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Complementary and Alternative Medicine and Diet Change in Southern Rural Residents Enrolled in a Cancer Prevention Intervention Trial

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Complementary and Alternative Medicine and Diet Change in Southern Rural Residents Enrolled in a Cancer Prevention Intervention Trial

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

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In memory of Elizabeth A. Fries, Ph.D.

February 25, 1963 – May 20, 2005

An exemplary scholar and mentor who is dearly missed

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ABSTRACT

COMPLEMENTARY AND ALTERNATIVE MEDICINE AND DIET CHANGE IN SOUTHERN RURAL RESIDENTS ENROLLED IN A CANCER PREVENTION INTERVENTION TRIAL

By Amanda C. Kracen, B.A.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

Virginia Commonwealth University, 2005

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Using data from The Rural Physician Cancer Prevention Project, a dietary intervention trial, this cross-sectional, longitudinal study explored predictors of complementary and alternative medicine (CAM) use in a Southern, rural population (N = 375). Participants' dietary knowledge, stage of change, and dietary behavior were examined at baseline and 1 and 12 months after the intervention. More than half the

participants (mean age = 48 years; 65% female; 60% Caucasian) reported using CAM. Logistic regression indicated that age, education, ethnicity and trust in physician affect the likelihood of CAM use. Hierarchical multiple regressions suggested that CAM use was associated with healthier fat and fiber consumption at baseline. CAM users in the intervention, unexpectedly, reported decreased fat knowledge 1 month after the intervention, although similar results were not seen later. Among the intervention participants, CAM use was not significantly associated with changes in stage of behavior change or dietary consumption behaviors.

Chapter One

Introduction

Complementary and alternative medicine (CAM) is a broad group of health systems, products and therapies that do not fall within conventional medicine. In the United States, studies have estimated that between 29% to 75% of the population has used complementary and alternative medicines (Ni, Simile, & Hardy, 2001; Barnes, Powell-Griner, McFann, & Nahin, 2004). Although studies provide differing percentages, a vast proportion of the American public has used some form of CAM. Additionally, it is clear that CAM use is increasing in the United States. Use has steadily risen since the 1950s, and lifetime prevalence rates have increased substantially during the last decade (Kessler et al., 2001; Barnes et al., 2004).

With high rates of use in the United States, researchers must understand the demographics of who is using CAM because use can have serious implications for patient health and care. While the field of CAM research is still emerging as a whole, there is especially little research available about CAM use by minority populations. Few studies have looked at specific populations, such as African Americans (Mackenzie, Taylor, Bloom, Hufford, & Johnson, 2003), rural residents (del Mundo, Shepard, & Marose, 2002; Herron & Glasser, 2003; Cuellar, Aycock, Cahill, & Ford, 2003), and Southern residents (Burg, Hatch, & Neims, 1998).

Additionally, some evidence supports the idea that CAM use is associated with more healthy behaviors, but little is known about diet (MacLennan, Wilson, & Taylor,

1996; Cappuccio, Duneclift, Atkinson, & Cook, 2001). Fat and fiber consumption behaviors are particularly important, because research demonstrates that a low fat, high fiber diet helps prevent chronic disease, including cancer (Key et al., 2004). This information is especially useful for a rural population with a high percentage of African American residents because these individuals are less likely to receive preventative healthcare and are at increased risk of cancer mortality (Casey, Thiede Call, & Klinger, 2001; Ward et al. (2004).

Using data from The Rural Physician Cancer Prevention Project (CA 71024), a dietary intervention trial, the current study explored predictors of CAM use in a unique Southern, rural population. In turn, the association between CAM use and dietary knowledge, stage of change and behaviors were analyzed. The current research also examined the effect of a dietary intervention on CAM users' dietary knowledge, stage of change and behavior during the 12 months following baseline evaluation interviews.

Findings from this research are useful in providing better traditional care for patients, encouraging communication between healthcare providers and patients, and helping prevent possible adverse interactions between CAM and conventional medicines. The findings help psychologists and physicians better understand patients, their dietary behaviors, and their health needs.

Chapter Two

A Review of the Literature

Defining Complementary and Alternative Medicine

CAM refers to a broad group of health systems, products and therapies that do not fall within conventional medicine. A popular definition for CAM in the research literature is "medical interventions not widely taught at U.S. medical schools or generally available at U.S. hospitals" (Eisenberg et al., 1993, p.246). The National Institutes of Health's National Center on Complementary and Alternative Medicine (NCCAM) defines CAM as, "...a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine" (NCCAM, n.d., ¶ 2).

Although usually defined and abbreviated in a single acronym, complementary and alternative medicines are distinctly separate in some respects. As the name suggests, *complementary* medicine is used *in conjunction with* conventional medical approaches. For instance, it can refer to treating hypertension with traditional medication, as well as using yoga and relaxation methods. In contrast, *alternative* medicine is used *instead of* conventional medicine. For example, subscribers to an alternative medicine approach may treat cancer by taking shark cartilage or adhering to a unique diet in place of conventional treatments, such as radiation, chemotherapy, or surgery. Cassileth and Deng (2004) argue that there is a distinction between complementary and alternative

systems. They believe the term "integrative" is a better because it suggests a marrying of conventional medicine with safe and effective complementary medicines.

The World Health Organization (WHO) derives its terminology by recognizing that the heritage and origin of many therapies come from indigenous people. Thus, the WHO defines "traditional medicine" (TM) as "...a comprehensive term to refer to TM systems such as traditional Chinese medicine, Indian ayurveda and Arabic unani medicine, and to various forms of indigenous medicine" (WHO, 2002, p.1). The terminology used by international and government agencies, as well as researchers, differs greatly and has political, social, legal, financial and practical implications.

The definition of CAM is socially determined due to what is considered "conventional." In other countries, national healthcare systems offer and physicians provide many therapies that are not considered conventional in the United States. For instance, China, Vietnam, North Korea and South Korea offer citizens an integrated healthcare system in which CAM treatments are available at public clinics and hospitals, providers are registered and regulated, and treatments are reimbursed by health insurance (WHO, 2002). Similarly, the WHO describes the developed countries of Canada and the United Kingdom as having an "inclusive" system of healthcare; although they do not possess an integrated system, Canada and the U.K. are making significant strides regarding policy, research, insurance coverage and education (WHO, 2002). People around the world are using CAM therapies and treatments that have historically been outside the realm of traditional medicinal approaches.

In the United States, the NCCAM has defined CAM from an American perspective, classifying practices into five categories as outlined in Table 1 below (NCCAM, n.d., ¶ 6). Although this classification scheme is useful, a report from NCCAM highlights the overlap between categories and the ever-changing nature of CAM approaches and therapies (Barnes et al., 2004). Not only do new developments in healthcare continually emerge, but research also provides evidence for some approaches, allowing them to be adopted into mainstream care.

Table 1

National Institutes of Health's National Center on Complementary and Alternative Medicine's Classification, Explanation, and Examples of the Five Categories of CAM Therapies

NCCAM category	Examples
Alternative medical systems "...built upon complete systems of theory and practice"	Homeopathic medicine, naturopathic medicine, traditional Chinese medicine, Ayurveda, etc.
Mind-body interventions "variety of techniques designed to enhance the mind's capacity to affect bodily function and symptoms"	Meditation, yoga, prayer, mental healing, and therapies that incorporate art, music, or dance, etc.
Biologically based therapies "substances found in nature, such as herbs, foods, and vitamins"	Vitamins, dietary supplements, herbal remedies, etc.
Manipulative and body-based methods "based on manipulation and/or movement of one or more parts of the body"	Chiropractic or osteopathic manipulation, massage, etc.
Energy therapies "involve the use of energy fields"	Biofield therapies (qi gong, reiki, therapeutic touch, etc.) and Bioelectromagnetic-based therapies (pulsed fields, magnetic fields, alternating-current or direct-current fields, etc.).

Prevalence of CAM Use

Traditional medicine and CAM have broad appeal. It is estimated that 80% of Africans satisfy their health care needs with traditional medicine (WHO, 2002). In developed countries, the percentages of adults in France, Australia and Japan who have used CAM at least once in their life were 49%, 49%, and 76% respectively (Fisher & Ward, 1994; MacLennan et al., 1996; Yamashita, Tsukayama, & Sugishita, 2002).

In the United States, studies have estimated CAM use rates ranging from 29% to 75% (Ni et al., 2002; Barnes et al., 2004). Unfortunately, a major obstacle in this area of research is the ambiguity that exists in defining CAM. There is a lack of consensus among researchers, and therefore every study defines CAM differently and surveys participants about various therapies. In turn, this leads to problems in measuring and comparing rates of CAM use. Therefore, possibly the most illustrative research that has been done in the United States were two parallel studies by Eisenberg et al. (1993; 1998). In the earlier study, 34% of 1,539 respondents reported using at least one type of CAM in the previous year when presented with a list of 16 unconventional therapies (excluding prayer and exercise). In the follow-up study, employing the same methodology, 42% of the 2,055 participants reported using at least one CAM therapy in last 12 months.

Although limited by differing CAM inclusion criteria, three other national surveys offer valuable findings. First, Astin's study (1998) was modeled on the Eisenberg et al. study (1993). It measured alternative healthcare use as a dichotomous variable, which was operationalized as the use of one or more of 17 CAM therapies in the previous 12 months. However, the therapies presented to respondents differed from those presented

in the Eisenberg et al. (1993) study. Astin's results suggest that some form of alternative health care was used by 40% of participants ($N = 1,035$).

Second, the findings of the 1999 National Health Interview Survey ($N = 30,801$) suggest that 29% of the U.S. adult population used at least one CAM therapy in the previous year (Ni et al., 2002). In this study, respondents were asked if they had used any of 12 identified CAM therapies (including prayer) in the past 12 months.

Finally, the most recent and comprehensive study uses data from the 2002 National Health Interview Survey (Barnes et al., 2004). Specifically seeking to improve the data collection to yield richer results about CAM, researchers questioned participants ($N = 31,044$) about 27 different CAM therapies. They were asked about both lifetime use and use during last 12 months. Findings indicate that 75% of adults have used CAM at least once in their lifetime (including prayer). During the previous 12 months, 62% of adults used some form of CAM when 'prayer for health reasons' was included, while 36% of adults used some form of CAM when this variable was excluded.

Although the studies provide differing percentages, a consistent finding is that a vast proportion of the American public has used some form of CAM. Additionally, research suggests that the use of complementary and alternative medicine is increasing in the United States. The lifetime prevalence of CAM use has steadily risen since the 1950s and research suggests that rates have risen substantially even during the last decade (Kessler et al., 2001; Barnes et al., 2004).

Perceived Benefits: Appeal of CAM to Consumers

The growth of CAM use in the United States is complex and has numerous determinates. Researchers and social scientists have proposed multiple explanations that incorporate personal, philosophical, cultural and social factors that also vary by type of disease and ethnic heritage (Pappas & Perlman, 2002). Common to all users is the belief or hope that a particular therapy will be effective and do them some good; thus, the most influential factor that patients offer to explain their decision to use CAM is the perceived efficacy of the treatment (Astin, 1998). Many people avail of CAM therapies as a preventative measure and to promote overall wellness (Eliason, Huebner, & Marchand, 1999). Others seek out CAM therapy with expectations of relief from symptoms and an improved quality of life (Richardson, 2004).

CAM therapies particularly appeal to patients who are in poorer health and who suffer from certain types of ailments, specifically severe, chronic and debilitating conditions (Astin, 1998; Murray & Shepherd, 1993). Americans report using CAM most often for back, neck, head or joint aches, colds, anxiety or depression, gastrointestinal disorders, and sleeping problems (Barnes et al., 2004). One study found patients to perceive CAM therapies to be more helpful for headaches and neck and back problems, while they judge conventional medicine to be useful for treating hypertension (Eisenberg et al., 2001). Chronic conditions often feature ill-defined symptoms and can be difficult to treat with conventional approaches. Thus, CAM provides patients with an alternative for symptom relief (Burg et al., 1998; Zollman & Vickers, 1999; Palinkas & Kabongo, 2000).

Healthcare professionals reflecting on current CAM use have suggested that scepticism of the efficacy of conventional medicine and medical providers prompts users to seek out alternative care (Sutherland & Verhoef, 1994; Furnham & Forey, 1994). However, this hypothesis has been debunked in numerous research studies. A national study suggests that CAM use among Americans is not due to dissatisfaction with conventional care (Astin, 1998). Only 4.4% of the sample ($N = 1,035$) reported relying primarily on alternative treatments. Instead, it seems that individuals more often avail of both conventional and alternative care. For instance, of the 54% who indicate that they are highly satisfied with their conventional practitioners, 39% also engage in alternative therapies. Other studies have found similar results, indicating that most people use both CAM therapies and conventional medical care (Ni et al., 2002; Scrace, 2003; Eisenberg et al., 1993; Eisenberg et al., 1998; Murray & Shepherd, 1993; McFarland, Bigelow, Zani, Newsom, & Kaplan, 2002; Burg et al., 1998). Findings from another study demonstrate that 79% of 831 respondents who availed of both conventional medicine and CAM therapies perceived the combination to be a better approach than the use of either one alone (Eisenberg et al., 2001). Other research has studied satisfaction with health provider. No significant difference in level of patient satisfaction was measured between physicians and CAM providers, or between ratings of relationship with physician between CAM users and non-users (Palinkas & Martin, 2000; Boon et al. 2000).

Many CAM users perceive the benefits from CAM to be in addition to the conventional care they receive. As demonstrated in a study of American veterans, patients use CAM to supplement the specific areas in which they are dissatisfied

(Kroesen, Baldwin, Brooks, & Bell, 2002). Although content with most aspects of their medical care, the veterans used CAM to deal with side effects from prescription drugs, as well as conventional medicine's lack of emphasis on nutrition, exercise and preventative medicine. Using CAM also satisfied their desire for more holistic health care. The desire of expecting and experiencing a holistic approach to health is corroborated throughout the literature (Astin, 1998; Richardson, 2004). Eisenberg et al.'s study (1998) found that CAM was more often used to prevent illness and maintain health than used to exclusively treat existing illness.

Studies that question patients about their experiences with CAM therapists offer valuable findings. Respondents report appreciating the amount of time and attention that CAM therapists devote to them in a visit (Murray & Shepherd, 1993). Patients also report choosing CAM providers because treatment often involves the same therapist throughout the course of care, involves personal aspects including personality and emotion, incorporates more physical contact, provides explanations of illness that make sense to patients, and addresses spiritual and existential concerns (Zollman & Vickers, 1999).

Variables Associated with CAM Use

Although the data are often conflicting due to measurement problems, a clearer picture of CAM users is emerging in the research literature. Below are some characteristics that predispose individuals to use CAM.

Gender. In the United States, more women than men use CAM therapies (Barnes et al., 2004; Ni et al., 2002; Palinkas & Kabongo, 2000; Burg et al., 1998; Eisenberg et

al., 1998). For instance, Eisenberg et al. (1998) found that that 48.9% of women used CAM, while only 37.8% of men did so. Ni et al. (2002) report female and male usage rates of 33.4% and 24.0%, respectively. Barnes et al. (2004) found that 69.3% of women and 54.1% of men used CAM in the previous 12 months. Similar findings have also been found in British and Australian samples (Cappuccio et al., 2001; Murray & Shepard, 1993; MacLennan et al., 1996).

Race and ethnicity. There is not a clear picture of CAM use patterns among members of different racial groups in the United States. Both of the Eisenberg et al. (1993; 1998) studies found that CAM use was significantly less common among African Americans (23% and 33% respectively) than among individuals in other racial groups (35% and 45% respectively). However, a recent study found substantial usage among Black/African Americans and Asians (Barnes et al., 2004), suggesting that CAM use patterns may be highly dependent on the definition of CAM. For in the Barnes et al. (2004) study, 'prayer for health reasons' was included within the CAM use analysis, while it was excluded in the Eisenberg et al. (1993; 1998) studies. Barnes et al. (2004) found that Black/African Americans (71.3%) were more likely than Caucasian Americans (60.4%) or Asians (61.7%) to use CAM when it included prayer and megavitamin therapy. However, when CAM was defined with these two variables excluded, Asians (43.1%) were more likely to use CAM than Caucasian Americans (35.9%) or Black/African Americans (26.2%).

In addition to race, acculturation appears to play a role in CAM use and the specific types of CAM used. A British study of Caucasians, South Asians and first-

generation Blacks of African origin found that Black people were significantly more likely than the other racial groups to use CAM (Cappuccio et al., 2001). The authors conclude that CAM use may be culturally determined with first-generation immigrants possessing strong health beliefs, which may not have been weakened in the host culture. Two American studies of family practice patients in California and Texas revealed differences among participants' preference for CAM types by degree of acculturation (Palinkas & Kabongo, 2000; Burge & Albright, 2002). Both studies, which included Latino participants, found that the degree of acculturation influences the type of CAM used. Participants strongly affiliated with the Latino culture tended to use folk and traditional practices, while those more acculturated availed of mind-body treatments and manual healing. In the Palinkas & Kabongo (2000) study, Hispanic ethnicity was the only significant predictor of traditional folk remedies use, indicating that members of this ethnic group were more than 10 times as likely as people of other ethnic groups to use such remedies.

Age. Research suggests that CAM use is more common among middle-aged people (approximately 30 to 50 years old) than in other cohorts (Ni et al., 2002; Eisenberg et al., 1993; Eisenberg et al., 1998). CAM use has an inverse curvilinear relationship with age, with the youngest and oldest individuals reporting the lowest rates of CAM use (Barnes et al., 2004; Murray & Shepard, 1993). However, when prayer for health reasons is included in the definition of CAM use, the predictive age shifts higher and older adults report more use than other age groups (Barnes et al., 2004).

Marital status. There is little research regarding the association between marital status and CAM use. In a study of Florida residents, CAM use was associated with being widowed or divorced (Burg et al., 1998).

Education. Previous research has consistently demonstrated that higher educational levels predict increasing CAM use among individuals (Barnes et al., 2004; Ni et al., 2002; Boon et al., 2000; Eisenberg et al., 1993; Eisenberg et al., 1998; MacLennan et al., 1996). However, education may be predictive of certain types of CAM use, for a recent study found that level of education was inversely related to the use of traditional folk medicines (Palinkas & Kabongo, 2000).

Relationship with physician and use of conventional care. Although it has been hypothesized that CAM use is a result of dissatisfaction with conventional care, this suggestion has not been supported by research (Astin, 1998). In a study seeking reasons why patients use CAM, it was found that CAM use was not significantly associated with negative attitudes toward or poor experiences with conventional medicine (Astin, 1998). CAM users are actually more likely to have a primary care doctor and tend to use CAM in tandem with seeking conventional care (Gray, Tan, Pronk, & O'Connor, 2002; Druss & Rosenheck, 1999). In 1997, one in three (31.8%) people seeing a medical doctor reported that they also used an alternative therapy (Eisenberg et al., 1998). In the same study, only 21% of CAM users indicated that they believed "Alternative therapies are superior to conventional therapies", while 79% of respondents agreed that "Using both conventional and alternative therapies is better than using either one alone" (Eisenberg et al., 2001). In fact, CAM users have been found to have more visits to a physician and to

use the conventional medical system more than non-users, possibly due to poorer health and more chronic conditions (Ni et al., 2002; Ong, Petersen, Bodeker, & Stewart-Brown, 2002; Murray & Shepherd, 1993).

Body Mass Index (BMI). Little research has considered the association between BMI and CAM use. An Australian study calculated participants' BMI using their height and weight responses (MacLennan et al., 1996). The findings demonstrated that CAM users were typically of normal weight, while respondents who visited CAM practitioners were more likely to be overweight.

Dietary behavior. Two studies have been conducted which suggest that CAM users engage in healthier dietary behaviors than non-users. In the first study of 4,404 health insurance members, CAM users reported higher vegetable consumption and lower dietary fat intake (Gray et al., 2002). In a second study of nearly 1,600 people attending a health fair, CAM users reported being more likely to eat a low-fat diet (Robinson, Crane, Davidson, & Steiner, 2002).

Dietary knowledge and readiness to change. No research to-date is known to have studied the association between CAM use and individuals' dietary knowledge and readiness to make dietary changes.

This is a brief review of the variables that are directly relevant to the current research. However, there are numerous other personal characteristics in the literature that have also been studied in relation to the general public's CAM use. Variables include: income (Eisenberg et al., 1998), employment status (Burg et al., 1998; MacLennan et al., 1996), area of residence (Barnes et al., 2004; Eisenberg et al., 1998), general health status

(Herron & Glasser, 2003; McFarland et al., 2002); smoking status (Barnes et al., 2004), use of other medicines (Burge & Albright, 2002), possession and satisfaction with a health insurance plan (Robinson et al., 2002; Gray et al., 2002), and outlook on life (MacLennan et al., 1996). As expected, the relationship between personal variables and CAM use is complex and multi-faceted.

Types of CAM Used by Patients

CAM is used as preventative care and to treat a myriad of diverse ailments. Just as the reasons for use are diverse, so are the types of CAM used. The most popular types of CAM vary by research study, especially because the categories and nomenclature differ by study. The most recent study, conducted by the Centers for Disease Control, of 27 types of CAM therapies found that the following were the most utilized in the previous 12 months by respondents (in decreasing order): prayer for self, prayer by others for a patient, natural products (Echinacea, ginseng, garlic, glucosamine, etc.), deep breathing exercises, participation in prayer group, meditation, chiropractic care, yoga, massage, and diets (Barnes et al., 2004). Other major studies have published similar findings; the most commonly used therapies were exercise, prayer, relaxation chiropractic care, and massage (Eisenberg et al., 1993); chiropractic care, lifestyle diet, exercise/movement and relaxation (Astin, 1998); spiritual healing/prayer, herbal medicine, and chiropractic therapies (Ni et al., 2002).

If individuals report CAM use, most do not seem to use just one type of CAM. Research suggests that people often simultaneously use multiple types of CAM (Burg et al., 1998). For instance, in a study of CAM use in older Caucasian Americans and

African American adults in a rural area, participants reported using an average of 3.8 different types of CAM, with a range of one to 12 types (Cuellar et al., 2003). Similarly, a study of CAM use by rural family practice patients found that over 69% of those who used CAM reported using three or more therapies (Herron & Glasser, 2003).

Disclosure of CAM Use

Patients often do not tell their physicians about their use of CAM. In two national surveys, only 40% of CAM therapies were disclosed to physicians (Eisenberg et al., 1993; Eisenberg et al., 1998). Adler and Fosket's study (1999) of women who had recently been diagnosed with breast cancer clarifies why many people do not disclose CAM usage. All participants were seeing a conventional physician and 72% were also using some form of CAM. Only 54% of women who were simultaneously seeing a physician and CAM practitioner informed their physician about their CAM use. Interestingly, 94% of these same women discussed their conventional medical treatment with their CAM provider. In qualitative interviews, participants explained their reasons why they withheld details of their CAM use from physicians (listed in decreasing order of participants' emphasis): perceptions that physicians are not interested in CAM use, expectations of receiving a negative or even hostile response from physicians, beliefs that physicians are unable or unwilling to add useful information to their CAM regime, perceptions that their CAM use is not relevant to their medical treatment process, and beliefs concerning their coordination of different healing strategies. Participants who chose to discuss CAM usage with their physicians did so because they perceived them to be "respectful, open-minded, and willing to listen" (Adler & Fosket, 1999, p. 456).

Physicians are often characterized as being dismissive and closed-minded about patients using CAM; however studies have shown that many doctors have accepting attitudes regarding alternative and complementary therapies (Eliason et al., 1999; Ernst, Resch, & White, 1995). A review of five popular therapies in 19 international studies found that many physicians refer patients to alternative practioners and some personally provide CAM therapy (Astin, Marie, Pelletier, Hansen, & Haskell, 1998). The study suggested that physicians had preferences regarding CAM therapies, preferring acupuncture, chiropractic and massage therapies to homeopathy and herbal medicine. Acupuncture, chiropractic and massage therapies referral rates were 43%, 40%, and 21%, perceived efficacy rates were 51%, 53% and 48%, and personal practice rates were 17%, 19% and 19%, respectively.

Although patients do not disclose CAM usage to their physicians, many want a partnership with their physician that encourages disease prevention, as well as treatment. They would like doctors to become more knowledgeable about alternative approaches so that they can be offered in addition to valuable conventional care (Eliason et al., 1999). The American Medical Association has recognized the importance of educating young doctors about CAM, and a 1997 report encouraged medical schools to include instruction about various types of alternative therapies (American Medical Association, 1997). A 1998 study found that at least 75 of the 125 U.S. medical schools offered electives or included content in required courses about CAM (Wetzel, Eisenberg, & Kaptchuk, 1998).

Some physicians, however, may be reluctant to discuss CAM use with their patients. They may discourage the discussion of CAM therapies for many reasons,

including their lack of knowledge about the topic and not wanting to appear uninformed (Pappas & Perlman, 2002). Additionally, they may be skeptical about the safety and efficacy of alternative therapies and have ethical concerns about the minimal scientific evidence that is available. However, it is important that patients and doctors dialogue about CAM use, especially as it can be potentially dangerous. The use of some CAM products may lead to potential complications and adverse interactions for people taking conventional medications (Massey, 2002). This is especially a concern for cancer patients; they are a group that is prescribed an array of potent conventional medications and one that exhibits high rates of CAM use (Boon et al., 2000; Richardson, Sanders, Palmer, Greisinger, & Singletary, 2000; Adler & Fosket, 1999).

Safety and Regulations Regarding CAM

CAM therapies are often viewed as being healthy and natural, and few consumers contemplate the potential adverse reactions to such therapies. However, similar to all forms of conventional treatment approaches, there are safety concerns regarding CAM. Although some CAM treatments, particularly herbal medicines, have been used for hundreds of years, traditional use is a poor indicator of efficacy or safety (Ernst & Pittler, 2002). People misperceive natural treatments as being organic and harmless, but Ernst (1998) argues that many herbal medicines can have negative consequences for consumers. A recent example that received widespread media attention was the banning by the U.S. Department of Health and Human Services of dietary supplements containing ephedrine alkaloids (Department of Health and Human Services, 2004). The

governmental agency announced that the herbal supplement increased risk of heart attack and stroke and determined that the risks were too great for the general public.

Many CAM treatments are under-researched and few have been evaluated with clinical trials; thus their impact on the human body is not clear. While limited research suggests that some dietary supplements may actually improve the delivery of specific drugs, most attention has been focused on the safety problems that can arise when CAM is taken in conjunction with conventional treatments (Massey, 2002). This is an issue of major concern for physicians, because evidence suggests that some herbal medicines can have adverse interactions with pharmacological drugs (Ernst & Pittler, 2002; Ernst, 1998). Popular herbal medicines, such as Evening Primrose, Licorice, Devil's Claw, and Dong Quai, have been shown to have deleterious effects among patients, including thinned blood flow and seizures. (Ernst & Pittler, 2002). For patient well-being, it is especially important for physicians to be aware of CAM use among cancer and HIV patients who are typically treated pharmacologically for diseases. A recent study of 102 patients enrolled in a phase I clinical chemotherapy trial revealed that more than 88% of patients were using CAM, thus putting them at a potential risk for adverse effects or altered rates of efficiency (Dy et al., 2004).

The quality of CAM treatments is also an issue. Many manufacturers of unlicensed products, such as herbal remedies, currently are not obligated to meet industry standards (Barnes, 2003). Therefore, there are many problems with pharmacologic CAM treatments, including mistaken and mislabeled products, inconsistent composition, contamination with accidental or intentional substitution of other substances, and a lack

of standardization among products (Ernst, 1998; Ernst & Pittler, 2002; Barnes, 2003). Similarly, concerns also exist regarding the quality of nonpharmacologic CAM treatments, such as chiropractic, massage, acupuncture, naturopath therapies, etc. Most CAM professions lack standard licensing and credentialing processes vary across the U.S. states; education and training vary dramatically among individuals (Eisenberg et al., 2002). Standardizing the CAM field may undermine the diversity in many CAM professions and alienate CAM providers who, for many reasons, want to stay outside the conventional system. However, Eisenberg et al. (2002) argue that professional standardization would help guard against dangerous practices and ensure that patients have the right to seek out safe therapies.

CAM Use and Health Behaviors

Little research has been done to understand the health behaviors of CAM users, and therefore the relationship between CAM use and general preventative care is not clear. However, two studies have been conducted that indicate that CAM users are health conscious, impacting multiple areas of personal behavior (Gray et al., 2002; Robinson et al., 2002). In a study of 4,404 members of a managed care organization in Minnesota, CAM users, when compared with nonusers, reported more exercise, higher vegetable consumption, lower dietary fat intake, and lower alcohol intake (Gray et al., 2002). In another study of 1,593 participants at a health fair in Colorado, CAM users differed from nonusers in that they were more likely to engage in healthy lifestyle behaviors. They were more prone to eat a low-fat diet, engage in exercise, and not smoke (Robinson et al., 2002). These findings suggest that CAM users may be more health-conscious and may

take part in preventative care. As such, in the current research, CAM use is conceptualized as part of a clustering of more healthy behaviors and lifestyle (Hagoel, Ore, Neter, Silman, & Rennert, 2002; Berrigan, Dodd, Troiano, Krebs-Smith, & Barbash, 2003). Therefore, it was hypothesized that CAM users will be more likely to adopt healthier dietary behavior change. Results from the current study contribute to the literature, proving information regarding the success of CAM users in a dietary intervention trial that examines knowledge, stage of change, and behavior.

Cancer and Diet

Cancer is the second leading cause of death in United States (Minino, Arias, Kochanek, Murphy & Smith, 2002; American Cancer Society, 2005). For 2005, the American Cancer Society estimates that more than 1,372,910 new cancer cases will be diagnosed, while 570,280 people will die from the disease (American Cancer Society, 2005). While cancer takes a heavy toll on the nation, many types of cancers can be prevented, including those that are related to nutrition and obesity (American Cancer Society, 2005). It is estimated that up to 50% of cancer incidence and 35% of cancer deaths are attributed to diet and alcohol use (Williams, Williams, & Weisburger, 1999). Therefore, a major thrust of the American cancer control strategy has been to encourage individuals to adhere to a low fat, high fiber diet. The 5 A Day for Better Health Program is the largest national behavioral intervention program, which advises people to eat five or more servings of fruits and vegetables each day (Stables & Heimendinger, 2001). Recognizing that dietary interventions are complex, Bal and Foerster (1993) call for more resources for dietary modification programs because the immediate implications are

immense – potential savings of 300,000 new diagnoses and $25 billion in economic costs, as well as the prevention of 160,000 deaths.

Chapter Three

Statement of the Problem

The current study was exploratory in nature, as CAM use is a relatively recent phenomenon to be studied and many gaps exist in the literature. Thus, this research examined predictors of CAM use among a unique population, and if and how use was associated with changes in dietary knowledge, stage of change, and behavior as a result of an intervention trial.

Previous studies have begun documenting the prevalence of CAM use among the general U.S. population. However, few studies look at specific populations, such as African Americans (Mackenzie et al., 2003), rural residents (del Mundo, Shepard, & Marose, 2002; Herron & Glasser, 2003; Cuellar et al., 2003), and Southern residents (Burg et al., 1998). This unique sample provided insight into healthy family practice patients who fall into these populations. Therefore, guided by the sparse literature that is available, the research examined the relationship between CAM use and variables such as gender, ethnicity, marital status, age, educational attainment, time since last visit to physician, trust in physician, body mass index, knowledge of fat, stage of dietary change, and fat and fiber consumption.

Thus far, research in the field of CAM has focused on quantifying the demographics of people using alternative medicine. No previous study has considered the influence that CAM use may have on participants involved in a health promotion

intervention trial. As both a cross-sectional and longitudinal study, this research provided important information regarding participants' CAM use and dietary knowledge, behavior, and readiness to change at the baseline measurement, as well as measuring changes in these variables at both 1- and 12-month time points.

Findings from this study are useful in providing better traditional care for patients and encouraging communication between physicians and patients, which may ultimately help prevent possible adverse interactions between CAM and conventional medicines. Results from the current study also provide a better understanding of CAM users' involvement in health promotion campaigns. The findings can inform the development of future dietary intervention trials so they are more effective and tailored to reflect the interests and health habits of the U.S. population.

The Rural Physician Cancer Prevention Project

The current study used data from the Reaching Rural Residents with Innovative Nutrition Strategies: The Rural Physician Cancer Prevention Project (CA 71024), which was a successful intervention trial that encouraged dietary changes among participants with the goal of reducing high cancer mortality rates. The Rural Physician Cancer Prevention Project (RPCPP) was designed to decrease fat and increase fiber consumption in rural, low-income, low-education level individuals in southern Virginia. The low-intensity intervention had four components: a letter from a personal physician, personalized dietary analysis and feedback, a brief counseling telephone call, and a series of educational nutrition booklets developed for a rural audience.

As seen in Figure 1, participants in the RPCPP trial were contacted by telephone at baseline and three subsequent points (1, 6 and 12 months post-baseline), and data were collected between 1999 and 2003. For an explanation of the study's recruitment and procedures, please refer to Appendix A, and for a full description of the research study and its findings, please see article by Fries et al. (2005).

The current study used data from baseline and 1 and 12 months post-baseline evaluation interviews. Although the trial had 754 randomized participants, this research used a smaller sample of 375 participants. The sample is restricted because only about half of the participants were asked about their use of CAM, as the questions about CAM were added later to the RPCPP baseline interview.

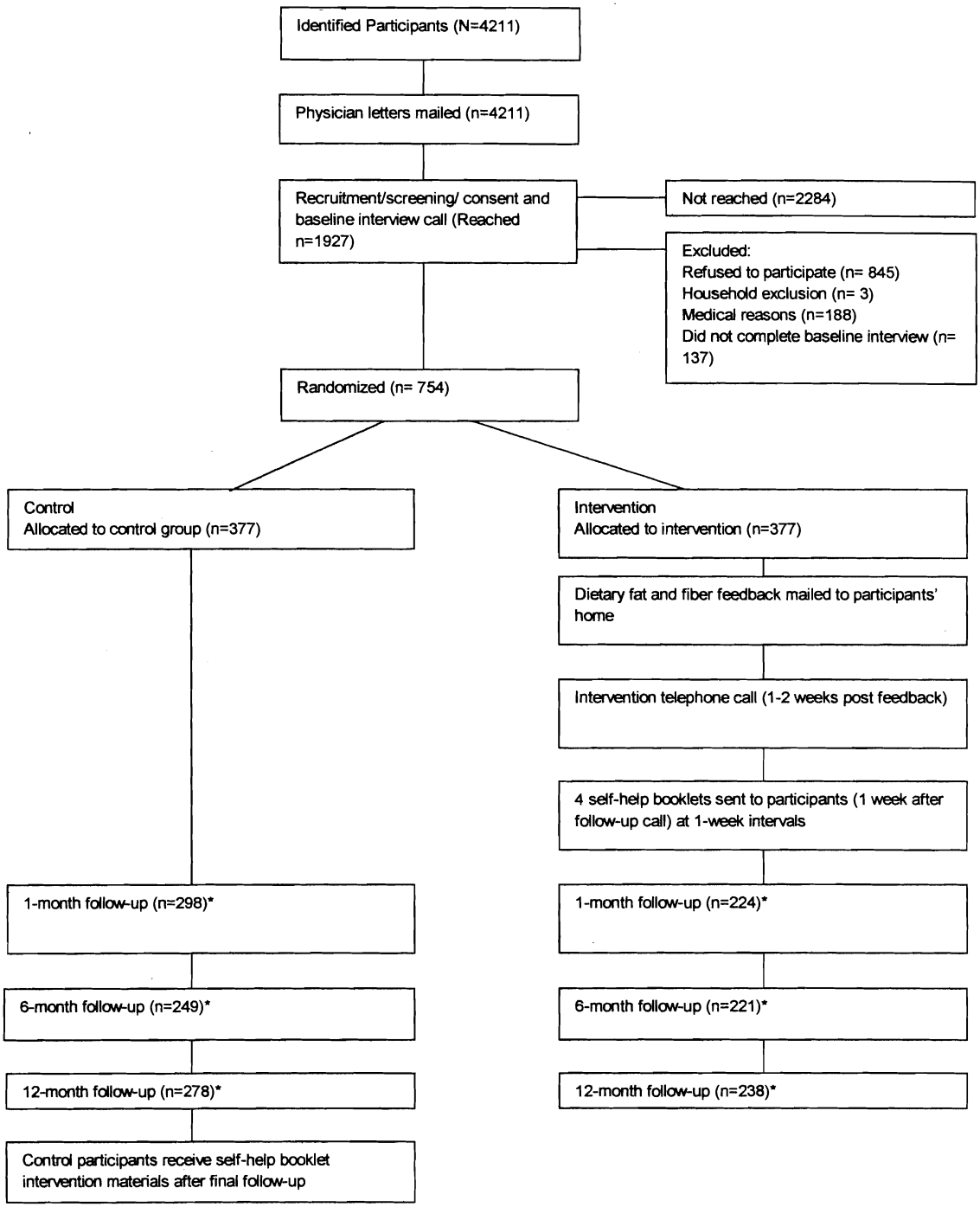

Figure 1: Consort diagram of recruitment and control/intervention groups. *Note: Not all baseline participants responded to every follow-up. Participants may have responded to one, two or all three follow-ups.

Hypotheses

The current study tested the following baseline and change hypotheses:

1. Individuals who are female, Caucasian American, middle-aged, unmarried, and who have more education, a more recent visit to a physician, higher trust in physician, and a lower body mass index score will be more likely to use CAM.
2. CAM use will predict higher knowledge of fat, a more advanced stage of fat behavior change, lower fat consumption behavior, and higher fiber consumption behavior.
3. As a result of the intervention, CAM users will be more likely to demonstrate higher knowledge of fat and a more advanced stage of fat behavior change than non-users at one and 12-month post-intervention evaluation interviews.
4. As a result of the intervention, CAM users will be more likely to report decreased fat consumption behavior and increased fiber consumption behavior than non-users at one and 12-month post-intervention evaluation interviews.

Chapter Four

Method

Participants

Sample characteristics of participants at baseline are displayed in Table 2. Participants ranged from 19 to 72 years of age, with a mean age of 48.1 years (SD = 13.37). The gender breakdown of the sample (N = 375) was 34.9% male and 65.1% female. Caucasian Americans represented 60.0% of the sample; African Americans constituted 36.8% and 3.2% of participants reported other racial identities. Most participants were married (61.1%). In terms of educational attainment, 14.7% had not received a high school diploma, 32.5% earned a high school diploma or equivalent, 27.5% had some college experience, and 25.4% earned a college or graduate degree.

Table 2

Sample Characteristics of Participants at Baseline

Variable	*N*	%	*M*	*SD*	Sample range
Age	375		48.1	13.4	19 – 72
Gender	375				
Male	131	34.9			
Female	244	65.1			
Ethnicity	375				
Caucasian American	225	60.0			
African American	138	36.8			
Other	12	3.2			
Asian	2				
Hispanic/Latino	1				
Native American	2				
Other	3				
No response	4				
Marital status	375				
Married	229	61.1			
Divorced	50	13.3			
Separated	12	3.2			
Widowed	26	6.9			
Never married	58	15.5			
Education	375				
< High school diploma	55	14.7			
High school diploma or equivalent	122	32.5			
Some college experience	103	27.5			
Earned college or graduate degree	95	25.3			

Measures

Data from the baseline and 1- and 12-month follow-up questionnaires were analyzed in the current study. Measures of interest include personal and demographic variables, dietary habits, dietary knowledge, stage of dietary change, and use of CAM.

Personal and demographic variables. For a list of the items asked of participants, please refer to Appendix B.

Age and gender were ascertained from participants' medical records. The other personal and demographic variables were asked during the baseline interview.

Ethnicity was determined by asking, "What is your ethnic or racial background?" Participants were given six possibilities (African America/Black, Caucasian/White, Hispanic/Latino, Native-American/Any tribe, Other) and interviewers could also indicate a response of Don't know or No response.

Marital status was assessed by asking, "Are you: Married, Divorced, Separated, Widowed or Never Married?"

Educational status was determined by asking, "What is the highest level of education that you have completed?" The interviewer allocated each answer to the appropriate answer box corresponding to a level of education. The ten levels of education were: less than 6^{th} grade, 6^{th}-8^{th} grade, Some high school, High school/GED, Technical school graduate, Some college, College degree, Graduate degree, Don't know, and No response.

Body mass index (BMI) was measured using the responses to two questions: "What is your height?" and "What is your weight?" Interviewers recorded answers in feet and inches and in pounds, respectively. BMI was calculated using height and weight ($[lbs./in.^2] \times 703$ or kg/m^2).

Participants were asked two questions regarding their relationship with their physician. First, the length of time since the patient attended a physician was assessed by

asking, "When was the last time you went to a doctor or clinic?" Interviewers wrote the response in terms of months or checked Don't know or No response. If the participant's response was less than one month, the answer was coded as 1 month. Second, trust in personal physician was measured with a question asking participants to rate their trust level with the question, "On a scale of 1 to 5, where 1 is not at all and 5 is very much, how much do you trust what your physician tells you?" Responses were coded on a Likert-type scale, or interviewers could indicate an answer of Don't know or No response.

Fat and Fiber Behavior-related Questionnaire (FFB). The RPCPP used 28 questions to assess dietary habits concerning fat and fiber consumption behavior; the questions were drawn from the Fat and Fiber Behavior-related Questionnaire (Shannon, Kristal, Curry, & Beresford, 1997; Beresford et al., 2001). The FFB measures behaviors including food exclusion, substitution, replacement and modification. Each question follows the same format, asking "In the past three months, how often did you ..." Items assessing dietary fat behavior included examples such as, "In the past three months, how often did you eat bread with butter or margarine?" and "In the past three months, how often did you take the skin off chicken?" Dietary fiber behavior is assessed with questions, including "In the past three months, how often did you eat high-fiber cereal?" and "In the past three months, how often did you eat raw vegetables for a snack instead of chips?" Participants were asked to respond with Usually, Sometimes or Rarely. The FFB provides two summary scores. Both are the average score of the subscale items, ranging from 1.0 to 3.0. Higher fat scores indicate higher fat intake, while higher fiber

scores represent lower fiber intake; therefore lower scores indicate more healthy behaviors.

The FFB is considered to be a reasonably valid and reliable measure of dietary intake (Shannon et al., 1997). The instrument's validity was determined to be 0.53 for the fat scale and 0.50 for the fiber scale, while Cronbach's alpha was 0.77 for the fat scale and 0.74 for the fiber scale. Alphas in the full RPCPP sample were 0.75 for the fat subscale and 0.69 for the fiber subscale (Fries et al., 2005).

Fat knowledge. Fat knowledge was measured with six binary questions, and participants were instructed to identify which food contains less fat. Examples of the fat knowledge questions include "Which one is the better choice? Hamburger or Chicken breast?" and "Which snack is the better choice? Pretzels or Regular potato chips?" These questions were derived from the NCI Surveillance System in Seattle, Washington. Cronbach's alpha for fat knowledge questions was 0.79. Participants' scores range from zero to six correct answers.

Dietary fat stages of change. Participants' readiness for fat behavior change was assessed with eight self-report questions, based on Prochaska and DiClemente's model of change and similar to items in other studies (Curry, Kristal, & Bowen, 1992; Prochaska & DiClemente, 1982). The questions enquired about participants' past attempts and future plans to change the amount of fat in their diet, as well as assessed their confidence in their ability to change. Sample questions include, "Have you ever changed what you eat in order to decrease the amount of fat you eat?" and "In the next month, do you plan to make any changes to reduce the amount of fat you eat?" A staging algorithm (Curry,

Kristal, & Bowen, 1992) was used to categorize participants' responses. Thus, stage of fat behavior change scores were coded 1 to 5, corresponding to the stages of precontemplation through maintenance.

CAM use. Participants were asked two questions to measure CAM use. The questions were developed in consultation with the physicians involved in the RPCPP and were based on their clinical work with patients. First, vitamin usage was assessed by asking, "Do you take any vitamins?" Second, participants were asked, "Do you take any kind of natural or herbal remedies or 'alternative medicine'?" Response options were No, Yes, or Don't know. CAM use was indicated by a positive response to one or both questions.

Recruitment and Procedures

The current research analyzed data from 375 participants from the RPCPP. For a full description of the RPCPP recruitment and procedures, including a description of the telephone survey methods, please see Appendix A.

Data Analytic Plan

Statistical analyses commenced with an examination of the data for outliers, after which the data set was cleaned according to Tabachnick and Fidell's (2001) guidelines. Descriptive statistics were run and examined, including frequencies, means, medians, and modes. Important correlations were plotted to see if the data was significantly skewed. Finally, the assumptions of statistical analysis were tested and appropriate adjustments made.

Baseline hypotheses. Logistic regression analysis was used to analyze the first hypothesis due to the dichotomous outcome (CAM use yes/no). The demographic and personal variables that were hypothesized to influence CAM use (gender, ethnicity, age, marital status, education, visit to physician, trust in physician, and body mass index) were entered in the logistic regression.

The second hypothesis was analyzed by running four separate hierarchical regressions to examine the effect of CAM use on fat knowledge, stage of fat behavior change, and fat and fiber consumption behaviors. In Step 1, each regression controlled for gender, ethnicity, age, marital status, education, time since last visit to physician, and trust in physician. CAM use was entered in Step 2. The dependent variables were fat knowledge score, stage of fat behavior change score, FFB fat behavior score and FFB fiber behavior score.

Change hypotheses. Four hierarchical regressions were used to analyze the third hypothesis, examining the effect of the intervention on CAM users' change in dietary knowledge and stage of change. The analysis required calculating change scores to measure the difference between participants' knowledge of fat and stage of fat behavior change at the baseline interview and at one and 12-month post-intervention evaluation interviews. Personal variables (gender, ethnicity, age, marital status, education, time since last visit to physician, and trust in physician) were entered in Step 1. CAM use and condition (control or intervention) were entered in Step 2. An interaction term (condition x CAM use) was entered in Step 3. The outcome variables were the change scores for 1 and 12 months for fat knowledge and stage of fat behavior change.

Similarly, the fourth and final hypothesis was analyzed with four hierarchical regression analyses to examine the effect of the intervention on CAM users' dietary behavior. This required calculating change scores to measure the difference between participants' fat and fiber consumption behaviors at the baseline interview and at 1- and 12-month post-intervention evaluation interviews. Personal variables (gender, ethnicity, age, marital status, education, time since last visit to physician, and trust in physician) were entered in Step 1. CAM use and condition (control or intervention) were entered in Step 2. An interaction term (condition x CAM use) was entered in Step 3. The outcome variables were the change scores for one and 12 months for fat and fiber consumption behaviors.

Chapter Five

Results

Preliminary Analyses

The data used in this study were previously cleaned by the RPCPP data manager and the principal investigator. However, the current subset of data (the 397 participants who received a baseline questionnaire that included two questions about CAM use) was additionally examined for outliers, missing data, and normality. No outlying values on variables of interest were found in the sample. As data were found to be missing randomly, listwise deletion was used for the 22 participants (in the sample of 397) who had missing data at any of the time-points. Participants were deleted if they were missing data on any personal or demographic variable, or if they did not provide a score measuring their knowledge, behavior, stage of change or CAM use. Thus the sample was reduced to 375 participants. There is also a smaller subset of this sample ($n = 121$) that was asked about their height and weight at baseline, as these questions were added to the survey at a later time. Therefore, the body mass index (BMI) variable, which is calculated using height and weight ([lbs./in.^{2}] x 703 or kg/m^2), features a smaller sample size. Response rates for the overall sample ($N = 375$) were 69.6% ($n = 261$) and 73.3% ($n = 275$) at 1 month and 12 months, respectively. There were no significant differences in the demographic characteristics at baseline for participants who followed up at 1 month and 12 months. Based on recommendations by Tabachnick and Fidell (2001) to

examine the shape of the distribution with large samples, graphs suggested that the assumptions of normality were met.

Descriptive Statistics

Three hundred and ninety-seven participants of the total RPCPP sample received a baseline questionnaire that included two questions about CAM use. Twenty-two participants were excluded due to missing data; therefore the sample for this study was composed of 375 participants. The control condition was composed of 49.6% (n = 186) of the participants, while the other 50.4% (n = 189) were part of the intervention group.

Table 3 contains personal and demographic characteristics of participants at baseline. All participants had seen a physician within the last 36 months, and the mean response was 4.16 months previously (SD = 5.65). They endorsed a high level of trust in their physicians, indicating a mean trust score of 4.53 (SD = .75) on a 5-point scale. The 121 participants who were asked at baseline reported a mean height of 66.30 in. (1.68 m; SD = 3.80 in.) and a mean weight of 181.56 lb. (82.35 kg; SD = 43.52 lb.). The mean calculated body mass index (BMI) was 29.00 (SD = 6.70; 25.0 to 29.9 is considered overweight) and ranged from 18.60 to 56.50. More than half of the sample (53.6%) reported CAM use, with 48.8% taking vitamins and 16.4% taking "any kind of natural or herbal remedies or alternative medicine."

Participants were quite knowledgeable about dietary fat in foods, featuring a mean score of 5.28 (SD = 1.29) on a 6-point scale. When categorized according to the five stages of the Transtheoretical Model, participants were active concerning dietary fat intake, as they endorsed a mean score of 3.77 (SD = 1.40) indicating that they fell

between the Preparation and Action stages (Prochaska & DiClemente, 1982). Finally, concerning their dietary consumption habits, participants reported moderate scores – a mean fat score of 2.02 ($SD = 0.34$) and a mean fiber score of 2.23 ($SD = 0.36$) – on a 3-point scale (lower score indicates lower fat and higher fiber). Shannon et al. (1997), in a sample of participants in Washington State, reported a similar mean fat score ($M = 1.96$, $SD = 0.35$) but a lower mean fiber score ($M = 1.84$, $SD = 0.36$). Bean (2004), studying a Virginia sample of first degree relatives of people with colon cancer, found very similar FFB scores – a mean fat score of 2.0 ($SD = 0.38$) and a mean fiber score of 2.3 ($SD = 0.33$).

Zero-order correlations for continuous variables at baseline are displayed in Table 4. Time since last visit to physician (in months) was significantly and negatively related to body mass index (BMI). Trust in physician was significantly and negatively related to education and time since last visit to physician visit to physician. Fat knowledge was significantly and positively correlated with education. Fat stage of change was significantly and positively correlated with age, education, and fat knowledge score. The Fat and Fiber Behavior Questionnaire (FFB) fat behavior score was significantly and negatively related to age, education, fat knowledge score, and fat stage of change. Finally, the FFB fiber behavior score was significantly and negatively related to age, fat stage of change, and the FFB fat behavior score.

Table 3

Personal and Demographic Characteristics of Participants: Baseline Descriptive Results

Variable	*N*	%	*M*	*SD*	Sample range	Possible range
Body mass index (BMI)	121		29.00	6.70	18.6 – 56.5	
Relationship with physician	375					
Time since last visit to physician						
(in months)	375		4.16	5.65	1 – 36	1 – 36
Trust in personal physician	375		4.53	0.75	1 – 5	1 – 5
Fat knowledge score	375		5.28	1.92	0 – 6	0 – 6
Fat stage of change	375		3.77	1.40	1 – 5	1 – 5
FFB fat behavior score	375		2.01	0.02	0.80 – 2.80	1.00 – 3.00
FFB fiber behavior score	375		2.23	0.02	1.03 – 2.93	1.00 – 3.00
CAM use	375					
Yes	201	53.6				
No	174	46.4				

Table 3 continues

Take vitamins	375	
Yes	183	48.8
No	192	51.2
Take remedies/alternative medicine	371	
Yes	61	16.4
No	310	83.6

Note. Body mass index is calculated using height and weight ([lbs./in.^{2}] x 703 or kg/m^2). Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). More fat knowledge is indicated by a higher score on a 6-point scale, 1 (low) to 6 (high). A more advance stage of fat behavior change is indicated by a higher score, 1 (low) to 5 (high). FFB = Fat and Fiber Behavior Questionnaire; fat and fiber scores range from 1 (low) to 3 (high) and higher FFB scores indicate higher fat or lower fiber consumption.

Table 4

Correlations between Continuous Variables Measured at Baseline

	Variable	1	2	3	4	5	6	7	8	9
1	Age	--								
2	Education	-.16**	--							
3	Body mass index (BMI)	.00	-.15	--						
4	Time since last visit to physician	-.09	.02	-.21*	--					
5	Trust in personal physician	.07	-.12*	.13	-.14**	--				
6	Fat knowledge score	.06	.12*	.02	-.04	.01	--			
7	Dietary fat stage of change	.21**	.11*	.08	-.08	.05	.12*	--		
8	FFB fat score	-.23**	-.10*	.13	.07	-.02	-.12*	-.40**	--	
9	FFB fiber score	-.30**	-.02	.06	.04	-.04	-.06	-.27**	.72**	--

Note. Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Body mass index is calculated using height and weight ([lbs./in.^{2}] x 703 or kg/m^2). Time since last visit to physician is measured in months. Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). More fat knowledge is indicated by a higher score on a 6-point scale, 1 (low) to 6 (high). A more advance stage of fat behavior change is indicated by a higher score, 1 (low) to 5 (high). FFB = Fat and Fiber Behavior Questionnaire; fat and fiber scores range from 1 (low) to 3 (high) and higher FFB scores indicate higher fat or lower fiber consumption.

*$p < .05$. **$p < .01$.

Hypothesis Testing: Baseline Hypotheses

Hypothesis 1. Individuals who are female, Caucasian American, middle-aged, unmarried, and who have more education, a more recent visit to a physician, higher trust in physician, and a lower body mass index (BMI) score will be more likely to use CAM.

A logistic regression analysis was conducted to determine factors that influence CAM use (yes/no). Two separate logistic regression models were run due to the fewer participants who provided information to calculate a BMI score (n = 121). In the first logistic regression that included all predictor variables but BMI, the overall model was significant, $\chi 2$ (9) = 24.08, p = .004. Of the individual variables, age (odds ratio [OR] = 1.02, confidence interval [CI] = 1.00-1.04), education (OR = 1.18, CI = 1.03-1.34), and trust in personal physician (OR = .744, CI = 0.55-1.00) significantly influenced CAM use. Notably, the individual variable of other ethnicity (referring to Asian, Latino, Native American, or other ethnicity) most significantly influenced CAM use (OR = 26.57, CI = 1.15-615.53).

A second logistic regression model testing the relationship between BMI and CAM use (without any other variables included in the model) was not significant, $\chi 2$ (1) = 1.36, p = .24, suggesting that there is not a relationship between BMI and CAM use.

Hypothesis 2. CAM use will predict higher knowledge of fat, more advanced stage of fat behavior change, lower fat consumption behavior, and higher fiber consumption behavior.

Four separate hierarchical regression models were run to examine the effect of CAM use on fat knowledge, stage of fat behavior change, and fat and fiber consumption

behaviors. In Step 1, each regression controlled for personal and demographic variables (gender, age, ethnicity, marital status, education, time since last visit to physician, and trust in physician). CAM use was entered in Step 2.

The first analysis examined the effect of CAM use on fat knowledge (see Table 5). The overall model was significant, $F(9, 361) = 3.42$, $p < .001$; however, CAM use in Step 2 did not account for a significant amount of variance above and beyond Step 1, $F(1, 361) = 0.14$, $p = .71$, $\Delta R^2 = .00$. Personal and demographic variables in Step 1 accounted for 7.8% of the variance in the fat knowledge baseline scores, which was statistically significant, $F(8, 362) = 3.84$, $p < .001$. When holding other variables constant, marital status was the only significant predictor of fat knowledge ($\beta = -.15$, $p = .004$), indicating that being married was associated with more fat knowledge.

Table 5

Hierarchical Multiple Regression Results for CAM Use Influence on Fat Knowledge Baseline Scores

Variable	*Df*	ΔR^2	*B*	*SE B*	*B*
Step 1	(8, 362)	.08**			
Gender			.17	.14	.06
Age			.00	.01	.01
Education			.07	.04	.09
Marital status			-.41	.14	-.15**
Time since last visit to physician			-.01	.01	-.03
Trust in physician			-.02	.09	-.01
Caucasian (dummy coded)			.55	.46	.21
African American (dummy coded)			.13	.46	.05
Step 2	(1,361)	.00			
Gender			.20	.14	.07
Age			.00	.01	.01
Education			.07	.04	.10
Marital status			-.41	.14	-.15**

Table 5 continues

Time since last visit to physician	-.01	.01	-.02
Trust in physician	-.02	.09	-.01
Caucasian (dummy coded)	.53	.46	.20
African American (dummy coded)	.11	.46	.04
CAM use	-.05	.14	-.02

Note. All statistics are reported at each step. $F(9, 361) = 3.42, p < .001$. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). Caucasian (dummy coded) is a variable coded in reference to Other Ethnicities. African American (dummy coded) is a variable coded in reference to Other Ethnicities. CAM use is a dichotomous variable of 1 (no) or 2 (yes). More fat knowledge is indicated by a higher score.

*$p < .05$. **$p < .01$.

The second analysis tested the effect of CAM use on participants' stage of fat behavior change (see Table 6). Once again, the overall model was significant, $F(9, 361) = 3.79, p < .001$; however, CAM use in Step 2 did not account for a significant amount of variance above and beyond Step 1, $F(1, 361) = 0.38, p = .54, \Delta R^2 = .00$. Personal and demographic variables accounted for 8.5% of the variance in the stage of fat behavior

change, which was statistically significant, $F(8, 362) = 4.22, p < .001$. Gender ($\beta = .13, p = .01$), age ($\beta = .22, p < .001$) and education ($\beta = .13, p = .01$), when holding other variables constant, were statistically significant predictors of stage of fat behavior change. Female gender, older age and more education were associated with more advanced stages of fat behavior change.

Table 6

Hierarchical Multiple Regression Results for CAM Use Influence on Stage of Fat Behavior Change Scores

Variable	*Df*	ΔR^2	*B*	*SE B*	*B*
Step 1	(8, 362)	.09**			
Gender			.40	.15	.13*
Age			.02	.01	.22**
Education			.11	.04	.13*
Marital status			-.17	.15	-.06
Time since last visit to physician			-.01	.01	-.03
Trust in physician			.08	.10	.04
Caucasian (dummy coded)			.13	.49	.05
African American (dummy coded)			.14	.50	.05
Step 2	(1,361)	.00			
Gender			.39	.16	.13*
Age			.02	.01	.21**
Education			.11	.04	.13*
Marital status			-.17	.15	-.06

Table 6 continues

Time since last visit to physician	-.01	.01	-.03
Trust in physician	.08	.10	.04
Caucasian (dummy coded)	.16	.50	.06
African American (dummy coded)	.18	.50	.06
CAM use	.09	.15	.03

Note. All statistics are reported at each step. $F(9, 361) = 5.37, p < .001$. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). Caucasian (dummy coded) is a variable coded in reference to Other Ethnicities. African American (dummy coded) is a variable coded in reference to Other Ethnicities. CAM use is a dichotomous variable of 1 (no) or 2 (yes). A more advanced stage of fat behavior change is indicated by a higher score.

*$p < .05$. **$p < .01$.

The third analysis explored the effect of CAM use on FFB fat behavior baseline scores (see Table 7). The overall model was statistically significant, $F(9, 361) = 5.37, p < .001$. CAM use was statistically significant and accounted for an additional 2.1% of the variance in fat behavior baseline scores, $F(1, 361) = 8.47, p = .004, \Delta R^2 = .02$, beyond the 9.7% explained by the personal and demographic variables in Step 1. In the full

model, gender (β = -.13, p = .01), age (β = -.21, p < .001), education (β = -.11, p = .04), and CAM use (β = -.15, p = .01) were statistically significant predictors of FFB fat behavior baseline scores. Being male, younger, less educated, and not using CAM were associated with higher FFB fat scores (indicating higher fat consumption).

Table 7

Hierarchical Multiple Regression Results for CAM Use Influence on Fat and Fiber Behavior-related Questionnaire (FFB) Fat Behavior Baseline Scores

Variable	*Df*	ΔR^2	*B*	*SE B*	*B*
Step 1	(8, 362)	.10**			
Gender			-.10	.04	-.15**
Age			-.01	.00	-.23**
Education			-.03	.01	-.12*
Marital status			.03	.04	.04
Time since last visit to physician			.00	.00	.02
Trust in physician			-.00	.02	-.01
Caucasian (dummy coded)			.07	.12	.10
African American (dummy coded)			.11	.12	.15
Step 2	(1,361)	.02**			
Gender			-.10	.04	-.13*
Age			-.01	.00	-.21**
Education			-.02	.01	-.11*
Marital status			.03	.04	.05

Table 7 continues

Time since last visit to physician	.00	.00	.03
Trust in physician	-.01	.02	-.02
Caucasian (dummy coded)	.04	.12	.06
African American (dummy coded)	.07	.12	.10
CAM use	-.10	.04	-.15**

Note. All statistics are reported at each step. $F(9, 361) = 3.79, p < .001$. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). Caucasian (dummy coded) is a variable coded in reference to Other Ethnicities. African American (dummy coded) is a variable coded in reference to Other Ethnicities. CAM use is a dichotomous variable of 1 (no) or 2 (yes). Higher FFB scores indicate higher fat consumption.

*$p < .05$. **$p < .01$.

Finally, the fourth analysis examined the effect of CAM use on FFB fiber behavior baseline scores (see Table 8). Again, the overall model was significant, $F(9,361) = 5.78, p < .001$, and CAM use in Step 2 was statistically significant, accounting for 1.3% of the variance in fiber behavior baseline scores, $F(1, 361) = 5.30, p = .02, \Delta R^2 = .01$, above and beyond the variables in Step 1. Gender ($\beta = -.12, p = .02$), age ($\beta = -.29,$

$p < .001$) and CAM use ($\beta = -.12$, $p = .02$) were statistically significant predictors of FFB fiber behavior baseline scores. Being male, younger, and not using CAM were associated with higher FFB fiber scores (indicating lower fiber consumption).

Table 8

Hierarchical Multiple Regression Results for CAM Use Influence on Fat and Fiber Behavior-related Questionnaire (FFB) Fiber Behavior Baseline Scores

Variable	*Df*	ΔR^2	*B*	*SE B*	*B*
Step 1	(8, 362)	.11**			
Gender			-.10	.04	-.13*
Age			-.01	.00	-.30**
Education			-.01	.01	-.06
Marital status			.03	.04	-.04
Time since last visit to physician			.00	.00	-.02
Trust in physician			-.01	.02	-.02
Caucasian (dummy coded)			.06	.12	.08
African American (dummy coded)			.10	.12	.14
Step 2	(1,361)	.01*			
Gender			-.09	.04	-.12*
Age			-.01	.00	-.29**
Education			-.01	.01	-.05
Marital status			-.03	.04	-.04

Table 8 continues

Time since last visit to physician	.00	.00	-.02
Trust in physician	-.02	.02	-.03
Caucasian (dummy coded)	.03	.12	.04
African American (dummy coded)	.07	.12	.10
CAM use	-.08	.04	-.12*

Note. All statistics are reported at each step. $F(9,361) = 5.78, p < .001$. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (*not at all*) to 5 (*very*). Caucasian (dummy coded) is a variable coded in reference to Other Ethnicities. African American (dummy coded) is a variable coded in reference to Other Ethnicities. CAM use is a dichotomous variable of 1 (no) or 2 (yes). Higher FFB scores indicate lower fiber consumption.

*$p < .05$. **$p < .01$.

Hypothesis Testing: Change Hypotheses

Hypothesis 3. As a result of the intervention, CAM users will be more likely to demonstrate higher knowledge of fat and a more advanced stage of fat behavior change than non-users at 1 and 12 month post-intervention evaluation interviews.

Four separate hierarchical regression models were run to examine the effect of the intervention on CAM users' knowledge of fat and stage of fat behavior change. In Step 1, each regression controlled for personal and demographic variables (gender, age, ethnicity, marital status, education, time since last visit to physician, and trust in physician). CAM use and condition (control vs. experimental) were entered in Step 2, and an interaction term (condition x CAM use) was entered in Step 3. Results of the regression analyses are presented in Tables 9 and 10.

The first analysis examined the effect of the intervention on CAM users' knowledge of fat at 1 month (see Table 9). The overall model was significant, $F(11, 249) = 2.96$, $p = .001$. The first step of the control variables was significant $F(8, 252) = 3.28$, $p = .001$; however, the addition of CAM use and condition in Step 2 was not significant, $F(2, 250) = 0.58$, $p = .56$, $\Delta R^2 = .00$. The addition of the interaction term in Step 3 was significant, $F(1, 249) = 4.83$, $p = .03$, $\Delta R^2 = .02$. Unexpectedly, participants in all groups experienced a decrease in fat knowledge (see Figure 2). For participants in the intervention group, CAM users ($M = -.76$, $SD = .97$) experienced less of a decrease in fat knowledge than non-users ($M = -.83$, $SD = .86$). In contrast, for participants in the control condition, CAM users ($M = -.91$, $SD = 1.22$) experienced more of a decrease in fat knowledge than non-users ($M = -.42$, $SD = 1.46$).

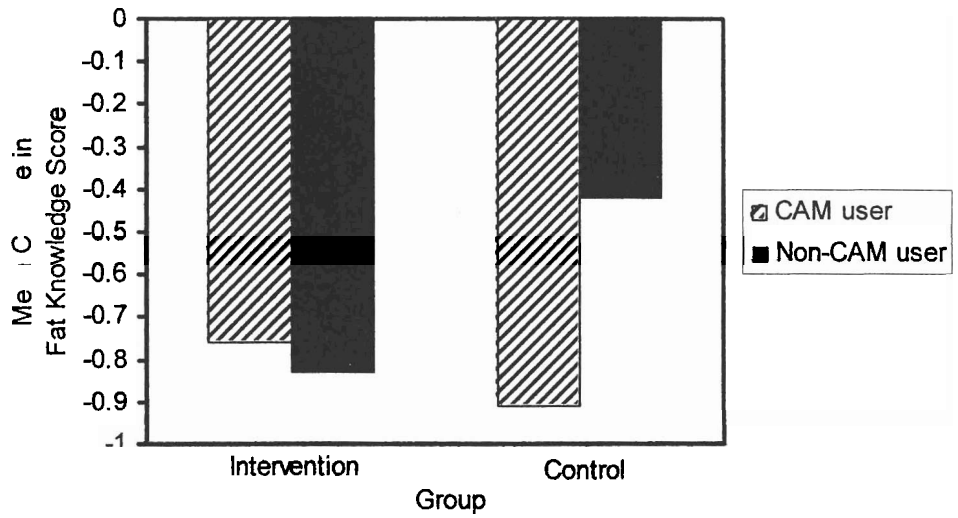

Figure 2. Mean change in fat knowledge score (range of 0 – 6 points) at 1 month post-intervention.

The effect of the intervention on CAM users' knowledge of fat at 12 months was explored in the second analysis (see Table 9). The overall model was significant, $F(11, 263) = 1.98, p = .03$. The control variables were not significant, $F(8,266) = 1.92, p = .06$. Additionally, when added to the model in Step 2, CAM use and condition were not significant, $F(2,264) = 2.30, p = .10, \Delta R^2 = .02$. The addition of the interaction term in Step 3 did not significantly increase the amount of variance accounted for by the entire model, $F(1, 263) = 1.63, p = .20, \Delta R^2 = .01$. Although each step did not increase the variance significantly, the full model was significant and accounted for 7.7% of the variance in change in fat knowledge over 12 months. In the full model, other ethnicity ($\beta = -.13, p = .03$) and trust in physician ($\beta = .16, p = .01$) were statistically significant predictors. Being of other ethnicities (Asian, Hispanic/Latino, or Native American) was

associated with lower levels of knowledge about fat 12 months after the intervention, whereas more trust in physician was associated with more knowledge about fat at the same time-point.

Table 9

Hierarchical Multiple Regression Results for CAM Use Influence on Fat Knowledge Scores at 1 and 12 Months

Variable	*df*	ΔR^2	*B*	*SE B*	*β*
Equation 1: Fat knowledge at 1 month					
Step 1	(8, 252)	.09**			
Gender			-.25	.16	-.10
Age			-.00	.01	-.02
Education			-.04	.04	-.05
Marital status			-.04	.16	-.02
Time since last visit to physician			.02	.01	.08
Trust in physician			.17	.10	.11
Caucasian (dummy coded)			-.56	.16	-.23**
Other ethnicity (dummy coded)			-1.24	.48	-.16*
Step 2	(2,250)	.00			
Gender			-.22	.16	-.09
Age			-.00	.01	-.01
Education			-.03	.05	-.04*

Table 9 continues

Marital status			-.04	.16	-.02
Time since last visit to physician			.02	.01	.08
Trust in physician			.16	.10	.11
Caucasian (dummy coded)			-.55	.16	-.23**
Other ethnicity (dummy coded)			-1.22	.49	-.15*
CAM use			-.12	.15	-.05
Condition			-.10	.14	-.04
Step 3	(1, 249)	.02*			
Gender			-.21	.16	-.08
Age			-.00	.00	-.03
Education			-.03	.05	-.05
Marital status			-.05	.16	-.02
Time since last visit to physician			.02	.01	.08
Trust in physician			.18	.10	.12
Caucasian (dummy coded)			-.56	.16	-.23**
Other ethnicity (dummy coded)			-1.24	.48	-.16*
CAM use			-1.03	.44	-.43*

Table 9 continues

Condition	-1.08	.47	-.45*
CAM use X Condition	.63	.29	.58*
Overall $F(11, 249) = 2.96, p = .00$**			
Equation 2: Fat knowledge at 12 months			
Step 1	(8, 266) .06		
Gender	-.15	.15	-.06
Age	-.01	.01	-.06
Education	.01	.04	.02
Marital status	.06	.15	.02
Time since last visit to physician	.02	.01	.10
Trust in physician	.23	.10	.15*
Caucasian (dummy coded)	-.10	.16	-.04
Other ethnicity (dummy coded)	-.95	.49	-.12
Step 2	(2, 264) .02		
Gender	-.15	.15	-.06
Age	-.01	.01	-.08
Education	.01	.05	.01

Table 9 continues

Marital status			.04	.15	.02
Time since last visit to physician			.02	.01	.09
Trust in physician			.24	.10	.15*
Caucasian (dummy coded)			-.12	.16	-.05
Other ethnicity (dummy coded)			-1.09	.50	-.14*
CAM use			.14	.15	.06
Condition			-.27	.14	-.12
Step 3	(1, 263)	.01			
Gender			-.14	.15	-.06
Age			-.01	.01	-.09
Education			.00	.05	.00
Marital status			.05	.15	.02
Time since last visit to physician			.02	.01	.09
Trust in physician			.25	.10	.16*
Caucasian (dummy coded)			-.11	.16	-.05
Other ethnicity (dummy coded)			-1.07	.50	-.13*
CAM use			-.40	.44	-.17

Table 9 continues

Condition	-.84	.46	-.36
CAM use X Condition	.37	.29	.34
Overall $F(11, 263) = 1.98, p = .03$*			

Note: All statistics are reported at each step. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (not at all) to 5 (very). Caucasian (dummy coded) is a variable coded in reference to No Response. Other Ethnicity (dummy coded) is a variable coded in reference to No Response. CAM use is a dichotomous variable of 1 (no) or 2 (yes). Condition is a dichotomous variable of 1 (control) or 2 (intervention). More fat knowledge is indicated by a higher score.

*$p < .05$. **$p < .01$.

The third analysis tested the effect of the intervention on CAM users' stage of fat behavior change at 1 month (see Table 10). The overall model was significant, $F(11, 245) = 2.02, p = .03$, and accounted for 8.3% of the variance in the change in fat behavior change at 1 month. Step 1 of the control variables was significant $F(8, 248) = 2.61, p = .01$; however, the addition of CAM use and condition in Step 2 was not significant, $F(2, 246) = 0.57, p = .57, \Delta R^2 = 0.00$. The addition of the interaction term in Step 3 was also not significant, $F(1, 245) = .38, p = .54, \Delta R^2 = 0.00$. In the full model, statistically

significant predictors were gender ($\beta = .13, p = .04$), age ($\beta = .13, p = .05$) and trust in physician ($\beta = .15, p = .03$). Female gender, older age and more trust in physician were associated with more advanced stages of fat behavior change at 1 month.

The effect of the intervention on CAM users' stage of fat behavior change at 12 months was examined in the fourth analysis (see Table 10). The overall model was significant, $F(11, 253) = 3.10, p = .00$. The control variables in Step 1 were significant, $F(8, 256) = 3.76, p < .001$. However, neither the addition of the second step (CAM use and condition) was significant, $F(2, 254) = 1.85, p = .16, \Delta R^2 = 1.3$, nor was the addition of the interaction term in Step 3, $F(1, 253) = .20, p = .66, \Delta R^2 = 0.00$. Although Steps 2 and 3 did not increase the variance significantly, Step 1 accounted for 10.5% of the variance and the full model accounted for 11.9% of the variance in the change in fat behavior stage at 12 months. In the full model, only gender ($\beta = .18, p = .01$) and age ($\beta = .21, p = .002$) were statistically significant predictors. Being female and older was associated with more advanced stages of fat behavior change at 12 months.

Table 10

Hierarchical Multiple Regression Results for CAM Use Influences on Stage of Fat Behavior at 1 and 12 Months

Variable	*df*	ΔR^2	*B*	*SE B*	*β*
Equation 3: Stage of fat behavior at 1 month					
Step 1	(8, 248)	.08			
Gender			.34	.16	.14*
Age			.01	.01	.13*
Education			.06	.05	.08
Marital status			-.22	.16	-.09
Time since last visit to physician			-.01	.01	-.04
Trust in physician			.22	.1	.14*
Caucasian (dummy coded)			.00	.17	.00
Other ethnicity (dummy coded)			.01	.50	.00
Step 2	(2, 246)	.00			
Gender			.34	.16	.13*
Age			.01	.01	.14*
Education			.06	.05	.09

Table 10 continues

Marital status			-.21	.16	-.08
Time since last visit to physician			-.01	.01	-.04
Trust in physician			.22	.1	.14*
Caucasian (dummy coded)			.01	.17	.00
Other ethnicity (dummy coded)			.05	.50	.01
CAM use			-.07	.15	-.03
Condition			.14	.15	.06
Step 3	(1, 245)	.00			
Gender			.34	.16	.13*
Age			.01	.01	.13*
Education			.06	.05	.09
Marital status			-.21	.16	-.09
Time since last visit to physician			-.01	.01	-.04
Trust in physician			.23	.10	.15*
Caucasian (dummy coded)			.01	.17	.00
Other ethnicity (dummy coded)			.04	.50	.01
CAM use			-.33	.50	-.14

Table 10 continues

Condition	-.15	.49	-.06
CAM use X Condition	.19	.30	.17
Overall F (11, 245) = 2.02, p = .03*			
Equation 4: Stage of fat behavior at 12 months			
Step 1 (8, 256) .11**			
Gender	.51	.17	.19**
Age	.02	.01	.21**
Education	.09	.05	.12*
Marital status	-.11	.17	-.04
Time since last visit to physician	.01	.01	.04
Trust in physician	.10	.11	.06
Caucasian (dummy coded)	.19	.17	.07
Other ethnicity (dummy coded)	-.18	.58	-.02
Step 2 (2, 254) .01			
Gender	.49	.17	.18**
Age	.02	.01	.20**
Education	.08	.05	.10

Table 10 continues

Marital status			-.11	.17	-.04
Time since last visit to physician			.01	.01	.04
Trust in physician			.11	.11	.06
Caucasian (dummy coded)			.19	.17	.07
Other ethnicity (dummy coded)			-.17	.58	-.02
CAM use			.21	.16	.08
Condition			.22	.16	.08
Step 3	(1, 253)	.00			
Gender			.49	.17	.18**
Age			.02	.01	.21**
Education			.08	.05	.11
Marital status			-.11	.17	-.04
Time since last visit to physician			.01	.01	.04
Trust in physician			.11	.11	.06
Caucasian (dummy coded)			.19	.17	.07
Other ethnicity (dummy coded)			-.17	.59	-.02
CAM use			.41	.49	.16

Table 10 continues

Condition	.44	.51	.17
CAM use X Condition	-.14	.32	-.12

Overall $F(11, 253) = 3.10, p = .00^{**}$

Note: All statistics are reported at each step. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (not at all) to 5 (very). Caucasian (dummy coded) is a variable coded in reference to No Response. Other Ethnicity (dummy coded) is a variable coded in reference to No Response. CAM use is a dichotomous variable of 1 (no) or 2 (yes). Condition is a dichotomous variable of 1 (control) or 2 (intervention). A more advance stage of fat behavior change is indicated by a higher score.

$^{*}p < .05$. $^{**}p < .01$.

Hypothesis 4. As a result of the intervention, CAM users will be more likely to report decreased fat consumption behavior and increased fiber consumption behavior than non-users at 1- and 12-month post-intervention evaluation interviews.

Similar to the analyses for the third hypothesis, analyzing the fourth hypothesis required running four separate hierarchical regression models to examine the effect of the intervention on CAM users' dietary behavior. Each regression controlled for personal and demographic variables (gender, ethnicity, age, marital status, education, time since

last visit to physician, and trust in physician) in Step 1. CAM use and condition were entered in Step 2, and an interaction term (condition x CAM use) was entered in Step 3.

The first hierarchical regression examined the effect of CAM use and the intervention on fat consumption behaviors after 1 month (see Table 11). The overall model was significant, $F(11, 249) = 2.47$, $p = .006$, and accounted for 9.8% of the variance. The control variables in Step 1 of the model were not significant, $F(8, 252) = .63$, $p = .75$, $\Delta R^2 = .02$, whereas the addition of Step 2 (CAM use and condition) when added to the model was significant, $F(2, 250) = 9.29$, $p<.001$, $\Delta R^2 = .07$. The addition of the interaction term in Step 3 was not statistically significant, $F(1, 249) = 3.03$, $p = .08$, $\Delta R^2 = 0.01$. In terms of the test of the individual coefficients in the full model, the condition (control versus intervention) was the only significant predictor of change in participants' fat consumption behaviors ($\beta = -.59$, $p = .003$), suggesting that inclusion in the intervention group was associated with more change in fat consumption behaviors.

Table 11

Hierarchical Multiple Regression Results for CAM Use Regressed onto Fat Consumption Behavior at 1 Month

Variable	*df*	ΔR^2	*B*	*SE B*	*B*
Step 1	(8, 252)	.02			
Gender			.04	.04	.06
Age			.00	.00	.03
Education			.01	.01	.03
Marital status			.02	.04	.03
Time since last visit to physician			.00	.00	.06
Trust in physician			-.03	.02	-.09
Caucasian (dummy coded)			-.01	.04	-.02
Other ethnicity (dummy coded)			.04	.12	.02
Step 2	(2,250)	.07**			
Gender			.05	.04	.08
Age			.00	.00	.01
Education			.00	.01	.02
Marital status			.01	.04	.02

Table 11 continues

Time since last visit to physician			.00	.00	.06
Trust in physician			-.03	.02	-.10
Caucasian (dummy coded)			-.02	.04	-.03
Other ethnicity (dummy coded)			.01	.11	.01
CAM use			.02	.04	.04
Condition			-.14	.03	-.26**
Step 3	(1, 249)	.01			
Gender			.05	.04	.09
Age			.00	.00	-.00
Education			.00	.01	.01
Marital status			.01	.04	.01
Time since last visit to physician			.00	.00	.05
Trust in physician			-.03	.02	-.09
Caucasian (dummy coded)			-.02	.04	-.3
Other ethnicity (dummy coded)			.01	.11	.00
CAM use			-.15	.10	-.27
Condition			-.33	.11	-.59**

Table 11 continues

CAM use X Condition	.12	.07	.46

Note: All statistics are reported at each step. $F(11, 249) = 2.47, p = .006$. Gender is a dichotomous variable of 1 (male) or 2 (female). Education ranges from 1 (less than 6th grade) to 8 (graduate degree). Marital status is a dichotomous variable of 1 (married) or 2 (not married). Trust in physician is a Likert-type scale from 1 (not at all) to 5 (very). Caucasian (dummy coded) is a variable coded in reference to Other Ethnicities. Other ethnicity (dummy coded) is a variable coded in reference to Other Ethnicities. CAM use is a dichotomous variable of 1 (no) or 2 (yes). Condition is a dichotomous variable of 1 (control) or 2 (intervention). Higher consumption scores indicate higher fat consumption. $*p < .05$. $**p < .01$.

None of the remaining full hierarchical regression models were significant. The second hierarchical regression explored the effect of CAM use and the intervention on fat consumption behaviors after 12 months. The overall model was not significant, $F(11, 263) = 1.55, p = .11$. The third hierarchical regression tested the effect of CAM use and the intervention on fiber consumption behaviors after 1 month. The overall model was not significant, $F(11, 249) = 1.01, p = .44$. The fourth and final hierarchical regression examined the effect of CAM use and the intervention on fiber consumption behaviors after 12 months. The overall model was not significant, $F(11, 263) = .52, p = .89$.

Chapter Six

Discussion

The current study of participants enrolled in a dietary intervention had four goals. First, as there is a lack of research concerning CAM use among Southerners in the United States, the current study explored predictors of use in a unique Southern, rural population. Second, this research examined the relationship at baseline between CAM use and other measures of well-being (dietary knowledge, stage of dietary change, and fat and fiber consumption). Both the third and fourth goals involved exploring the effects of CAM use and the intervention over 12 months on dietary knowledge, stage of dietary change, and fat and fiber consumption. Specifically, the third goal explored changes in knowledge and stage of change, and it was hypothesized that CAM users in the intervention condition would be more likely to demonstrate higher knowledge of fat and a more advanced stage of fat behavior change than non-users at 1 and 12 months after the intervention. Finally, the fourth goal was to explore changes in dietary behaviors. Thus, it was hypothesized that CAM users in the intervention condition would be more likely to report decreased fat consumption and increased fiber consumption at 1 and 12 months after the intervention.

Summary of Findings

Baseline descriptive findings are useful for understanding the health of the sample. The mean body mass index (BMI) of this sample is considered to be

'overweight,' unfortunately reflecting the national obesity epidemic in the United States. Although weight was a problem for many, participants tended to be quite knowledgeable about the dietary fat in foods. They also demonstrated that they were actively thinking about and seeking to limit their dietary fat intake; based on mean scores, they indicated that they fell between the Preparation and Action stages of Prochaska and DiClemente's (1982) stage of change model. In terms of actual dietary consumption habits, participants reported moderate scores regarding fat and fiber intake and reported more healthy consumption behavior regarding fat than fiber. Findings also suggest that participants tended to trust what their physicians tell them. Finally, more than half of the sample (53.6%) reported CAM use, which is in line with other research findings (Ni et al., 2002; Barnes et al., 2004). Nearly half of the current sample (48.8%) reported taking vitamins and about a sixth of the sample (16.4%) reported taking "any kind of natural or herbal remedies or alternative medicine."

Using logistic regression models, numerous predictors of CAM use were examined, yet only four of the demographic variables were found to significantly increase the likelihood of CAM use – age, education, trust in physician and ethnicity. Being older and having more education were associated with an increased likelihood of CAM use, which is consistent with previous research (Barnes et al., 2004; Ni et al., 2002; Boon et al., 2000; Eisenberg et al., 1993; Eisenberg et al., 1998; MacLennan et al., 1996).

The current research also found that less trust in personal physician increased the likelihood of CAM use in this sample, which did not support the hypothesis. Although most of the latest research suggests that CAM use is not associated with negative

attitudes toward or poor experiences with conventional care, there have been conflicting findings. For instance, Li, Verhoef, Best, Otley, and Hilsden (2005) and Sutherland and Verhoef (1994) found that dissatisfaction with conventional care, particularly less confidence in physician and scepticism toward conventional medicine, is related to CAM use. Thus, the current finding suggests that, in addition to confidence and skepticism, trust may be a specific component of the physician-patient relationship that prompts a patient to seek CAM to complement or replace conventional care.

Although a clear picture has not emerged regarding what racial groups tend to use CAM at higher rates in the United States, it is notable that the variable of other ethnicity (referring to Asian, Latino, Native American, or other ethnicity) was found to most significantly increase the likelihood of CAM use in the current study. This finding may reflect a similar finding by Barnes et al. (2004) that Asian Americans are more likely to use CAM (excluding prayer and megavitamin therapy) than Caucasian Americans or African Americans. This suggests that, depending on the definition of CAM, people who are non-Caucasian American and non-African Americans may utilize CAM at higher rates. Although the current finding was statistically significant, it will be useful to seek confirmation in other samples due to the small subsample of the other ethnicity group (n = 8). Additionally, as there is more variation within than between racial groups, ethnic identification and degree of acculturation needs to be studied in future research to better understand specific predictors of CAM use. Finally, although hypothesized to increase participants' likelihood of CAM use, gender, marital status, time since last visit to physician and BMI did not significantly affect usage rates.

Hierarchical regression analyses were conducted to explore CAM users' health knowledge, stage of change and behavior at baseline. As little research regarding this issue exists, it was hypothesized that CAM use would predict more healthy tendencies. However, CAM use did not predict a higher knowledge of fat beyond personal and demographic variables in the model, nor did it account for significant variance in participants' stage of fat behavior change at baseline. Although CAM use was not predictive, being female, older and having more education were significantly associated with more advanced stages of fat behavior change.

Although not associated with knowledge or stage of change, CAM use was significantly associated with measures of actual health behaviors (self-reported fat and fiber consumption at baseline), thus supporting the hypotheses that CAM use would predict lower fat and higher fiber consumption. This finding supports results from two previous studies (Gray et al., 2002; Robinson et al., 2002) in which the authors found CAM users reported more healthy dietary consumption. In the regression, CAM use uniquely accounted for a small amount of the variance (2.1%) in the FFB fat score beyond the personal and demographic variables in the model and its use predicted lower fat consumption. The full model suggested that being male, younger, less educated, and not using CAM were associated with higher FFB fat scores (higher fat consumption). Whereas it was also statistically significant, CAM use only accounted for 1.3% of the variance in fiber behavior baseline scores. Similar to the finding about fat consumption, higher FFB fiber scores (lower fiber consumption) were associated with being male, younger, less educated, and not using CAM.

Separate hierarchical regression models were run to examine the behavior of CAM users involved in the intervention; it was hypothesized that they would feature more knowledge and a more advanced stage of fat behavior change at 1 and 12 months after the intervention. After 1 month, a significant interaction between CAM use and condition uniquely predicted fat knowledge, although only accounting for 1.7% of the variance. Unexpectedly, participants in all groups experienced a decrease in fat knowledge. For participants in the intervention group, CAM users experienced less of a decrease in fat knowledge than non-users. In contrast, for participants in the control condition, CAM users experienced more of a decrease in fat knowledge than non-users. Needless to say, it is difficult to understand this paradoxical finding of decreased fat knowledge across conditions. One possible explanation is that there may be something inherent in the interview or the interview process which caused participants to be less sure of their knowledge regarding fat in food. For instance, possibly by being asked questions about fat knowledge, participants experienced more self-awareness which may have led them to question or doubt their knowledge, thus resulting in fewer correct responses.

Twelve months after the intervention, fat knowledge was significantly predicted by the full model of variables, however neither CAM use, condition, nor an interaction between these variables, was statistically significant. It appears that, a year after the intervention, neither CAM use nor the intervention predicted change in knowledge about dietary fat. This finding does not lend support to the idea that CAM users possibly are more interested in and retain more information about healthy foods. In the full regression

model, the variables of 'other ethnicity' and 'trust in physician' were statistically significant predictors of fat knowledge. Being of an ethnicity other than Caucasian American or African American was associated with lower levels of knowledge about fat a year after the intervention was completed, whereas having more trust in a personal physician was associated with increased knowledge.

Hierarchical regression models examining stage of fat behavior change at 1 and 12 months after the intervention revealed that CAM use, condition, and their interaction (CAM use x condition) did not significantly predict fat behavior change at either time point. In both cases, the full model was significantly predictive. At 1 month, being female, older and having more trust in their physicians was associated with more advanced stages of fat behavior. At 12 months, only being female and older continued to be associated with more advanced stages of fat behavior change.

The final analyses examined the behavior of CAM users involved in the intervention; it was hypothesized that they would exhibit more healthy dietary behaviors at 1 and 12 months post-intervention, namely decreased fat consumption and increased fiber consumption. At 1 month, the overall model significantly predicted fat consumption behaviors; however, the interaction (CAM use x condition) was not significant. The only significant predictor of change in participants' fat consumption behaviors was their condition (intervention vs. control). As expected, results suggested that inclusion in the intervention group was associated with a decrease in fat consumption behaviors. Therefore, fat intake decreased for these participants, regardless of the fact that their fat knowledge decreased at one month (refer to the third hypothesis).

Contrary to the hypotheses, the proposed hierarchical regression analyses did not significantly predict variance in the models for fat consumption at 12 months and fiber consumption at 1 and 12 months. None of these three models featured a single significant step in the model. This suggests that possibly other attributes that were not included in the regression model predicted such behaviors in this sample. Another possible explanation is that these outcomes were not predicted by the variables in the model at the specific time points of 1 and 12 months.

Limitations

There are limiting factors to the current study, particularly because the Rural Physician Cancer Prevention Project (RPCPP) was not originally developed to measure CAM use. CAM use was measured with only two questions (Do you take any vitamins? Do you take any kind of natural or herbal remedies or alternative medicine?). The questions probably did not completely capture the wide and varied complementary and alternative medicine behaviors that exist. Although the RPCPP interviewers invited participants who positively answered either of the two questions to indicate the types of CAM that they use, the resulting data were not accurate or useful. The responses indicated that many people took multivitamins and other natural remedies (including aloe vera juice, dandelion root, kelp, green tea, catnip, Echinacea, etc.). However, as a result of the phrasing used in the study, participants supplied answers only about items they ingested. Without being prompted to consider the many types of CAM that they may use (such as yoga, prayer, chiropractic adjustments, etc.) participants may have neglected to provide an accurate account of CAM use. Additionally, because the questions were

developed from clinical experience, as opposed to previous research, the findings from this study may not be comparable to other studies of CAM use. However, this is a general problem in this area of research, because there have not been guidelines for defining or classifying CAM for research purposes. The selection of which CAM therapies to include in research studies is usually left up to the judgment of researchers, which leads to studies that are not comparable (Burg et al., 1998).

Other limitations to the present study must be recognized. First, the data analyzed in this study were collected from self-report measures. Thus, the conclusions are derived without objectively verified measures or multimodal measures of beliefs and behavior. For instance, the FFB results are limited because this instrument measures self-report behavior and does not capture an individual's actual food intake. Second, survey fatigue may have negatively affected data collection. In particular, the two questions used to qualify a participant as a CAM user were near the end of the 25-minute telephone survey. Third, the findings of this study may not generalize to all geographic regions in the United States because the results are derived from a unique Southern population. Previous research suggests that CAM use is significantly lower in the South than in the West and Midwest, and higher than the Northeast (Ni et al., 2002). However, insight into this unique population is a higher priority than external validity, especially as previous studies have analyzed nationwide CAM use (Astin, 1998; Eisenberg et al., 1998, Eisenberg et al., 1993; Ni et al., 2002). Additionally, the findings from this study may not generalize well to the general American public because the sample appears to be relatively privileged. Although income was not assessed in the RPCPP, a recent visit to a

physician suggests some financial stability. The sample was also well-educated – 27.5% had some college experience and 25.4% had earned a college or graduate degree. Although these generalizability issues with the research sample are considered limitations, they also helped control for differences among participants. Having a more homogenous sample limits the confounding variables that can affect the findings.

Implications and Directions for Future Research

The findings of the current exploratory study contribute to the ongoing attempt to discern personal characteristics of CAM users, thus helping psychologists, physicians, health educators, and others better understand these patients. The finding that nearly 54% of the current rural, Southern population uses CAM serves as a reminder that research has consistently found that a significant proportion of the American population reports using CAM. Understanding personal predictors of CAM use in this unique sample provides useful information for health care providers, allowing them to better understand the health care options that patients are choosing. Better understanding who uses CAM gives health care providers more information, hopefully making them more comfortable to discuss CAM use with patients. Developing an open and honest dialogue about CAM is critically needed to dispel myths about CAM use and prevent possible adverse interactions between CAM and conventional medicines.

The current study also has implications for how health care providers, researchers, marketers and others perceive CAM users as a social group. Although it was expected that CAM use would be part of a constellation of healthy behaviors and that CAM users would be more likely to demonstrate better abilities to improve their diet, the results

demonstrated little support for these hypotheses. In actuality, there were few differences between CAM users and non-users. These findings dispel many of the current stereotypes and assumptions regarding CAM users, who are often portrayed in the media as new-age, hippies who live alternative lifestyles. Such perceptions of CAM users are not accurate. Instead, these results suggest that CAM use is so prevalent in society that it is not restricted to a subgroup or counterculture.

The current study has implications for researchers regarding the measurement of CAM use in future studies. Difficulties in analyzing and interpreting the data in this project highlight the need for the field of CAM researchers to develop standardized measures. Thus, researchers should collaborate and create tests and measures to accurately assess CAM use, especially to enhance comparability across studies.

Not surprisingly, the most significant finding of the current study is that more research is needed to clarify the issues tackled in this project. First, future research would benefit from measuring CAM use in a more comprehensive manner, as opposed to the two questions that were asked in the current data collection. Like many of the epidemiologic studies that have been conducted (Astin, 1998; Eisenberg et al., 1998, Eisenberg et al., 1993; Ni et al., 2002), it is recommended that future studies provide participants with list of possible CAM therapies and allow them to select which are preferred. Additionally, developing measurement tools that are modelled on those in other studies increases the ability to compare across studies.

Second, it is important that future research continues to clarify the demographic predictors of CAM use and the relationship between individual factors and specific types

of CAM use. The current results suggest that more research is required particularly regarding people of ethnic minority groups and people with varying levels of trust in their healthcare providers. Previous research has provided conflicting findings; thus future research is required to tease out the relationship between these important variables and CAM use. Additionally, research is required to understand the relationship between weight and CAM use, especially as the only existing study found that the type of CAM use was associated with different BMI categorizations (MacLennan et al., 1996). As the United States struggles with an obesity epidemic and cancer prevention initiatives recognize the importance of maintaining healthy weight levels, great insight could be gained from clarifying the relationship between CAM use and BMI. It would be valuable to understand if CAM use is employed by patients as a treatment modality or as prevention aid when used to address weight issues. Finally, upcoming studies would benefit from including and addressing the issues of income, perceived health status, and patient disclosure behavior to help elucidate additional important factors regarding CAM use.

Third, more research is required to better understand CAM use and its relationship with other health behaviors. As has been established, CAM is used by a vast proportion of Americans; therefore there is an opportunity to better understand how to harness people's use of CAM therapies to enhance our treatment strategies and health promotion efforts, particularly cancer prevention interventions. The National Institutes of Health's National Center on Complementary and Alternative Medicine (NCCAM) highlights this as a goal in its recent strategic plan, "Explore the ability of CAM therapies

to enhance resilience, positive affect, and coping in order to improve health and well-being, prevent or slow disease progression, and treat diseases and disorders and their symptoms" (NCCAM, n.d.). Related to the current study, it would be useful for future researchers to further explore the relationship between CAM use and dietary knowledge and behavior. Additionally, there is also a need to understand if CAM is being used for treatment or health promotion (Grzywacz et al., 2005). Distinctions regarding CAM use will be valuable to inform service delivery and the development of health promotion initiatives so that they are more effective and tailored to reflect the interests and health habits of the U.S. population.

Summary and Conclusions

The purposes of this study were to explore CAM use and its predictors in a unique Southern, rural population; analyze the association between CAM use and dietary knowledge, stage of change and behaviors; and examine the effect of a dietary intervention on CAM users' dietary knowledge, stage of change and behavior during the 12 months following the intervention. Results suggested that more than half of the sample reported CAM use, with nearly half of the sample ingesting vitamins and a sixth of the sample taking natural or herbal remedies or alternative medicine. Being older, more educated, neither Caucasian nor African American, and having lower trust in personal physician increased the likelihood of participants using CAM. CAM use was not associated with knowledge of dietary fat or stage of fat behavior change, although it was associated with more healthy fat and fiber consumption behaviors. CAM users in the intervention, unexpectedly, reported decreased fat knowledge shortly after the

intervention, although similar significant results were not seen a year following the intervention. Additionally, CAM users in the intervention did not indicate that they were more likely to make changes in their diet to limit fat consumption. Finally, CAM users were not more likely than other participants to make healthier changes in their diets as a result of the intervention. Although these exploratory results are difficult to interpret and possibly suggest otherwise, more research is required to understand if CAM is part of a constellation of positive health behaviors and if CAM users act differently than non-users in behavioral health interventions. It is hoped that these findings, while not providing conclusive answers, have raised more questions about CAM use to inspire further research.

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APPENDIX A

Rural Physician Cancer Prevention Project (RPCPP) recruitment and procedures

Participants in the RPCPP study were randomly selected from the patient lists of three rural physicians. Individuals were excluded if they lived beyond the targeted geographic region (a 50 mile radius around South Hill, Virginia), were outside the age parameters (18-72 years), had a serious illness, or adhered to a prescribed medical diet. Only one member of a household was randomly selected to participate. Additionally, patients were excluded if they did not have a home telephone or were cognitively or physically unable to answer the research questions.

From the patient lists, 4,211 adults were identified as potentially eligible for participation. They were sent a letter from their physician, inviting them to take part in the research study. After receiving the letters, trained interviewers telephoned patients to consent them into the study. If participants agreed to take part, the interviewer proceeded to complete the baseline interview with them. Contact was made with 1,927 persons, while 2,284 persons could not be reached. Of the 1,927 patients, 328 were deemed ineligible (had a household member participating, had medical problems, or were unable to complete to complete the baseline interview). Another 845 individuals refused to participate in the RPCPP. Seven hundred and fifty-four participants consented and completed the baseline assessment. Participants were assigned to control (n = 377) and intervention groups (n =377).

The baseline interview typically took 20 to 25 minutes to complete and assessed participants' fat and fiber dietary behavior, dietary fat intentions, and self-efficacy for changing their fat intake behavior and fat and fiber knowledge. Personalized dietary

feedback and recommendations based on an analysis of their responses were mailed to participants in the intervention group. Interviewers contacted participants to ensure that they had received the specialized dietary feedback and offered to answer any questions regarding these materials. It was explained that they would receive a series of four booklets at one-week intervals to learn about a healthy diet, specifically how to increase fiber and decrease fat intake. The low-literacy booklets were designed to encourage the skills that lead to healthy eating and were illustrated to demonstrate desired behaviors. All members of the control group received the personalized dietary feedback and educational booklets after the study was complete.

The study was longitudinal with follow-up telephone interviews taking place at one, six and twelve months after participants completed the baseline interview. The follow-up interviews were similar to the baseline interview, collecting information regarding dietary behavior and its correlates. No follow-up data was collected from 132 participants (35 control/97 intervention). The number of control group participants who completed one, two and three follow-up interviews was, respectively, 59, 83, and 200. The number of participants in the intervention group who completed one, two and three follow-up interviews was, respectively, 44, 69, and 167. At one, six and 12 months, respective response rates for the control group were 79%, 66%, and 74% and the intervention group responses rates were 59%, 59%, and 63%.

APPENDIX B

Items of interest from the RPCPP baseline, one month and twelve month surveys

(in order of presentation to participants)

These questions are about the way you ate over the past 3 months. So that is since _____ *(write in and say the month)*. There are three possible answers to these questions, they are Usually, Sometimes, or Rarely.

1. In the past three months, how often did you eat baked or broiled chicken? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
2. In the past three months, how often did you take the skin off chicken? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
3. In the past three months, how often did you trim visible fat from your meat? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
4. In the past three months, how often did you eat baked or broiled fish? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
5. In the past three months, how often did you eat a small portion of meat? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
6. In the past three months how often did you eat a vegetarian dinner? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
7. In the past three months, how often did you eat meatless pasta sauce? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
8. In the past three months, how often did you eat fruit for dessert? Would you say Usually, Sometimes or Rarely?	U S R ☐☐☐	DK NR ☐ ☐
	1 2 3	98 99
9. In the past 3 months, how often did you eat a potato without butter or margarine?	U S R ☐☐☐	DK NR ☐ ☐

	1 2 3 98 99
10. In the past three months, how often did you put butter or margarine on vegetables?	U S R DK NR ☐☐☐ ☐ ☐
	3 2 1 98 99
11. In the past three months, how often did you eat a vegetable at lunch?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
12. In the past three months, how often did you eat two or more vegetables at dinner?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
13. In the past three months, how often did you eat bread with butter or margarine?	U S R DK NR ☐☐☐ ☐ ☐
	3 2 1 98 99
14. In the past 3 months, how often have you eaten fruit for breakfast?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
15. In the past three months how often did you eat hot or cold cereal for breakfast?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
16. In the past 3 months how often did you eat high-fiber cereals?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
17. In the past three months how often did you eat whole-grain crackers or breads?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
18. In the past 3 months, how often did you add bran to casseroles or cereal?	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99
19. In the past 3 months, how often did you use Pam instead of oil, margarine, or butter? Would you say....	U S R DK NR ☐☐☐ ☐ ☐
	1 2 3 98 99

20. In the past three months, how often did you eat fish or chicken instead of red meat?

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

21. In the past 3 months how often did you eat low-fat cheese instead of regular cheese?

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

22. In the past 3 months, how often did you drink low-fat or nonfat milk instead of whole? Would you say....

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

23. In the past 3 months how often did you eat ice milk, frozen yogurt, or sherbet instead of ice cream? Would you say...

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

24. In the past three months, how often did you use low-calorie salad dressing instead of regular? Would you say...

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

25. In the past three months, how often did you use yogurt instead of sour cream? Would you say....

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

26. In the past 3 months how often did you eat raw vegetables for a snack instead of chips?

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

27. In the past three months, how often did you eat brown rice instead of white rice?

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

28. In the past 3 months how often did you eat whole-wheat instead of regular pasta?

U S R DK NR
☐☐☐ ☐ ☐
1 2 3 98 99

The next questions ask about eating fat. As always, please take your time and answer honestly.

Dietary Fat Stages of Change

42. Have you ever changed what you eat in order to decrease the amount of fat in your diet? *Just let them answer yes or no*

☐ No (1)

☐ Yes (2)

☐ DK (98) ☐ NR (99)

43. During the past six months, have you thought about changes you could make to reduce the fat in your diet? *Just let them answer yes or no*

☐ No (1)

☐ Yes (2)

☐ DK (98) ☐ NR (99)

44. Are you currently limiting the amount of fat in your diet? (*Just let them answer yes or no)*

☐ No (1) ↓

☐ Yes (2) →

☐ DK (98) ☐ NR (99)

44-b. If yes.....How long have you limited the amount of fat in your diet, Would you say...

☐ (1) Less than 30 days
☐ (2) 1-6 months
☐ (3) 7-12 months or
☐ (4) Over one year
☐ (98) DK
☐ (99) NR

45. Would you say you are now eating a low fat diet? *Just let them answer yes or no*

☐ No (1)

☐ Yes (2)

☐ DK (98) ☐ NR (99)

46. How strong is your desire to lower the fat in your diet even more? Is it...

☐ Very strong (1)

☐ Somewhat strong (2)

☐ Mildly strong, or (3)

☐ Not strong at all (4)
☐ DK (98) ☐ NR (99)

47. In the next month, do you plan to make any changes to reduce that amount of fat in your diet? *Just let them answer yes or no*

☐ (1) No
☐ (2) Yes
☐ DK (98) ☐ NR (99)

48. On a scale of 1 to 5 where 1 is not at all likely and 5 is very likely, how likely are you to lower the amount of fat in your diet in the next six months?

1	2	3	4	5	☐	☐
Not at all likely				very likely	DK (98)	NR (99)

49. How confident are you in your ability to change the amount of fat in your diet? Are you…

☐ Very confident (1)
☐ Somewhat confident (2)
☐ Mildly confident, or (3)
☐ Not at all confident (4)
☐ DK (98) ☐ NR (99)

For the next questions, I will say two foods and you tell me which food is the better choice in terms of the FAT it has.

(Interviewer: circle their answer; You can switch to just reading pairs of words if necessary YOU CANNOT GIVE ANSWERS TO THEM BECAUSE OF THE RESEARCH AND BE CAREFUL NOT TO GIVE HINTS IN TONE OF VOICE. You can clarify with 'which has less fat?')

82. Which cheese is the better choice?

☐ Cheddar cheese (1)
☐ 1% cottage cheese (2)
☐ DK (98) ☐ NR (99)

83. Which snack is the better choice?

☐ Pretzels (1)
☐ Regular potato chips (2)
☐ DK (98) ☐ NR (99)

84. Which meat is the better choice?

☐ Bacon (1)
☐ Baked ham (2)
☐ DK (98) ☐ NR (99)

85. Which pizza is the better choice?

☐ Pepperoni pizza (1)
☐ Vegetable pizza (2)
☐ DK (98) ☐ NR (99)

86. Which fish is the better choice?

☐ Deep fried fish (1)
☐ Baked fish (2)
☐ DK (98) ☐ NR (99)

87. Which one is the better choice?

☐ Hamburgers (1)
☐ Chicken breasts (2)
☐ DK (98) ☐ NR (99)

Demographics (only asked at the baseline interview)

86. Are you: ☐ Married ☐ Divorced ☐ Separated ☐ Widowed or ☐ Never married

89. What is your ethnic or racial background?
(just let them answer and check one or read if necessary)

☐ African-American/Black (1)
☐ Asian (2)
☐ Caucasian/White (3)
☐ Hispanic/Latino/Latino (4)

☐ Native-American (5)
☐ Other (6)
☐ DK (98) ☐ NR (99)

92. On a scale of 1 to 5 where 1 is not at all and 5 is very much, how much do you trust what your physician tells you?

1	2	3	4	5	(DK)	(NR)
Not at all trust				very much trust	(98)	(99)

116. What is your height?_____ft _____in

117. What is your weight?_____lbs.

108. Do you take any vitamins?

☐ No (1)
☐ Yes (2)
☐ DK (98) ☐ NR (99)

108A. If yes, what kind(s)?_____
_____

109. Do you take any kind of natural or herbal remedies or 'alternative medicine'?

☐ No (1)
☐ Yes (2)
☐ DK (98) ☐ NR (99)

109A. If yes, what kind(s)?_____
_____

93. When was the last time you went to a doctor or clinic? (# of months: <1=1)_____

☐ DK (98) ☐ NR (99)

96. What is the highest level of education that you have completed?

☐ less than 6th grade (1)
☐ 6th - 8th grade (2)
☐ Some High School (3)
☐ High School/GED (4)
☐ Technical School Graduate (5)
☐ Some College (6)
☐ College degree (7)
☐ Graduate degree (8)

APPENDIX C

Baseline descriptive results for the Fat and Fiber Behavior-related Questionnaire (FFB)

Item	% Usually	% Sometimes	% Rarely	% Missing	Item mean
Eat baked or broiled chicken	43.5	31.2	24.0	1.3	1.80
Take skin off chicken	42.4	13.3	42.1	2.1	2.00
Trim visible fat from meat	59.7	13.6	24.5	2.1	1.64
Eat baked or broiled fish	13.1	26.7	52.3	8.0	2.43
Eat small portion of meat	40.1	28.8	18.9	2.1	1.68
Eat vegetarian dinner	17.9	29.9	51.5	0.8	2.34
Eat meatless pasta sauce	11.5	33.6	51.7	3.2	2.42
Eat fruit for dessert	35.5	36.0	27.5	1.1	1.92
Eat potato without butter or margarine	13.9	20.5	62.9	2.7	2.50
Put butter or margarine on vegetables	40.8	22.4	36.0	0.8	1.95
Eat a vegetable at lunch	38.4	30.9	28.0	2.7	1.89
Eat two or more vegetables at dinner	59.7	23.7	16.5	0	1.57
Eat bread with butter or margarine	45.6	27.7	24.8	1.9	1.79
Eaten fruit for breakfast	18.1	32.8	47.7	1.3	2.30
Eat hot or cold cereal for breakfast	35.7	32.3	29.9	2.1	1.94
Eat high-fiber cereal	29.1	22.9	46.1	1.9	2.17
Eat whole-grain crackers or breads	27.5	30.9	40.3	1.3	2.13
Add bran to casseroles or cereal	4.5	13.3	77.1	5.1	2.76
Use Pam instead of oil, margarine or butter	36.5	24.3	37.6	1.6	2.01
Eat fish or chicken instead of red meat	52.8	38.9	6.9	1.3	1.54
Eat low-fat cheese instead of regular cheese	14.7	14.1	65.1	6.1	2.54
Drink low-fat or nonfat milk instead of whole	49.1	6.1	32.0	12.8	1.80
Eat ice milk, frozen yogurt or sherbet instead of ice cream	20.5	23.2	48.5	7.7	2.30
Use low-calorie salad dressing instead of regular	34.1	20.5	40.3	5.1	2.06
Use yogurt instead of sour cream	11.2	8.8	59.7	20.3	2.61
Eat raw vegetables for a snack instead of chips	18.1	33.9	43.5	4.5	2.27
Eat brown rice instead of white rice	14.4	24.3	56.5	4.8	2.44
Eat whole-wheat instead of regular pasta	2.1	10.1	79.5	8.3	2.84

Note: $N = 375$. The FFB provides a fat and a fiber summary score. Both are the average score of the subscale items, ranging from 1.0 to 3.0. Lower scores indicate more healthy behaviors.

VITA

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