbal supplements than others. After obtaining approval for the finalized questionnaire from the Oregon State University Institutional Review Board for the Protection of Human Subjects, the survey instrument was pilot tested.

Structure of Questionnaire

The questionnaire was finalized according to the comments from the meeting of pilot test. A 9-page survey was developed (Appendix.1). It assessed the following:

- *Perceived health status and selected health behaviors.* Two items independently measured perceived health status (Q8 and Q9). The overall health at the present time (Q1) was asked. Two items were asked about what kinds of health behavior they try to do in order to maintain health (Q4 and Q7). The current smoking status (Q11), the subject's level of physical activity (Q10), and health and diet information sources (Q6) were measured as well.
- *The frequency and reasons for using vitamin/mineral supplement.* The frequency of vitamin and/or mineral supplements use (Q12) was measured as: "regularly" (at least once a week), "occasionally", and "never." People who answered "never" were instructed to skip this whole section about vitamin and/or mineral supplement usage and information sources. One item (Q13) was asked about the reasons why they take vitamin and/or mineral supplements during the past year. Questions assessed if their doctor advises them to take vitamin and/or mineral supplements (Q12-c).
- *Herbal supplement usage and information sources.* The frequency of herbal supplement use (Q14) was measured as: "regularly" (at least once a week), "occasionally", and "never". People who answered "never" were instructed to skip this whole section about herbal supplement usage, attitudes toward use, benefits and barriers, and information sources. The frequency of usage (Q14-c) and the perceived degree of the possible benefits (Q14-g) of eight herbal products (chamomile, echinacea, feverfew, ginkgo biloba, ginseng, kava kava, saw palmetto, and St. John's

Wort) were measured. Also, the amount of money spent by the household for herbal supplements per month was assessed (Q14-e). In addition, the places they frequently purchased the herbal supplements during the past year were determined (Q14-f). The herbal supplements information sources (Q19) were asked as well.

- *Attitude towards herbal supplement use.* Since this study investigated what might influence the subjects to take herbal supplements, the questions of this section measured their attitudes toward herbal supplement use. Responses were measured with a four-point Likert scale (strongly disagree, disagree, agree, and strongly agree). The perceptions of degree of lessened susceptibility to health problems (Q17) and the perceptions of degree of reduced severity of health problems (Q18) associated with herbal supplement use were measured. Perceptions of health risks (Q15) and the attitudes toward efficacy (Q16) regarding herbal supplement use were determined in the questionnaire as well.
- *General demographic information.* Gender (Q20), age (Q21), race (Q22), education level (Q23), and household gross income (Q27) were all assessed. In addition, current living status (Q24, such as: live alone, live with spouse, live with relatives, and live with a friend or partner), the current type of Capital Manor housing (Q25), and year length of residence in Capital Manor (Q26) were also measured.

Pilot Test

The pilot test was held at *The Regent* on February 16th, 2000. *The Regent* is a retirement center in Corvallis. The reason the study chose the residents of *The Regent*, as a pilot test was because it had an environment similar to Capital Manor. There were 5

residents (3 females and 2 males) who participated in the pilot test. In general, they spent about 7 to 18 minutes to completing the survey. Most of them were satisfied with the questionnaire format, such as: the font size, length, and the white and print color. They also gave us a number of unique comments regarding the context itself. We took these comments into the consideration while finalizing the questionnaire.

The average age of pilot test participants was 84 years (ranging from 75 to 90 years). All of them were Caucasian. They all rated their overall health as “good.” They all reported getting health and diet information from their doctors. All of them were taking vitamin and mineral supplements “regularly.” Two were taking herbal supplements; one regularly, and the other one occasionally. Both herbal supplement users were taking ginkgo biloba. Although they agreed that taking herbal supplements would contribute to their overall well being, they did not think that expected benefits were achieved.

Sampling and Data Collection

Survey Administration

The finalized questionnaires were delivered to Capital Manor on 2nd March 2000. The subjects of this study were all residents of Capital Manor, excluding those who live in the health care center. Their mail box number, and marital status were provided from Dr. Dunton. A total of 402 questionnaires were delivered with a cover letter (Appendix.1) and a return envelope. Each subject received detailed instructions regarding the specifics of the survey. Questionnaires were returned to a locked box near the front desk.

Collection of Data

Salant and Dillman survey procedures (66) were used to increase the response rate with the exception of the advanced notice, the third follow-up, and the telephone call due to the limitations of time and budget. The first follow-up reminder letter (Appendix.1) was put in mailboxes one week after the initial delivery to those who had not responded. About two weeks after the first follow-up reminder letter, the second follow-up instrument was delivered with a replacement questionnaire, reminder letter and a return envelope.

Statistical Analysis

The data were numerically coded, and the SPSS-PC (Statistical Package for the Social Science) version 10.0 software system (67) was used to conduct all the statistical analysis for this study. Before starting testing null hypotheses, the descriptive data analysis was performed. Analysis of the association between the dependent variable (the frequency of herbal supplement usage) and independent variables (such as: perceived susceptibility to chronic disease; perceived severity of chronic disease; perceived barriers and benefits of herbal supplement use) were analyzed by the *chi square* test. Specific variables and data used for analysis show in Table 1.

The Spearman's rho (ρ), phi coefficient (ϕ), or the Cramèr's V (depending on the nature of the variables) were tested to examine the strength of association if the chi-square test lead to rejection of the null hypothesis. In this study, a *p*-value less than 0.05 was considered statistically significant.

Table 1. Variables and statistical analysis for null hypotheses test

Null Hypotheses	Variables	Analysis
H₀₁ : Perceptions of degree of susceptibility to chronic disease will not be associated with the frequency of herbal supplement usage.	Perceptions of susceptibility to chronic disease (Data: Strongly Agree, Agree, Disagree, Strongly Disagree) (Q17-6, 7) X Frequency of Herbal supplement usage (Q14) [Data: Regular (R-HSu) & Occasional (O-HSu)]	Chi-square
H₀₂ : Perceptions of degree of severity of chronic disease will not be associated with the frequency of herbal supplement usage.	Perceptions of severity of chronic disease (Data: Strongly Agree, Agree, Disagree, Strongly Disagree) (Q18-6, 7) X (R-HSu) & (O-HSu)	Chi-square
H₀₃ : Perceptions of health risks of herbal supplement use will not be associated with the frequency of herbal supplement usage.	Perceptions of health risks of herbal supplement use (Data: Strongly Agree, Agree, Disagree, Strongly Disagree) (Q15-2, 3, 9) X (R-HSu) & (O-HSu)	Chi-square
H₀₄ : Preventive lifestyle factors will not be associated with the frequency of herbal supplement usage.	Preventive lifestyle factors (Q7) (Data: Very Much, Much, Some, Not at all) X (Users) & (Non-users)	Chi-square
H₀₅ : Vitamin/mineral supplement usage was not associated with the frequency of herbal supplement usage.	Frequency of Vitamin/mineral supplement use (Data: User, Non-users) (Q12) X Frequency of herbal supplement use (Data: User, Non-users) (Q14)	Chi-square
H₀₆ : Attitudes toward efficacy of herbal supplements will not be associated with the frequency of herbal supplement usage.	Attitudes toward efficacy of herbal supplements (Data: Strongly Agree, Agree, Disagree, Strongly Disagree) (Q16) X (R-HSu) & (O-HSu)	Chi-square
H₀₇ : Herbal supplement information sources will not be associated with the frequency of herbal supplement usage.	Herbal supplement information sources X (R-HSu) & (O-HSu)	Chi-square

To determine whether the null hypotheses H_{04} , and H_{06} were rejected, the rejection criteria of 75% significance was decided upon. Therefore, if more than 75% of the measured items were statistically significant at a level of $p < 0.05$ in the hypothesis, the hypothesis was rejected. Lastly, in order to analyze the data appropriately, statistical consulting was received from the Department of Statistics at Oregon State University.

RESULTS/DISCUSSION

Response Rate

All residents of Capital Manor were surveyed, excluding the institutionalized residents living in the Health Care Center (n=62). Four hundred and two residents received the survey and 341 were returned. Twenty-three questionnaires were not completed: 6 residents had moved into the Health Care Center during the survey period, 12 residents refused to complete the survey, and 5 residents were on vacation. Thus, 23 of returning surveys were excluding from further analyses, leaving a total of 318 usable questionnaires (response rate of 84%) for this study (Table 2). The frequency of each specific answer on the questionnaire is shown in the Appendix 2 (for all subjects, vitamin/mineral supplement users only, and herbal supplement users only).

Table 2. Response rate

		N
Number of subjects selected		402
Number of subjects that received questionnaire		402
Number of questionnaires returned		(341)
Unusable (n=23)	<i>Undeliverable</i>	5
	<i>Refusal</i>	12
	<i>Incomplete</i>	6
Usable questionnaires		318

Sociodemographic Data

The subjects in this study consisted of 318 Capital Manor residents. The individuals' sociodemographic characteristics are shown in Table 3.

Of the 318 subjects, 32% (n=103) were men and 68% (n=215) were women, a proportion similar to the sex ratio of the entire population of Capital Manor. This population can be profiled as higher-income and higher educated older age Caucasians. Their ages ranged from 65 to 100, with a mean age of 82.2 ± 6.10 . A t-test was used to compare the mean age between males and females, and no significant difference was found. When divided into three age groups (65~74, 75~84, and ≥ 85) in order to assess the age distribution, the majority of them (53%) were 75 to 84 years of age, and 38% were 85 years of age or older. There were two centenarians in this population. The gender distribution of the sample was similar to the entire population in the three age groups. That there were substantially more women than men in the sample may be due to the fact that women have a longer lifespan or to the possibility that women are more likely to fill out the questionnaire.

The group was predominately Caucasian (88%). There was a small group of Native Americans (n=30, 9%) in this group; perhaps because a Native American reservation is nearby. The majority of respondents (78%) reported being educated beyond high school, and 10% of them reported having professional degree. The number of persons who lived alone (n=147, 46%) was about equal to the number of persons who said they lived with a spouse (53%). Approximately 82% of these participants reported annual household incomes greater than or equal to \$10,000; and 90 subjects (35%) have

Table 3. Sociodemographic characteristics of participants

Sociodemographic Variables	Participants	
	Number (N)	Percentage ² (%)
<i>Gender</i>	(318) ¹	
Female	215	67.6
Male	103	32.4
<i>Age (mean=82.18±6.10)</i>	(299) ¹	
65~74	27	9.0
75~84	158	52.8
≥85	114	38.1
<i>Ethnicity³</i>	(318) ¹	
Latin American	1	0.3
Native American	30	9.4
Caucasian	281	88.4
Other	6	1.9
<i>Education Level³</i>	(318) ¹	
Some high school	4	1.3
High school graduate	50	15.7
Trade/business school	17	5.3
Some college	69	21.7
College graduate	56	17.6
Some graduate work	36	11.3
Graduate degree	53	16.7
Professional degree	33	10.4
<i>Living Status³</i>	(318) ¹	
Live alone	147	46.2
Live with spouse	169	53.1
Live with relatives	2	0.6
<i>1999 Gross Income</i>	(255) ¹	
Less than \$ 10,000	2	0.8
\$ 10,000- \$ 29,999	48	18.8
\$ 30,000- \$ 49,999	71	27.8
\$ 50,000- \$ 79,999	58	22.7
\$ 80,000- \$ 99,999	18	7.1
More than \$ 100,000	14	5.5
Don't know	23	9.0
None of your business	21	8.2

¹ The number inside of parentheses means the total number of that specific category.

² Percentages do not always add up to 100% due to rounding.

³ Some sub-categories do not appear due to no one responding to those sub-categories.

annual incomes more than \$50,000. The mean annual income was in the \$ 30,000 to \$49,999 range. There were 63 subjects who refused to answer the income question and 21 subjects responded “none of your business” or “too sensitive to answer” regarding annual income.

Health Characteristic Data

Table 4 provides a summary of health characteristic data for all subjects. Most of the respondents (77%) described their health status as “good,” compared to “fair” (21%) or “poor” (2%). Approximately 76% of the subjects reported worrying about their health over the past year. Cardiovascular disease, including hypertension, was the most frequently cited health problem (52%), with arthritis ranking second (40%) and osteoporosis ranking third (18%).

The majority of subjects (66%) reported their health status stayed the same during the last year, and 23% of subjects claimed that their health status actually declined. There was a significant relationship between a changed health status (Q3) and worrying about their health (Q9-2) during the last year ($p < 0.001$). When people perceived a decline in health status, they were more likely to report worrying about their health.

Most subjects regularly participated in walking, swimming, aqua-aerobics or other kinds of physical exercise (81%), although the results did not show in which specific exercises they were engaged. Among people who reported exercising, 64% of them rated their exercise level as “moderate.”

Table 4. Health characteristics of participants

Health Variables	Participants	
	Number (N)	Percentage ² (%)
<i>Perceived Overall Health Status</i>	(316) ¹	
Excellent	24	7.6
Very good	97	30.7
Good	123	38.9
Fair	67	21.2
Poor	5	1.6
<i>Have Experience of Following</i> ³		
Arthritis	116	36.9
Hypertension	97	30.7
Cardiovascular Disease	67	21.3
Diabetes	36	11.4
Osteoporosis	56	17.8
Cancer	45	14.2
Excess weight	38	12.1
Certain vitamin/mineral deficiency	29	9.3
Others	42	19.2
<i>Health Changed During Last Year</i>	(317) ¹	
Greatly improved	4	1.3
Improved	27	8.5
Stayed the same	209	65.9
Declined	74	23.3
Greatly declined	3	0.9
<i>Physical Exercise</i>	(316) ¹	
No	62	19.5
Yes, exercise level ⁴	256	80.5
-Vigorous	28	10.9
-Moderate	163	63.7
-Light	65	25.7
<i>Current Smoking Status</i> ⁵	(312) ¹	
Former smoker	101	32.4
Never have smoked	211	67.6

¹ The number inside of parentheses means the total number of that specific category.

² Percentages do not always add up to 100% due to rounding.

³ People who answered "Yes" on each sub-category.

⁴ Percentage of people who answered "Yes" on participating in physical exercise only.

⁵ Some sub-categories do not appear due to no one responding to those sub-categories.

In this study, none of the respondents reported being a current smoker, although 32% of them were former smokers. The majority of them (68%) were reported “never been smoked”. This suggested that either a deception situation occurs, which is common around the smoking issue, or confusion about the definition of “current smoker.” According to the CDC, “current smoker” defines as someone who has smoked, even a single puff, in the past seven days (69). The subjects might not know this definition and consider they were not current smokers based on if they have just quitted that day. Another explanation was the smoking policy in the facility. Smoking is not allowed in the Capital Manor common areas, so the only place the residents could smoke would be in their own apartments. Perhaps this is perceived as not smoking. Smoking status was significantly associated with herbal supplement usage, at the p -value=0.054 level. Herbal supplement users were more likely to be non-smokers than non-herbal supplement users.

Dietary Supplements

Incidence of Supplementations

Table 5 shows the percentage of subjects who reported using supplementation, including vitamin/mineral supplements or herbal supplements. A substantial percentage (87%) of the subjects indicated use of vitamin and/or mineral supplements. This percent is about 30% to 50% higher than other studies of the elderly (13,48,59). Only one study conducted by Gregory E.G. et al. (17) reported a high usage rate, with 72% of the subjects 60 years of age or older consuming supplements. Our study and Gregory E.G. et al.’s study both studied the residents of retirement communities, and this similarity might

account for the high vitamin/mineral supplement usage, although our study showed a higher rate than theirs. Approximately 20% of subjects reported using herbal supplements, which was about the same rate found in other studies (13,30,60).

Table 5. Percentage of vitamin/mineral and herbal supplement usage

	Vitamin/mineral Supplement		Herbal Supplement	
	Users	Non-users	Users	Non-users
Number (318) ¹	277	41	65	253
Percentage (%)	87.1	12.9	20.4	79.6

¹Total number of subjects.

Table 6 shows the frequency of both vitamin/mineral and herbal supplement use. Among 277 vitamin/mineral supplement users, 248 (90%) of them were regular users (at least once a week), and 41 of them (11%) were occasional users only. Forty of 65 herbal supplement users (62%) reported using them regularly, and 25 subjects (39%) used them occasionally.

Table 6. Percentage of the frequency of vitamin/mineral and herbal supplement usage

	Vitamin/mineral Supplement Users (N=277)		Herbal Supplement Users (N=65)	
	Regularly	Occasionally	Regularly	Occasionally
Number (318) ¹	248	29	40	25
Percentage (%)	89.5	10.5	61.5	38.5

¹Total number of subjects.

When comparing the usage of both supplement (Table 7), we found that 36 subjects (11% of all subjects) were using both vitamin/mineral and herbal supplements together regularly. The majority of regular herbal supplement users (n=63, 97%) were also vitamin/mineral supplement users, either regular or occasional users. However, two regular herbal supplement users reported that they have never used vitamin/mineral supplements.

Table 7. Comparison of the numbers of vitamin/mineral and herbal supplement users

Vitamin/mineral supplement use	Herbal supplement use			
	Regularly (n)	Occasionally (n)	Never (n)	Total (n)
Regularly (n)	36	22	190	248
Occasionally (n)	2	3	24	29
Never (n)	2	-	39	41
Total	40	25	253	318

Sociodemographic and Health Characteristic Data

Table 8 shows the sociodemographic data for both vitamin/mineral and herbal supplement users, and Table 9 shows the health status data for both users. The data for both types of users show similar ratio and tendency when compared to all subjects.

Most of the vitamin/mineral supplement users were female (72%) and Caucasian (89%), with household incomes more than \$50,000 (41%, after excluding “don’t know” and “none of your business”). Seventy-nine percent of them were high school graduates. The mean age of the user was 81.8 years. The majority of the users (76%) reported having a “good” health status, and 82% of the users exercised.

Table 8. Sociodemographic characteristics of vitamin/mineral supplement (V/M/S) and herbal supplement (H/S) users

Sociodemographic Variables	V/M/S users		H/S users	
	N	% ²	N	% ²
<i>Gender</i>	(277) ¹		(65) ¹	
Female	199	71.8	44	67.7
Male	78	28.2	21	32.3
<i>Age (years)</i>	(262) ¹	81.9±6.1 ⁴	(61) ¹	79.6±5.8 ⁴
65~74	27	10.3	9	14.8
75~84	141	53.8	38	62.2
≥85	94	35.9	14	23.0
<i>Ethnicity</i> ³	(277) ¹		(65) ¹	
Latin American	1	0.4	0	0
Native American	25	9.0	10	15.4
Caucasian	247	89.2	55	84.6
Other	4	1.4	0	0
<i>Education Level</i> ³	(277) ¹		(65) ¹	
Some high school	4	1.4	0	0
High school graduate	40	14.4	8	12.3
Trade/business school	15	5.4	6	9.2
Some college	67	24.2	17	26.2
College graduate	49	17.2	14	21.5
Some graduate work	31	11.2	5	7.7
Graduate degree	46	16.6	9	13.8
Professional degree	25	9.0	6	9.2
<i>Living Status</i> ³	(277) ¹		(65) ¹	
Live alone	129	46.6	19	29.2
Live with spouse	146	52.7	45	69.2
Live with relatives	2	0.7	1	1.5
<i>1999 Gross Income</i>	(219) ¹		(52) ¹	
Less than \$ 10,000	2	0.9	1	1.9
\$ 10,000- \$ 29,999	44	20.1	5	9.6
\$ 30,000- \$ 49,999	60	27.4	14	26.9
\$ 50,000- \$ 79,999	49	22.4	14	26.9
\$ 80,000- \$ 99,999	16	7.3	4	7.7
More than \$ 100,000	10	4.6	1	1.9
Don't know	21	9.6	4	7.7
None of your business	17	7.8	9	17.3

¹ The number inside of parentheses means the total number of that specific category.

² Percentages do not always add up to 100% due to rounding.

³ Some sub-categories do not appear due to no one responding to those sub-categories.

⁴ Mean ± S.D for age.

Table 9. Health characteristics of vitamin/mineral and herbal supplement users

Health Variables	V/M/S users		H/S users	
	N	(%) ²	N	(%) ²
<i>Perceived Overall Health Status</i>	(276) ¹		(64) ¹	
Excellent	22	8.0	6	9.4
Very good	81	29.3	24	37.5
Good	106	38.4	20	31.3
Fair	62	22.5	14	21.9
Poor	5	1.8	0	0
<i>Have Experience of Following</i> ³				
Arthritis	105	38.5	20	31.7
Hypertension	89	32.4	13	20.3
Cardiovascular Disease	57	20.9	12	19.0
Diabetes	29	10.5	11	17.5
Osteoporosis	53	19.4	7	11.3
Cancer	44	16.0	7	11.1
Excess weight	34	12.4	11	17.7
Certain vitamin/mineral deficiency	29	10.7	5	8.1
Others	37	19.9	12	29.3
<i>Health Changed During Last Year</i>	(276) ¹		(65) ¹	
Greatly improved	4	1.4	1	1.5
Improved	25	9.1	10	15.4
Stayed the same	179	64.9	42	64.6
Declined	65	23.6	10	15.4
Greatly declined	3	1.1	2	3.1
<i>Physical Exercise</i>	(277) ¹		(65) ¹	
No	52	18.8	6	9.2
Yes, exercise level ⁴	225	81.2	59	90.8
-Vigorous	24	10.5	14	23.7
-Moderate	141	61.8	34	57.6
-Light	63	27.6	11	18.6
<i>Current Smoking Status</i> ⁵	(273) ¹		(63) ¹	
Former smoker	87	31.9	14	22.2
Never have smoked	186	68.1	49	77.8

¹ The number inside of parentheses means the total number of that specific category.

² Percentages do not always add up to 100% due to rounding.

³ People who answered, "Yes" on each sub-category.

⁴ Percentage of people who answered, "Yes" on participating in physical exercise only.

⁵ Some sub-categories do not appear due to no one responding to those sub-categories.

Most of the herbal supplement users were female (68%). Compared to the vitamin/mineral supplement users, herbal supplement users tended to be slightly younger (mean age was 79.6 years), have higher income (fewer of the users reported having low incomes and more of them reported “none of your business”). Perhaps people tend to respond “none of your business” or “too sensitive” if they have a higher income. Seventeen percent of the herbal supplement users responded “none of your business” on the income question, compared to 8% of the vitamin/mineral supplement users.

Eighty-five percent of the herbal supplement users were Caucasians, compared to 15% of users were Native Americans. This may reflect a cultural difference between Caucasians and Native Americans. Folk medicine is part of the Native American culture and this may explain why a higher percentage (15%) of them used herbal supplements, while only 9% of them use vitamin/mineral supplements. A higher percentage of the herbal supplement users reported, “live with spouse”(69%) than the vitamin/mineral supplement users (53%). The majority of the herbal supplement users (78%) reported having a “good” health status, and 91% of the users reported exercising.

Table 10 lists the results of statistical comparison of the association between each sociodemographic or health characteristic variable and the vitamin/mineral supplement and herbal supplement usage (user vs. non-users). There was a significant relationship ($p \leq 0.000$) between gender and the use of vitamin/mineral supplements; women were more likely than men to use vitamin/mineral supplements. This finding is consistent with previous studies (13,17,48,59). However, the gender was not related to the herbal supplement users.

Table 10. Significant relationships between sociodemographic variables and vitamin/mineral supplement (V/M/S) and herbal supplement (H/S) use

Variables	V/M/S		H/S	
	% of users	χ^2 value	% of users	χ^2 value
<i>Gender</i>				
Female	72	17.56*	-----	-----
Male	28		-----	
<i>Age (years)</i>				
65~74	10	7.00*	15	8.71*
75~84	54		62	
≥85	36		23	
<i>Living Status</i>				
Live alone	-----	-----	29	10.16*
Live with spouse	-----		69	
Live with relatives	-----		2	
<i>Health Changed Last Year</i>				
Greatly improved	-----	-----	2	10.74*
Improved	-----		15	
Stayed the same	-----		65	
Declined	-----		15	
Greatly declined	-----		3	
<i>Control Over Health</i>				
Very much	-----	-----	19	8.18*
Much	-----		55	
Some	-----		26	
Not at all	-----		0	
<i>Physical Exercise</i>				
Yes	-----	-----	91	5.49*
No	-----		9	
<i>Current Smoking Status</i>				
Former smoker	-----	-----	22	3.71*
Never have smoked	-----		78	

*Statistical significant at the level of $p \leq 0.05$.

----- Not significant associated

There was a significant relationship between age and the usage (users vs. non-users) of both vitamin/mineral ($p \leq 0.030$) and herbal supplement ($p \leq 0.013$). Subjects

among the age group of 75 to 84 years tended to be more likely to consume supplementation (both vitamin/mineral supplements and herbal supplements) than the other two groups. Herbal supplement users were significantly more likely to report, “live with spouse” than nonusers ($p \leq 0.006$). Both “health status change last year” and “physical exercise participation” were significantly associated with herbal supplement usage ($p \leq 0.030$, and $p \leq 0.019$, respectively). Herbal supplement users were more likely to report their health changed as “improved,” while non-users tended to report “declined”. Herbal supplement users were likely to participate in exercise than non-users.

Moreover, self-efficacy (the control over health) was significantly associated with the herbal supplement usage. Unlike the non-users, herbal supplement users felt they were likely to have control over health. The vitamin/mineral or herbal supplement usage did not vary significantly by race, education, income, reported health status, smoking status, or frequency of worrying about health last year.

In addition, smoking status was significantly associated with herbal supplement usage, at the p -value=0.054 level. Herbal supplement users were more likely to be non-smokers than non-herbal supplement users.

Health Behaviors

Perceived Health Maintenance Behaviors

Table 11 shows the number and percentage of all subjects, vitamin/mineral supplements users only, and herbal supplement users only, regarding the behaviors that they think help to maintain their health. The majority of them (more than 50%) think that

“balanced diet”, “exercise”, and “vitamin/mineral supplements” were three major factors to help maintain health. For herbal supplement users, 44% believe that taking herbal supplements was also a factor to help maintain health.

While 12% of the vitamin/mineral supplement users perceived herbal supplements help maintain health, the majority of the herbal supplement users (72%) perceived that vitamin/mineral supplements help maintain health. This explained the prevalence of both supplements, i.e., 23% of the vitamin /mineral supplement users reported using herbal supplements, and 97% of the herbal supplements used vitamin/mineral supplements. Most of the herbal supplement users were also vitamin/mineral supplement users, which indicates that similar factors may influence supplement use.

Table 11. Perceptions of behaviors that help to maintain health¹

Subjects	Balanced diet	Exercise	Quit smoking	H/S ²	V/M/S ³	Others
Total subjects	314	314	314	314	314	314
Number ⁴	293	274	64	34	182	34
Percentage (%)	93.3	87.3	20.4	10.8	58.0	10.8
V/M/S users ⁵	274	274	274	274	274	274
Number ⁴	255	240	58	34	181	30
Percentage (%)	93.1	87.6	21.2	12.4	66.1	10.9
H.S users	64	64	64	64	64	64
Number ⁴	56	57	11	28	46	7
Percentage (%)	87.5	89.1	17.2	43.8	71.9	10.9

¹ Multiple Responses

² H/S = Herbal Supplements

³ V/M/S = Vitamin and/or Mineral Supplements

⁴ People who answered “Yes” on each sub-category.

⁵ Users: regular or occasional

Preventive Lifestyle and Dietary Behaviors

When the subjects were asked to what extent they try to do seven preventive lifestyle and dietary behaviors, the majority of them tried to do at least “some” for each behavior. Six of the seven preventive behaviors are the recommendations from *the 1995 Dietary Guidelines for Americans*. The other one, “get enough calcium in food or supplements”, was asked based on the high rate of osteoporosis among the elderly.

The results of level of trying to do each preventive behavior for all subjects, the vitamin/mineral supplement (V/M/S) users only, and the herbal supplement (H/S) users only, are shown in the Table 12. For three behaviors: “choose a diet moderate in salt and sodium”, “choose a diet with plenty of grain products, vegetables, and fruits”, and “eat a variety of foods”, the majority of subjects of all three groups chose the same response, “some”, “very much”, and “much”, respectively. Thirteen percent of the vitamin/mineral supplement users indicated that they did not try to “choose a diet moderate in salt and sodium” behavior, compared to only 3% of herbal supplement users who did not do so.

For “get enough calcium in foods or supplements” behavior, the majority of herbal supplement users (40%) were trying to do “very much” when compared to “much” for the majority of vitamin/mineral supplement users (42%). For “exercise regularly” behavior, the majority of herbal supplement users (39%) were trying to do “very much” when compared to “some” for the most of vitamin/mineral supplement users (42%).

Table 12. Preventive lifestyle and dietary behaviors of subjects

			A ¹	B ²	C ³	D ⁴	E ⁵	F ⁶	G ⁷
Participants	Very much	N	64	54	76	126	123	87	92
		%	20.8	17.2	24.4	40.5	39.3	29.8	29.9
	Much	N	111	88	80	114	133	122	85
		%	36.0	28.0	25.7	36.7	42.5	41.8	27.6
	Some	N	119	137	111	62	52	69	122
		%	38.6	43.6	35.7	19.9	16.6	23.6	39.6
Not at all	N	14	35	44	9	5	14	9	
	%	4.5	11.4	14.1	2.9	1.6	4.8	2.9	
V/M/S Users	Very much	N	58	47	71	110	108	81	83
		%	21.7	17.2	26.3	40.7	39.7	31.8	31.3
	Much	N	100	78	71	104	118	108	74
		%	37.5	28.6	26.3	38.5	43.4	42.4	27.7
	Some	N	99	123	93	50	43	56	103
		%	37.1	45.1	34.4	18.5	15.8	22.0	38.6
Not at all	N	10	25	35	6	3	10	7	
	%	3.7	9.2	13.0	2.2	1.1	3.9	2.6	
H/S Users	Very much	N	18	17	20	32	21	23	24
		%	30.8	26.6	31.3	50.0	33.9	39.7	38.7
	Much	N	26	22	17	24	31	22	18
		%	43.3	34.4	26.6	37.5	50.0	37.9	29.0
	Some	N	15	22	25	8	10	12	20
		%	25.0	34.4	39.1	12.5	16.1	20.7	32.3
Not at all	N	1	3	2	-	-	1	-	
	%	1.7	4.7	3.1	-	-	1.8	-	

¹⁻⁷ Seven preventive lifestyle and dietary behaviors subjects tried to do at different levels (very much, much, some, or not at all):

1. Choose a diet low in fat, saturated fat, and cholesterol
2. Choose a diet moderate in sugar
3. Choose a diet moderate in salt and sodium
4. Choose a diet with plenty of grain products, vegetables, and fruits
5. Eat a variety of foods
6. Get enough calcium in foods or supplements
7. Exercise regularly

Health and Diet Information Sources

Table 13 shows the results of where or from whom the subjects usually get their health and diet information. The results were similar for all the subjects, the vitamin/mineral supplement users only, and the herbal supplement users only. The most frequently mentioned source of health and diet information was “medical doctor/nurse” (78%, 77%, and 76%, respectively for three groups). Media influence also plays an important role in people’s behavior. When it comes to the topic of supplementation use, the situation remains the same. Many previous studies show that one of the reasons people take supplements is due to the influence of media advertising (12,13,17,48).

The second most frequently used source was “books, newspapers, or magazines” (51%, 54%, and 64%, respectively), followed by “dietitians” (34%, 35%, and 37%), and “family or friends” (24%, 22%, and 25%). It is interesting to note that, among the listed sources of information, most do not have in-depth training in nutrition, except for dietitians. The major source of influence, “medical doctor/nurse”, was not associated with respondents’ gender, education, living arrangement, health status, or age.

Although “alternative health care providers” was not a major health and diet information source for vitamin and mineral supplement users (6%), more than 17% of herbal supplement users used them as their health and diet information source. Also, “health food or grocery stores” was more often reported as an information source by herbal supplement users (20%) than the vitamin/mineral supplement users (9%).

Table 13. Health and diet information sources of vitamin/mineral supplement (V/M/S), herbal supplement (H/S) and all respondents

Sources	All		V/M/S users		H/S users	
	N ²	(%)	N ²	%	N ²	%
Medical doctor/Nurse	247 (316) ¹	78.2	212 (275)	77.1	48 (63)	76.2
Dietitians	107 (316)	33.9	95 (275)	34.5	23 (63)	36.5
Alternative health care providers (such as: chiropractors, naturopaths, etc.)	18 (317)	5.7	17 (276)	6.2	11 (64)	17.2
Capital Manor residents	31 (316)	9.8	29 (276)	10.5	5 (64)	7.8
Family or friends	75 (317)	23.7	61 (276)	22.1	16 (64)	25.0
Drug stores or pharmacist	46 (316)	14.6	43 (275)	15.6	11 (64)	17.2
Health food or grocery stores	25 (318)	7.9	24 (277)	8.7	13 (65)	20.0
Books, newspapers or magazines	161 (316)	50.9	148 (275)	53.8	40 (63)	63.5
TV or radio	55 (315)	17.5	49 (276)	17.9	11 (63)	17.5
Internet	17 (315)	5.4	15 (276)	5.5	5 (63)	7.9
Others	26 (274)	9.5	25 (220)	10.5	6 (51)	11.8

¹ The number inside parentheses was total numbers of subject.

² People who answered "Yes".

Reasons for Taking Vitamin/Mineral Supplements

The majority of vitamin/mineral supplement users (67%) said that their doctors advised them to take vitamin/mineral supplements. Users were asked to indicate (from a list of reasons) why they took vitamin/mineral supplements. Results are shown in Table 14. The most frequently cited reason was "to benefit your overall health" (88%), followed by "to supplement your diet"(60%), "to increase your energy level (40%), and "to prevent specific symptoms or disease" (38%).

Table 14. Reasons for taking vitamin/mineral supplements

	Number of Subjects ² (N)	Percentage (%)
To benefit your overall health (N ¹ =252)	222	88.1
To treat specific symptoms or disease (N ¹ =251)	63	25.1
To prevent specific symptoms or disease (N ¹ =251)	95	37.8
To supplement your diet (N ¹ =252)	151	59.9
To increase your energy level (N ¹ =252)	100	39.7
To slow the aging process (N ¹ =251)	79	31.5
Other specific reasons (N ¹ =189)	17	9.0

¹Total numbers of subject might not always be 277 due to missing data.

²People who answered “Yes”.

Table 15 shows the relationship among three variables: gender, age by group, and frequency of usage and the four top reasons for taking vitamin/mineral supplements.

Gender was not associated with any top four reasons for taking vitamin/mineral supplements. Age was only significantly associated with one of the top four reasons for taking vitamin/mineral supplements, “to supplement your diet” ($p \leq 0.001$). The users of the group of 75-84 years old was more likely to report using vitamin/mineral supplements for the reason of “to supplement your diet” than the other two age groups.

Frequency of use of vitamin/mineral supplements was also only significantly associated with one of the top four reasons for taking vitamin/mineral supplements, “to benefit your overall health” ($p \leq 0.001$). Regular vitamin/mineral supplement users were more likely to use vitamin/mineral supplements for the reason of “to benefit your overall health” than occasional users.

Table 15. Relationship between three variables (gender, age, frequency of usage) and four reasons for taking vitamin/mineral supplements

Variables		Reasons			
		To benefit your overall health	To prevent specific symptoms or diseases	To supplement your diet	To increase your energy level
Gender	χ^2	0.335	0.825	2.105	0.004
	p	0.563	0.364	0.147	0.949
Age ¹ (3 groups)	χ^2	0.323	4.538	13.508	4.817
	p	0.313	0.106	0.001	0.090
Frequency of usage ²	χ^2	12.004	0.029	1.167	1.129
	p	0.001	0.805	0.280	0.288

¹ Three age groups: 65-74 years, 75-84 years, and 85+ years

² Frequency of usage: Regular, and Occasional

Herbal Supplements

Herbal Products

In this study, the subjects were asked how often they currently take eight kinds of herbal products (chamomile, Echinacea, feverfew, ginkgo biloba, ginseng, kava kava, Saw Palmetto, and St. John's Wort). Table 16 shows the frequency of each herbal supplement the subjects used. Ginkgo Biloba was the most frequently used one by the majority of the herbal supplement users. It was used by 71% either regularly, occasionally, or seldom (43% were regular users). The second most frequently used herbal product was Echinacea (39% of users), followed by ginseng (29%). For people who answered "other" (n=32), a wide variety of herbal products was reported, such as

Table 16. Frequency of taking herbal supplements

	Users						Not users			
	Regularly		Occasionally		Seldom		Never		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ¹ =58)	2	3.4	8	13.8	4	6.9	42	72.4	2	3.4
Echinacea (N ¹ =56)	2	3.6	11	19.6	9	16.1	33	58.9	1	1.8
Feverfew (N ¹ =56)	0	0	1	1.8	4	7.1	50	89.3	1	1.8
Ginkgo Biloba (N ¹ =61)	26	42.6	10	16.4	7	11.5	16	26.2	2	3.3
Ginseng (N ¹ =58)	1	1.7	7	12.1	9	15.5	38	65.5	3	5.2
Kava kava (N ¹ =57)	0	0	1	1.8	4	7.0	50	87.7	2	3.5
Saw Palmetto (N ¹ =58)	7	12.1	2	3.4	4	6.9	43	74.1	2	3.4
St. John's Wort (N ¹ =55)	1	1.8	4	7.3	8	14.5	40	72.7	2	3.6
Other (N ¹ =32)	10	31.3	1	3.1	2	6.3	16	50.0	3	9.4

¹Total number of subjects might not always be 65 due to missing data.

²Percentages do not always add up to 100% due to rounding.

garlic, ginger, alfalfa, aloe, cranberry, and several different herbal teas such as green or black tea for energy or weight problems.

Education, living arrangement, or reported health status were not associated with any particular herbal supplement. Gender, however, was significantly associated with one particular herbal supplement – Saw Palmetto ($p \leq 0.000$). The majority of Saw Palmetto users were men. The function of saw palmetto is to prevent or ease the symptoms of enlargement of the prostate gland.

Possible Benefits of Herbal Products

Table 17 shows the results from subjects' perceptions about the possible benefits of each specific herbal product. Compared to other products, ginkgo biloba's possible benefits were well known to the majority of the users. Approximately 83% of users reported having some knowledge about the benefits of ginkgo biloba. On the other hand, "feverfew" and "kava kava" were two herbal supplements that the respondents were less familiar with. Seventy-eight percent of the users reported, "know nothing" or "never heard about it" for "feverfew", and 80% of the users said so for "kava kava".

Chi-square was used to test the association between two variables: frequency of use of certain herbal product and perception of benefits of that certain product. Spearman's rho (ρ) was used to test the strength of the relationship, if there was any, between these two ordinal variables. Table 18 shows the relationship between knowing the benefits of certain herbal products and taking that herbal product. All of them were found to be statistically significant at $p \leq 0.05$, and positive rho. A positive rho tells us that there is a positive relationship between knowing the benefits of herbal products

Table 17. The degree of the perceived possible benefits of each herbal product

	Know a lot		Know something		Know a little		Know nothing		Never heard about it	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ¹ =61)	2	3.3	6	9.8	13	21.3	33	54.1	7	11.5
Echinacea (N ¹ =61)	1	1.6	15	24.6	14	23.0	24	39.3	7	11.5
Feverfew (N ¹ =59)	1	1.7	3	5.1	9	15.3	37	62.7	9	15.3
Ginkgo Biloba (N ¹ =63)	8	12.7	24	38.1	20	31.7	10	15.9	1	1.6
Ginseng (N ¹ =61)	1	1.6	8	13.1	25	41.0	24	39.3	3	4.9
Kava kava (N ¹ =59)	0	0	3	5.1	9	15.3	39	66.1	8	13.6
Saw Palmetto (N ¹ =63)	3	4.8	6	9.5	12	19.0	35	55.6	7	11.1
St. John's Wort (N ¹ =61)	1	1.6	7	11.5	19	31.1	30	49.2	4	6.6
Other (N ¹ =21)	2	9.5	3	14.3	2	9.5	11	52.4	3	14.3

¹Total number of subjects might not always be 65 due to missing data.

²Percentages do not always add up to 100% due to rounding.

and taking them. The more they know about the benefits of what they were taking, the more they were likely to use them.

Table 18. Relationship between the perceptions of benefits and actual usage

Herbal Supplements	χ^2 -value	<i>p</i> -value	rho (ρ)
Chamomile	38.204	0.010	0.575**
Echinacea	38.156	0.010	0.802**
Feverfew	28.451	0.005	0.544**
Ginkgo Biloba	34.160	0.005	0.708**
Ginseng	86.856	0.000	0.598**
Kava kava	31.486	0.000	0.803**
Saw Palmetto	61.895	0.000	0.859**
St. John's Wort	88.500	0.000	0.910**
Other	17.500	0.008	1.000**

** Statistically Significant at the level of $p \leq 0.005$

Decision About Taking Herbal Supplements

Table 19 shows the results about how well informed the subjects were to make decisions about taking or not taking herbal supplements. Approximately 68% of them reported that they were well (including "very much" and "somewhat") informed to make the decision. However, there was no significant association between being informed and the frequency of herbal supplement usage.

Table 19. Degree of how well informed to make decisions about taking or not taking herbal supplements

	Number of Subjects (N)	Percentage ² (%)
Very much	13	20.0
Somewhat	31	47.7
A little	19	29.2
Not at all	2	3.1

Money Spent Per Month on Herbal Supplements

Table 20 shows the approximate money the subjects spent on herbal supplements per month. In this study, there was a wide range about how much money was spent on herbal supplements. The largest group (23%) of subjects reported that they spent about “\$6-10” per month on herbal products. However, the amount of money spent on herbal supplement per month was equally distributed between the categories of “\$1-5” (19%), and “more than \$20” (19%). Moreover, about 22% of subjects did not know how much money they generally spent on herbal supplements per month. The amount spent was not significantly associated with gender, age, education, reported income levels or frequency of herbal supplement use.

Table 20. Approximate money per household per month spent on herbal supplements

	Number of Subjects (N) (N=64)	Percentage ² (%)
None	1	1.6
Received as gift	-	-
\$ 1- 5	12	18.8
\$ 6- 10	15	23.4
\$ 11- 15	5	7.8
\$ 16- 20	5	7.8
More than \$ 20	12	18.8
Don't know	14	21.9

Places of Purchasing Herbal Supplements

The subjects purchased herbal supplements in a variety of places. Table 21 indicates that the most popular places for them to purchase them were supermarkets and health food stores (41% of users for each). This might be due to the geographic factor

that there was a supermarket with a pharmacy – Safeway – nearby the Capital Manor. According to the round-table discussion, most people said that they went shopping there regularly.

Other studies (7,13,17) have indicated that the supermarket is the most popular place to purchase mostly vitamin and mineral supplements. In this study, the same result for herbal supplements purchase was seen. This might be because it is convenient for them to buy herbal supplements there since they go shopping there regularly.

Table 21. Places the subjects have frequently purchased herbal supplements

	Number of Subjects ¹ (N)	Percentage (%)
Supermarket (N=64)	26	40.6
Discount store (N=64)	10	25.6
Health food store (N=64)	26	40.6
Drug store (N=64)	17	26.6
Catalogue/mail order (N=64)	17	26.6
Others (N=64)	8	12.5

¹ Participants who answered “Yes” on each choice.

Herbal Supplement Information

Table 22 shows the herbal supplement information sources. Herbal supplement users relied on (including “very much”, “somewhat”, and “a little”) “books, newspapers or magazines”(84%), “medical doctor/nurse”(72%), and “family or friends” (62%) for information about herbal supplements. A minority listed “television or radio”(2%), and no one was using the Internet as their herbal supplement information source although they do have a computer room in the Capital Manor. According to the result of round-

Table 22. Sources of herbal supplement information relied on by respondents

Information Sources	Yes						No	
	Very Much		Somewhat		A little		Not at all	
	n ¹	% ²	n	%	n	%	n	%
Medical doctor/Nurse	16	25.0	17	26.6	13	20.3	18	28.1
Dietitians	8	12.9	17	27.4	13	21.0	24	38.7
Alternative health care providers (such as: chiropractors, naturopaths, etc.)	5	8.2	13	21.3	5	8.2	38	62.3
Capital Manor residents	0	0	7	11.7	15	25.0	38	63.3
Family or friends	6	9.5	16	25.4	17	27.0	24	38.1
Drug stores/pharmacist	6	9.7	11	17.7	12	19.4	33	53.2
Health food or grocery stores	5	8.3	11	18.3	14	23.3	30	50.0
Books, newspapers or magazines	8	12.5	16	25.0	30	46.9	10	15.6
TV or radio	1	1.7	6	10.0	22	36.7	31	51.7
Internet	0	0	4	8.3	6	12.5	38	79.2
Others	2	11.8	0	0	3	17.6	12	70.6

¹ Total number of subjects might not always be 65 due to missing data.

² Percentages do not always add up to 100% due to rounding.

table discussion, people did mention that family, especially spouses, or Capital Manor residents have influenced the decision of using supplements.

However, “medical doctor/nurse”(25%), “books, newspapers or magazines”(13%) and “dietitians” (13%) were the top three information sources where the regular and occasional herbal supplement users reported to rely on “very much”. This is supported by previous study (70).

The source of influence was not associated with respondents’ gender, age, education, living arrangement, health status, or frequency of worrying about health.

Attitudes about the Statements of Herbal Supplements

Table 23 shows the attitudes toward 10 statements about herbal supplement use (Q-15). These 10 belief statements were constructed to assess attitudes toward supplement use in the form of a four-point Likert-type scale, and a “not sure” category. The respondents were given the option of strongly agree, agree, disagree, and strongly disagree. The option of “not sure” was also asked to find out if there was any education opportunity for herbal supplement use.

For 9 of 10 statements, at least one third of herbal supplement users answered “not sure”. This might suggest that there was a certain percentage of herbal supplement users purchasing herbal supplements without enough information about herbal supplements themselves. The three top statements that the majority of subjects reported “not sure” were statement of “herbal supplements are adequately tested for safety, purity, and consistency of dosage before being marketed (43%)”, “herbal supplements shouldn’t be taken with other medications (46%)”, and “they are more effective than prescription

Table 23. Attitudes about concepts of herbal supplements

	Strongly agree		Agree		Disagree		Strongly disagree		Not sure	
	N	%	N	%	N	%	N	%	N	%
They will contribute to one's overall well-being (n=63)	10	15.9	28	44.4	3	4.8	1	1.6	21	33.3
They are adequately tested for safety, purity, and consistency of dosage before being marketed (n=63)	3	4.8	19	30.2	7	11.1	7	11.1	27	42.9
They may cause side effects (n=63)	2	3.2	31	49.2	9	14.3	0	0	21	33.3
They are too expensive (n=62)	8	12.9	28	45.2	13	21.0	0	0	13	21.0
They do not ensure good health (n=61)	4	6.6	18	29.5	15	24.6	0	0	24	39.3
They should only be taken with prescription (n=63)	6	9.5	6	9.5	22	34.9	8	12.7	21	33.3
They shouldn't be taken with other medications (n=59)	3	5.1	11	18.6	17	28.8	1	1.7	27	45.8
They are <i>more natural</i> than prescription and over-the-counter medications (n=63)	9	14.3	25	39.7	5	7.9	2	3.2	22	34.9
They are <i>safer</i> than prescription and over-the-counter medications (n=64)	6	9.4	18	28.1	14	21.9	3	4.7	23	35.9
They are <i>more effective</i> than prescription and over-the-counter medications (n=61)	1	1.6	11	18.0	15	24.6	3	4.9	31	50.8

and over-the-counter medication (51%)”. This might suggest the importance for health educators to educate the public about herbal supplements.

The majority of users strongly agreed/agreed with the following statements: “herbal supplements will contribute to one’s overall well-being (60%)”, “herbal supplements are too expensive (58%)”, “herbal supplements are *more natural* than prescription and over-the-counter medications (54%)” and “herbal supplements may cause side effects (52%)”. On the other hand, 48% of herbal supplement users strongly disagreed/disagreed about “herbal supplements should only be taken with prescription”.

Although approximately 38% of herbal supplement users strongly agreed/agreed with the statement “herbal supplements are safer than prescription and over-the-counter medications”, 27% of them strongly disagreed/disagreed this statement. Also, compared to 35% of users who strongly agreed/agreed, “herbal supplements are adequately tested for safety, purity, and consistency of dosage before being marketed”, 22% of users strongly disagreed/disagreed with this statement. It might appear that many users are unaware of the potential risks of herbal supplement use.

After excluding the response of “not sure”, most of the herbal supplement users strongly agreed/agreed that herbal supplements are more natural (83%) and safer (59%) than prescription and over-the-counter medications. However, only 40% of the herbal supplement users strongly agreed/agreed that herbal supplements are more effective than prescription and over-the-counter medications.

While 91% of herbal supplement users strongly agreed/agreed that “herbal supplements will contribute to one’s overall well-being” (after excluding the response of “not sure”), 59% of herbal supplement users strongly agreed/agreed that “herbal

supplements do not ensure good health". This inconsistency could be explained by the misreading of the double negative question.

Table 24 shows the results of simple means of responses to each statement about herbal supplements among regular and occasional users. The results excluded the response of "not sure" in order to get the precise attitude tendency of each statement. A t-test was used to examine the attitude differences between regular and occasional herbal supplement users. None of the 10 statements showed statistical significance.

Table 24. The mean score on agreement with each concept about herbal supplements

	Frequency of herbal supplement use	n	Mean \pm S.D ¹
They will contribute to one's overall well-being	Regularly	27	1.85 \pm 0.53
	Occasionally	15	1.93 \pm 0.80
They are adequately tested for safety, purity, and consistency of dosage before being marketed	Regularly	22	2.36 \pm 0.85
	Occasionally	14	2.71 \pm 0.99
They may cause side effects	Regularly	28	2.21 \pm 0.57
	Occasionally	14	2.07 \pm 0.27
They are too expensive	Regularly	30	2.20 \pm 0.66
	Occasionally	19	1.95 \pm 0.62
They do not ensure good health	Regularly	24	2.29 \pm 0.69
	Occasionally	13	2.31 \pm 0.63
They should only be taken with prescription	Regularly	28	2.86 \pm 0.89
	Occasionally	14	2.57 \pm 1.02
They shouldn't be taken with other medications	Regularly	22	2.55 \pm 0.60
	Occasionally	10	2.40 \pm 0.97
They are <i>more natural</i> than prescription and over-the-counter medications	Regularly	27	1.93 \pm 0.78
	Occasionally	14	2.14 \pm 0.66
They are <i>safer</i> than prescription and over-the-counter medications	Regularly	27	2.22 \pm 0.85
	Occasionally	14	2.57 \pm 0.76
They are <i>more effective</i> than prescription and over-the-counter medications	Regularly	20	2.55 \pm 0.76
	Occasionally	10	2.90 \pm 0.57

¹Summary mean \pm S.D based on 4-point scale where:
1=Strongly Agree, 2=Agree, 3= Disagree, 4= Strongly Disagree

Attitudes Toward Efficacy of Herbal Supplements

Table 25 shows the subjects' attitudes about the efficacy of herbal supplement use (Q-16). Perception of nine possible benefits of using herbal supplements were rated by using the same four-point Likert-type scale measurement as mentioned before. A "don't know" response category was actually added by some respondents (from 16% to 24%, depending on the statements). This suggested that it would be beneficial to include "don't know" opinion in future questionnaires.

The majority of the herbal supplement users strongly agreed/agreed with the following statements about efficacy of herbal supplement use: "make you feel less stressed (88%)", "protect you from getting a cold (81%)", "improve your memory (81%)", "give you more energy (78%)", "make you healthier (75%)", and "improve your mood (73%)". Approximately 31% of the respondents strongly agreed/agreed with the statement of "herbal supplements protect you from cancer". For the statements of "help you look younger" and "help you to live longer," the respondents had a mixed opinion.

Table 26 shows the result of simple mean of responses to each efficacy statement among regular and occasional herbal supplement users. The results excluded "don't know" responses. A t-test was used to examine the attitude differences between regular and occasional herbal supplement users. Only one of the statements, "improve your memory", showed a significant difference ($p \leq 0.008$). Regular herbal supplement users were more likely to agree that herbal supplement would help improve their memory than occasional herbal supplement users.

Five of these nine suggested benefits of using herbal supplements corresponded with purported functions of certain herbal products (Q14-c). For instance, improve

Table 25. Attitudes toward efficacy about using herbal supplements

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know ¹	
	N	%	N	%	N	%	N	%	N	%
Give you more energy (N ² =61)	4	8.2	34	69.4	9	18.4	2	4.1	12	19.7
Protect you from getting a cold (N=63)	8	15.1	35	66.0	8	15.1	2	3.8	10	15.9
Protect you from cancer (N=55)	3	7.1	10	23.8	20	47.6	9	21.4	13	23.6
Improve your memory (N=59)	9	18.8	30	62.5	7	14.6	2	4.2	11	18.6
Make you healthier (N=58)	5	10.4	31	64.6	9	18.8	3	6.3	10	17.2
Help you look younger (N=58)	1	2.2	19	41.3	21	45.7	5	10.9	12	20.7
Make you feel less stressed (N=60)	2	4.1	41	83.7	4	8.2	2	4.1	11	18.3
Improve your mood (N=56)	3	6.8	29	65.9	10	22.7	2	4.5	12	21.4
Help you to live longer (N=55)	4	9.3	22	51.2	15	34.9	2	4.7	12	21.8

¹The “don't know” category was created by some respondents

²The total number of respondents, including the respondents who added “don't know” category

Table 26. The mean score on agreement with each statement about efficacy of using herbal supplement

	Frequency of herbal supplement use	n	Mean \pm S.D ¹
Give you more energy	Regularly	30	2.20 \pm 0.71
	Occasionally	19	2.16 \pm 0.50
Protect you from getting a cold	Regularly	31	2.10 \pm 0.79
	Occasionally	22	2.05 \pm 0.49
Protect you from cancer	Regularly	26	2.85 \pm 0.97
	Occasionally	16	2.81 \pm 0.66
Improve your memory**	Regularly	30	1.83 \pm 0.65
	Occasionally	18	2.39 \pm 0.70
Make you healthier	Regularly	31	2.16 \pm 0.73
	Occasionally	17	2.29 \pm 0.69
Help you look younger	Regularly	29	2.66 \pm 0.72
	Occasionally	17	2.65 \pm 0.70
Make you feel less stressed	Regularly	30	2.03 \pm 0.49
	Occasionally	19	2.26 \pm 0.56
Improve your mood	Regularly	26	2.15 \pm 0.61
	Occasionally	18	2.39 \pm 0.70
Help you to live longer	Regularly	28	2.32 \pm 0.70
	Occasionally	15	2.40 \pm 0.63

¹Summary mean \pm S.D based on 4-point scale where:

1=Strongly Agree, 2=Agree, 3= Disagree, 4= Strongly Disagree

** Statistically significant at the level of $p \leq 0.01$.

memory is said to be one of the functions of ginkgo biloba. Echinacea and feverfew are widely used to fight colds and flu; ginseng has been used as an energy-enhancer; St. John's Wort is popular for reducing mild depression; and kava kava is used to treat stress. Spearman's correlation test was used to examine the relationship between the respondents' attitude toward efficacy of certain herbal supplement use and actual use of these certain herbal supplements (Table 27).

Table 27. Relationship between attitude toward efficacy of herbal supplements (Q16) and the frequency of herbal supplement usage (Q14-c)

	Spearman's Correlation	
	rho	<i>p</i>
Ginkgo Biloba vs. "improve your memory"	0.176	0.303
Ginseng vs. "give you more energy"	0.500	0.058
Echinacea vs. "protecting you from getting cold"	0.369	0.109
St. John's Wort vs. "improve your mood"	-0.004	0.991
Kava Kava vs. "make you less stressed"	0.250	0.900

The relationship between the herbal supplements users' attitudes toward efficacy of certain herbal supplements (Q16) and the degree of their knowing possible benefits of these certain herbal supplements (Q14-g) was examined by Spearman's correlation as well (Table 28). There were no significant associations, although ginseng approached significance. The results indicate that perceptions of benefits of herbal supplements might not be related to herbal supplement use. When examining the relationship between the attitudes toward efficacy of herbal supplement use and the degree of knowing possible benefits of herbal supplements, two relationships showed a significant association (Ginkgo Biloba vs. "improve your memory" and Ginseng vs. "give you more energy"). The more the respondents knew about the possible benefits of certain herbal supplements, the stronger they agreed about the efficacy of that certain herbal supplement.

These two significant results might be due not only to the well-known and specific benefits of ginkgo biloba and ginseng, but also to the popularity of these two products in the market place. Although the other three products were also best selling herbal products, they might have more than one specific function and people might use them for various benefits. For instance, echinacea is not only used for relieving the

symptoms of colds, but also for supporting immune system. Therefore, people might use them for immune system improvement rather than as fever reliever.

Table 28. Relationship between attitude toward efficacy of herbal supplements (Q16) and the perceived possible benefits of herbal supplements (Q14-g)

	Spearman's Correlation	
	rho	p
Ginkgo Biloba vs. "improve your memory"	0.332	0.024*
Ginseng vs. "give you more energy"	0.432	0.004*
Echinacea vs. "protecting you from getting cold"	0.135	0.388
St. John's Wort vs. "improve your mood"	0.264	0.109
Kava Kava vs. "make you less stressed"	-0.021	0.900

Perception of Degree of Susceptibility to Health Condition and Perception of Degree of Severity of Health Condition vs. the Frequency of Herbal Supplement Usage

Table 29 shows the perceptions of susceptibility to health conditions (Q17) and table 30 shows the perception of severity to health conditions (Q18). For each item under both questions, the same four-point Likert-type scale was used to measure the extent of agreement on each item.

The opinion of "don't know" was actually added by some respondents and this suggested that this category should be asked in the future questionnaires. Respondents were more likely to report "don't know" in regard to the effect of herbal supplements on susceptibility and severity of "cancer", "skin problems", and "serious illness".

For perceived susceptibility, the majority of the respondents strongly agreed/agreed that herbal supplements make them less susceptible to "memory loss"(82%), "colds"(79%), and "stress"(76%). For perceived severity, most of the users strongly agreed/agreed that herbal supplements reduce their severity of "memory loss"(82%), "colds"(79%), and "stress"(79%). This result was consistent with the finding

Table 29. Attitudes toward using herbal supplements to lessen *susceptibility* to diseases

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know ¹	
	N	%	N	%	N	%	N	%	N	%
Serious illness (N ² =61)	6	13.3	19	42.7	14	31.1	6	13.3	16	26.2
Stress (N=60)	3	6.5	32	69.6	8	17.4	3	6.5	14	23.3
Colds (N=62)	6	11.3	36	67.9	10	18.9	1	1.9	9	14.5
Skin problems (N=59)	3	7.1	21	50.0	16	38.1	2	4.8	17	28.8
Memory loss (N=58)	6	12.0	35	70.0	8	16.6	1	2.0	8	13.8
Heart attacks (N=61)	4	8.7	21	45.7	14	30.4	7	15.2	15	24.6
Cancer (N=56)	2	5.1	13	33.3	14	35.9	10	25.6	17	30.4
Other health problems (N=22)	0	0	7	63.6	0	0	4	36.4	11	50.0

Table 30. Attitudes toward using herbal supplements to reduce *severity* of diseases

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know ¹	
	N	%	N	%	N	%	N	%	N	%
Serious illness (N ² =59)	4	9.8	21	51.2	11	26.8	5	12.2	18	30.5
Stress (N=62)	4	8.3	34	70.8	8	16.7	2	4.2	14	22.6
Colds (N=64)	6	10.7	38	67.9	10	17.9	2	3.6	8	12.5
Skin problems (N=57)	3	7.9	17	44.7	14	36.8	4	10.5	19	33.3
Memory loss (N=58)	9	17.6	33	64.7	7	13.7	2	3.9	7	12.1
Heart attacks (N=56)	6	15.4	14	35.9	11	28.2	8	20.5	17	30.4
Cancer (N=56)	4	11.1	13	36.1	12	33.3	7	19.4	20	35.7
Other health problems (N=22)	1	10.0	6	60.0	2	20.0	1	10.0	12	54.5

¹The “don't know” category was created by some respondents

²The total number of respondents, including the respondents who added “don't know” category

in the question of attitude toward efficacy of herbal supplement use. The top three benefits of using herbal supplement they reported were: “make you feel less stressed”, “protect you from getting a cold”, and “improve your memory”.

Tables 31 and Table 32 show the simple mean of responses to each health condition in questions 17 and 18 among regular and occasional users. The results excluded the response of “don’t know.” A t-test was used to examine the attitude difference on each condition between regular and occasional herbal supplement users in both questions. For question 17, none of the health problems showed significant difference between the regular and occasional users. This means that for both regular and occasional herbal supplement users, the opinion about taking herbal supplements to make them less susceptible to health conditions were similar.

Table 31. The mean score on agreement with each health problem that herbal supplements lessen susceptibility to

	Frequency of usage	n	Mean \pm S.D ¹
Serious illness	Regularly	27	2.44 \pm 0.93
	Occasionally	18	2.44 \pm 0.86
Stress	Regularly	25	2.28 \pm 0.79
	Occasionally	21	2.19 \pm 0.51
Colds	Regularly	31	2.13 \pm 0.62
	Occasionally	22	2.09 \pm 0.61
Skin problems	Regularly	23	2.39 \pm 0.78
	Occasionally	19	2.42 \pm 0.61
Memory loss	Regularly	31	1.97 \pm 0.60
	Occasionally	19	2.26 \pm 0.56
Heart attacks	Regularly	28	2.50 \pm 0.84
	Occasionally	18	2.56 \pm 0.92
Cancer	Regularly	22	2.86 \pm 0.99
	Occasionally	17	2.76 \pm 0.75
Other health problems	Regularly	9	2.33 \pm 0.50
	Occasionally	2	2.50 \pm 0.71

¹Summary mean \pm S.D based on 4-point scale were:

1=Strongly Agree, 2=Agree, 3= Disagree, 4= Strongly Disagree

For question 18, two of the eight health problems showed a significant difference (table 32) when comparing the regular and occasional users: “memory loss” ($p \leq 0.020$) and “other health problems” ($p \leq 0.018$). The regular users were more likely to agree that taking herbal supplement reduces their severity of “memory loss” than occasional users, and this certainly explained the high percentage of ginkgo biloba use in this study. Although the statistical result shows a significant difference regarding herbal supplement use and reduction of severity of “other health problems” between the regular and occasional herbal supplement user, only one respondent listed a health problem, i.e. reduce his severity of “prostate enlargement”.

Table 32. The mean score on agreement with each health problem that herbal supplements reduce severity of

	Frequency of herbal supplement use	n	Mean \pm S.D ¹
Serious illness	Regularly	24	2.42 \pm 0.88
	Occasionally	17	2.41 \pm 0.80
Stress	Regularly	28	2.14 \pm 0.65
	Occasionally	20	2.20 \pm 0.62
Colds	Regularly	33	2.18 \pm 0.64
	Occasionally	23	2.09 \pm 0.67
Skin problems	Regularly	22	2.45 \pm 0.86
	Occasionally	16	2.56 \pm 0.73
Memory loss*	Regularly	34	1.88 \pm 0.64
	Occasionally	17	2.35 \pm 0.70
Heart attacks	Regularly	23	2.57 \pm 0.99
	Occasionally	16	2.50 \pm 1.03
Cancer	Regularly	21	2.57 \pm 0.98
	Occasionally	15	2.67 \pm 0.90
Other health problems*	Regularly	9	2.11 \pm 0.60
	Occasionally	1	4.00 \pm 0.00

¹Summary mean \pm S.D based on 4-point scale where:

1=Strongly Agree, 2=Agree, 3= Disagree, 4= Strongly Disagree

* Statistically significant at the level of $p \leq 0.05$.

Null Hypothesis Testing

For null hypotheses testing, the chi-square test was performed to examine the association between proposed independent variables and the frequency of herbal supplement usage. However, the value of the chi-square test only provides information about the association rather than the strength and type of association between two variables. Thus, the Spearman's rho (ρ), phi coefficient (ϕ), or the Cramèr's V (depending on the nature of the variables) was tested to examine the strength of association if the chi-square test leads to rejection of the null hypothesis.

Spearman's rho is a measure of association for rank order data between two ordinal variables. When measuring the strength of the relationship between two nominal variables, the ϕ is used if the cross-tabulation table is composed of two dichotomous variables, and the Cramèr's V is used for the cross-tabulation table if larger than 2 x 2. The results of the analyses of seven hypotheses, based on the HBM, provided information related to the factors that predict the herbal supplement use.

H₀1: Perceptions of degree of susceptibility to chronic disease (Q17-6, 17-7) will not be associated with the frequency of herbal supplement usage (Q14).

The association between perceptions of degree of susceptibility to chronic diseases (Q-17) and the frequency of herbal supplement usage (regularly and occasionally) was tested. Eight health problems were tested via question 17. Only two of them were related to *chronic diseases*: "heart attacks" and "cancer". Table 33 shows the

result of χ^2 for both of them, and neither of them shows statistical association with the frequency of herbal supplement usage; hence, hypothesis 1 is retained.

Table 33. Association between the perceptions of degree of susceptibility to chronic diseases and the frequency of herbal supplement usage

	χ^2 -value (d.f.)	<i>p</i> -value
Heart attacks	0.255 (1)	0.635
Cancer	0.094 (1)	0.759

Perceived susceptibility is an important component in the HBM to predict behavior change. However, in this study, the statistic result indicated that the variable of the perceptions of degree of susceptibility to chronic disease was not a strong factor to predict the frequency of herbal supplement usage. The explanations would be, first, the respondents may not see themselves as susceptible to heart attacks or cancers. Second, they may not consider the behavior of “taking herbal supplements” as working for these health conditions. Although regular and occasional users may have similar beliefs regarding herbal supplement use, personal susceptibility may differ. Thus, if the respondents did not perceive themselves susceptible to certain health condition, they would not think of taking action to prevent those certain diseases. Thus, the null hypothesis 1 was retained.

H₀₂: Perceptions of degree of severity of chronic disease (Q18-6, 18-7) will not be associated with the frequency of herbal supplement usage (Q14).

The association between perceived severity to chronic diseases (Q-18) and the frequency of herbal supplement usage was tested for “heart attacks” and “cancer”

through hypothesis 2. Table 34 shows the result of χ^2 for both of them, and neither of them shows statistical association with the frequency of herbal supplement usage; thus, hypothesis 2 is retained.

Table 34. Association between the perceptions of degree of severity to chronic diseases and the frequency of herbal supplement usage

	χ^2 -value (d.f.)	<i>p</i> -value
Heart attacks	0.003 (1)	0.955
Cancer	0.018 (1)	0.894

According to the finding of question 2, “have you received a doctor’s diagnosis for any of the following illnesses”, only a small number of herbal supplement users reported they have heart disease (n=12), or cancer (n=7). This small portion of the respondents on these two health conditions might result in the low response of the perceived severity of disease. In other words, if people have not experienced a certain disease, they might not be able to know how serious that disease is, and they might not think it is necessary to take action to prevent that health condition.

Perceived threat is a sequential function of perceived severity and perceived susceptibility. When perception of threat from certain disease is high, the chance of taking action for improving that certain disease will be high as well. However, in this study not only was the perception of threat not high enough, but also the reason for taking herbal supplements was not related to these two health conditions. This might explain no association between perception of threat and herbal supplement use.

H₀3: Perceptions of health risks of herbal supplement use (Q15-2, 15-3, 15-9) will not be associated with the frequency of herbal supplement usage (Q14).

According to Glanz K. et al. (21), the component of perceived barriers is the most powerful single predictor among the HBM dimension of many studies. Perceived barriers for taking herbal supplements including safety, expense, and inconvenience. In hypothesis 3, we focused on the health risk of using herbal supplements rather than the other barriers. Cost might not be a large concern since our subjects were reported to be a high-income population. Also, the Safeway is near the Capital Manor so it is convenient for them to purchase these herbal supplements.

The association between three perceived health risks of taking herbal supplements and the frequency of herbal supplement usage are listed in the Table 35. None of the three statements shows a significant association with herbal supplement usage frequency; thus, hypothesis 3 was retained. This finding might result from the low perceived threat. If the perception of threat is not high, it is not likely that low perceived barriers would necessarily influence herbal supplement use.

This result indicated that our subjects did not consider the safety issue as a barrier to the frequency of herbal supplement usage. Although approximately 52% of herbal supplement users agreed herbal supplements might cause side effects, 37% of the respondents agreed “they are safer than prescription and over-the-counter medications” and 35% of them agreed “they are adequately tested for safety before being marketed”. This finding differed from another study (61), which found that the consumers did not think herbal supplements were safe or adequately tested.

Table 35. Association between the perceptions of health risks of herbal supplements and the frequency of herbal supplement usage

	χ^2 -value (d.f.)	<i>p</i> -value
They are not adequately tested for safety, purity, and consistency of dosage before being marketed (-)	1.190 (1)	0.275
They may cause side effects	2.545 (1)	0.111
They are not <i>safer</i> than prescription and over-the-counter medications (-)	2.153 (1)	0.142

(-) The statement was reversed from the original survey.

H₀4: Practice of preventive lifestyle factors (Q-7) will not be associated with herbal supplement usage (Q14).

Will people who practice preventive lifestyles tend to use herbal supplements more than other people? This is the purpose of hypothesis 4. To measure hypothesis 4, the list of preventive dietary factors from question 7 and the smoking status (preventive lifestyle factor) were examined by χ^2 -test (Table 36) in order to find the association between preventive lifestyle factors and herbal supplement usage (users vs. non-users). Only three of the eight factors (38%) were statistically significantly associated with herbal supplement usage. Hypothesis 4 was therefore retained.

One of the preventive factors that tested significant was “choose a diet low in fat, saturated fat, and cholesterol.” The Cramer’s $V = 0.17$ ($p \leq 0.012$) expressed a weak relationship between this factor and herbal supplement use. The herbal supplement users reported a slightly higher percentage of trying at least “*much*” to “choose a diet low in fat, saturated fat, and cholesterol” than non-users. The other preventive factor that

showed significance was “choose a diet moderate in sugar.” The Cramer’s V was 0.168 ($p \leq 0.012$). The herbal supplement users also had a slightly higher percentage “choose a diet moderate in sugar” than non-users.

Table 36. Association between the preventive lifestyle factors and herbal supplement usage

	χ^2 -value (d.f)	p -value
Choose a diet low in fat, saturated fat, and cholesterol*	8.856 (2)	0.012
Choose a diet moderate in sugar*	8.880 (2)	0.012
Choose a diet moderate in salt and sodium	2.499 (2)	0.287
Choose a diet with plenty of grain products, vegetables, and fruits	5.572 (2)	0.062
Eat a variety of foods	1.789 (2)	0.409
Get enough calcium in foods or supplements	3.539 (2)	0.170
Exercise regularly	1.015 (2)	0.134
Smoking	3.714 (2)	0.054

* Statistically significant at the level of $p \leq 0.05$.

In this study, none of the herbal supplement users reported being a current smoker, although 22% of herbal supplement users were former smokers. The majority of them (78%) have never been smoked. This suggested that either a deception situation occurs, which is common around the smoking issue, or the confusion about the definition of “current smoker”. Another explanation was the smoking policy in the Capital Manor. Smoking is not allowed in the Capital Manor common areas, so the only place the residents could smoke would be in their own apartments. Perhaps this is perceived as not smoking. Although smoking status was not found to be significantly associated with

herbal supplement usage, a rounded p -value, 0.05 (original p -value=0.054) suggested a slight association between smoking and herbal supplement usage might exist. Herbal supplement users may be more likely to be non-smokers than non-herbal supplement users.

Although there was a slight association between three preventive lifestyle factors and herbal supplements, we can't generalize the results to each preventive lifestyle factor. We need more information to measure how preventive lifestyle actually affects the herbal supplement use in order to explain the relationship.

H₀5: Vitamin/mineral supplement usage (Q12) will not be associated with herbal supplement usage (Q14).

The relationship between vitamin/mineral supplement usage and herbal supplement usage was examined in hypothesis 5. Table 37 shows the significant association between vitamin/mineral supplement usage and herbal supplement usage ($\phi=0.148$ at the level of $p \leq 0.008$), thus hypothesis 5 was rejected. The Phi coefficient showed a weak relationship between vitamin/mineral supplement use and herbal supplement use.

Table 37. Relationship between vitamin/mineral supplement usage and herbal supplement usage

	χ^2 -value (d.f)	p -value
V/M/S usage*	7.010 (1)	0.008

* Statistically significant at the level of $p \leq 0.05$.

Approximately 97% of herbal supplement users were also vitamin/mineral supplement users, but only 23% of vitamin/mineral supplement users said they used herbal supplements. This indicated that if people have been using herbal supplements, they mostly have the experience of using vitamin/mineral supplements. People who use either one may consider the other one as similar supplementation (even though the functions are not the same), and have the similar expectation (such as, the products will work or they are safer than medication). In this study, we only examined the relationship between these two supplements. The attitudes toward the efficacy for both products were not conducted.

H₀₆: Attitudes toward efficacy of herbal supplements (Q16) will not be associated with the frequency of herbal supplement usage (Q14).

The possible perceived benefit, also called efficacy, is usually a stronger predictor in the HBM than other components for engaging certain health-behavior change. It is important that perceived benefits not be viewed strictly in the context of health. Perceived benefits of taking supplements can include either physical (such as, protect you from cancer) or psychological (such as, improve your mood) efficacy. Immediate functional benefits (such as, relieve the cold) of taking herbal supplements should also be considered. Thus, nine perceived benefits of using herbal supplement (Q-16) were examined in this study.

Table 38 shows the χ^2 results about the association between the perceived benefits and herbal supplement use for each benefit. Only one of the nine benefits showed significant association with the frequency of herbal supplement usage ($p=0.006$). Thus,

hypothesis 6 was retained. The strength of this relationship was measured by Spearman's rho ($\rho=0.400$ at $p \leq 0.005$). Since rho is close to 0.5, the relationship between "taking herbal supplements" and "improve your memory" was moderate strong and positive. The regular users tend to agree that herbal supplements improve their memory, compared to the occasional users who disagreed on this benefit.

Perceived benefits and barriers will be stronger predictors of behavior change when perceived threat is high rather than when it is low. Since the result of the perceived threat was low, this might explain why both perceived benefits and barriers were low in this study.

Table 38. Association between the attitudes toward efficacy of herbal supplements and the frequency of herbal supplement usage.

	χ^2 -value (d.f)	<i>p</i> -value
Give you more energy	0.035 (1)	0.852
Protect you from getting a cold	0.672 (1)	0.412
Protect you from cancer	0.001 (1)	0.974
Improve your memory *	7.667 (1)	0.006
Make you healthier	0.273 (1)	0.601
Help you look younger	0.141 (1)	0.708
Make you feel less stressed	2.240 (1)	0.134
Improve your mood	2.072 (1)	0.150
Help you to live longer	0.490 (1)	0.484

* Statistically significant at the level of $p \leq 0.05$.

H₀7: Herbal supplement information sources (Q19) will not be associated with the frequency of herbal supplement usage (Q14).

Question 19 listed a number of information sources where people got not only health information, but also herbal supplement information. This influence on herbal

supplement use is what we call “cues”. Some of them might motivate behavior change and some of them might not. Hypothesis 7 was designed to measure which cues have more influence on herbal supplement use than others.

Table 39 has the χ^2 test results of the association between herbal supplement information sources and herbal supplement use for each cue. Unfortunately, none of the information sources shows a significant association with the frequency of herbal supplement usage; thus, hypothesis 7 was retained. Even though there was no association between information sources and the frequency of herbal supplement usage; this does not mean that the respondents did not use these cues as their herbal supplement information sources. For both regular and occasional herbal supplement users, they reported similar levels of relying on sources. “Books, newspapers or magazine”, “medical doctor/nurse”, and “dietitian” were the top three information sources they relied on.

Table 39. The relationship between herbal supplement information sources and the frequency of herbal supplement usage

	χ^2 -value (d.f)	<i>p</i> -value
Medical doctor/Nurse	0.000 (1)	0.986
Dietitians	3.012 (1)	0.078
Alternative health care providers (such as: chiropractors, naturopaths, etc.)	0.052 (1)	0.819
Capital Manor residents	0.205 (1)	0.651
Family or friends	0.077 (1)	0.781
Drug stores/pharmacist	1.432 (1)	0.231
Health food or grocery stores	0.069 (1)	0.793
Books, newspapers or magazines	0.004 (1)	0.947
TV or radio	2.336 (1)	0.126
Internet	0.201 (1)	0.654
Others	1.311 (1)	0.252

CONCLUSION/IMPLICATIONS

A number of surveys reflect the high prevalence of dietary supplement use in the older population. The high incidence of vitamin/mineral supplement purchases and the reasons for their use have been widely studied. However studies have examined the incidence of herbal supplement use by the elderly, and none having done so using a theoretical model. Thus, this study used the Health Belief Model (HBM) components in order to identify the factors that predict the frequency of herbal supplement usage.

Profiles of the Participants

The subjects of this study consisted of 318 independent residents of Capital Manor, a continuing care retirement center in Salem, Oregon. Most subjects were female (68%) and Caucasian (88%). The age range of this group was 65 to 100 years and the mean age was 82.2 years. They had a high annual household income (43% had incomes more than \$50,000, excluding “don’t know” and “none of your business”) and were highly educated (78% had more than a high school education). Seventy-seven percent of the subjects self-reported their health status as “good”, and 66% of the respondents said their health status “stayed the same” during last year, compared to 23% reporting that their health “declined.” The three most frequently cited health problems of the respondents were: heart disease (including cardiovascular disease and hypertension (52%), arthritis (40%) and osteoporosis (18%). Approximately 81% of the subjects reported exercising and 64% of them were engaging at a moderate exercise level.

A majority of the study group reported being vitamin and/or mineral supplement users (n=277, 87%), which is notably greater than the percentages found in the past research on supplement intake among the elderly. Among the vitamin/mineral supplement users, 90% of them reported being regular users (at least once a week). This could be due to an increasing awareness of physical health and wellness in our society.

Approximately 20% (n=65) of the respondents reported using herbal supplements, and this finding was parallel to previous research (13). Among 20% of herbal supplement users, 62% of them were “regular” users, and 39% were “occasional” users.

Vitamin and Mineral Supplement Users

Most of the vitamin/mineral supplement users were female (72%) and Caucasian (89%), with household incomes above \$50,000 (41%); 79% had more than high school education. The mean age of the users was 81.8 years. The majority of the users (76%) reported having a “good” health status, and 81% of the users exercised.

Most of the vitamin/mineral supplement users perceived that “balanced diet”(93%), “exercise”(88%), and “vitamin/mineral supplement use”(66%) helped maintain health. The majority of the users said they tried to do the following preventive behaviors: “choose a diet moderate in sugar”(91%), “choose a diet with plenty of grain products, vegetables, and fruits” (98%), and “eat a variety of foods”(99%). In contrast, vitamin/mineral supplement users were less likely to do the behavior of “choose a diet moderate in sale and sodium”(87%) than other preventive behaviors.

Level of education and income status were not significantly associated with vitamin/mineral supplement use by the elderly. In agreement with other reports (7), neither marital status nor living situation was significantly associated with vitamin/mineral supplement use. The one factor that was significantly related to vitamin/mineral supplement usage was gender, with women being more frequent users of supplements (72%) than men (28%).

Health care providers should recognize that some men might view certain nutrition behaviors, such as taking a supplement, as a feminine behavior. To encourage the appropriate use of vitamin/mineral supplements by the elderly, a sensitive (considering differences in the health belief systems of men and women) culturally appropriate nutrition education program through health and social support systems is needed.

Respondents reported three top reasons for using vitamin/mineral supplements: “to benefit your overall health”(88%), “supplement your diet”(69%), and “to increase your energy level”(40%). These reasons were cited in many of the previous studies as the popular reasons to take supplements as well (8,17,28,62,63). Gender was not significantly associated with any top reason for taking vitamin/mineral supplements. However, age was significantly associated with one of the reasons “to supplement your diet”(with the users of the age group of 75-84 years being more likely to report this reason than the age group of 65-74 years and 85+ years). The frequency of usage was significantly associated with “to benefit your overall health” (with regular users more likely to report this reason than occasional users).

“Medical doctor/nurse”(77%), “books, newspapers or magazines”(54%) and “dietitians”(35%) were the three most frequently cited sources from which the

vitamin/mineral supplement users reported getting their diet and health information. Professionals in the field of nutrition should try to expose older age groups to accurate nutrition information, and to encourage appropriate use of vitamin and mineral supplementation. Recognizing patterns of supplement use and related psychosocial factors can help health professionals develop nutrition education programs which encourage elderly to arrive at a safe regimen of supplement use most appropriate for their needs.

The elderly appear to place much value in media messages, particularly magazine articles and advertisements. These messages about vitamin/mineral and herbal supplements could well be a source of misconceptions in regard to the usage amount and potential functions. The importance of communication between the older adults and individuals qualified to offer nutrition information must be stressed as a way to decrease the adherence to unreliable information. The use of magazine articles or advertisements as a basis for nutrition discussion, by qualified individuals, could lead to more active learning and could increase the ability of the elderly individuals to evaluate value of the articles or advertisements more critically. With the rapid aging of the population, development of techniques to assist the elderly in obtaining the most healthful diets is greatly needed.

Herbal Supplement Users

Most of the herbal supplement users were female (68%). Although most users were Caucasian (85%), 15% were Native American. This may reflect the cultural differences between Caucasians and Native Americans. Folk medicine is part of the

Native American culture and this may explain why a higher percentage (23%) using herbal supplements while only 9% used vitamin/mineral supplements. This also suggested that future research may need to study use of the herbal supplements by populations other than Caucasians.

Compared to the vitamin/mineral supplement users, herbal supplement users tended to be slightly younger (mean age was 79.6 years), have higher income (fewer of the users reported low incomes and more of them reported “none of your business” to the income question). Moreover, a higher percentage of the herbal supplement users reported “live with spouse (69%)” than the vitamin/mineral supplement users (53%). This might suggest an influence of the spouse on the herbal supplement use.

The majority of the herbal supplement users (78%) reported having a “good” health status, and 91% of the users reported exercising. Users perceived that three health behaviors help maintain health: “balanced diet” (88%), “exercise”(89%) and “vitamin/mineral supplement use”(72%). While 12% of the vitamin/mineral supplement users perceived “herbal supplement” to help maintain health, the majority of the herbal supplement users (72%) perceived that “vitamin/mineral supplements” help maintain health. This explained the actual usage prevalence of both supplements, i.e., 23% of the vitamin /mineral supplement users reported using herbal supplements, and 97% of the herbal supplements used vitamin/mineral supplements. Most of the herbal supplement users were also vitamin/mineral supplement users, which indicate that similar factors may influence usage.

The majority of the herbal supplement users reported trying to do better on most of seven preventive lifestyle and dietary behaviors, compared to the vitamin/mineral supplement users. Among the seven behaviors, 5% of the herbal supplement users

reported doing “not at all” on the behavior of “choose a diet moderate in sugar”. Even so, compared to the vitamin/mineral supplement users (9% of them reporting “not at all”), the herbal supplement users still did better.

Four factors were significantly related to herbal supplement use: age group (with age group of 75 to 84 years end to be more likely to be users than age groups of 65 to 74 years and age group of 85 years and over); living status (with those living with spouses being more likely to be users than those living alone), health status changes in the past year (with users being more likely to report their health status as "improved" than non-users); and physical exercise participation (with users being more likely to exercise than non-users).

In addition, self-efficacy, one of the components of the Health Belief Model (HBM), was significantly associated with herbal supplement use. The more control they felt they had over their health, the more likely they were to use herbal supplements. However, this sense of control wasn't a significant factor predicting vitamin/mineral supplement use.

In this study, no one reported being a current smoker, although 22% of herbal supplement users were former smokers. The majority of them (78%) were nonsmokers. This suggested that either a deception situation occurs, which is common around the smoking issue, or confusion about the definition of “current smoker”. Smoking is not allowed in the Capital Manor common areas, so the only place the residents could smoke would be in their own apartments. Perhaps this is perceived as not smoking. Smoking status was significantly associated with herbal supplement usage, at the p -value=0.054 level. Herbal supplement users were more likely to be non-smokers than non-herbal supplement users.

Herbal supplement users relied on (including “very much”, “somewhat”, and “a little”) “books, newspapers or magazines”(84%), “medical doctor/nurse”(72%), and “family or friends”(62%) for information about herbal supplements. “Medical doctor/nurse”(25%), “books, newspapers or magazines”(13%) and “dietitians”(13%) were the top three information sources which the regular and occasional herbal supplement users reported relying on “very much”.

Ginkgo biloba was the most frequently used herbal product (76% of users), followed by the echinacea (39%), and ginseng (29%). Education, living arrangement, and reported health status were not significantly associated with use of any particular herbal supplement. Gender, however, was significantly associated with “Saw Palmetto”. Men were more likely to be Saw Palmetto users than women. Saw Palmetto has been promoted to prevent the enlargement of the prostate gland.

Compared to seven other herbal supplements, the possible benefits of ginkgo biloba were well known to the majority of the subjects. Approximately 83% of the herbal supplement users reported having some knowledge about its benefits. The relationships between frequency of use of eight herbal supplements and the perceived possible benefits of each were found to be statistically significant. The more they knew about the possible benefits of each herbal supplement, the more likely respondents were to take them.

Forty-four percent of user households spent more than \$10 per month on herbal supplements. The amount spend was not significantly associated with gender, age, education, income, or the frequency of herbal supplement use. “Supermarkets” (41%) and “health food stores” (41%) were the top two places where the herbal supplement users purchased herbal supplements.

The attitudes toward ten statements about herbal supplement use were asked. The majority of herbal supplement users strongly agreed/agreed “herbal supplements will contribute to one’s overall well-being” (60%) and “herbal supplements are more natural than prescriptions and over-the-counter medications”(54%). Fifty-two percent strongly agreed/agreed that “herbal supplements may cause side effects”(52%); 24% of herbal supplement users strongly agreed/agreed “herbal supplements should *not* be taken with medication”. This indicated some people don’t recognize the potential risk of using herbal supplements. There were no significant attitude differences between regular and occasional herbal supplement users for all concepts.

The herbal supplement users had mixed opinions about whether “herbal supplements are safer than prescription and over-the-counter medications”, and whether “herbal supplements are adequately tested for safety, purity, and consistency of dosage before being marketed”. Our subjects did not seem to have clear ideas about the safety issue in regard to herbal supplements. Although there may be some potential health benefits of herbal supplement use, there are potential risks such as: unsubstantiated health claims, inadequate safety testing, toxicity, and interactions with prescription drugs present a high potential risk for taking a herbal supplement.

In addition, it is often believed that if a small amount of a supplement is good, that more is even better. This type of thinking could increase the health risk. Thus, the potential risks and benefits to older adults of herbal supplementation must be carefully considered. Also, some respondents answered, “don’t know” in regarding to the benefits/barriers and the concepts of using herbal supplements. This suggested a need for future education directions and opportunities for health educators.

Nine attitudes toward suggested benefits about using herbal supplements were measured. The majority of the herbal supplement users strongly agreed/agreed that taking herbal supplements would “make you feel less stressed”(88%), “protect you from getting a cold”(81%), “improve your memory”(81%), “give you more energy”(78%), “make you healthier”(75%), and “improve your mood”(73%). The herbal supplement users had mixed opinions about the benefits of taking herbal supplement to “protect you from cancer”, “help you look younger”, and “help you to live longer”. The attitude differences between regular and occasional herbal supplement users for each statement were examined, and only one statement, “improve your memory”, showed a significant difference. Regular herbal supplement users were more likely to agree with this statement than occasional herbal supplement users.

Perceptions of degree of susceptibility to eight health conditions and their severity were measured. The majority of the respondents strongly agreed/agreed that taking herbal supplements makes them less susceptible to “memory loss”(82%), “colds”(79%), and “stress”(76%). Also, the majority of the respondents strongly agreed/agreed that taking herbal supplements reduces severity of “memory loss”(82%), “colds”(79%), and “stress”(79%). There were no significant differences between regular and occasional herbal supplement users regarding perceived susceptibility. Nevertheless, for the perceived severity of “memory loss”, a significant difference existed between regular and occasional herbal supplement users. The regular users were more likely to agree that taking herbal supplements reduces the severity of “memory loss”.

Hypotheses Testing

Perceived susceptibility to chronic diseases (hypothesis 1) and perceived severity of these chronic diseases (hypothesis 2) were not significantly associated with the frequency of herbal supplement usage. Likewise, there was no significant association between the perceived barriers, especially the health risk barriers (hypothesis 3), and the frequency of the herbal supplement. Thus, these three null hypotheses were retained.

Hypothesis 4 was designed to determine whether preventive lifestyle would be a factor to predict herbal supplement use. Three of the eight factors (38%), “choose a diet low in fat, saturated fat, and cholesterol”, and “choose a diet moderate in sugar” were statistically significantly associated with herbal supplement use. The herbal supplement users had a slightly higher tendency to try to choose a diet moderate in sugar and a diet low in fat, saturated fat, and cholesterol. Even though two of the eight factors showed significant association, null hypothesis 4 was retained.

The relationship between vitamin/mineral supplement use and herbal supplement use was examined in hypothesis 5. A weak significant relationship was found between vitamin/mineral and herbal supplement use; thus, null hypothesis 5 was rejected. This indicated that if people are using herbal supplements, they tend to use vitamin/mineral supplements.

Nine attitudes toward perceived benefits of using herbal supplements were examined among the regular and occasional herbal supplement users in the hypothesis 6. Only one of the nine benefits, “improve your memory”, showed significant association with the frequency of herbal supplement usage; hence, hypothesis 6 was retained. The

regular users tended to agree more that taking herbal supplements improves their memory than the occasional users.

Hypothesis 7 measured which herbal supplement information sources have more influence on the frequency of the herbal supplement usage than others. However, none of the information sources showed a significant association with the frequency of the herbal supplement usage; thus, null hypothesis 7 was retained.

Although only one of the null hypotheses was rejected, we cannot conclude that the Health Belief Model (HBM) was not a useful theoretical model to predict herbal supplement use. First, the HBM is formed to measure whether or not people take action for certain health-related behavior, and the behavior is either “change” or “not change” for the measurement. However, in this study, most of the HBM component measurements were based on the “frequency” of herbal supplement usage – regular use and occasional use, and the HBM was not designed to test the “degree” of people’s behavior. Second, the herbal supplement users may not all consider “taking herbal supplement” as a health-related behavior. These might be the major reasons that most of the hypotheses were not rejected.

This study examined factors that predict the intention to use herbal supplements in an elderly population. It provided insight into attitudes toward herbal supplement use. This information should be useful to those working with the elderly. When educating the elderly on the appropriate use of herbal supplements, it is important to elicit and address their attitude and beliefs regarding this topic.

Physicians would be an effective channel for educational efforts since most of the herbal supplement users relied heavily (“very much”) on them for herbal supplement information. Perhaps an education effort directed at encouraging physicians to provide

their patients with information on appropriate use of herbal supplements would help. Hopefully, there will be a movement toward incorporating herbal supplementation into the physician's agenda by emphasizing the importance of preventive and therapeutic nutritional practices rather than solely on the importance of traditional prescription and over-the-counter medications.

LIMITATION

Findings in this study can't be generalized to all elderly. First, our subjects were the residents of a retirement community in Oregon. Geographic comparisons of older adults living independently have revealed the overall use of vitamins and minerals to be higher among residents of western states than among populations in other sections of America. Gray et al. (17) reported that 72% of seniors residing in Southern California retirement community used dietary supplements, whereas Sobal and colleagues (71) discovered a much lower rate among residents of a Maryland retirement community. In addition, for five of seven hypotheses (hypothesis 1, 2, 3, 6, 7), the sample size was only 65, compared to 318 for the other two hypotheses. Thus, both the small sample size and geographical location of this study limit generalization.

This study relied on self-reported perceptions of health status, susceptibility to illness, severity of illness, and benefits of and perceived barriers to supplement use. Thus, the actual and reported attitudes of the above behaviors might be different depending on an individual's perception that using herbal supplement is a health-related behavior.

Questionnaire design might have influenced responses. When people age, they might not see as well as when they were young, so the long questionnaire or double negative questions might have influenced responses. Although this study did not assess reliability of the questionnaire, face validity (pilot test), and the content validity (comments from the committee members) were assessed.

The self-reported vitamin/mineral and herbal supplement usage was based on perceptions of "regular" (at least once per week) or "occasional" use. The association between length of usage and amount of usage was not determined.

Another limitation in this study regards the measurement of the relationships among the Health Belief Model (HBM) components. We tested the relationship between each single component and the frequency of the herbal supplement usage under the assumption of the independence of each concept. However, in reality, people's behavior is influenced not only by one single event but also by many factors, and these many factors might either have high or low inter-item correlations. Thus, a future study could examine the direct measure as well as conditional effects of variables on behavior.

RECOMMENDATION FOR FUTURE RESEARCH

The small sample size of herbal supplement users and the geographic location limitation in this study could be overcome in a future study by increasing the randomized sample size nationwide in order to get information which applies to the general elderly population. In addition, this was a mailed survey type of study. An interview technique would overcome barriers to questionnaire completion by the elderly.

The results of this study showed that the Health Belief Model (HBM) didn't predict factors that influence the "*frequency*" of herbal supplement usage (i.e. regular and occasional). Future research is needed to examine the factors that influence the differences between herbal supplement "*users* and *nonusers*" by using the components of the HBM. In addition, the length and amount of use should be added in the future research in order to provide more information to explain herbal supplement use behavior. Moreover, other theoretical models should also be utilized to provide a framework to explain herbal supplement use behavior and implement a health education program. Further research is needed to determine whether educational efforts targeted at beliefs identified through the HBM process will be more effective than those not targeted.

Herbal supplements are receiving a lot of attention lately and attracting many consumers to try them for the first time. These "new users" might have different perceptions about using herbal supplements than the long-term (traditional) herbal supplement users or vitamin/mineral supplement users. Thus, a future study should examine the difference between the new herbal supplement users and the traditional herbal supplement or vitamin/mineral supplement users.

The association between supplement use and race has been addressed in many studies; however, the majority of which focused only on Caucasians. As we know, folk medicine is part of the culture of some other populations, including Native Americans, Asian Americans, and Hispanic Americans. Hence, further investigation of herbal supplement use by other cultural populations is necessary.

From the information we gather in this study, a number of people did not have knowledge about the potential risks nor the possible benefits of herbal supplements. This provides an education opportunity for health professionals. Continuing care retirement center or senior center would be a good education channel to reach out to the older adults. A short herbal supplement education lesson might focus on “what are herbal supplements and how much would be beneficial?” or “what are the potential risks of herbal supplements”. Internet, radio or TV would be other good channels to implement the herbal supplement education program as well. After implementation, the results of an evaluation of the program will provide more information for future research.

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APPENDICES

Appendix 1.

Cover Letter, Survey Questionnaire, and Reminder Letter

DEPARTMENT OF NUTRITION AND FOOD MANAGEMENT



OREGON STATE UNIVERSITY

108 Milam Hall · Corvallis, Oregon 97331-5103

Telephone 541-737-3561 Fax 541-737-6914

February, 2000

Dear Capital Manor Resident;

Enclosed is a questionnaire that is being delivered to all residents living independently in Capital Manor. The purpose of our survey is to study older adults' food consumption and supplement usage.

There are no right or wrong answers to the questions. Because we would like each person's opinions (including males as well as females) your responses should reflect your own views rather than those of others in your household.

Your participation in the survey is voluntary and you may refuse to answer a question if you so chose. If you wish to answer any questions in more detail, please feel free to write down any comments in the margins or at the end of the questionnaire.

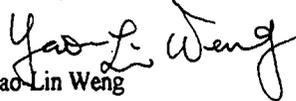
This is an anonymous survey. The answers you provide are confidential. Your name will not be associated with any results. The code number on your questionnaire is for distribution purposes only. We will use that number to give reminders to those who have not yet returned their questionnaire, so we do not burden those who have already responded.

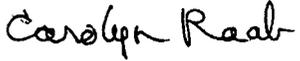
We would appreciate it if you would take a few minutes to complete the questionnaire. Please put it in the return envelope we have provided. Then put the envelope in the locked box at the reception desk labeled "OSU Diet and Health Survey".

If you'd like to receive a summary of survey results, write "Results Requested" on the back of the return envelope and print your name and address below it. Please do NOT write this information on the questionnaire itself.

Thank you in advance for responding to the survey (which is a graduate student research project). If you have any questions, please contact us.

Sincerely,


Yao-Lin Weng
Graduate student
Nutrition and Food Management
(541)758-9003


Carolyn Raab, Ph.D., R.D.
Professor
Nutrition and Food Management
(541)737-1019

Questionnaire

(1) In general, how would you rate your overall health at the present time? (Please check **one**)

- | | | | | | |
|---|--------------------------|-----------|---|--------------------------|------------|
| 1 | <input type="checkbox"/> | Excellent | 4 | <input type="checkbox"/> | Fair |
| 2 | <input type="checkbox"/> | Very good | 5 | <input type="checkbox"/> | Poor |
| 3 | <input type="checkbox"/> | Good | 6 | <input type="checkbox"/> | Don't know |

(2) Have you received a doctor's diagnoses for any of the following illnesses? (Please check **one** for each)

- | | YES | NO | |
|---|--------------------------|--------------------------|---|
| 1 | <input type="checkbox"/> | <input type="checkbox"/> | Arthritis |
| 2 | <input type="checkbox"/> | <input type="checkbox"/> | Hypertension |
| 3 | <input type="checkbox"/> | <input type="checkbox"/> | Cardiovascular Disease |
| 4 | <input type="checkbox"/> | <input type="checkbox"/> | Diabetes |
| 5 | <input type="checkbox"/> | <input type="checkbox"/> | Osteoporosis |
| 6 | <input type="checkbox"/> | <input type="checkbox"/> | Cancer |
| 7 | <input type="checkbox"/> | <input type="checkbox"/> | Excess weight |
| 8 | <input type="checkbox"/> | <input type="checkbox"/> | Certain vitamin/mineral deficiency
(Please indicate which _____) |
| 9 | <input type="checkbox"/> | <input type="checkbox"/> | Others |

(3) How has your health changed during the past year? (Check **one**)

- | | | | | | |
|---|--------------------------|------------------|---|--------------------------|------------------|
| 1 | <input type="checkbox"/> | Greatly improved | 4 | <input type="checkbox"/> | Declined |
| 2 | <input type="checkbox"/> | Improved | 5 | <input type="checkbox"/> | Greatly declined |
| 3 | <input type="checkbox"/> | Stayed the same | | | |

(4) Which of the following do you think help to maintain health?
(Please check **all** that apply)

- | | | | | | |
|---|--------------------------|--------------------|---|--------------------------|---------------------------------|
| 1 | <input type="checkbox"/> | Balanced diet | 5 | <input type="checkbox"/> | Vitamin and mineral supplements |
| 2 | <input type="checkbox"/> | Exercise | 6 | <input type="checkbox"/> | Others |
| 3 | <input type="checkbox"/> | Quit smoking | | | |
| 4 | <input type="checkbox"/> | Herbal supplements | | | |
-

(5) Have you found that your food habits have changed since you moved into Capital Manor? (Please check **one**)

- | | | |
|---|--------------------------|--|
| 1 | <input type="checkbox"/> | Yes (if <i>YES</i> , please go to # 5-a) |
| 2 | <input type="checkbox"/> | No (if <i>NO</i> , please go to # 6) |
| 3 | <input type="checkbox"/> | Not sure (please go to # 6) |

(5-a) What kinds of changes? (Please describe briefly)

Example: drinking more or less coffee than before; eating breakfast more or less often; eating larger or smaller meals.

(6) Where or from whom do you usually get your health and diet information? (Check one for each)

YES NO

- 1 Medical doctor/Nurse
 - 2 Dietitians
 - 3 Alternative health care providers (such as:
chiropractors, naturopaths, etc.)
 - 4 Capital Manor residents
 - 5 Family or friends
 - 6 Drug stores/pharmacist
 - 7 Health food or grocery stores
 - 8 Books, newspapers or magazines
 - 9 TV or radio
 - 10 Internet
 - 11 Others
-

(7) Thinking about your personal diet, to what extent do you try to do the following? (Please check one for each)

	Very Much	Much	Some	Not at all
1 Choose a diet low in fat, saturated fat, and cholesterol....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Choose a diet moderate in sugar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Choose a diet moderate in salt and sodium.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Choose a diet with plenty of grain products, vegetables, and fruits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Eat a variety of foods.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Get enough calcium in foods or supplements.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Exercise regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(8) Please rate yourself on the following. (**Check one for each**)

	Excellent	Very Good	Good	Fair	Poor
1 How your health compares to others your age.....	<input type="checkbox"/>				
2 How your level of physical activity compares to others your age.....	<input type="checkbox"/>				

(9) Please describe your situation (**Check one for each**)

	Very Much	Much	Some	Not at all
1 How much did you <i>worry</i> about your health over the past year?.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 How much control do you feel you have over your health?....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(10) Do you regularly participate in any kind of physical activity such as walking, swimming, aqua-aerobics or other kinds of exercise?

- 1 No (Please go to # 11)
 2 Yes (Please go to # 10-a)

→ (10-a) How would you rate your exercise level? (**Please check one**)

- 1 Vigorous
 2 Moderate
 3 Light

→ (11) What is your current smoking status? (**Please check one**)

- 1 Smoker
 2 Former smoker
 3 Never have smoked

(12) How frequently do you take vitamin and/or mineral supplements (such as multivitamin/mineral, Vitamin C, Vitamin E, or Calcium)?

- 1 Regularly (at least once a week)
 2 Occasionally
 3 Never (please go to question # 14)

(12-a) Have you taken any kind of vitamin or mineral supplement during the past year? (**Please Check one**)

- 1 Yes (if *YES*, please go to # 12-b)
 2 No (if *NO*, please go to question # 14)

(12-b) Have you taken any kind of vitamin or mineral supplement during the last week? (**Please Check one**)

1 No (if *NO*, please go to question # 14)

2 Yes (if *YES*, please go to # 12-c)

→ (12-c) Did your doctor advise you to take vitamin and/or mineral supplements?

1 Yes

2 No

(13) Please indicate the reasons you have taken vitamin or mineral supplements during the past year. (**Check one for each**)

YES NO

1 To benefit your overall health

2 To treat specific symptoms or disease

3 To prevent specific symptoms or disease

4 To supplement your diet

5 To increase your energy level

6 To slow the aging process

7 Other specific reasons

→ (14) How frequently do you take herbal supplements (such as Chamomile, Feverfew, Echinacea, Ginkgo Biloba, Ginseng, Kava Kava, Saw Palmetto, St. John's Wort)?

1 Regularly (at least once a week)

2 Occasionally

3 Never (please skip to # 20: ☞)

→ (14-a) Have you taken any kind of herbal supplements during the Past year? (Please Check one)

1 Yes (if *YES*, please go to # 14-b)

2 No (please skip to # 20: ☞)

→ (14-b) Have you taken any kind of herbal supplements during the last week? (Please Check one)

1 Yes (if *YES*, please go to # 14-c)

2 No (if *NO*, please go to # 14-c)

(14-c) How often do you currently take these herbal supplements?
(Please check one for each)

	Regularly	Occasionally	Seldom	Never	Don't know
1 Chamomile ...	<input type="checkbox"/>				
2 Echinacea	<input type="checkbox"/>				
3 Feverfew	<input type="checkbox"/>				
4 Ginkgo Biloba	<input type="checkbox"/>				
5 Ginseng	<input type="checkbox"/>				
6 Kava kava	<input type="checkbox"/>				
7 Saw Palmetto..	<input type="checkbox"/>				
8 St. John's Wort	<input type="checkbox"/>				
9 Other	<input type="checkbox"/>				

(14-d) How well informed are you to make decisions about taking or not taking herbal supplements? (Please check one)

- 1 Very much 3 A little
2 Somewhat 4 Not at all

(14-e) Approximately how much money do you think your household usually spends per month on herbal supplements?

- 1 None 5 \$ 11- \$ 15
2 Received as gift 6 \$ 16- \$ 20
3 \$ 1- \$ 5 7 More than \$ 20
4 \$ 6- \$ 10 8 Don't know

(14-f) Please indicate the places you have frequently purchased these herbal supplements during the past year. (Check all that apply)

- 1 Supermarket _____
2 Discount store _____
3 Health food store _____
4 Drug store _____
5 Catalogue/mail order _____
6 Others _____

(14-g) How much would you say you know about the possible benefits of these herbal products? (Check one for each)

	Know a lot	Know something	Know a little	Know nothing	Never heard about it
1 Chamomile	<input type="checkbox"/>				
2 Echinacea	<input type="checkbox"/>				
3 Feverfew	<input type="checkbox"/>				
4 Ginkgo Biloba...	<input type="checkbox"/>				
5 Ginseng	<input type="checkbox"/>				
6 Kava kava	<input type="checkbox"/>				
7 Saw Palmetto...	<input type="checkbox"/>				
8 St. John's Wort.	<input type="checkbox"/>				
9 Other _____	<input type="checkbox"/>				

(15) How strongly do you agree or disagree with each of the following statements about herbal supplements? (Check one for each)

	Strongly agree	Agree	Disagree	Strongly disagree	Not sure
1 They will contribute to one's overall well-being	<input type="checkbox"/>				
2 They are adequately tested for safety, purity, and consistency of dosage before being marketed.....	<input type="checkbox"/>				
3 They may cause side effects....	<input type="checkbox"/>				
4 They are too expensive	<input type="checkbox"/>				
5 They do not ensure good health.....	<input type="checkbox"/>				
6 They should only be taken with prescription	<input type="checkbox"/>				
7 They shouldn't be taken with other medications	<input type="checkbox"/>				
8 They are <i>more natural</i> than prescription and over-the-counter medications.....	<input type="checkbox"/>				
9 They are <i>safer</i> than prescription and over-the-counter medications.....	<input type="checkbox"/>				
10 They are <i>more effective</i> than prescription and over-the-counter medications.....	<input type="checkbox"/>				

(16) To what extent do you agree or disagree that taking herbal supplements might

	Strongly agree	Agree	Disagree	Strongly disagree
1 Give you more energy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Protect you from getting cold	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Protect you from cancer.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Improve your memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Make you healthier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Help you look younger.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Make you feel less stressed..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Improve your mood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Help you to live longer.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(17) To what extent do you agree or disagree that taking herbal supplements makes you *less susceptible to*:

	Strongly agree	Agree	Disagree	Strongly disagree
1 Serious illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Colds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Skin problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Memory loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Heart attacks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Other health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(18) To what extent do you agree or disagree that taking herbal supplements *reduces severity of*:

	Strongly agree	Agree	Disagree	Strongly disagree
1 Serious illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Colds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Skin problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Memory loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Heart attacks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Cancer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Other health problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(19) How much do you rely on the following sources of information about herbal supplements? **(Please check one for each)**

	Very much	Somewhat	A little	Not at all
1 Medical doctor/Nurse....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Dietitians.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Alternative health care providers (chiropractors, naturopaths, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Capital Manor residents..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Family or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Drug stores/pharmacist...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Health food or grocery stores.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Books, newspapers or magazines.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 TV or radio.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 Others _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us about yourself

☞ (20) Gender:

- 1 Female
2 Male

(21) Your age in years. _____ years.

(22) Race (Please Check one)

- 1 Asian/Pacific Islander 4 Native American
2 African American 5 Caucasian
3 Latin American 6 Other (please specify)

(23) What is the **highest level** that you completed in school?

(Please check one)

- 1 No formal education 6 Some college
2 Grade school 7 College graduate
3 Some high school 8 Some graduate work
4 High school graduate 9 Graduate degree
5 Trade/business school 10 Professional degree

(24) What is your **CURRENT** living status? (**Please check one**)

- 1 Live alone
- 2 Live with spouse
- 3 Live with relatives
- 4 Live with a friend or partner

(25) What is your **CURRENT** type of Capital Manor housing?
(**Please check one**)

- 1 In an Apartment (either Terrace or Tower apartment)
- 2 Villa
- 3 Townhome

(26) How long have you been living in Capital Manor? _____ years

(27) Last year – **1999** – what was your total household gross income from all sources, before taxes? (**Please Check one**)

- 1 Less than \$ 10,000
- 2 \$ 10,000- \$ 29,999
- 3 \$ 30,000- \$ 49,999
- 4 \$ 50,000- \$ 79,999
- 5 \$ 80,000- \$ 99,999
- 6 More than \$ 100,000
- 7 Don't know

(28) Other comments?

THANK YOU FOR YOUR PARTICIPATION.

Please put this questionnaire in the envelope provided after finishing it and return it to the locked box at the front desk.

DEPARTMENT OF NUTRITION AND FOOD MANAGEMENT



OREGON STATE UNIVERSITY
108 Milam Hall · Corvallis, Oregon 97331-5103
Telephone 541-737-3561 Fax 541-737-6914

March, 2000

Dear Capital Manor Resident,

Last week we left an Oregon State University diet and health survey questionnaire in your mailbox. If you have already completed and returned it, please accept our sincere thanks. If not, would you please do so today?

We value your opinions. To accurately reflect the diet and health practices of Capital Manor residents living independently, we'd like to include your responses.

If by some chance you didn't receive the questionnaire, or if it got misplaced, please call Carolyn Raab collect at 541-737-1019 and we will get you a replacement copy.

Reminder: Please put your completed questionnaire in the envelope provided and drop it in the locked box at the reception desk labeled "OSU Diet and Health Survey".

Thank you for your support of this graduate student research project.

Sincerely,

Yao-Lin Weng
Yao-Lin Weng
Graduate Student
Nutrition and Food Management

Carolyn Raab
Carolyn Raab, Ph.D., R.D.
Professor
Nutrition and Food Management
raabc@orst.edu

DEPARTMENT OF NUTRITION AND FOOD MANAGEMENT



OREGON STATE UNIVERSITY
108 Milam Hall · Corvallis, Oregon 97331-5103
Telephone 541-737-3561 Fax 541-737-6914

March 9, 2000

Dear Capital Manor resident,

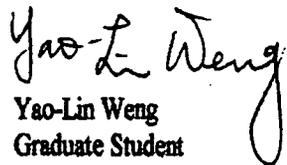
We recently left an Oregon State University diet and health survey questionnaire in your mailbox. If you have already completed and returned it to the box in the lobby, please accept our sincere thanks.

If you haven't yet completed the questionnaire, would you please take a few minutes to do so today? We're providing another copy in case you didn't receive the questionnaire or it got misplaced.

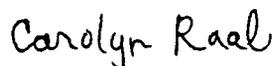
Your responses will help us to accurately reflect the diet and health practices of Capital Manor residents living independently. Thank you for your assistance.

Reminder: Please put your completed questionnaire in the envelope provided and drop it the locked box at the reception desk labeled "OSU Diet and Health Survey".

Sincerely,


Yao-Lin Weng
Graduate Student

Nutrition and Food Management



Carolyn Raab, Ph.D., R.D.
Professor

Nutrition and Food Management

Appendix 2.

Data Tables

2.1 Frequencies of Total Respondents Who Answered Each Question

2.2 Frequencies of Vitamin/Mineral Supplement Users Who Answered Each Question

2.3 Frequencies of Herbal Supplement Users Who Answered Each Question

Appendix 2-1. Frequencies of Total Respondents Who Answered Each Question

- (1) In general, how would you rate your overall health at the present time?
(Please check one)

Health Status	Number of Subjects (N) (N ¹ =316)	Percentage ² (%)
Excellent	24	7.6
Very good	97	30.7
Good	123	38.9
Fair	67	21.2
Poor	5	1.6
Don't know	- ⁶	-

- (2) Have you received a doctor's diagnosis for any of the following illnesses?
(Please check **one for each**)

	Number of Subjects ³ (N)	Percentage (%)
Arthritis (N ¹ =314)	116	36.9
Hypertension (N ¹ =316)	97	30.7
Cardiovascular Disease (N ¹ =314)	67	21.3
Diabetes (N ¹ =316)	36	11.4
Osteoporosis (N ¹ =314)	56	17.8
Cancer (N ¹ =316)	45	14.2
Excess weight (N ¹ =315)	38	12.1
Certain vitamin/mineral deficiency (N ¹ =312)	29	9.3
Others (N ¹ =219)	42	19.2

¹ Total number of subjects might not always be 318 due to missing data.

² Percentages do not always add up to 100% due to rounding.

³ People who answered "Yes".

⁴ Multiple responses.

⁵ Total numbers of subject might not always be 65 due to missing data.

⁶ "-" means "0".

(3) How has your health changed during the past year? (Please check **one**)

	Number of Subjects (N) (N ¹ =317)	Percentage ² (%)
Greatly improved	4	1.3
Improved	27	8.5
Stayed the same	209	65.9
Declined	74	23.3
Greatly declined	3	0.9

(4) Which of the following do you think help to maintain health?
(Please check **all** that apply)

	Number of Subjects ⁴ (N)	Percentage (%)
Balanced diet (N ¹ =314)	293	93.3
Exercise (N ¹ =314)	274	87.3
Quit smoking (N ¹ =314)	64	20.4
Herbal supplements (N ¹ =314)	34	10.8
Vitamin and mineral supplements (N ¹ =314)	182	58.0
Others (N ¹ =314)	34	10.8

(5) Have you found that your food habits have changed since you moved into Capital Manor? (Please check **one**)

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Yes (if <i>YES</i> , please go to # 5-a)	167	52.5
No (if <i>NO</i> , please go to # 6)	126	39.6
Not sure (please go to # 6)	25	7.9

(5-a) What kinds of changes? (Please describe briefly)

- (6) Where or from whom do you usually get your health and diet information?
(Check one for each)

	Number of Subjects ³	Percentage (%)
Medical doctor/Nurse (N ¹ =316)	247	78.2
Dietitians (N ¹ =316)	107	33.9
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ¹ =317)	18	5.7
Capital Manor residents (N ¹ =316)	31	9.8
Family or friends (N ¹ =317)	75	23.7
Drug stores/pharmacist (N ¹ =316)	46	14.6
Health food or grocery stores (N ¹ =318)	25	7.9
Books, newspapers or magazines (N ¹ =316)	161	50.9
TV or radio (N ¹ =315)	55	17.5
Internet (N ¹ =315)	17	5.4
Others (N ¹ =274)	26	9.5

- (7) Thinking about your personal diet, to what extent do you try to do the following?
(Please check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Choose a diet low in fat, saturated fat, and cholesterol (N ¹ =308)	64	20.8	111	36.0	119	38.6	14	4.5
Choose a diet moderate in sugar (314)	54	17.2	88	28.0	137	43.6	35	11.4
Choose a diet moderate in salt and sodium (311)	76	24.4	80	25.7	111	35.7	44	14.1
Choose a diet with plenty of grain products, vegetables, and fruits (311)	126	40.5	114	36.7	62	19.9	9	2.9
Eat a variety of foods (313)	123	39.3	133	42.5	52	16.6	5	1.6
Get enough calcium in foods or supplements (292)	87	29.8	122	41.8	69	23.6	14	4.8
Exercise regularly (308)	92	29.9	85	27.6	122	39.6	9	2.9

(8) Please rate yourself on the following. (Check one for each)

	Excellent		Very Good		Good		Fair		Poor	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
How your health compares to others your age (N ¹ =317)	50	15.8	135	42.6	112	35.3	20	6.3	-	-
How your level of physical activity compares to others your age (N ¹ =313)	44	14.1	91	29.1	117	37.4	53	16.9	8	2.6

(9) Please describe your situation (Check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
How much did you <i>worry</i> about your health over the past year? (N ¹ =314)	8	2.5	30	9.6	196	62.4	80	25.5
How much <i>control</i> do you feel you have over your health? (N ¹ =314)	411	13.1	147	46.8	117	37.3	9	2.9

(10) Do you regularly participate in any kind of physical activity such as walking, swimming, aqua-aerobics or other kinds of exercise?

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Yes (Please go to # 10-a)	256	80.5
No (Please go to # 11)	62	19.5

(10-a) How would you rate your exercise level? **(Please check one)**

	Number of Subjects (N) (N ¹ =256)	Percentage ² (%)
Vigorous	28	10.9
Moderate	163	63.7
Light	65	25.4

(11) What is your current smoking status? **(Please check one)**

	Number of Subjects (N) (N ¹ =312)	Percentage ² (%)
Smoker	-	-
Former smoker	101	32.4
Never have smoked	211	67.6

(12) How frequently do you take vitamin and/or mineral supplements (such as multivitamin/mineral, Vitamin C, Vitamin E, or Calcium)?

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Regularly (At least once a week)	248	78.0
Occasionally	29	9.1
Never (If you answered <i>NEVER</i> , please go to question # 14)	41	12.9

(12-a) Have you taken any kind of vitamin or mineral supplement during the past year? **(Please check one)**

	Number of Subjects (N ¹ =276)	Percentage ² (%)
Yes (If <i>YES</i> , please go to # 12-b)	266	96.4
No (If <i>NO</i> , please go to question # 14)	10	3.6

(12-b) Have you taken any kind of vitamin or mineral supplement during the last week? (Please check one)

	Number of Subjects (N ¹ =267)	Percentage ² (%)
Yes (If YES, please go to # 12-c)	249	93.3
No (If NO, please go to question # 14)	18	6.7

(12-c) Did your doctor advise you to take vitamin and/or mineral supplements?

	Number of Subjects (N) (N ¹ =251)	Percentage ² (%)
Yes	167	66.5
No	84	33.5

(13) Please indicate the reasons you have taken vitamin or mineral supplements during the past year. (Check one for each)

	Number of Subjects ³	Percentage (%)
To benefit your overall health (N ¹ =252)	222	88.1
To treat specific symptoms or disease (N ¹ =251)	63	25.1
To prevent specific symptoms or disease (N ¹ =251)	95	37.8
To supplement your diet (N ¹ =252)	151	59.9
To increase your energy level (N ¹ =252)	100	39.7
To slow the aging process (N ¹ =251)	79	31.5
Other specific reasons (N ¹ =189)	17	9.0

- (14) How frequently do you take herbal supplements (such as Chamomile, Feverfew, Echinacea, Ginkgo Biloba, Ginseng, Kava Kava, Saw Palmetto, St. John's Wort)?

	Number of Subjects (N) (N ⁵ =318)	Percentage ² (%)
Regularly (At least once a week)	40	12.6
Occasionally	25	7.9
Never (If you answered <i>NEVER</i> , please go to question # 20)	253	79.6

- (14-a) Have you taken any kind of herbal supplement during the past year?
(Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Yes (If YES, please go to # 14-b)	65	100.0
No (If NO, please go to question # 20)	-	-

- (14-b) Have you taken any kind of herbal supplement during the last week?
(Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Yes (If YES, please go to question # 14-c)	48	73.8
No (If NO, please go to # 14-c)	17	26.2

(14-c) How often do you currently take these herbal supplements?
(Please check one for each)

	Regularly		Occasionally		Seldom		Never		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =58)	2	3.4	8	13.8	4	6.9	42	72.4	2	3.4
Echinacea (56)	2	3.6	11	19.6	9	16.1	33	58.9	1	1.8
Feverfew (56)	-	-	1	1.8	4	7.1	50	89.3	1	1.8
Ginkgo Biloba (61)	26	42.6	10	16.4	7	11.5	16	26.2	2	3.3
Ginseng (58)	1	1.7	7	12.1	9	15.5	38	65.5	3	5.2
Kava kava (57)	-	-	1	1.8	4	7.0	50	87.7	2	3.5
Saw Palmetto (58)	7	12.1	2	3.4	4	6.9	43	74.1	2	3.4
St. John's Wort (55)	1	1.8	4	7.3	8	14.5	40	72.7	2	3.6
Other (32)	10	31.3	1	3.1	2	6.3	16	50.0	3	9.4

(14-d) How well informed are you to make decisions about taking or not taking herbal supplements? (Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Very much	13	20.0
Somewhat	31	47.7
A little	19	29.2
Not at all	2	3.1

(14-e) Approximately how much money do you think your household usually spends **per month** on herbal supplements?

	Number of Subjects (N) (N ⁵ =64)	Percentage ² (%)
None	1	1.6
Received as gift	-	-
\$ 1- \$ 5	12	18.8
\$ 6- \$ 10	15	23.4
\$ 11- \$ 15	5	7.8
\$ 16- \$ 20	5	7.8
More than \$ 20	12	18.8
Don't know	14	21.9

(14-f) Please indicate the places you have frequently purchased these herbal supplements during the past year. (**Check all that apply**)

	Number of Subjects ⁴ (N)	Percentage (%)
Supermarket (N ⁵ =64)	26	40.6
Discount store (N ⁵ =64)	10	25.6
Health food store (N ⁵ =64)	26	40.6
Drug store (N ⁵ =64)	17	26.6
Catalogue/mail order (N ⁵ =64)	17	26.6
Others (N ⁵ =64)	8	12.5

(14-g) How much would you say you know about the possible benefits of these herbal products? (Check one for each)

	Know a lot		Know something		Know a little		Know nothing		Never heard about it	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =61)	2	3.3	6	9.8	13	21.3	33	54.1	7	11.5
Echinacea (N ⁵ =61)	1	1.6	15	24.6	14	23.0	24	39.3	7	11.5
Feverfew (N ⁵ =59)	1	1.7	3	5.1	9	15.3	37	62.7	9	15.3
Ginkgo Biloba (N ⁵ =63)	8	12.7	24	38.1	20	31.7	10	15.9	1	1.6
Ginseng (N ⁵ =61)	1	1.6	8	13.1	25	41.0	24	39.3	3	4.9
Kava kava(N ⁵ =59)	-	-	3	5.1	9	15.3	39	66.1	8	13.6
Saw Palmetto (N ⁵ =63)	3	4.8	6	9.5	12	19.0	35	55.6	7	11.1
St. John's Wort (N ⁵ =61)	1	1.6	7	11.5	19	31.1	30	49.2	4	6.6
Other (N ⁵ =21)	2	9.5	3	14.3	2	9.5	11	52.4	3	14.3

(15) In general, how strongly do you **agree or disagree** with each of the following statements about herbal supplements?
(Please check one for each)

	Strongly agree		Agree		Disagree		Strongly disagree		Not sure	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
They will contribute to one's overall well-being (N ⁵ =63)	10	15.9	28	44.4	3	4.8	1	1.6	21	33.3
They are adequately tested for safety, purity, and consistency of dosage before being marketed (N ⁵ =63)	3	4.8	19	30.2	7	11.1	7	11.1	27	42.9
They may cause side effects (N ⁵ =63)	2	3.2	31	49.2	9	14.3	-	-	21	33.3
They are too expensive (N ⁵ =62)	8	12.9	28	45.2	13	21.0	-	-	13	21.0
They do not ensure good health (N ⁵ =61)	4	6.6	18	29.5	15	24.6	-	-	24	39.3
They should only be taken with prescription (N ⁵ =63)	6	9.5	6	9.5	22	34.9	8	12.7	21	33.3
They shouldn't be taken with other medications (N ⁵ =59)	3	5.1	11	18.6	17	28.8	1	1.7	27	45.8
They are <i>more natural</i> than prescription and over-the-counter medications (63)	9	14.3	25	39.7	5	7.9	2	3.2	22	34.9
They are <i>safer</i> than prescription and over-the-counter medications (N ⁵ =64)	6	9.4	18	28.1	14	21.9	3	4.7	23	35.9
They are <i>more effective</i> than prescription and over-the-counter medications (61)	1	1.6	11	18.0	15	24.6	3	4.9	31	50.8

(16) To what extent do you agree or disagree that taking herbal supplements might...

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Give you more energy (N ⁵ =61)	4	8.2	34	69.4	9	18.4	2	4.1	12	19.7
Protect you from getting a cold (N ⁵ =63)	8	15.1	35	66.0	8	15.1	2	3.8	10	15.9
Protect you from cancer (N ⁵ =55)	3	7.1	10	23.8	20	47.6	9	21.4	13	23.6
Improve your memory (N ⁵ =59)	9	18.8	30	62.5	7	14.6	2	4.2	11	18.6
Make you healthier (N ⁵ =58)	5	10.4	31	64.6	9	18.8	3	6.3	10	17.2
Help you look younger (N ⁵ =58)	1	2.2	19	41.3	21	45.7	5	10.9	12	20.7
Make you feel less stressed (N ⁵ =60)	2	4.1	41	83.7	4	8.2	2	4.1	11	18.3
Improve your mood (N ⁵ =56)	3	6.8	29	65.9	10	22.7	2	4.5	12	21.4
Help you to live longer (N ⁵ =55)	4	9.3	22	51.2	15	34.9	2	4.7	12	21.8

(17) To what extent do you agree or disagree that taking herbal supplements makes you *less susceptible to*:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Serious illness (N ⁵ =61)	6	13.3	19	42.7	14	31.1	6	13.3	16	26.2
Stress (N ⁵ =60)	3	6.5	32	69.6	8	17.4	3	6.5	14	23.3
Colds (N ⁵ =62)	6	11.3	36	67.9	10	18.9	1	1.9	9	14.5
Skin problems (N ⁵ =59)	3	7.1	21	50.0	16	38.1	2	4.8	17	28.8
Memory loss (N ⁵ =58)	6	12.0	35	70.0	8	16.6	1	2.0	8	13.8
Heart attacks (N ⁵ =61)	4	8.7	21	45.7	14	30.4	7	15.2	15	24.6
Cancer (N ⁵ =56)	2	5.1	13	33.3	14	35.9	10	25.6	17	30.4
Other health problems (N ⁵ =22)	-	-	7	63.6	-	-	4	36.4	11	50.0

(18) To what extent do you agree or disagree that taking herbal supplements *reduces severity of*:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	N	% ²	N	% ²	N
Serious illness (N ⁵ =59)	4	9.8	21	51.2	11	26.8	5	12.2	18	30.5
Stress (N ⁵ =62)	4	8.3	34	70.8	8	16.7	2	4.2	14	22.6
Colds (N ⁵ =64)	6	10.7	38	67.9	10	17.9	2	3.6	8	12.5
Skin problems (N ⁵ =57)	3	7.9	17	44.7	14	36.8	4	10.5	19	33.3
Memory loss (N ⁵ =58)	9	17.6	33	64.7	7	13.7	2	3.9	7	12.1
Heart attacks (N ⁵ =56)	6	15.4	14	35.9	11	28.2	8	20.5	17	30.4
Cancer (N ⁵ =56)	4	11.1	13	36.1	12	33.3	7	19.4	20	35.7
Other health problems (N ⁵ =22)	1	10.0	6	60.0	2	20.0	1	10.0	12	54.5

(19) How much do you rely on the following sources of information about herbal supplements? **(Please check one for each)**

	Very much		Somewhat		A little		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Medical doctor/Nurse (N ⁵ =64)	16	25.0	17	26.6	13	20.3	18	28.1
Dietitians (N ⁵ =62)	8	12.9	17	27.4	13	21.0	24	38.7
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ⁵ =61)	5	8.2	13	21.3	5	8.2	38	62.3
Capital Manor residents (N ⁵ =60)	-	-	7	11.7	15	25.0	38	63.3
Family or friends (N ⁵ =63)	6	9.5	16	25.4	17	27.0	24	38.1
Drug stores/pharmacist (N ⁵ =62)	6	9.7	11	17.7	12	19.4	33	53.2
Health food or grocery stores (N ⁵ =60)	5	8.3	11	18.3	14	23.3	30	50.0
Books, newspapers or magazines (N ⁵ =64)	8	12.5	16	25.0	30	46.9	10	15.6
TV or radio (N ⁵ =60)	1	1.7	6	10.0	22	36.7	31	51.7
Internet (N ⁵ =48)	-	-	4	8.3	6	12.5	38	79.2
Others (N ⁵ =17)	2	11.8	-	-	3	17.6	12	70.6

(20) Gender

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Female	215	67.6
Male	103	32.4

(21) Your age in years. _____ years

Range: 65-100

Average: 82.2

	Number of Subjects (N) (N ¹ =299)	Percentage ² (%)
65-74	27	9.0
75-84	158	52.8
85+	114	38.1

(22) Race (Please check one)

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Asian/Pacific Islander	-	-
African American	-	-
Latin American	1	0.3
Native American	30	9.4
Caucasian	281	88.4
Other (please specify)	6	1.9

(23) What is the **highest level** that you completed in school? (Please check one)

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
No formal education	-	-
Grade school	-	-
Some high school	4	1.3
High school graduate	50	15.7
Trade/business school	17	5.3
Some college	69	21.7
College graduate	56	17.6
Some graduate work	36	11.3
Graduate degree	53	16.7
Professional degree	33	10.4

(24) What is your **CURRENT** living status? (Please check one)

	Number of Subjects (N) (N ¹ =318)	Percentage ² (%)
Live alone	147	46.2
Live with spouse	169	53.1
Live with relatives	2	0.6
Live with a friend or partner	-	-

(25) What is your **CURRENT** type of Capital Manor housing? (Please check one)

	Number of Subjects (N) (N ¹ =316)	Percentage ² (%)
In an Apartment (Either Terrace or Tower apartment)	195	61.3
Villa	105	33.2
Townhome	16	5.1

(26) How long have you been living in Capital Manor? _____ years

Range: 1/4-23

Average: 5.9 years

	Number of Subjects (N) (N ¹ =288)	Percentage ² (%)
0 – 5	163	56.6
>5 – 10	83	28.8
>10 – 15	26	9.0
>15 – 20	14	4.9
>20 – 25	2	0.7

(27) Last year – **1999** – what was your total household gross income from all sources, before taxes? (**Please Check one**)

	Number of Subjects (N) (N ¹ =255)	Percentage ² (%)
Less than \$ 10,000	2	0.8
\$ 10,000- \$ 29,999	48	18.8
\$ 30,000- \$ 49,999	71	27.8
\$ 50,000- \$ 79,999	58	22.7
\$ 80,000- \$ 99,999	18	7.1
More than \$ 100,000	14	5.5
Don't know	23	9.0
None of your business	21	8.2

(28) Other comments?

Table 40. The responses to open-ended questions (for all respondents):

Q2-9	<p>Four respondents reported “Parkinson’s disease” One respondent reported “Inner ear problems” One respondent reported “Polymyalgiarhumations” One respondent reported “COPP” One respondent reported “Pulmonary problem” One respondent reported “Bone fracture” One respondent reported “Allergies” One respondent reported “Swallowing problem” Two respondents reported “High cholesterol” One respondent reported “Hepatitis C” One respondent reported “Eyes problem” One respondent reported “Enlarged prostate”</p>
Q4-6	<p>One respondent reported “Regular medical checkups” One respondent reported “Drinking plenty of water” One respondent reported “Positive healthy attitude” Two respondents reported “No alcohol” Two respondents reported “A lot of vegetables and fruits” One respondent reported “Low stress lifestyle”</p>
Q5-a	<p>30 respondents reported “Drinking more coffee” 24 respondents reported “Drinking less coffee” 136 respondents reported “Eating a smaller meal” 142 respondents reported “Eating a larger meal” 35 respondents reported “More desserts” 197 respondents reported “More fresh salad-variety” 46 respondents reported “Less salad” 145 respondents reported “More fresh fruits” 21 respondents reported “Less fruits” 12 respondents reported “More breakfast” 34 respondents reported “Less breakfast” 57 respondents reported “Large lunch” 31 respondents reported “Small lunch” 67 respondents reported “More snacks” 13 respondents reported “Eating three times a day regularly” 87 respondents reported “More balanced meals” 2 respondents reported “Too much salt” 4 respondents reported “Too much sugar” 69 respondents reported “Drinking more water” 45 respondents reported “Drinking more juice” 72 respondents reported “More various meal”</p>

Q6-11	<p>One respondent reported "My wife"</p> <p>One respondent reported "Information put out by C.M"</p> <p>One respondent reported "Published health newsletter"</p> <p>One respondent reported "Medical literature"</p>
Q13-7	<p>One respondent reported "For eyes problem"</p> <p>One respondent reported "To help keeping a cold getting bad"</p> <p>One respondent reported "To strengthen knee muscles"</p>
Q14-c-9	<p>Five respondents reported "Garlic"</p> <p>One respondent reported "SOD/CAT"</p> <p>One respondent reported "Herbal and energy boost"</p> <p>One respondent reported "AIM products"</p> <p>One respondent reported "Bilberry"</p>
Q14-f	<p>Six respondents reported "Safeway" (Q14-f-1)</p> <p>Four respondents reported "Wal-Mart" (Q14-f-2)</p> <p>Four respondents reported "Bi-Mart" (Q14-f-2)</p> <p>Three respondents reported "Rite Aid" (Q14-f-2)</p> <p>One respondent reported "Life Source, Salem"(Q14-f-3)</p> <p>One respondent reported "Hischool Pharmacy" (Q14-f-4)</p> <p>One respondent reported "Natures Sunshine" (Q14-f-5)</p> <p>One respondent reported "Skinless Distributor" (Q14-f-6)</p> <p>One respondent reported "Independent distributor" (Q14-f-6)</p> <p>One respondent reported "Doctor's home" (Q14-f-6)</p>
Q17-9	<p>One respondent reported "Prostate enlargement"</p>
Q18-9	<p>One respondent reported "Prostate enlargement"</p>
Q28	<p>One respondent reported "Believe in moderation variety-quality-fresh air-adequate and rest, and avoid stress."</p> <p>One respondent reported "Too many duplication in questions."</p> <p>One respondent reported "One question may not appple to every one, not every one needs the same vitamin or prescriptions."</p> <p>One respondent reported "I have had no experience using herbal supplements."</p> <p>One respondent reported "Based on four meals, the planned meals and excellent exercise facility will help me improve my general health."</p> <p>One respondent reported "C.M. take good care of me."</p> <p>Two respondents reported "It is not polite to ask income question"</p>

Appendix 2-2. Frequencies of Vitamin and/or Mineral Supplement Users Who Answered Each Question

- (1) In general, how would you rate your overall health at the present time?
(Please check one)

Health Status	Number of Subjects (N) (N ¹ =276)	Percentage ² (%)
Excellent	22	8.0
Very good	81	29.3
Good	106	38.4
Fair	62	22.5
Poor	5	1.8
Don't know	- ²	-

- (2) Have you received a doctor's diagnosis for any of the following illnesses?
(Please check **one for each**)

	Number of Subjects ³ (N)	Percentage (%)
Arthritis (N ¹ =273)	105	38.5
Hypertension (N ¹ =275)	89	32.4
Cardiovascular Disease (N ¹ =273)	57	20.9
Diabetes (N ¹ =275)	29	10.5
Osteoporosis (N ¹ =273)	53	19.4
Cancer (N ¹ =275)	44	16.0
Excess weight (N ¹ =274)	34	12.4
Certain vitamin/mineral deficiency (N ¹ =271)	29	10.7
Others (N ¹ =186)	37	19.9

¹ Total numbers of subject might not always be 277 due to missing data.

² Percentages do not always add up to 100% due to rounding.

³ People who answered "Yes".

⁴ Multiple responses.

⁵ Total numbers of subject might not always be 63 due to missing data.

⁶ "-" means "0".

(3) How has your health changed during the past year? (Please check **one**)

	Number of Subjects (N) (N ¹ =276)	Percentage ² (%)
Greatly improved	4	1.4
Improved	25	9.1
Stayed the same	179	64.9
Declined	65	23.6
Greatly declined	3	1.1

(4) Which of the following do you think help to maintain health?
(Please check **all** that apply)

	Number of Subjects ⁴ (N)	Percentage (%)
Balanced diet (N ¹ =274)	255	93.1
Exercise (N ¹ =274)	240	87.6
Quit smoking (N ¹ =274)	58	21.2
Herbal supplements (N ¹ =274)	34	12.4
Vitamin and mineral supplements (N ¹ =274)	181	66.1
Others (N ¹ =274)	30	10.9

(5) Have you found that your food habits have changed since you moved into Capital Manor? (Please check **one**)

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Yes (if <i>YES</i> , please go to # 5-a)	149	53.8
No (if <i>NO</i> , please go to # 6)	107	38.6
Not sure (please go to # 6)	21	7.6

(5-a) What kinds of changes? (Please describe briefly)

- (6) Where or from whom do you usually get your health and diet information?
(Check one for each)

	Number of Subjects ³	Percentage (%)
Medical doctor/Nurse (N ¹ =275)	212	77.1
Dietitians (N ¹ =275)	95	34.5
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ¹ =276)	17	6.2
Capital Manor residents (N ¹ =276)	29	10.5
Family or friends (N ¹ =276)	61	22.1
Drug stores/pharmacist (N ¹ =275)	43	15.6
Health food or grocery stores (N ¹ =277)	24	8.7
Books, newspapers or magazines (N ¹ =275)	148	53.8
TV or radio (N ¹ =274)	49	17.9
Internet (N ¹ =274)	15	5.5
Others (N ¹ =240)	25	10.5

- (7) Thinking about your personal diet, to what extent do you try to do the following?
(Please check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Choose a diet low in fat, saturated fat, and cholesterol (N ¹ =267)	58	21.7	100	37.5	99	37.1	10	3.7
Choose a diet moderate in sugar (273)	47	17.2	78	28.6	123	45.1	25	9.2
Choose a diet moderate in salt and sodium (270)	71	26.3	71	26.3	93	34.4	35	13.0
Choose a diet with plenty of grain products, vegetables, and fruits (270)	110	40.7	104	38.5	50	18.5	6	2.2
Eat a variety of foods (272)	108	39.7	118	43.4	43	15.8	3	1.1
Get enough calcium in foods or supplements (255)	81	31.8	108	42.4	56	22.0	10	3.9
Exercise regularly (267)	83	31.3	74	27.7	103	38.6	7	2.6

(8) Please rate yourself on the following. (Check one for each)

	Excellent		Very Good		Good		Fair		Poor	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
How your health compares to others your age (N ¹ =276)	43	15.6	117	42.4	97	35.1	19	6.9	-	-
How your level of physical activity compares to others your age (N ¹ =274)	40	14.6	75	27.4	102	37.2	49	17.9	8	2.9

(9) Please describe your situation (Check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
How much did you <i>worry</i> about your health over the past year? (N ¹ =274)	8	2.9	28	10.2	171	62.4	67	24.5
How much <i>control</i> do you feel you have over your health? (N ¹ =274)	38	13.9	127	46.4	101	36.9	8	2.9

(10) Do you regularly participate in any kind of physical activity such as walking, swimming, aqua-aerobics or other kinds of exercise?

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Yes (Please go to # 10-a)	225	81.2
No (Please go to # 11)	52	18.8

(10-a) How would you rate your exercise level? **(Please check one)**

	Number of Subjects (N) (N ¹ =228)	Percentage ² (%)
Vigorous	24	10.5
Moderate	141	61.8
Light	63	27.6

(11) What is your current smoking status? **(Please check one)**

	Number of Subjects (N) (N ¹ =273)	Percentage ² (%)
Smoker	-	-
Former smoker	87	31.9
Never have smoked	186	68.1

(12) How frequently do you take vitamin and/or mineral supplements (such as multivitamin/mineral, Vitamin C, Vitamin E, or Calcium)?

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Regularly (At least once a week)	248	89.5
Occasionally	29	10.5

(12-a) Have you taken any kind of vitamin or mineral supplement during the past year? **(Please check one)**

	Number of Subjects (N ¹ =276)	Percentage ² (%)
Yes (If YES, please go to # 12-b)	266	96.4
No (If NO, please go to question # 14)	10	3.6

(12-b) Have you taken any kind of vitamin or mineral supplement during the last week?
(Please check one)

	Number of Subjects (N ¹ =267)	Percentage ² (%)
Yes (If YES, please go to # 12-c)	249	93.3
No (If NO, please go to question # 14)	18	6.7

(12-c) Did your doctor advise you to take vitamin and/or mineral supplements?

	Number of Subjects (N) (N ¹ =251)	Percentage ² (%)
Yes	167	66.5
No	84	33.5

(13) Please indicate the reasons you have taken vitamin or mineral supplements during the past year. (Check one for each)

	Number of Subjects ³	Percentage (%)
To benefit your overall health (N ¹ =252)	222	88.1
To treat specific symptoms or disease (N ¹ =251)	63	25.1
To prevent specific symptoms or disease (N ¹ =251)	95	37.8
To supplement your diet (N ¹ =252)	151	59.9
To increase your energy level (N ¹ =252)	100	39.7
To slow the aging process (N ¹ =251)	79	31.5
Other specific reasons (N ¹ =189)	17	9.0

- (14) How frequently do you take herbal supplements (such as Chamomile, Feverfew, Echinacea, Ginkgo Biloba, Ginseng, Kava Kava, Saw Palmetto, St. John's Wort)?

	Number of Subjects (N) (N ⁵ =277)	Percentage ² (%)
Regularly (At least once a week)	38	13.7
Occasionally	25	9.0
Never (If you answered <i>NEVER</i> , please go to question # 20)	214	77.3

- (14-a) Have you taken any kind of herbal supplement during the past year?
(Please check one)

	Number of Subjects (N ⁵ =63)	Percentage ² (%)
Yes (If <i>YES</i> , please go to # 14-b)	63	100
No (If <i>NO</i> , please go to question # 20)	-	-

- (14-b) Have you taken any kind of herbal supplement during the last week?
(Please check one)

	Number of Subjects (N ⁵ =63)	Percentage ² (%)
Yes (If <i>YES</i> , please go to question # 14-c)	46	73
No (If <i>NO</i> , please go to # 14-c)	17	27

(14-c) How often do you currently take these herbal supplements?

(Please check one for each)

	Regularly		Occasionally		Seldom		Never		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =56)	2	3.6	8	14.3	4	7.1	40	71.4	2	3.6
Echinacea (N ⁵ =54)	2	3.7	11	20.4	9	16.4	31	57.4	1	1.9
Feverfew (N ⁵ =54)	-	-	1	1.9	4	7.4	48	88.9	1	1.9
Ginkgo Biloba (N ⁵ =59)	25	42.4	10	16.9	7	11.9	15	25.4	2	3.4
Ginseng (N ⁵ =56)	1	1.8	7	12.5	9	16.1	36	64.3	3	5.4
Kava kava (N ⁵ =55)	-	-	1	1.8	4	7.3	48	87.3	2	3.6
Saw Palmetto (N ⁵ =56)	6	10.7	2	3.6	4	7.1	42	75.0	2	3.6
St. John's Wort (N ⁵ =53)	1	1.9	4	7.5	8	15.1	38	71.7	2	3.8
Other (N ⁵ =32)	10	31.3	1	3.1	2	6.3	16	50.5	3	9.4

(14-d) How well informed are you to make decisions about taking or not taking herbal supplements? (Please check one)

	Number of Subjects (N ⁵ =63)	Percentage ² (%)
Very much	13	20.6
Somewhat	10	47.6
A little	18	28.6
Not at all	2	3.2

(14-e) Approximately how much money do you think your household usually spends **per month** on herbal supplements?

	Number of Subjects (N) (N ⁵ =62)	Percentage ² (%)
None	1	1.6
Received as gift	-	-
\$ 1- \$ 5	11	17.7
\$ 6- \$ 10	14	22.6
\$ 11- \$ 15	5	8.1
\$ 16- \$ 20	5	8.1
More than \$ 20	12	19.4
Don't know	14	22.6

(14-f) Please indicate the places you have frequently purchased these herbal supplements during the past year. (**Check all that apply**)

	Number of Subjects ⁴ (N)	Percentage (%)
Supermarket (N ⁵ =62)	25	40.3
Discount store (N ⁵ =62)	9	14.5
Health food store (N ⁵ =62)	26	41.9
Drug store (N ⁵ =62)	17	27.4
Catalogue/mail order (N ⁵ =62)	17	27.4
Others (N ⁵ =62)	8	12.9

(14-g) How much would you say you know about the possible benefits of these herbal products? (Check one for each)

	Know a lot		Know something		Know a little		Know nothing		Never heard about it	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =59)	2	3.4	6	10.2	13	22.0	32	54.2	6	10.2
Echinacea (N ⁵ =59)	1	1.7	15	25.4	14	23.7	23	39.0	6	10.2
Feverfew (N ⁵ =57)	1	1.8	3	5.3	9	15.8	36	63.2	8	14.0
Ginkgo Biloba (N ⁵ =61)	8	13.1	24	39.3	19	31.1	10	16.4	-	-
Ginseng (N ⁵ =59)	1	1.7	8	13.6	25	42.4	23	39.0	2	3.4
Kava kava(N ⁵ =57)	-	-	3	5.3	9	15.8	38	66.7	7	12.3
Saw Palmetto (N ⁵ =61)	3	4.9	6	9.8	11	18.0	34	55.7	7	11.5
St. John's Wort (N ⁵ =59)	1	1.7	7	11.9	19	32.2	29	49.2	3	5.1
Other (N ⁵ =20)	2	10.0	3	15.0	2	10.0	11	55.0	2	10.0

(15) In general, how strongly do you **agree or disagree** with each of the following statements about herbal supplements?
(Please check one for each)

	Strongly agree		Agree		Disagree		Strongly disagree		Not sure	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
They will contribute to one's overall well-being (N ⁵ =61)	10	16.4	28	45.9	2	3.3	1	1.6	20	32.8
They are adequately tested for safety, purity, and consistency of dosage before being marketed (N ⁵ =61)	3	4.9	18	29.5	6	9.8	7	11.5	27	44.3
They may cause side effects (N ⁵ =61)	2	3.3	30	49.2	8	13.1	-	-	21	34.4
They are too expensive (N ⁵ =60)	8	13.3	28	46.7	12	20.0	-	-	12	20.0
They do not ensure good health (N ⁵ =60)	4	6.7	17	28.3	15	25.0	-	-	24	40.0
They should only be taken with prescription (N ⁵ =61)	6	9.8	6	9.8	21	34.4	8	13.1	20	32.8
They shouldn't be taken with other medications (N ⁵ =57)	3	5.3	11	19.3	16	28.1	1	1.8	26	45.6
They are <i>more natural</i> than prescription and over-the-counter medications (61)	9	14.8	25	41.0	3	4.9	2	3.3	22	36.1
They are <i>safer</i> than prescription and over-the-counter medications (N ⁵ =62)	6	9.7	17	27.4	13	21.0	3	4.8	23	37.1
They are <i>more effective</i> than prescription and over-the-counter medications (59)	1	1.7	11	18.6	14	23.7	3	5.1	30	50.8

(16) To what extent do you agree or disagree that taking herbal supplements might...

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Give you more energy (N ⁵ =59)	4	8.3	34	70.8	8	16.7	2	4.2	11	18.6
Protect you from getting a cold (N ⁵ =61)	8	15.4	35	67.3	7	13.5	2	3.8	9	14.8
Protect you from cancer (N ⁵ =53)	3	7.3	10	24.4	19	46.3	9	22.0	12	22.6
Improve your memory (N ⁵ =57)	8	17.4	30	65.2	6	13.0	2	4.3	11	19.3
Make you healthier (N ⁵ =56)	5	10.6	31	66.0	8	17.0	3	6.4	9	16.1
Help you look younger (N ⁵ =56)	1	2.2	19	42.2	20	44.4	5	11.1	11	19.6
Make you feel less stressed (N ⁵ =58)	2	4.2	40	83.3	4	8.3	2	4.2	10	17.2
Improve your mood (N ⁵ =54)	3	7.0	29	67.4	9	20.9	2	4.7	11	20.4
Help you to live longer (N ⁵ =53)	4	9.5	21	50.0	15	35.7	2	4.8	11	20.8

(17) To what extent do you agree or disagree that taking herbal supplements makes you *less susceptible to*:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Serious illness (N ⁵ =59)	6	13.6	19	43.2	13	29.5	6	13.6	15	25.4
Stress (N ⁵ =58)	3	6.7	32	71.1	7	15.6	3	6.7	13	22.4
Colds (N ⁵ =60)	6	11.5	36	69.2	9	17.3	1	1.9	8	13.3
Skin problems (N ⁵ =57)	3	7.3	21	51.2	15	36.6	2	4.9	16	28.1
Memory loss (N ⁵ =56)	5	10.4	35	72.9	7	14.9	1	2.1	8	14.3
Heart attacks (N ⁵ =59)	4	8.9	21	46.7	13	28.9	7	15.9	14	23.7
Cancer (N ⁵ =54)	2	5.3	13	34.2	13	34.2	10	26.3	16	29.6
Other health problems (N ⁵ =22)	-	-	6	60.0	4	40.0	-	-	10	50.0

(18) To what extent do you agree or disagree that taking herbal supplements reduces severity of:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	N	% ²	N	% ²	N
Serious illness (N ^s =57)	4	10.0	21	52.5	10	25.0	5	12.5	17	29.8
Stress (N ^s =60)	4	8.5	34	72.3	7	14.9	2	4.3	13	21.7
Colds (N ^s =62)	6	10.9	38	69.1	9	16.4	2	3.6	7	11.3
Skin problems (N ^s =55)	3	8.1	17	45.9	13	35.1	4	10.8	18	32.7
Memory loss (N ^s =56)	8	16.3	33	67.3	6	12.2	2	4.1	7	12.5
Heart attacks (N ^s =54)	6	15.8	14	36.8	10	26.3	8	21.1	16	29.6
Cancer (N ^s =54)	4	11.4	13	37.1	11	31.4	7	20.0	19	35.2
Other health problems (N ^s =20)	1	11.1	5	55.6	2	22.2	1	11.0	11	55.0

(19) How much do you rely on the following sources of information about herbal supplements? **(Please check one for each)**

	Very much		Somewhat		A little		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Medical doctor/Nurse (N ⁵ =62)	16	25.8	17	27.4	13	21.0	16	25.8
Dietitians (N ⁵ =60)	8	13.3	17	28.3	13	21.7	22	36.7
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ⁵ =59)	5	8.5	13	22.0	5	8.5	36	61.0
Capital Manor residents (N ⁵ =58)	-	-	7	12.1	15	25.9	16	62.1
Family or friends (N ⁵ =61)	6	9.8	16	26.2	17	27.9	22	36.1
Drug stores/pharmacist (N ⁵ =60)	6	10.0	11	18.3	11	18.3	32	53.3
Health food or grocery stores (N ⁵ =58)	5	8.6	11	19.0	13	22.4	29	50.0
Books, newspapers or magazines (N ⁵ =62)	8	12.9	16	25.8	29	46.8	9	14.5
TV or radio (N ⁵ =58)	1	1.7	6	10.3	21	36.2	30	51.7
Internet (N ⁵ =47)	-	-	4	8.5	6	12.8	37	78.7
Others (N ⁵ =16)	2	12.5	-	-	3	18.8	11	68.8

(20) Gender

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Female	199	71.8
Male	78	28.2

(21) Your age in years. _____ years
 Range: 65-100
 Average: 81.9

	Number of Subjects (N) (N ¹ =262)	Percentage ² (%)
65-74	27	10.3
75-84	141	53.8
85+	94	35.9

(22) Race (Please check one)

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Asian/Pacific Islander	-	-
African American	-	-
Latin American	1	0.4
Native American	25	9.0
Caucasian	247	89.2
Other (please specify)	4	1.4

(23) What is the **highest level** that you completed in school? (Please check one)

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
No formal education	-	-
Grade school	-	-
Some high school	4	1.4
High school graduate	40	14.4
Trade/business school	15	5.4
Some college	67	24.2
College graduate	49	17.2
Some graduate work	31	11.2
Graduate degree	46	16.6
Professional degree	25	9.0

(24) What is your **CURRENT** living status? (Please check one)

	Number of Subjects (N) (N ¹ =277)	Percentage ² (%)
Live alone	129	46.6
Live with spouse	146	52.7
Live with relatives	2	0.7
Live with a friend or partner	-	-

(25) What is your **CURRENT** type of Capital Manor housing? (Please check one)

	Number of Subjects (N) (N ¹ =275)	Percentage ² (%)
In an Apartment (Either Terrace or Tower apartment)	168	61.1
Villa	91	33.1
Townhome	16	5.8

(26) How long have you been living in Capital Manor? _____ years

Range: 1/4-23

Average: 5.7 years

	Number of Subjects (N) (N ¹ =252)	Percentage ² (%)
0 – 5	147	58.3
>5 – 10	73	29.0
>10 – 15	18	7.1
>15 – 20	12	4.8
>20 – 25	2	0.8

(27) Last year – **1999** – what was your total household gross income from all sources, before taxes? (**Please Check one**)

	Number of Subjects (N) (N ¹ =219)	Percentage ² (%)
Less than \$ 10,000	2	0.9
\$ 10,000- \$ 29,999	44	20.1
\$ 30,000- \$ 49,999	60	27.4
\$ 50,000- \$ 79,999	49	22.4
\$ 80,000- \$ 99,999	16	7.3
More than \$ 100,000	10	4.6
Don't know	21	9.6
None of your business	17	7.8

(28) Other comments?

Appendix 2-3. Frequencies of Herbal Supplement Users Who Answered Each Question

(1) In general, how would you rate your overall health at the present time?

(Please check one)

Health Status	Number of Subjects (N) (N ¹ =64)	Percentage ² (%)
Excellent	6	9.4
Very good	24	37.5
Good	20	31.3
Fair	14	21.9
Poor	- ⁶	-
Don't know	-	-

(2) Have you received a doctor's diagnosis for any of the following illnesses?

(Please check **one for each**)

	Number of Subjects ³ (N)	Percentage (%)
Arthritis (N ¹ =63)	20	31.7
Hypertension (N ¹ =64)	13	20.3
Cardiovascular Disease (N ¹ =63)	12	19.0
Diabetes (N ¹ =63)	11	17.5
Osteoporosis (N ¹ =62)	7	11.3
Cancer (N ¹ =63)	7	11.1
Excess weight (N ¹ =62)	11	17.7
Certain vitamin/mineral deficiency (N ¹ =62)	5	8.1
Others (N ¹ =41)	12	29.3

¹ Total number of subjects might not always be 65 due to missing data.

² Percentages do not always add up to 100% due to rounding.

³ People who answered "Yes".

⁴ Multiple responses.

⁵ "-" means "0".

(3) How has your health changed during the past year? (Please check **one**)

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Greatly improved	1	1.5
Improved	10	15.4
Stayed the same	42	64.6
Declined	10	15.4
Greatly declined	2	3.1

(4) Which of the following do you think help to maintain health?
(Please check **all** that apply)

	Number of Subjects ⁴ (N)	Percentage (%)
Balanced diet (N ¹ =64)	56	87.5
Exercise (N ¹ =64)	57	89.1
Quit smoking (N ¹ =64)	11	17.2
Herbal supplements (N ¹ =64)	28	43.8
Vitamin and mineral supplements (N ¹ =64)	46	71.9
Others (N ¹ =64)	7	10.9

(5) Have you found that your food habits have changed since you moved into Capital Manor? (Please check **one**)

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Yes (if <i>YES</i> , please go to # 5-a)	44	67.7
No (if <i>NO</i> , please go to # 6)	18	27.7
Not sure (please go to # 6)	3	4.6

(5-a) What kinds of changes? (Please describe briefly)

- (6) Where or from whom do you usually get your health and diet information?
(Check one for each)

	Number of Subjects ³	Percentage (%)
Medical doctor/Nurse (N ¹ =63)	48	76.2
Dietitians (N ¹ =63)	23	36.5
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ¹ =64)	11	17.2
Capital Manor residents (N ¹ =64)	5	7.8
Family or friends (N ¹ =64)	16	25.0
Drug stores/pharmacist (N ¹ =64)	11	17.2
Health food or grocery stores (N ¹ =65)	13	20.0
Books, newspapers or magazines (N ¹ =63)	40	63.5
TV or radio (N ¹ =63)	11	17.5
Internet (N ¹ =63)	5	7.9
Others (N ¹ =51)	6	11.8

- (7) Thinking about your personal diet, to what extent do you try to do the following?
(Please check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Choose a diet low in fat, saturated fat, and cholesterol (N ¹ =60)	18	30.0	26	43.3	15	25.0	1	1.7
Choose a diet moderate in sugar (64)	17	26.6	22	34.4	22	34.4	3	4.7
Choose a diet moderate in salt and sodium (64)	20	31.3	17	26.6	25	39.1	2	3.1
Choose a diet with plenty of grain products, vegetables, and fruits (64)	32	50.0	24	37.5	8	12.5	-	-
Eat a variety of foods (62)	21	33.9	31	50.0	10	16.1	-	-
Get enough calcium in foods or supplements (58)	23	39.7	22	37.9	12	20.7	1	1.7
Exercise regularly (62)	24	38.7	18	29.0	20	32.3	-	-

(8) Please rate yourself on the following. (Check one for each)

	Excellent		Very Good		Good		Fair		Poor	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
How your health compares to others your age (N ¹ =65)	15	23.1	29	44.6	15	23.1	6	9.2	-	-
How your level of physical activity compares to others your age (N ¹ =64)	14	21.9	15	23.4	25	39.1	9	14.1	1	1.6

(9) Please describe your situation (Check one for each)

	Very Much		Much		Some		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
How much did you <i>worry</i> about your health over the past year? (N ¹ =65)	2	3.1	11	16.9	37	56.9	15	23.1
How much <i>control</i> do you feel you have over your health? (N ¹ =65)	12	18.5	36	55.4	17	26.2	-	-

(10) Do you regularly participate in any kind of physical activity such as walking, swimming, aqua-aerobics or other kinds of exercise?

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Yes (Please go to # 10-a)	59	90.8
No (Please go to # 11)	6	9.2

(10-a) How would you rate your exercise level? (**Please check one**)

	Number of Subjects (N) (N ¹ =59)	Percentage ² (%)
Vigorous	14	23.7
Moderate	34	57.6
Light	11	18.6

(11) What is your current smoking status? (**Please check one**)

	Number of Subjects (N) (N ¹ =63)	Percentage ² (%)
Smoker	-	-
Former smoker	14	22.2
Never have smoked	49	77.8

(12) How frequently do you take vitamin and/or mineral supplements (such as multivitamin/mineral, Vitamin C, Vitamin E, or Calcium)?

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Regularly (At least once a week)	58	89.2
Occasionally	5	7.7
Never (If you answered <i>NEVER</i> , please go to question # 14)	2	3.1

(12-a) Have you taken any kind of vitamin or mineral supplement during the past year?
(**Please check one**)

	Number of Subjects (N ¹ =626)	Percentage ² (%)
Yes (If <i>YES</i> , please go to # 12-b)	61	98.4
No (If <i>NO</i> , please go to question # 14)	1	1.6

(12-b) Have you taken any kind of vitamin or mineral supplement during the last week?
(Please check one)

	Number of Subjects (N ¹ =62)	Percentage ² (%)
Yes (If YES, please go to # 12-c)	60	96.8
No (If NO, please go to question # 14)	2	3.2

(12-c) Did your doctor advise you to take vitamin and/or mineral supplements?

	Number of Subjects (N) (N ¹ =59)	Percentage ² (%)
Yes	37	62.7
No	22	37.3

(13) Please indicate the reasons you have taken vitamin or mineral supplements during the past year. (Check one for each)

	Number of Subjects ³	Percentage (%)
To benefit your overall health (N ¹ =61)	57	93.4
To treat specific symptoms or disease (N ¹ =60)	18	30.0
To prevent specific symptoms or disease (N ¹ =61)	36	59.0
To supplement your diet (N ¹ =61)	48	78.7
To increase your energy level (N ¹ =61)	40	65.6
To slow the aging process (N ¹ =63)	31	51.7
Other specific reasons (N ¹ =36)	4	11.1

(14) How frequently do you take herbal supplements (such as Chamomile, Feverfew, Echinacea, Ginkgo Biloba, Ginseng, Kava Kava, Saw Palmetto, St. John's Wort)?

	Number of Subjects (N) (N ⁵ =65)	Percentage ² (%)
Regularly (At least once a week)	40	61.5
Occasionally	25	38.5

(14-a) Have you taken any kind of herbal supplement during the past year?
(Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Yes (If YES, please go to # 14-b)	65	100.0
No (If NO, please go to question # 20)	-	-

(14-b) Have you taken any kind of herbal supplement during the last week?
(Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Yes (If YES, please go to question # 14-c)	48	73.8
No (If NO, please go to # 14-c)	17	26.2

(14-c) How often do you currently take these herbal supplements?
(Please check one for each)

	Regularly		Occasionally		Seldom		Never		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =58)	2	3.4	8	13.8	4	6.9	42	72.4	2	3.4
Echinacea (56)	2	3.6	11	19.6	9	16.1	33	58.9	1	1.8
Feverfew (56)	-	-	1	1.8	4	7.1	50	89.3	1	1.8
Ginkgo Biloba (61)	26	42.6	10	16.4	7	11.5	16	26.2	2	3.3
Ginseng (58)	1	1.7	7	12.1	9	15.5	38	65.5	3	5.2
Kava kava (57)	-	-	1	1.8	4	7.0	50	87.7	2	3.5
Saw Palmetto (58)	7	12.1	2	3.4	4	6.9	43	74.1	2	3.4
St. John's Wort (55)	1	1.8	4	7.3	8	14.5	40	72.7	2	3.6
Other (32)	10	31.3	1	3.1	2	6.3	16	50.0	3	9.4

(14-d) How well informed are you to make decisions about taking or not taking herbal supplements? (Please check one)

	Number of Subjects (N ⁵ =65)	Percentage ² (%)
Very much	13	20.0
Somewhat	31	47.7
A little	19	29.2
Not at all	2	3.1

(14-e) Approximately how much money do you think your household usually spends **per month** on herbal supplements?

	Number of Subjects (N) (N ⁵ =64)	Percentage ² (%)
None	1	1.6
Received as gift	-	-
\$ 1- \$ 5	12	18.8
\$ 6- \$ 10	15	23.4
\$ 11- \$ 15	5	7.8
\$ 16- \$ 20	5	7.8
More than \$ 20	12	18.8
Don't know	14	21.9

(14-f) Please indicate the places you have frequently purchased these herbal supplements during the past year. **(Check all that apply)**

	Number of Subjects ⁴ (N)	Percentage (%)
Supermarket (N ⁵ =64)	26	40.6
Discount store (N ⁵ =64)	10	25.6
Health food store (N ⁵ =64)	26	40.6
Drug store (N ⁵ =64)	17	26.6
Catalogue/mail order (N ⁵ =64)	17	26.6
Others (N ⁵ =64)	8	12.5

(14-g) How much would you say you know about the possible benefits of these herbal products? (Check one for each)

	Know a lot		Know something		Know a little		Know nothing		Never heard about it	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Chamomile (N ⁵ =61)	2	3.3	6	9.8	13	21.3	33	54.1	7	11.5
Echinacea (N ⁵ =61)	1	1.6	15	24.6	14	23.0	24	39.3	7	11.5
Feverfew (N ⁵ =59)	1	1.7	3	5.1	9	15.3	37	62.7	9	15.3
Ginkgo Biloba (N ⁵ =63)	8	12.7	24	38.1	20	31.7	10	15.9	1	1.6
Ginseng (N ⁵ =61)	1	1.6	8	13.1	25	41.0	24	39.3	3	4.9
Kava kava(N ⁵ =59)	-	-	3	5.1	9	15.3	39	66.1	8	13.6
Saw Palmetto (N ⁵ =63)	3	4.8	6	9.5	12	19.0	35	55.6	7	11.1
St. John's Wort (N ⁵ =61)	1	1.6	7	11.5	19	31.1	30	49.2	4	6.6
Other (N ⁵ =21)	2	9.5	3	14.3	2	9.5	11	52.4	3	14.3

(15) In general, how strongly do you **agree or disagree** with each of the following statements about herbal supplements?
(Please check one for each)

	Strongly agree		Agree		Disagree		Strongly disagree		Not sure	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
They will contribute to one's overall well-being (N ⁵ =63)	10	15.9	28	44.4	3	4.8	1	1.6	21	33.3
They are adequately tested for safety, purity, and consistency of dosage before being marketed (N ⁵ =63)	3	4.8	19	30.2	7	11.1	7	11.1	27	42.9
They may cause side effects (N ⁵ =63)	2	3.2	31	49.2	9	14.3	-	-	21	33.3
They are too expensive (N ⁵ =62)	8	12.9	28	45.2	13	21.0	-	-	13	21.0
They do not ensure good health (N ⁵ =61)	4	6.6	18	29.5	15	24.6	-	-	24	39.3
They should only be taken with prescription (N ⁵ =63)	6	9.5	6	9.5	22	34.9	8	12.7	21	33.3
They shouldn't be taken with other medications (N ⁵ =59)	3	5.1	11	18.6	17	28.8	1	1.7	27	45.8
They are <i>more natural</i> than prescription and over-the-counter medications (63)	9	14.3	25	39.7	5	7.9	2	3.2	22	34.9
They are <i>safer</i> than prescription and over-the-counter medications (N ⁵ =64)	6	9.4	18	28.1	14	21.9	3	4.7	23	35.9
They are <i>more effective</i> than prescription and over-the-counter medications (61)	1	1.6	11	18.0	15	24.6	3	4.9	31	50.8

(16) To what extent do you agree or disagree that taking herbal supplements might...

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Give you more energy (N ⁵ =61)	4	8.2	34	69.4	9	18.4	2	4.1	12	19.7
Protect you from getting a cold (N ⁵ =63)	8	15.1	35	66.0	8	15.1	2	3.8	10	15.9
Protect you from cancer (N ⁵ =55)	3	7.1	10	23.8	20	47.6	9	21.4	13	23.6
Improve your memory (N ⁵ =59)	9	18.8	30	62.5	7	14.6	2	4.2	11	18.6
Make you healthier (N ⁵ =58)	5	10.4	31	64.6	9	18.8	3	6.3	10	17.2
Help you look younger (N ⁵ =58)	1	2.2	19	41.3	21	45.7	5	10.9	12	20.7
Make you feel less stressed (N ⁵ =60)	2	4.1	41	83.7	4	8.2	2	4.1	11	18.3
Improve your mood (N ⁵ =56)	3	6.8	29	65.9	10	22.7	2	4.5	12	21.4
Help you to live longer (N ⁵ =55)	4	9.3	22	51.2	15	34.9	2	4.7	12	21.8

(17) To what extent do you agree or disagree that taking herbal supplements makes you less susceptible to:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	% ²	N	% ²	N	% ²
Serious illness (N ⁵ =61)	6	13.3	19	42.7	14	31.1	6	13.3	16	26.2
Stress (N ⁵ =60)	3	6.5	32	69.6	8	17.4	3	6.5	14	23.3
Colds (N ⁵ =62)	6	11.3	36	67.9	10	18.9	1	1.9	9	14.5
Skin problems (N ⁵ =59)	3	7.1	21	50.0	16	38.1	2	4.8	17	28.8
Memory loss (N ⁵ =58)	6	12.0	35	70.0	8	16.6	1	2.0	8	13.8
Heart attacks (N ⁵ =61)	4	8.7	21	45.7	14	30.4	7	15.2	15	24.6
Cancer (N ⁵ =56)	2	5.1	13	33.3	14	35.9	10	25.6	17	30.4
Other health problems (N ⁵ =22)	-	-	7	63.6	-	-	4	36.4	11	50.0

(18) To what extent do you agree or disagree that taking herbal supplements *reduces severity of*:

	Strongly agree		Agree		Disagree		Strongly disagree		Don't know	
	N	% ²	N	% ²	N	N	% ²	N	% ²	N
Serious illness (N ^s =59)	4	9.8	21	51.2	11	26.8	5	12.2	18	30.5
Stress (N ^s =62)	4	8.3	34	70.8	8	16.7	2	4.2	14	22.6
Colds (N ^s =64)	6	10.7	38	67.9	10	17.9	2	3.6	8	12.5
Skin problems (N ^s =57)	3	7.9	17	44.7	14	36.8	4	10.5	19	33.3
Memory loss (N ^s =58)	9	17.6	33	64.7	7	13.7	2	3.9	7	12.1
Heart attacks (N ^s =56)	6	15.4	14	35.9	11	28.2	8	20.5	17	30.4
Cancer (N ^s =56)	4	11.1	13	36.1	12	33.3	7	19.4	20	35.7
Other health problems (N ^s =22)	1	10.0	6	60.0	2	20.0	1	10.0	12	54.5

(19) How much do you rely on the following sources of information about herbal supplements? **(Please check one for each)**

	Very much		Somewhat		A little		Not at all	
	N	% ²	N	% ²	N	% ²	N	% ²
Medical doctor/Nurse (N ⁵ =64)	16	25.0	17	26.6	13	20.3	18	28.1
Dietitians (N ⁵ =62)	8	12.9	17	27.4	13	21.0	24	38.7
Alternative health care providers (such as: chiropractors, naturopaths, etc.) (N ⁵ =61)	5	8.2	13	21.3	5	8.2	38	62.3
Capital Manor residents (N ⁵ =60)	-	-	7	11.7	15	25.0	38	63.3
Family or friends (N ⁵ =63)	6	9.5	16	25.4	17	27.0	24	38.1
Drug stores/pharmacist (N ⁵ =62)	6	9.7	11	17.7	12	19.4	33	53.2
Health food or grocery stores (N ⁵ =60)	5	8.3	11	18.3	14	23.3	30	50.0
Books, newspapers or magazines (N ⁵ =64)	8	12.5	16	25.0	30	46.9	10	15.6
TV or radio (N ⁵ =60)	1	1.7	6	10.0	22	36.7	31	51.7
Internet (N ⁵ =48)	-	-	4	8.3	6	12.5	38	79.2
Others (N ⁵ =17)	2	11.8	-	-	3	17.6	12	70.6

(20) Gender

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Female	44	67.7
Male	21	32.3

(21) Your age in years. _____ years
 Range: 65-91
 Average: 79.6

	Number of Subjects (N) (N ¹ =299)	Percentage ² (%)
65-74	9	14.8
75-84	38	62.2
85+	14	23.0

(22) Race (Please check one)

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Asian/Pacific Islander	-	-
African American	-	-
Latin American	-	-
Native American	10	15.4
Caucasian	55	84.6
Other (please specify)	-	-

(23) What is the **highest level** that you completed in school? (Please check one)

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
No formal education	-	-
Grade school	-	-
Some high school	-	-
High school graduate	8	12.3
Trade/business school	6	9.2
Some college	17	26.2
College graduate	14	21.5
Some graduate work	5	7.7
Graduate degree	9	13.8
Professional degree	6	9.2

(24) What is your **CURRENT** living status? (Please check one)

	Number of Subjects (N) (N ¹ =65)	Percentage ² (%)
Live alone	19	29.2
Live with spouse	45	69.2
Live with relatives	1	1.5
Live with a friend or partner	-	-

(25) What is your **CURRENT** type of Capital Manor housing? (Please check one)

	Number of Subjects (N) (N ¹ =316)	Percentage ² (%)
In an Apartment (Either Terrace or Tower apartment)	26	40.6
Villa	32	50.0
Townhome	6	9.4

(26) How long have you been living in Capital Manor? _____ years

Range: 1/4-11.5

Average: 4.3 years

	Number of Subjects (N) (N ¹ =58)	Percentage ² (%)
0 – 5	40	69.0
>5 – 10	16	27.6
>10 – 15	2	3.4
>15 – 20	-	-
>20 – 25	-	-

(27) Last year – **1999** – what was your total household gross income from all sources, before taxes? (**Please Check one**)

	Number of Subjects (N) (N ¹ =52)	Percentage ² (%)
Less than \$ 10,000	1	1.9
\$ 10,000- \$ 29,999	5	9.6
\$ 30,000- \$ 49,999	14	26.9
\$ 50,000- \$ 79,999	14	26.9
\$ 80,000- \$ 99,999	4	7.7
More than \$ 100,000	1	1.9
Don't know	4	7.7
None of your business	9	17.3

(28) Other comments?