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Osteopathic medical students' knowledge and perceptions of complementary and alternative medicine (CAM)

by

Mary Pat Wohlford-Wessels

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education

Program of Study Committee:
Mary E. Huba, Major Professor
Larry H. Ebbers
Joanne M. Marshall
Emily L. Moore
Eldon K. Uhlenhopp

Iowa State University

Ames, Iowa

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Major Professor

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For the Major Program

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ABSTRACT

As the prevalence of complementary and alternative medicine (CAM) use increases in the general population, it is critical that medical students are knowledgeable about its appropriate use and effectiveness. The purpose of this study was to describe osteopathic medical students' opinions, knowledge, perceptions, and perceived effectiveness of complementary and alternative medicine. A comprehensive review of the literature revealed only five studies of medical students. All of the studies to date included allopathic rather than osteopathic medical students.

The data were collected using a 72 item, closed format survey instrument. The survey was distributed to second year students at two osteopathic medical schools. A cross-sectional self-selected sample was utilized. The analysis of data included descriptive statistics, frequencies, and t-tests. A correlation analysis and factor analysis was also conducted.

It was found that participants had generally positive attitudes about the usefulness of CAM and the need for physicians to know more about CAM. Participants reported they were less than knowledgeable about most CAM therapies; however, the more they knew about a select therapy, the more effective they thought the therapy was. Participants' lack of knowledge about CAM therapies may explain why the conceptual groupings expected in the factor analysis did not occur. There were virtually no differences in results by gender.

Knowing more about students' opinions, knowledge and perceived effectiveness about CAM supports the need for curricular change. Adding content to medical school curricula related to the social and behavioral aspects of health will further develop medical student competencies in CAM. The development of competencies related to social and behavioral health will improve physician/patient communication which will ultimately improve patient outcomes.

CHAPTER 1. INTRODUCTION

There have been numerous changes in health care and the delivery of health services over the past 30 years, such as advances in technology, increasing specialization of the workforce and pressures related to the quality and the utilization of health services. However few changes have occurred in health care as rapidly as the prevalence and use of complementary and alternative medicine or CAM (Wetzel, Raptchuk, Haramati, & Eisenberg, 2003). The rapid growth of CAM has far reaching implications for the health care delivery system. The increased prevalence of CAM use challenges health science educators to think about patient expectations, physician/patient communication, physician competencies related to CAM assessment, and of course medical school curriculum reform.

What is CAM?

The 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 (western) medicine" (http://nccam.nih.gov/health/whatiscam/#1). While some evidence exists to support the effectiveness of some CAM therapies, for most the evidence is not available.

The list of what is considered to be CAM changes as therapies that are proven to be safe and effective become integrated into the traditional system of health care. Some examples of CAM include:

- Acupuncture
- Ayurvedic Medicine
- Biofeedback
- Chakra balancing
- Chelation Therapy
- Chiropractic Treatment
- Feldenkrais
- Healing Touch
- Herbal Medicine
- Homeopathy
- Hypnosis
- Magnet Therapy
- Massage Therapy
- Meditation
- Naturopathy
- Osteopathic Manipulative Medicine
- Prolotherapy
- QiGong
- Reflexology
- Reiki
- Rolfing
- Shiatsu
- Spiritual Healing
- Tai Chi
- Trager
- Yoga

Definitions of the CAM therapies, modalities and medical systems in this list can be found in Appendix A.

The NCCAM states that "complementary and alternative medicine are different terms representing different approaches" (http://nccam.nih.gov/health/whatiscam/#1). Complementary medicine is used in conjunction with conventional medicine. Using acupuncture to relieve nausea following surgery or chemotherapy would be considered complementary medicine. "Alternative medicine however, is used in place of or instead of conventional medicine" (http://nccam.nih.gov/health/whatiscam/#1). Using a macrobiotic diet

instead of recommended chemotherapy would be an example of alternative medicine.

The NCCAM classified CAM therapies into five categories, or domains (http://nccam.nih.gov/health/whatiscam/#4):

Alternative medical systems

Alternative medical systems are built upon complete systems of theory and practice. These systems have often evolved apart from and earlier than the conventional medical approach used in the United States. Chinese medicine would be an example of an alternative medical system.

Mind-body interventions

Mind-body medicine uses a variety of techniques designed to enhance the mind's capacity to affect bodily function and symptoms. These techniques include meditation, prayer, and art and music therapy. The use of biofeedback would be considered a mind-body intervention.

Biologically-based therapies

Biologically-based therapies use natural substances, such as herbs, foods, and vitamins. Naturopathy, which focuses on using natural substances and botanicals, would be considered a biologically-based therapy.

Manipulative and body-based methods

Manipulative and body-based methods are based on manipulation and/or the movement of one or more parts of the body. Some examples include chiropractic or osteopathic manipulation, massage, rolfing, and shiatsu.

Energy therapies

Energy therapies involve the use of energy fields. There are two types: (1) biofield therapies which are intended to affect energy fields that some believe surround the body; and (2) bioelectromagnetic-based therapies which involve the use of electromagnetic fields. The use of qi gong or reiki and the wearing of magnets would represent the use of energy therapies.

CAM has become so widespread today that it has long passed the point where one can dismiss or ignore it. What was once considered a fringe element now represents a significant portion of health services and competes with mainstream or traditional medicine.

Most CAM therapies or modalities are not new; many have been around for thousands of years. The image of a tribal shaman may come to mind when one thinks of complementary and alternative medicine but, in most cases, CAM practitioners would be hard to distinguish from those practicing in what might be considered mainstream medicine, and often they are one and the same.

Background of the Study

Prevalence

There are many indications that the use of complementary and alternative medicine is increasing. For example, the use of complementary and alternative medicine in the U.S. increased from 33.8% in 1990 to 42.1% in 1997, and the number of visits to alternative therapy practitioners exceeded the projected total number of visits to primary care physicians in the United States by an estimated 243 million visits. Patients seeking treatment from chiropractors and massage therapists accounted for nearly half of the patient appointments with practitioners of alternative therapy (Eisenberg, Davis, & Ettner, 1998). Data from the 2002 National Health Interview Survey (NHIS), conducted by the Centers for Disease Control and Prevention (CDC), indicated that 36% of adults in the U.S. population used some form of CAM. When the definition of CAM included prayer specifically for health reasons, the prevalence increased to 62% of the adult population (Barnes, Powell-Griner, McFann, & Nahin, 2004). Insurance coverage for CAM practitioners is also on the rise indicating that patients and providers are expecting more from payers (The Landmark Report on Public Perceptions of Alternative Care, 1998).

Similar trends can be seen internationally. Surveys of CAM utilization performed outside the U.S. suggest alternative medicine is popular throughout the industrialized world. The reported global use of homeopathy and aromatherapy increased 41% between 1992 and 1996 (Ernst, 2000).

Another indicator of increased interest can be found in the use of herbal supplements and botanicals. Nearly one in five of the adults surveyed reported taking herbal supplements and/or high doses of vitamins in addition to prescription medications. The global market for medicinal botanicals in 1998 was 3.87 billion U.S. dollars. In the U.S., the sale of St. John's Wort, a botanical used widely in Germany for treating minor depression, rose 2,800% from 1997 to 1998 (Eisenberg et al., 1998).

The use of alternative therapies is not confined to a specific component of society, though there are differences in utilization by gender, ethnicity, socioeconomic status, and level of education. According to Eisenberg (1998), women seek CAM providers more than men, and CAM use is more common among African Americans than other ethnic groups. Middle-aged individuals report higher CAM utilization than other age groups. The use of alternative therapy is higher among individuals who have a college education than those who don't. Use is more common among individuals who have income levels higher than $50,000 per year. In addition, reported use is higher in the western United States than in other areas of the country. CAM use reported among Canadians is very similar to CAM utilization in the U.S. (Miller, 1997).

Patient use and communication

One of the most significant findings to emerge from studying CAM use relates to patient/physician communication. Only 38.5% of individuals who report using CAM discuss their alternative therapy use with their physician (Eisenberg et al.,

1998). Physicians may assume their patients have become dissatisfied if they are seeking treatment elsewhere. While this may at times be the case, studies tend to suggest other reasons (Austin, Marie, Pelletier, Hansen, & Haskel, 1998; Eisenberg et al., 1998; Ernst, 1997; Furnham 1996). Confidence in CAM providers is not substantially different from patients' expressed confidence in their physicians. Despite their confidence in both types of providers, patients still do not talk freely about their CAM experiences to their physicians. Adults who report using CAM consider the combination to be superior to either alone. In addition, many have seen a physician before or while they are seeing a CAM provider (Eisenberg, 2002).

The reason for the apparent gap in communication varies, but it appears to be related to a gap in values, attitudes, and beliefs. Those who use alternative healthcare are more likely to report having had a transformational experience that changed how they viewed the world. CAM users also report that CAM practitioners tend to acknowledge the treatment of an illness within a larger context; they believe the use of alternative care is part of a broader value orientation and set of cultural beliefs, one that embraces a holistic orientation (Adler & Fosket, 1999; Weaver, Flannelly, Stone, & Dossey, 2003).

Medical students and medical school curricula

Approximately half of all patients seen in a physician's office have used some form of CAM, yet few medical students receive training in CAM therapies and practice. Considering that many people now regard CAM as a normal part of life,

health professionals must be equipped to guide their patients in assessing CAM effectiveness.

According to the CurrMit database and the Liaison Committee on Medical Education's (LCME) Annual Medical School Questionnaire (2001 – 2002), only 38 (26%) of the 125 U.S. and 16 Canadian medical schools require curricular content in CAM (http://services.aamc.org/currdir/section2/LCME_Hot.xls). Due to the significant percentage of the U.S. population using alternatives to traditional medicine, medical schools need to develop content related to CAM in order to prepare students for clinical practice.

The American Association of Colleges of Osteopathic Medicine (AACOM) reported that 16 out of 19 medical schools include some didactic content in CAM during the first two years of instruction. The AACOM reported that during the 2002-2003 academic year, 4,581 osteopathic medical students received formal content in CAM either in a required course or through an elective course offering. Of those, 1,561 students had a clinical experience in addition to didactic instruction in CAM (http://www.aacom.org/data/annualreport/).

Several studies indicate as interest in CAM among medical students (Baugniet, Boon, & Ostbye, 2000; Chez, Jonas, & Crawford, 2001; Furnham & McGill, 2003; Greiner, Murry, & Kallail, 2001). For example, between 60% and 80% of medical students surveyed would like more instruction related to CAM in their medical training. Between 30% and 50% would like to learn how to incorporate selected CAM practices into their treatment regimens because they believe that some CAM practices are effective (Furnham & McGill, 2003). In addition, 66% of

medical students surveyed felt CAM therapies in general could be a benefit to the public's health (Chez, Jonas, & Crawford, 2001).

In light of the significant prevalence of CAM use and the obvious need for physicians to be able to speak about CAM utilization with their patients, it is clear that medical schools must address an unmet curricular need. Medical schools must consider developing and delivering curricular content focused on entry level evidenced-based CAM competencies.

Need for the Study

Given the prevalence of CAM in the general U.S. population, it is critical that medical students are knowledgeable about its appropriate use and effectiveness. A comprehensive review of the literature revealed only five studies of medical students: (1) Furnham and McGill (2003) in the United Kingdom; (2) Kreitzer, Mitten, and Harris (2002) at the University of Minnesota; (3) Chez et al. (2001) of third year medical students during an eight-week rotation in obstetrics and gynecology; (4) Greiner et al. (2001) of medical students at the University of Kansas; and (5) Baugniet et al. (2000) of Canadian medical students. All of the studies to date included students in allopathic medical schools. The literature review did not reveal any research related students in osteopathic medical schools. As the need to add CAM to osteopathic medical school curricula becomes more apparent, it is important to assess students' opinions, perceptions, and perceived knowledge related to CAM.

Statement of the Purpose

As the prevalence of CAM increases in the general U.S. population, it is critical that medical students are knowledgeable about its appropriate use and effectiveness. The purpose of this survey research was to describe osteopathic medical students' opinions, knowledge, perceptions, and perceived effectiveness of complementary and alternative medicine.

Research Questions

This study was guided by the following research questions:

1. What are osteopathic medical students' opinions about general concepts related to complementary and alternative medicine?
2. How do osteopathic medical students rate their knowledge about specific complementary and alternative therapies and modalities?
3. How do osteopathic medical students rate the effectiveness of specific complementary and alternative therapies and modalities?
4. Is there a relationship between perceived knowledge and perceptions about the effectiveness of specific complementary and alternative therapies and modalities?
5. Is there a significant difference between male and female students' opinions and perceptions about complementary and alternative therapies and modalities?

6. Is there a significant difference between male and female students' perceived levels of knowledge and the effectiveness of specific complementary and alternative therapies and modalities?
7. What underlying structure exists related to opinions about complementary and alternative therapies and modalities?
8. What underlying structure exists related to perceived knowledge about complementary and alternative therapies and modalities?
9. What underlying structure exists related to perceptions of effectiveness regarding complementary and alternative therapies and modalities?

Hypotheses

Four hypotheses guided the gathering and analysis of data:

1. As osteopathic medical students' perceived levels of knowledge of complementary and alternative therapies and modalities increase, their perceptions of its effectiveness also increase.

   Rationale: Previous studies have shown positive relationships between individuals' perceived knowledge and their perceived effectiveness of CAM (Baugniet et al., 2000).

2. Female osteopathic medical students' opinions and perceptions about complementary and alternative therapies and modalities are more positive than male medical students' opinions and perceptions.

3. Female osteopathic medical students' perceived level of knowledge of complementary and alternative therapies and modalities is higher than male osteopathic medical students' perceived knowledge.
4. Female osteopathic medical students perceive complementary and alternative therapies and modalities to be more effective than male osteopathic medical students do.

    Rationale: Studies have shown that the utilization and perceived effectiveness of CAM in the general population is higher among women (Barnes, Powell-Griner, McFann, & Nahin, 2004; Eisenberg et al., 1998; Goldbeck-Wood, Dorozynski, & Lie, 1996; Millar,1997).

Assumptions

Findings regarding medical students' attitudes, opinions, and perceptions regarding CAM have all been based on studies that have included allopathic medical students (Baugniet et al., 2000, Chez et al., 2001; Furnham & McGill, 2003; Greiner et al., 2001). Because of the fundamental philosophical differences between osteopathic and allopathic practitioners, it is assumed that osteopathic medical students' opinions, perceptions, and perceived knowledge about CAM may differ from those of allopathic medical students. This study does not attempt to explain differences between osteopathic and allopathic students, but instead serves as the first attempt to describe osteopathic students' opinions, perceptions, and perceived effectiveness of CAM.

Limitations of the Study

There are a number of limitations inherent in this study. Since the enrollment in medical schools represents a rather diverse group of individuals in terms of past experience, students who had experience in health care or a related field may have more knowledge of CAM. The researcher did not control for past medical experience or past CAM experience.

Students were not provided with the definitions of the CAM modalities/therapies included in the survey. Individual differences in definitions may contribute to response error; thus, some of the questions may have been interpreted differently by different respondents. Students self-reported their knowledge, opinions, and beliefs related to CAM, and no objective measures were added to the study. For example, students were not tested regarding their understanding of the definitions of the CAM terms utilized.

Since participation in this study was voluntary, it is possible that students with an interest in CAM may have been more likely to complete the survey, thus causing a selection bias. It is possible that the individuals who did not participate are substantially different from those who completed the survey in terms of their opinions, perceived knowledge, and perceived effectiveness of CAM. The quality of this research is also based on the integrity of confidential responses received from subjects, and it is always possible that some subjects did not provide truthful or sincere responses.

The survey instrument consisted of four sections and 72 questions; thus, the length of the instrument may have contributed to non-response. The questionnaire

was a closed-format instrument, which did not attempt to obtain additional insights or concerns from the respondents other than what was addressed by each item. Thus, there may have been some perceptions of alternative and complementary medical therapies not addressed by the current survey.

Since this research was conducted using cross-sectional self-selected sampling, generalizability to all osteopathic medical students cannot be made. In addition, the students surveyed were second year students from two osteopathic medical schools. Students from Des Moines University - College of Osteopathic Medicine (DMU – COM) and the University of North Texas - College of Osteopathic Medicine (TCOM) participated. TCOM students were surveyed in December of their second year while students from DMU – COM were surveyed in June, or at the end of their second year. The results of this study represent the opinions, knowledge, and perceived effectiveness of students in a second year, pre-clinical, undergraduate medical curriculum.

Despite the limitations of the survey instrument and sampling, it is the researcher's sincere hope that this study will be helpful in contributing to the literature about CAM and will be useful in designing curricular content. Despite the possible errors, this study represents a careful use of survey research and the resulting data to provide reasonable estimates of the opinions, perceived knowledge, and perceived effectiveness of CAM of the osteopathic medical students surveyed.

Significance of the Study

As osteopathic professionals begin to address the need for adding content related to CAM into the medical school curricula, it is important to understand the students' opinions, knowledge and perceived effectiveness of CAM. Surveying osteopathic medical students will assist osteopathic medical schools in responding to the need for more information related to CAM. Developing preclinical and clinical curricula that address CAM use will assist medical students in developing CAM assessment skills that will support them in addressing patient questions and making appropriate referrals.

Content needs to include more than definitional information. It should also assist students in using a grounded systematic review of the literature related to CAM to make evidence-based decisions. It is also important for students to be familiar with the cultural underpinnings that may at times predispose patients to seek and use CAM therapies. Students who do not receive basic information about CAM and are not comfortable assessing the effectiveness of CAM will not be able to best serve their patients.

Including CAM experiences in medical school curricula may have broader implications for health policy as well. These policy issues include, but are not limited to, CAM practitioners' scope of practice, professional liability, licensure, insurance coverage, service utilization, and quality control. Expecting physicians to advise and guide their patients' health promotion, disease prevention and disease management issues will require physicians who understand how CAM services fit into the existing

delivery system. Physicians dealt with similar issues in the past when physician assistants and nurse practitioners began to practice in the United States.

As CAM becomes more integrated into the U.S. health service delivery system all stakeholders will need to:

- identify and articulate important policy directions and initiatives that represent common ground;
- build strong alliances among providers, educators, researchers, payers and consumers who have a commitment to advancing CAM and integrated health care safely and effectively;
- make it possible for individuals and groups to work together on recommendations to policymakers, legislators and regulators for high priority issues related to CAM use;
- develop a dynamic, shared policy agenda that all stakeholders can use to promote their respective organizational and professional goals for integrated health care; and to
- develop a forum to communicate effectively based on information and collaboration.

Including CAM in medical school curricula supports the beginning of meaningful dialog related to policy.

Summary

An overview of the purpose and significance of this study have been outlined in this chapter. Prior to conducting this study, the author reviewed the literature to determine the prevalence of CAM use, medical students' opinions regarding CAM, and the inclusion of CAM content in medical school curricula. This review of the literature can be found in Chapter 2. The study design and methodology are described in Chapter 3. The data gathered through this study's research are located in Chapter 4, and the findings and recommendations for use and further study are provided in Chapter 5.

CHAPTER 2. LITERATURE REVIEW

Introduction

This chapter cites key literature and research studies that address the issues related to the growth of CAM use in the United States. The chapter further includes content related to opinions and perceptions of CAM among medical students, health science faculty, and nurses. Finally, this chapter addresses the importance of including CAM content in medical school curricula in the attempt to better prepare future physicians to meet the needs of their patients. The information in Chapter 2 builds upon the general introduction and overview provided in Chapter 1. The comprehensive review of literature in this section provides the foundation for the study methodology outlined in Chapter 3.

Factors that Contributed to CAM Use in the United States

The history of CAM in the United States has been shaped by economic, educational, political, scientific, and social issues. In early America, care consisted of a mix of systems and providers. In the early 19th century, the majority of medical care was provided by naturopaths, midwives, chiropractors, homeopaths, and a wide range of various types of healers. The system began to change as a result of germ theory and the introduction of the scientific method (Kaufman, 1971; Starr, 1982; Whorton, 1999).

In the early 1900s, significant reform in medical education resulted in part due to the Flexner Report which was published in 1910. The Flexner Report was developed by Abraham Flexner, an educator who evaluated the quality of medical

school curricula in the U.S. The development of the American Medical Association, the American College of Surgeons, and the Joint Commission on the Accreditation of Hospitals served to standardize the practice of medicine and enhance the role of traditional (western) medicine in the U.S. (Starr, 1982).

In the late 1800s, two distinct medical curricula began to emerge: allopathic and osteopathic. An allopathic curriculum prepares medical doctors (MDs), whereas an osteopathic curriculum prepares doctors of osteopathic medicine (DOs). The term allopathic medicine refers to the practice of what was considered conventional medicine in both Europe and the United States during and before the 19th century. In the United States, this was also referred to as regular medicine, or medicine that was practiced by medical doctors (http://encyclopedia.thefreedictionary.com/Allopathic%20medicine).

The osteopathic and chiropractic movements began in the United States in the 1890s and had similar philosophies; however, osteopathy came to adopt the use of medicine and surgery whereas chiropractors continue to use manipulative medicine alone. Dr. Andrew Taylor Still founded osteopathic medicine. He developed the principles of osteopathy due to his belief in a holistic approach to treating illness. Still believed his counterparts used drug therapy too extensively and surgery should be an intervention of last resort. As medical science developed, osteopathy gradually incorporated its theories and practices. Osteopathic physicians practice in all fields of medicine and are fully licensed physicians in all 50 states with an identical scope of practice as their MD counterparts (http://encyclopedia.thefreedictionary.com/Osteopathy).

World War II was a turning point in U.S. history in terms of health care delivery. Prior to WWII, health care was considered a privilege; after WWII, U.S. citizens began to believe health care should be a right of all citizens (Shi & Singh, 2004). The economy was strong during the post-war era of the 1950s, and employers began offering major medical insurance coverage to guard against significant financial loss related to prolonged or catastrophic illness. This coverage changed over the years to include comprehensive health services. The growth of health insurance coverage has created a moral hazard, where consumers utilize more services when they have insurance than when they are responsible for paying for care. In addition, the increased utilization of services and patient expectations has often resulted in decreased patient satisfaction (Shi & Singh, 2004).

In the mid to late 1900s, specialization in medicine grew rapidly, in part due to the increased growth and use of technology. Starr (1982) noted that, in the 19th century, the medical profession was generally weak, divided, and insecure in status and income. In the 20th century, partially due to the organization of medicine, physicians became a powerful force that served to shape the organization and financial structure of American medicine.

Recently, due to significant increases in health care costs and the perceived poor quality of such care, the locus of control has shifted from physicians to complex health care delivery systems, financing and regulatory agencies, health insurance companies and corporations, and employers and labor unions. During this shift, the physician-patient relationship also changed. Long-standing physician-patient relationships are perhaps a thing of the past. In the mid 1900s, as solo practitioners

began to move into group practice settings, the erosion of the long-standing patient - physician relationship began (Shi and Singh, 2004; Starr, 1982).

Shi and Singh identified the major events in the development of science and technology that have shaped the U.S. health care delivery system (Table 1).

Table 1. Development of science and technology in the health care delivery system

Consumer Sovereignty (mid 18th to late 19th century)	Professional Dominance (late 19th to late 20th century)	Corporate Dominance (late 20th to 21st century)
- Open entry to medical practice - Intense competition - Weak and unorganized profession - Apprenticeship training - Undeveloped hospitals - Private pay for services - Low demand for services - Private medical schools providing general education	- Scientific basis to medicine - Urbanization - Emergence of the modern hospital - Emergence of organized medicine - Emergence of scientific medical training - Licensing - Development of public health systems - Specialization in medicine - Emergence of workers' compensation - Failure of national health insurance - Emergence of private insurance - The emergence of Medicaid and Medicare	- Growth of managed care - Growth of outpatient services - Emphasis on community based services - Growth of self-care and alternative therapies - Challenges of new diseases - Cost-cutting technology - Integration of health service organizations - Incremental reforms to increase access - Standardized clinical practice protocols - Emphasis on quality - Public health role in bioterrorism

Source: Delivering health care in America: A systems approach (p. 110), by L. Shi and D. Singh (2004), Sudbury, MA: Jones and Bartlett. Copyright 2004 by Jones and Bartlett Publishers. Reprinted with permission.

In most economic sectors, competition produces higher quality products at lower costs; however, in the U.S. health care delivery system, professional dominance rather than market competition govern medical care. This system is further complicated by the expectation of both the physician and patient that treatment selection and utilization should represent the best possible care, care that is often blind to cost and payment methodology. The professional model has also become vulnerable due to societal demands regarding patient autonomy and empowerment (Altman & Reinhardt, 1996).

Currently, the dominant health care practice in the United States is that of biomedical-based allopathic medicine. However, numerous studies have indicated tremendous growth in interest in complementary and alternative medicine. Shi and Singh (2004) stated the growth in CAM has occurred because of the following:

- people who seek alternative therapies do so because they believe they have explored and perhaps exhausted conventional approaches
- individuals believe CAM therapies have fewer adverse side effects
- individuals with chronic conditions seek alternative treatment to ease the symptoms of chronic disease
- individuals believe complementary and alternative practices are more holistic
- individuals seek CAM providers believing they will find more understanding and a more comprehensive assessment of their conditions/concerns.

Users of alternative healthcare are more likely to report having had a transformational experience that changed the way they saw the world. The use of CAM is part of a broader value orientation and set of cultural beliefs, one that embraces a holistic orientation to life. CAM users seek to find an acknowledgement

of the importance of treating illness within a larger context that often includes spirituality and life meaning (Weaver et al., 2003).

CAM Prevalence in the General Population

In the late 1960s and early 1970s, Americans became more exposed to health care systems from foreign and indigenous cultures (Berlinger & Salmon, 1980). During this same time period, a growing counterculture movement in America sparked interest in the religious and philosophical traditions of Asian cultures. At the same time, there was a growing interest in Native American and Mexican American health care practices (Whorton, 1995). During the late 1970s, there was an emergence of a holistic approach to health care which included attention to the physical, spiritual, psychological, and emotional aspects of healing (Boschma, 1994). The 1970s and 1980s brought about a new awareness in wellness, prevention, and health promotion. This heightened awareness of other cultures and interest in holistic approaches contributed to the increased prevalence of CAM use in the U.S. population.

The use of complementary and alternative medicine (CAM) in the U.S. increased from 33.8% in 1990, to 42.1% in 1997. Surveys performed outside the U.S. suggest that alternative medicine is popular throughout the industrialized world (Goldbeck-Wood, Dorozynski, & Lie, 1996). Data from the 2002 National Health Interview Survey (NHIS) conducted by the Centers for Disease Control (CDC) indicated that 36% of adults in the U.S. population used some form of CAM. When

the definition of CAM included prayer specifically for health reasons, the prevalence increased to 62% of the adult population (Barnes et al., 2004).

The 2002 National Health Interview Survey revealed the following 10 most commonly used CAM therapies:

1. Prayer for one's own health
2. Prayer for someone else's health
3. Participating in a prayer group for someone else's health
4. Natural product use
5. Deep breathing exercises
6. Meditation
7. Chiropractic care
8. Yoga
9. Massage
10. Diet-based therapies

The 2002 NHIS survey included a refined instrument that identified 27 types of CAM therapies used in the U.S. Unlike earlier surveys, this instrument included specific diet information (Atkins, Macrobiotic, Ornish, Pritikin, & Zone). The May 2004 report was based on data from 31,044 completed surveys (Barnes et al., 2004). The 2002 NHIS percentage of CAM use in the U.S. is shown in Table 2.

Prevalence estimates for the simultaneous use of prescription medications with herbs and or mega doses of vitamins, is also very important to assess. The use of select botanicals with prescription medications can be harmful. In a recent study of adults who take prescription medications nearly one in five reported taking herbs and or high doses of vitamins (Eisenberg et al., 1998). Data from the 2002 NHIS report on the use of nonvitamin, nonmineral, and natural products are shown in Table 3. Because of the potential harmful effects of taking select botanicals with

Table 2. Percentage of CAM use in the U.S. in 2002

Therapy	Ever used		Used during the past 12 months	
	Percent	(std error)	Percent	(std error)
Any CAM use	74.	(0.37)	62.1	(0.40)
Alternative medical systems				
Acupuncture	4.0	(0.13)	1.1	(0.07)
Ayurveda	0.4	(0.04)	0.1	(0.02)
Homeopathy	3.6	(0.14)	1.7	(0.09)
Naturopathy	0.9	(0.07)	0.2	(0.03)
Biologically based systems				
Nonvitamin, natural products	25.0	(0.32)	18.9	(0.28)
Diet therapy	6.8	(0.18)	3.5	(0.12)
Megavitamins	3.9	(0.13)	2.8	(0.11)
Manipulative & body-based therapies				
Chiropractic	19.9	(0.33)	7.5	(0.19)
Massage	9.3	(0.22)	5.0	(0.16)
Mind-body therapy				
Biofeedback	1.0	(0.06)	0.1	(0.02)
Meditation	10.2	(0.23)	7.6	(0.20)
Guided imagery	3.0	(0.12)	2.1	(0.10)
Relaxation	4.2	(0.14)	3.0	(0.12)
Deep Breathing	14.6	(0.27)	11.6	(0.24)
Hypnosis	1.8	(0.10)	0.2	(0.03)
Yoga	7.5	(0.19)	5.1	(0.16)
Tai Chi	2.5	(0.11)	1.3	(0.08)
Qi Gong	0.5	(0.05)	0.3	(0.04)
Prayer	55.3	(0.42)	45.2	(0.40)
Energy healing	1.1	(0.07)	0.5	(0.05)

Source: Advance Data, CDC, No. 343, May 27, 2004.

Table 3. Use of nonvitamin, nonmineral, and natural products

Nonvitamin, nonmineral, or natural product	Percent used	(Standard Error)
Echinacea	40.3	(0.80)
Ginseng	24.1	(0.67)
Ginkgo Biloba	21.1	(0.65)
Garlic supplements	19.9	(0.63)
Glucosamine w/wo chondroitin	14.9	(0.58)
St. John's Wort	12.0	(0.53)
Peppermint	11.8	(0.52)
Fish oils	11.7	(0.53)
Ginger supplements	10.5	(0.51)
Soy products	9.4	(0.49)
Ragweed/Chamomile	8.6	(0.44)
Bee pollen or Royal jelly	7.4	(0.41)
Kava Kava	6.6	(0.41)
Valerian	5.9	(0.38)
Saw Palmetto	5.8	(0.35)

Source: Advance Data, CDC, No. 343, May 27, 2004.

prescription medications, open communication between patients and physicians is critical.

Recent studies clearly indicate that CAM use has grown and with some therapies is used by the majority of the U.S. population. Most CAM therapies or modalities are not new. Many, such as traditional Chinese medicine, Japanese Kampo herbal medicine, and Indian Ayurvedic medicine have been around for thousands of years. The use of CAM therapies has increased steadily since the 1950s, and most significantly during the past 20 years. Today, more Americans made visits to complementary and alternative medicine practitioners than to primary care physicians (Eisenberg et al., 1998).

As CAM use has increased, health expenditures also changed. Between 1965 and 1975, national health care expenditures more than tripled, rising from $41 billion to nearly $130 billion (http://www.hcfa.gov/stats). The cost to the U.S. system related to CAM treatments is estimated to have risen from $14.6 billion in 1990 to $21.2 billion in 1997 (Shi & Singh, 2004). The majority of the CAM costs are paid out-of-pocket. Mainstream therapies, such as chiropractic care is covered by nearly all insurers, while less than half of health care insurers reimbursed acupuncture. Coverage for massage therapy is minimal and usually associated with physical therapy or chiropractic treatment. In addition, CAM insurance coverage can be confusing because of variation in health plan benefit structure, practitioner requirements, and the variation of CAM provider scope of practice from State to State (Cleary-Guida, Okvat, Oz, & Ting, 2001).

Characteristics of CAM Users

The use of alternative therapies is not confined to any narrow segment of society. According to Eisenberg (1998), rates of use ranged from 32% to 54% in the wide range of socio-demographic groups examined. Use was more common among women than men, and less common among African Americans than other ethnic or racial groups. Individuals between the ages of 35-49 reported more or higher rates of utilization than other age cohorts. The use of alternative therapy was higher among individuals who had some college education than those who did not. Use was more common among individuals who had income levels higher than $50,000 per year than among those who had lower annual incomes. Reported use was

higher in the western United States than other geographic areas of the country. Selected data from the 2002 NHIS report on CAM use by gender, ethnicity, education level, and rural/urban location are shown in Table 4. Given the characteristics of those who use CAM, potentially half of the patients seen by physicians have had some kind of CAM experience.

Table 4. Selected demographic characteristics of CAM users

Characteristic	Percent used	(Standard Error)
Gender		
Male	54.1	(0.54)
Female	69.3	(0.49)
Ethnicity		
White	60.4	(0.44)
Black or African American	71.3	(0.98)
Asian	61.7	(1.94)
Hispanic or Latino	61.4	(0.94)
Education		
Less than high school	57.4	(0.88)
High school graduate/GED	58.3	(0.68)
Bachelor's degree	66.7	(0.82)
Graduate or professional	65.5	(1.92)
Urban/Rural		
Urban	62.6	(0.43)
Rural	60.4	(0.80)

Source: Advance Data, CDC, No. 343, May 27, 2004.

Why Patients Use CAM

It is clear that CAM use has increased significantly, and it is clear that CAM users can be found in almost any segment of society, regardless of age, gender, ethnicity, income, or level of education. Why are so many individuals interested in

CAM? Contrary to common opinion in the health care arena, most people use alternative medicine not because they are dissatisfied with conventional medicine, but mainly because these therapies fit their own values and philosophical foundation regarding health and life (Brolinson, Price, & Ditmyer, 2001). Table 5 illustrates the 2002 NHIS percentage of CAM users and their reasons for using CAM.

Table 5. Percentage of CAM users and their reasons for using CAM

Therapy	Conventional medicine did not help		Combination of CAM *and/with* conventional medicine perceived to be more beneficial	
	Percent	(Std Error)	Percent	(Std Error)
Any CAM use	27.7	(0.67)	54.9	(0.78)
Acupuncture	44.2	(3.52)	56.2	(3.30)
Ayurveda	60.6	(16.01)	52.6	(16.98)
Homeopathy	36.7	(3.01)	43.1	(2.94)
Naturopathy	53.1	(7.23)	62.4	(6.50)
Chelation therapy	28.5	(5.72)	84.6	(10.64)
Folk medicine	43.1	(8.65)	53.5	(9.73)
Nonvitamin, nonmineral	19.2	(0.80)	47.5	(1.08)
Diet-based therapy	22.4	(2.55)	38.1	(2.92)
Megavitamin therapy	27.5	(2.84)	55.0	(3.09)
Chiropractic care	39.6	(1.35)	52.9	(1.40)
Massage	33.9	(2.05)	59.6	(2.17)
Biofeedback	22.9	(7.08)	61.0	(8.82)
Relaxation	20.6	(1.30)	56.1	(1.63)
Hypnosis	30.0	(6.84)	22.9	(4.98)
Yoga,Tai Chi, & Qi Gong	30.9	(3.37)	52.3	(3.57)
Energy healing	46.5	(6.48)	60.6	(6.03)

Source: Advance Data, CDC, No. 343, May 27, 2004.

Some individuals use CAM because they have exhausted conventional treatments and have not found relief for select medical conditions. Research has shown that CAM therapies can be more helpful than conventional care for the treatment of headache and neck and back conditions (Eisenberg, 2002).

Key themes were found in a qualitative study of 100 military veterans who use CAM (Kroeson, Baldwin, & Brooks, 2002). Although participants were satisfied in general terms with their conventional care, there were particular aspects of the conventional system that they criticized. Dissatisfaction with aspects of conventional care, particularly its reliance on prescription medications, was an important component in their motivation to use CAM. Veterans felt the conventional medical system's lack of a holistic approach to care also served to motivate them to seek CAM providers. In addition, veterans stated they had a sense of independent research and responsibility for their own health, and this sense of responsibility seemed to take them outside the conventional health care system.

CAM providers also believe patients seek their care because they are searching for something lacking in traditional medicine. CAM practitioners see CAM as supporting traditional medicine rather than replacing it. CAM providers perceive their practices include concepts of healing that technology and time pressures in the traditional system have reduced. They also perceive that the basis of healing is connection, being present in the moment, and seeing patients as whole human beings. CAM providers believe taking time with patients is important, and listening and engaging patients in their own care is critical. They see themselves as high touch and believe those who seek their services have not been able to find the connection they need within the traditional system (Moura, Warber, & James, 2002).

National Support for CAM Research

Proponents of CAM have become a significant political force, garnering the support of two U.S. presidents. Due to a significant interest and use of CAM by the U.S. population, Congress established the Office of Alternative Medicine in 1993 (Shi & Singh, 2004). In 1999, the National Institutes of Health established the National Center for Complementary and Alternative Medicine (NCCAM). As defined by Congress, "The general purposes of the NCCAM are the conduct and support of basic and applied research, research training, the dissemination of health information, and other programs with respect to identifying, investigating, and validating CAM treatment, diagnostic, and prevention modalities, disciplines, and systems." The Mission further states that it is "...dedicated to exploring complementary and alternative healing practices in the context of rigorous science; training CAM researchers; and disseminating authoritative information" (http://nccam.nih.gov/about/aboutnccam/index.htm). Budget allocations for the NCCAM have increased from $2 million in 1993, to $104.6 million in 2002. (http://nccam.nih.gov/about/aboutnccam/index.htm).

In March 2000, President William Clinton signed Executive Order 13-147, establishing the White House Commission on Complementary and Alternative Medicine. The purpose of the commission was to develop public policy proposals geared toward maximizing the benefits of complementary and alternative medicine to Americans (http://www.whccamp.hhs.gov/finalreport.html). The Commission developed 10 principles to guide their process and the development of recommendations. These principles can be found in Appendix B.

It is clear that there is support for continued research and policy development related to CAM. Given the 10 principles developed by the White House Commission on Complementary and Alternative Medicine, and reports by the Institute of Medicine challenging reform in medical education, medical school faculty should begin developing competencies that meet the needs of today's practice environment. Those competencies include skills related to CAM assessment.

Physician Perceptions and Referrals

The increasing demand for and purchase of alternative and complementary medical therapies by health care consumers has been fueled, in part, by support from some in conventional medicine. More than 50% of practicing physicians are willing to refer for CAM practices such as biofeedback, hypnosis, acupuncture, diet, and lifestyle (Astin et al., 1998). The 2002 NHIS report includes data related to the percentage of patients who were referred to a CAM therapy or provider by a conventional medical professional (Table 6).

In a study involving 783 physicians, Berman and Singh (1998) revealed that those in practice more than 22 years had the least positive attitudes toward complementary therapies. Osteopathic physicians were more open than medical physicians to therapies that required administering medication or a procedural technique. Berman and Singh (1998) also found that primary care physicians in the U.S. appeared to accept and use many therapies that were previously considered unorthodox. These results indicate that acceptance and usage of complementary

Table 6. Percentages of CAM users who were referred by a conventional medical practitioner

Therapy	Percent	(Standard Error)
Any CAM use	25.8	(0.66)
Acupuncture	24.8	(3.28)
Ayurveda	17.4	(13.73)
Homeopathy	14.2	(2.01)
Naturopathy	16.5	(4.95)
Folk medicine	7.5	(4.45)
Nonvitamin, nonmineral, natural products	15.3	(0.77)
Diet-based therapy	26.3	(2.65)
Megavitamin therapy	38.3	(2.94)
Chiropractic care	20.2	(1.11)
Massage	33.4	(2.01)
Biofeedback	62.7	(7.17)
Relaxation	36.3	(1.61)
Hypnosis	21.1	(4.83)
Yoga, Tai Chi, & Qi Gong	21.0	(3.09)
Energy healing	18.0	(5.02)

Source: Advance Data, CDC, No. 343, May 27, 2004.

and alternative practice are strongly influenced by a physician's knowledge of and attitude toward a therapy.

Knowledge of and familiarity with any therapy is a necessary prerequisite for sound clinical judgments when caring for patients. In light of the increasing interest among physicians and acceptance of complementary medicine among the general public, research is needed to evaluate the benefits of CAM therapies. When educational opportunities are provided to physicians to assist them with practice and treatment decisions, the best interests of their patients will be served.

The four areas of complementary and alternative medicine in which many physicians have had training and used in practice are: (a) diet and exercise; (b) counseling and psychotherapy; (c) behavioral medicine; and (d) biofeedback and relaxation (Berman & Singh, 1998; Blumberg, Grant, Hendricks, Kamps, & Dewan 1995).

Patient-Physician Communication and CAM

Patients who use CAM don't like to talk about it, at least not with their physician(s). Among the respondents in the 1997 survey who used at least one alternative therapy and had a medical doctor (MD or DO), only 38.5% discussed their alternative therapy use with their physician One of the most significant findings to emerge from the major studies of CAM was regarding patient attitudes and provider perceptions. Patient confidence in CAM providers was not substantially different from confidence in physicians; however, the majority of patients who saw a physician and used CAM did not disclose their CAM use to their physician. Thus, despite their confidence in providers from both camps, patients refrain from talking freely about their CAM experiences (Eisenberg et al., 1998).

One of the hurdles in understanding the prevalence of CAM and ensuring that it does not interfere with other therapies is getting patients to talk about it. Often it is not a matter of patients refusing to disclose that they are using other therapies, but simply a matter of communication. For example, when asked about medication use, patients will likely name the prescription medications they are taking, but they are less likely to mention over-the-counter products. They may not even see these

products within the same context as prescription drugs. Similarly, patients are not likely to volunteer information their use of CAM therapies. Therefore, physician assessment processes must include direct questions about the use of botanicals, and CAM therapies.

Health care professionals need to think about how they talk to patients and glean information from them in order to gain a true picture of the patients' health history. Far too often, physicians don't ask questions unless they appear on pre-printed intake forms.

Another problem is that many patients are unaware of what is considered CAM therapy. Some patients may use herbal therapies, vitamins, or supplements and may not perceive these as CAM. Once health care professionals learn more about therapies commonly used by most patients, they can make better use of NCCAM and other research engines to determine the effectiveness of these therapies and better guide their patients.

The ability to communicate effectively with patients about alternative therapies requires that medical school graduates have a reasonable knowledge base in CAM. Graduates must be knowledgeable about the CAM practices that are based on adequate research and those that remain unproven. A willingness to discuss alternative therapies with patients and to admit the lack of knowledge is also essential (Kligler, Gordon, Stuart, & Sierpina, 2000). To provide quality medical care, professionals need a basic knowledge of CAM therapies and communication skills that will encourage patients to talk about the alternative therapies they use so that guidance and advice can be offered. To encourage patients to talk about CAM,

physicians should use open-ended, yet direct questions. Physicians should avoid making judgmental statements (Steyer, 2001). The medical interview is a core clinical skill for all health care providers, but it seems to be especially important for primary care physicians who typically conduct between 120,000 and 160,000 interviews during a 40-year professional career (Beck, Daughtridge, & Sloane, 2002). An open provider-patient relationship is especially important in the management of chronic diseases, such as diabetes, hypertension, coronary artery disease, and congestive heart failure. When patients are informed and involved in decision making, they are more compliant with medical recommendations and carry out more health-related behavior change (e.g., exercise, smoking cessation, and dietary modification). Such joint decision making requires patients to be fully informed about alternatives and the potential risks of treatment, and it also requires that they trust in their physician. Patient satisfaction research has shown that physician-patient communication has frequently been judged to be inadequate (Bensing & Donkers, 1992). In fact, patients considered communication to be one of the top three competencies a physician should possess (McBride, Shugars, DiMatteo, Lepper, O Neil, & Damush, 1994).

These findings suggest the need for enhanced attention to communication skills in physician practice and medical education. Patient satisfaction and the need to seek alternative care are clearly tied to the patient's need to be understood.

Allopathic Medical Students Opinions of CAM

Recent surveys have revealed that between 60% and 80% of medical students desire more instruction about CAM in their medical training (Baugniet et al., 2000; Chez et al., 2001; Furnham & McGill, 2003; Greiner et al, 2001). Furnham and McGill (2003) reported survey results from 311 medical students in Great Britain. Between 30% and 50% of the respondents indicated they wanted to learn how to incorporate selected CAM practices into their treatment regimens. They also believed that some CAM practices were effective. Of the medical students studied, third-year students perceived CAM was less effective than their first-year counterparts, and the third-year students were also less interested in receiving additional training than first year students.

Table 7 provides the results from Furnham and McGill's (2003) study in which allopathic students were asked to respond to selected therapies in terms of their individual perceived knowledge and effectiveness.

Over 35% of those who responded perceived they were knowledgeable about aromatherapy (36.7), body work (41.8), counseling (58.2), meditation (36.0), and yoga (43.1). Greater than 60% of those who responded perceived the following therapies were effective: acupuncture (79.7), osteopathy (64.0), chiropractic (66.9), body work (75.6), counseling (92.9), meditation (61.4), nutritional therapy (63.3), and yoga (65.6). It is interesting to note that respondents perceived selected therapies to be effective although they had little knowledge about the therapy (acupuncture, osteopathy, chiropractic, and nutritional therapy).

Table 7. Selected therapies in terms of their individual perceived knowledge and effectiveness

Therapy	Knowledge about		Perceived as effective	
	Yes (%)	No (%)	Yes (%)	No (%)
Acupuncture	32.8	67.2	79.7	20.3
Hypnosis	21.2	78.8	54.3	45.7
Homeopathy	30.9	69.1	49.8	50.2
Osteopathy	25.1	74.9	64.0	36.0
Chiropractic	27.7	72.3	66.9	33.1
Alexander technique	17.0	83.0	33.4	66.6
Aromatherapy	36.7	63.3	35.4	64.6
Herbalism	19.6	80.4	37.0	63.0
Bach flower	11.3	88.7	16.4	83.6
Body work	41.8	58.2	75.6	24.4
Counseling	58.2	41.8	92.9	7.1
Meditation	36.0	64.0	61.4	38.6
Reflexology	26.7	73.3	42.4	57.6
Shiatsu	10.0	90.0	21.9	78.1
Nutritional therapy	34.7	65.3	63.3	36.7
Yoga	43.1	56.9	65.6	34.4

Source: *Medical students' attitudes about complementary and alternative medicine* (Furnham & McGill, 2003).

Furnham and McGill (2003) also studied students' attitudes by asking them to respond to 43 statements using an 8-point scale indicating whether they agreed or disagreed. Students agreed most strongly with the statements presented in Table 8.

In a study by Chez et al. (2001) which surveyed 78 third-year medical students regarding their opinions about the usefulness of CAM, 66% responded that they did not believe CAM therapies were a threat to the public's health, and many

Table 8. Students' attitudes revealing highest agreement to 10 opinion statements about CAM (total statements = 43)

Statement	Mean	Standard deviation
Agree		
▪ All CAM practitioners should be medically qualified.	5.53	2.38
▪ CAM has low status within medicine	5.89	1.67
▪ CAM practitioners are able to offer more time and are more prepared to listen than their doctors	5.67	1.88
▪ Women tend to enter CAM more than men	5.42	1.71
▪ CAM is less intellectually comprehensive than medical specialties	5.02	1.95
▪ Medical students in general know little about CAM	5.73	1.50
▪ Patients claim CAM is effective	5.70	1.63
▪ CAM practitioners are held in poor regard by other doctors	5.72	1.50
▪ Concurrent treatment with CAM and orthodox medicine is more effective than orthodox alone	5.14	1.67
▪ Treating the whole person is the main success of CAM	5.29	1.77

Source: *Medical students' attitudes about complementary and alternative medicine* (Furnham & McGill, 2003).

therapies were thought to be useful or very useful (Table 9). In addition, 89% perceived there were some CAM ideas and methods from which conventional medicine could learn. Chez et al. found there was no significant difference between the responses of male and female medical students.

Greiner et al. (2001) surveyed 158 medical students from a large Midwest medical school and found that the majority (84%) indicated that knowledge about alternative medical therapies would be important to them as future physicians. The respondents wanted to learn about alternative medical therapies while in medical school (72%), but most thought they would not receive adequate exposure to the topic (96%). Over half (58%) reported that direct observation of alternative

Table 9. Students' perceptions of the usefulness of selected CAM therapies

Therapy	Percent perceived useful or very useful
Meditation	90
Massage	87
Herbal medicine	73
Acupuncture	64
Hypnosis	62
Spiritual healing	61
Chiropractic	56
Homeopathy	18
Naturopathy	9
Reflexology	1

Source: Chez and Jonas (2001).

practitioners would be the best method of instruction. The results suggest that medical students are interested in learning about alternative medical therapies and they perceive this knowledge will be important to them as physicians.

Baugniet, Boon, and Ostbye (2000) found educational exposure to CAM was correlated with perceived usefulness of CAM. Medical students who reported the least amount of education about CAM viewed CAM therapies as less than useful. Medical students and pharmacy students were more likely than other health professional students to view traditional scientific forms of evidence as necessary before accepting CAM therapies. Perceptions differed among different health professions student groups about the usefulness of CAM therapies and the kind of evidence needed before incorporating CAM into standard care. This may have important implications for multidisciplinary care.

Studies indicate that exposure to medical education influences attitudes about CAM (Baugniet, Boon, & Ostbye, 2000). As traditional medical training proceeds from year one through year four, medical students seem to increase their skepticism about CAM. Time in medical school seems to decrease the desire to train in CAM, refer patients to CAM providers, and agree that CAM should be available to patients (Chez, Jonas, & Crawford, 2001). The correlation between knowledge about and the perceived effectiveness of specific CAM therapies differs. Baugniet et al. (2000) found a direct relationship between knowledge and effectiveness. As students were exposed to CAM therapies, and as their perceived knowledge increased, so did their perceived effectiveness of select CAM therapies. On the other hand, Furnham and McGill (2003) found the opposite to be true. Students with little knowledge of select therapies rated them to be very effective.

As medical schools undertake curriculum reform they should be aware of rising student interest in alternative medical therapies. Physicians should know why many patients choose these therapies and should be prepared to discuss alternative therapy use with patients. Medical schools must provide students with instructional experiences that will prepare them for discussions with patients and colleagues.

Nurses Perceptions of CAM

In a random sample of 1000 nurses, Brolinson et al. (2001) found that nearly half of the respondents perceived there was conclusive evidence that five CAM therapies were effective: biofeedback, chiropractic, meditation/relaxation, multivitamins, and massage therapy. Nurses also perceived five therapies as safe:

hypnotherapy, chiropractic, acupressure, acupuncture, and healing touch. In addition, they were most likely to recommend the following therapies: multivitamins, massage, meditation/relaxation, and pastoral/spiritual counseling. The majority (79%) of nurses perceived their professional preparation in this area to be fair to poor. The same study revealed that only about one in four nurses obtained their information on alternative and complementary medical therapies from a formal nursing curriculum.

Thus, professional preparation in this area for nurses seems to be essential. Recently, nurses recommended the inclusion of alternative and complementary medical therapies in the baccalaureate curriculum for nursing preparation (Dutta, Dutta, Bwayo, Akiyode, Ayuk-Egbe et al., 2003).

Faculty Perceptions about CAM

Kreitzer et al. (2002) assessed the attitudes of faculty and students in nursing, medicine, and pharmacy programs. More than 90% of faculty and students perceived that clinical care should integrate the best of conventional and CAM practices and that health professionals should be prepared to advise patients about commonly used CAM methods. Eight-eight percent of faculty and 84% of students indicated that CAM should be included in their school's curriculum. While there were similarities among the three faculty groups, the nursing faculty expressed the greatest interest in practicing CAM. In general, the faculty had favorable attitudes toward the integration of CAM within education and clinical care. On the other hand, personal use of CAM and training was limited, and lack of evidence was perceived

to be the most significant barrier to integration of CAM into Western medicine. The high degree of receptivity suggests the need for both faculty training and curriculum development.

In a survey of 143 medical school faculty, Levine, Weber-Levine, and Mayberry (2003) found that the majority had used CAM therapies, considered some of them legitimate medical practices, and would like more training in select therapies. In particular, five therapies were considered legitimate medical practices by more than 70% of the faculty: (1) nutrition and diet therapy, (2) counseling or psychotherapy, (3) fitness and exercise, (4) emotional support groups, and (5) biofeedback. An additional six therapies were considered legitimate medical practice by more than 50% of the faculty: (1) acupuncture, (2) herbal medicine, (3) massage therapy, (4) chiropractic, (5) hypnotherapy, and (6) meditation.

Evidence-Based Medicine and CAM

Science is necessary in the evaluation of both "regular medicine" and CAM. The proper limits of medicine are as crucial to evaluating CAM as are the limits of science within medicine. Evidence-based medicine is probably best understood as a decision-making framework that facilitates complex decisions across different and sometimes conflicting groups. It involves considering research and other forms of evidence on a routine basis when making healthcare decisions. Such decisions include clinical decisions about choice of treatment, test, or risk management for individual patients, as well as policy decisions for groups and populations (http://bmj.bmjjournals.com/cgi/content/full/312/7023/71).

The key distinction for evidence-based medicine that contrasts it with traditional practice is not so much whether evidence itself is used, or even exists, in relation to a particular question. Traditional medicine has always drawn upon research evidence at different times to inform key decisions. What is new about evidence-based medicine is that it provides healthcare decisions as a structured process to help professionals and patients alike select the best available healthcare interventions for the outcomes they are seeking. Because it involves routine use of research, evidence-based medicine was literally impossible before the advent of large electronic databases of research in the early 1990s. In addition, evidence-based medicine provides clinicians with practical information and tools for assessing best practice in relation to individual patients that until recently were simply unavailable (Donald, 2002).

The term "evidence-based medicine" was coined by clinicians and epidemiologists at McMaster University in Canada (Donald, 2002). It became known worldwide during the 1990s. The core idea of evidence-based medicine is that one should actively consider the effectiveness and harms of different interventions before implementing them, using reliable estimates of benefit and harm (Silverstein & Spiegel, 2001). Several people worldwide had previously pioneered many of the epidemiologic and statistical methods needed to perform evidence-based medicine. One leader who stands out is Archie Cochrane (http://www.cochrane.org/docs/descrip.htm), who championed the importance of understanding the effectiveness and efficiency of healthcare interventions, and the methods for doing so. The

Cochrane Library is a result of the work conducted since the early 1970s (http://www.update-software.com/publications/cochrane/).

Some examples of recently published consensus reports, clinical trials, and reviews that have suggested the possible efficacy of CAM include:

- Mind/body techniques for the treatment of pain and insomnia (NIH Publication #PB96113964 1995);
- Acupuncture for recurrent headaches (Melchart, Linde, Fischer, & White, 1999);
- Acupuncture for fibromyalgia (Berman, Ezzo, Hadhazy, & Swyers, 1999);
- Acupuncture for postoperative nausea (Lee & Done 1999);
- Homeopathy for the treatment of vertigo (Weiser, Strosser, & Klein 1998);
- Homeopathy for the treatment of allergic rhinitis (Taylor, Reilly, Llewellyn-Jones, McSharry, & Atchison, 2000);
- Massage and chiropractic therapy for the treatment of low back pain (Cherkin, Deyo, Battie, Street, & Barlow, 1998);
- Chinese herbs for the treatment of irritable bowel syndrome (Bensoussan, Tally, Hing, Menzines, Guo, & Ngu, 1998);
- Tai Chi for the treatment of balance disorders (Hain, Fuller, Weil, & Kotias 1999); and
- Glucosamine and chondroitin for the treatment of osteoarthritis (McAlindon, LaValley, Gulin, & Felson, 2000).

CAM as a Component of a Social and Behavioral Curriculum

It has been well established that approximately half of all causes of morbidity and mortality in the United States are linked to behavioral and social factors (McGinnis & Foege, 1993). In addition to the adverse health effects of harmful behaviors, psychological and social factors have been shown to influence chronic disease risk and recovery. Psychological factors, such as personality, developmental history, spiritual beliefs, expectations, fears, hopes, and past experiences, shape individuals' emotional reactions and behaviors regarding health and illness. Social factors, including support of family and friends, institutions, communities, culture, politics, and economics, can have a significant effect as well (Barefoot, Brummett, Helms, Mark, Siegler, & Williams, 2000; Leserman, Petitto, Golden, Gaynes, Gu et al., 2000).

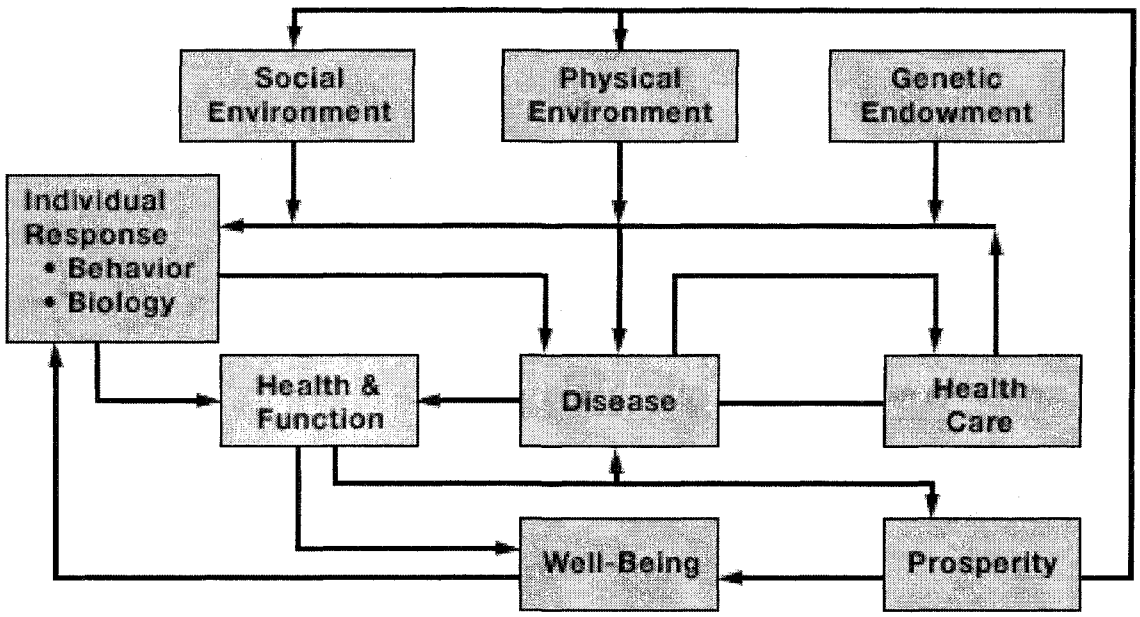
Understanding that behaviors can be changed and that proven methods are available to facilitate such change allows physicians to provide optimal interventions, both behavioral and nonbehavioral, to improve the health of patients. Identifying personal, familial, social, and environmental factors that may affect a patient's health enables physicians to provide better, more patient-centered care (IOM, 2001, 2003a).

Although the scientific evidence linking biological, behavioral, psychological, and social factors related to health, illness, and disease is impressive, the incorporation of this content into standard medical practice appears to have been less than successful. To make measurable improvements in the health of individuals in the United States, physicians must be equipped with the knowledge and skills

from the behavioral and social sciences to respond to patients as individuals. Sobel (2000), an expert in mind-body health care, noted that "more and more studies point to simple, safe and relatively inexpensive interventions that can improve health outcomes and reduce the need for more expensive medical treatments. Far from a new miracle drug or medical technology, the treatment is simply the targeted use of mind-body and behavioral medicine interventions in a medical setting." (p. 393). Physicians with an understanding of disease causation that extends beyond biomedical approaches are more likely to see better intervention outcomes than have been achieved to date (IOM, 2000).

The limitations of a restricted biomedical approach to health care suggest the need for a model of medical education designed to provide integrative and multilevel understanding of how biological, psychological, and social variables interact in health and illness (Engel, 1977). A unified process that is more inclusive than either or both of the biomedical and biopsychosocial models has been diagramed by Evans and Stoddart (1990) in their determinants of health diagram (Figure 1). Evans and Stoddart's model is a theoretical delineation of the interacting forces that contribute to health, functional status, and well-being of an individual or population.

It has become clear that medical education does not meet the test of best practice in terms of preparing physicians to address a more complex approach to health care and behavioral change. Due to this shortcoming, the Institute of Medicine (IOM) convened a committee in the Fall of 2002 to examine the content and effectiveness of behavioral and social science teaching in medical school education. The committee was asked to:



Source: Evans. R. G. & Stoddart G. L. (n.d.), Producing health, consuming resources. In R. G. Evans, M. L. Barer, & T. R. Marmor (Eds.), *Why are some people healthy and not others?* http://www.durhamhealthpartners.org/assessment/overview.shtml

Figure 1. Model of the Determinants of Health

1. Review the approaches used by medical schools that have tried to incorporate behavioral and social sciences into their curriculua.
2. Develop a list of prioritized topics from the behavioral and social sciences for possible inclusion in medical school curricula.
3. Provide options for how changes in curricula can be achieved.

From the IOM committee's work, a listing of 26 content areas for inclusion in medical school curricula was developed (Table 10).

The IOM included CAM in its list of content for many of the reasons discussed in this chapter. The IOM committee report concluded that medical students must be

Table 10. Behavioral and social science topics for inclusion in medical school curricula

Areas	Content
Mind-Body Interactions in Health and Disease	• Biological mediators between psychological and social factors and health • Psychological, social, and behavioral factors in chronic disease • Psychological and social aspects of human development that influence disease and illness • Psychosocial, biological, and management issues in somatization • Interaction among illness, family dynamics, and culture
Patient Behavior	• Health risk behaviors • Principles of behavior change • Impact of psychosocial stressors and psychiatric disorders on manifestations of other illnesses and on health behavior
Physician Role and Behavior	• Ethical guidelines for professional behavior • Personal values, attitudes, and biases as they influence patient care • Physician well-being • Social accountability and responsibility • Work in health care teams and organizations • Use of and linkage with community resources to enhance patient care
Physician-Patient Interactions	• Basic communication skills • Complex communication skills • Context of patient's social and economic situation, capacity for self-care, and ability to participate in shared decision making • Management of difficult or problematic physician-patient interactions
Social and Cultural Issues in Health Care	• Impact of social inequalities in health care and the social factors that are determinants of health outcomes • Cultural competency • Role of complementary and alternative medicine
Health Policy and Economics	• Overview of U.S. health care system • Economic incentives affecting patients' health-related behaviors • Costs, cost-effectiveness, and physician responses to financial incentives • Variations in care

aware of and have knowledge of CAM practices, as recent studies have shown a significant majority of people seeing a physician also use CAM. The committee also reported that medical students need to be skillful at eliciting information from their patients who are actively seeking or currently using other forms of treatment.

Medical students should also be encouraged to take an interest in their patients' rationale for using CAM and rather than simply objecting to a patient who uses CAM, medical students should consider the meaning a given practice may hold and the need it may meet for the patient. Students also need to determine from a biomedical viewpoint whether a practice is helpful, harmful, or neutral. Complementary and alternative medicine was included as a priority in the broader content area that addresses the social and cultural issues that impact health.

It is especially important that medical and health sciences institutions help students recognize that many patients have a value system that includes both CAM and traditional therapies. As part of this understanding, students need to know how to approach patients that use CAM. When CAM use is potentially harmful, students also need to know how to frame their conversations with patients to get the message across without alienating the patient. Considering that many people now regard CAM as a normal part of life, medical and health sciences institutions must reflect this shift in society in the education of students.

Resistance to the incorporation of these therapies into medical education is a result of a common attitude that CAM therapies are not grounded in scientific method and are therefore not a priority in medical education (Sugarman & Burk, 1998; Wetzel et al., 2003). Curriculum changes, however, are necessary to reflect new scientific understanding and technology, changing populations, changing health care needs, and an altered practice environment. A greater emphasis on practice guidelines and parameters as a means of assuring uniformly high-quality care and controlling costs will require medical school curricula to incorporate more education

on medical decision making and the evaluation of competing therapies and technologies. More attention to the individual physician's role and contribution to a patient's care will also need to be included.

There is a continuing call for broadening the base of physicians' knowledge and skills in the social and behavioral sciences as well as the humanities (IOM, 2003a & 2003b). Modern medical care requires increased awareness of patient behavior and lifestyle issues, as well as the ethical and economic dimensions related to providing care. Communication skills may be as important as clinical skills for increasing patient compliance and decreasing patient dissatisfaction.

Integrating CAM into a medical school curriculum can be accomplished in a number of ways. Some educators believe there is a need to teach one medicine, and it should be based in evidence (Forjuoh, Rascoe, Symm, & Edwards, 2003). Others believe one should begin by teaching medical students about the most heavily used therapies to include chiropractic, spiritual healing, relaxation techniques, and massage (Owen & Lewith, 2001). In addition, knowledge about herbal remedies and dietary supplements is critical due to potential interactions with prescription medications and other treatments. No matter what curricular change approach is selected barriers exist related to implementation.

Barrett (2003) identified barriers and facilitating factors related to the integration of CAM into a medical school curriculum (Table 11). What is most important at this time is to train students so they are comfortable talking to patients about CAM use. Many practicing clinicians lack the training necessary to ask

Table 11. Facilitating factors and barriers to incorporation of CAM in medical school curricula

Facilitating factors	Barriers to incorporation
Belief in the effectiveness of CAM ▪ Among patients ▪ Among health care providers ▪ Among health care system decision-makers	Belief in the effectiveness of CAM ▪ Among patients ▪ Among health care providers ▪ Among health care system decision-makers
Competition for patients	Cost containment
Consumer demand	Fear of liability
Evidence of efficacy of CAM	Momentum (habits and ingrained behaviors)
Lack of effectiveness of conventional medicine	Lack of availability
Evidence of cost effectiveness	Lack of insurance coverage
Lower risks of CAM therapies	Lack of efficacy evidence
Lower overall costs	Lack of standards, credentialing, and regulation

Source: Barrett. (2003). Alternative, complementary, and conventional medicine: Is integration upon us?

patients about their use of CAM therapies in a respectful and supportive manner that guides patients toward best practice.

Conceptual Perspective

As the use of CAM increases, it is important for physicians and primary care providers to have the ability to discuss the effectiveness of each modality with their patients. It is equally important to ensure that physicians are trained to ask questions that solicit patients to disclose their use of CAM treatments to include the use of herbal products, megavitamins, and other therapies. Without a comprehensive medical history, a primary care physician cannot adequately assess the patient and

therefore cannot develop an effective treatment plan. Numerous studies have surveyed physicians, medical students, nurses, physician assistants, and other allied health providers, and it is clear that most health professionals perceive the need to know more about CAM use, prevalence, and effectiveness. There is no research study to date that addresses the opinions, knowledge, and perceived effectiveness of osteopathic medical students.

Figure 2 illustrates the conceptual framework for this study. The framework was grounded in the literature related to CAM use, surveys of health science faculty and surveys of allopathic medical students. Surveying osteopathic medical students will assist osteopathic medical schools in responding to the need for more information related to CAM in the curriculum.

Summary

The review of literature has illustrated the need for heightened awareness of CAM throughout the health care delivery system. The literature review described CAM prevalence and described the characteristics of those who use CAM. Those who use CAM do so for a number of reasons, but clearly state that one reason for CAM use is the perception that CAM providers have a broader, more holistic approach to providing care. Those who use CAM find it difficult to communicate to their physicians and often do not share information that is critical to their wellbeing. Medical students, nurses, other allied health professionals and health science faculty all state they need more information about CAM. Many of those surveyed believe select CAM therapies are very effective.

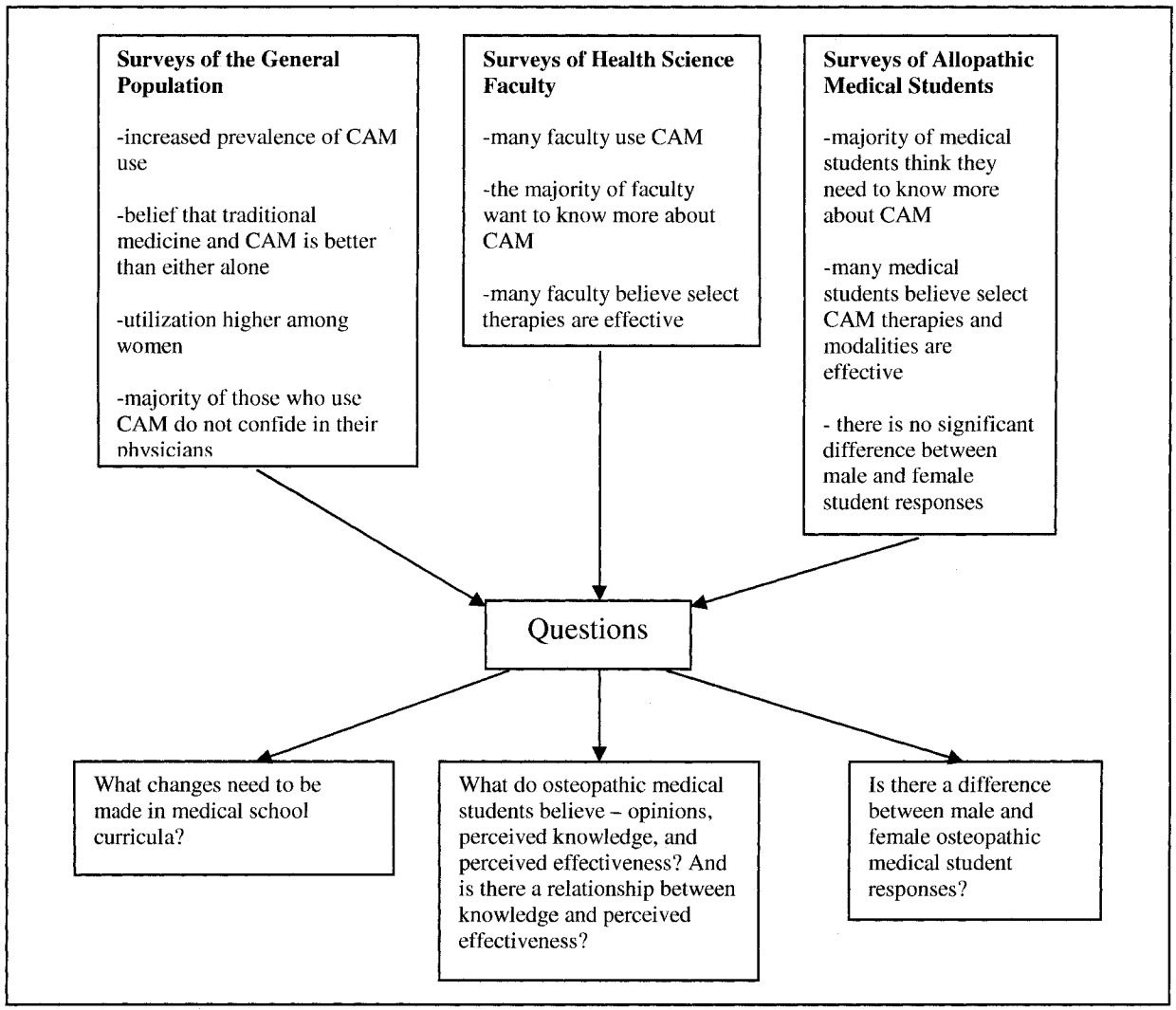


Figure 2. Conceptual framework for the study

The White House Commission on Complementary and Alternative Medicine and the Institute of Medicine have both published reports that call for medical school curricular reform, yet those in medical education struggle with the charge. Finding time in a medical school curriculum, while at the same time finding the evidence to support CAM, is a daunting task.

CHAPTER 3. METHODOLOGY

The purpose of this chapter is to describe the research design, the protection of human subjects, the participants, instrumentation, methods of data collection, and methods of data analysis.

Research Design

This descriptive and correlational study was designed to describe select characteristics of a given sample of individuals at one point in time, using a self-administered cross-sectional questionnaire. The survey instrument was designed by the researcher to assist in describing osteopathic medical students' opinions, perceived knowledge, and perceived effectiveness of select CAM therapies.

The study was built upon previous research that describes the prevalence of CAM among the general population and several studies designed to assess allopathic medical students, physicians, allied health practitioners and health sciences faculty opinions regarding CAM (Barrett, 2003; Berman & Singh, 1998; Brolinson et al., 2001; Chez et al., 2001; Eisenberg et al., 1998; Ernst, 2000; Furnham & McGill, 2003; Greiner et al., 2000; Kreitzer et al, 2002; Levine et al., 2003). There is no known research related to osteopathic medical students' opinions, perceived knowledge and effectiveness of CAM. Therefore the results of this research study directly contribute to the literature base and breadth of information available on this topic.

Quantitative research methodologies were used to obtain measurable data that were analyzed statistically. The survey instrument was developed, and the

research carried out using the research questions and hypothesis statements outlined in Chapter 1, and also discussed further in this chapter.

The researcher had adequate preparation for this study. Over a four year period, the researcher gained a thorough understanding of the issues facing the medical community, academic health centers and the general population regarding CAM use. The researcher developed an elective course in CAM which was offered to medical students at Des Moines University. While developing the elective course, the researcher developed the research questions and drafted the initial survey instrument. The researcher's early work related to the development of CAM content was presented at the American Osteopathic Medical Associations annual meeting in the Fall of 2002.

Institutional Review Board (IRB) and the Protection of Human Subjects

A Des Moines University IRB was completed and submitted on June 24, 2003, for which an expedited review was requested. Approval was received on July 1, 2003. Des Moines University IRB documents can be found in Appendix C. The Iowa State University (ISU) IRB form was completed and approval was received on November 10, 2004. ISU IRB documents can also be found in Appendix C.

The participants in this study were protected using several specific means. Students were informed that their participation was voluntary and the results would remain confidential. The survey instrument also contained the following statement:

> You are invited to participate in a survey research project designed to assess medical students' knowledge and perceptions related to Complementary and Alternative Medicine (CAM). This project is being conducted by the Division of Health Management, Des

> Moines University - Osteopathic Medical Center. The findings of this research will be used to assess educational needs. As a participant in this study you are assured that your identity will not be revealed. The information you share is confidential and your participation is voluntary.

The information obtained through the research gathered in this study was only disclosed in aggregate form in order to ensure participant confidentiality and to protect the identity of individuals. The researcher maintained all information related to this study in a physically secure location. Access to this information was restricted to the researcher.

Participants

Two groups of medical students were included in this survey: second year osteopathic medical students from Des Moines University in Des Moines, Iowa and second year osteopathic medical students from the University of North Texas in Fort Worth, Texas. Des Moines University admits approximately 210 medical students per year. The University of North Texas admits approximately 125 medical students per year. The researcher chose to work with the osteopathic medical students from the Des Moines and Texas schools due to convenience and medical school faculty interest and support.

The demographics of medical students admitted to osteopathic medical schools are very similar to those admitted to allopathic medical schools (AACOM Annual Report, 2003). Approximately half of all admitted medical students in the U.S. are women (American Association of Medical Colleges, 2003). In 2002, first year enrollment of women in all osteopathic medical school reached 47.5% (AACOM, 2003). In August 2004, Des Moines University admitted a first year class

of medical students of which 54% were women. Osteopathic medical schools report that approximately 8% of their enrollment is classified as underrepresented minorities (Black, Native American, and Hispanic).

The survey instrument used in this research included questions developed to describe demographic information. The demographic questions included in the survey addressed gender, age and marital status. The survey instrument did not include questions related to religion and ethnicity.

Instrumentation

The survey instrument, "Medical Students' Knowledge and Perceptions Related to Complementary and Alternative Medicine," which can be found in Appendix D, was designed in early 2002. The design of this study used a questionnaire to "...produce statistics, which provide quantitative or numerical descriptions of some aspect of the study population" (Fowler, 1984, p. 9). A questionnaire was the preferred form of data collection for this study because of the advantages of survey research; in particular, economy and the rapid turn around of data collection (Creswell, 1994).

The content validity for the instrument was established through careful review by and feedback from three individuals who have expertise in CAM. These experts were not included as participants in the survey. The experts reviewed the instrument and commented on the items in relation to the research questions, the clarity of the questions and the terminology used throughout the instrument. Based on feedback, modifications were made by the researcher. In addition to the field expert review that

established content validity, a factor analysis was later conducted to verify the construct validity of the questionnaire.

The instrument was pilot tested with students enrolled in an elective course on complementary and alternative medicine offered through the Division of Health Management at Des Moines University. The pilot test was a critical measure in establishing "the face validity of the instrument and improving the survey questions" (Creswell, 1994, p. 121). Students were asked to provide feedback that could be used to further develop questions, and/or improve the format and scales utilized. Twenty-five students completed the pilot, and returned the instrument with comments. Following the pilot test, several questions were modified for clarification. Those completing the survey during the pilot test were also timed; therefore, a time estimate could be given to those who later participated in the survey.

The instrument was developed to include four major sections. The first section, section A, was designed to assist in describing medical students general perceptions about complementary and alternative medicine. Facts about CAM were taken from the NCCAM website and used to develop statements for the survey. The questionnaire presented 15 statements about CAM and was designed to assess students' agreement with each statement using a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree). Selected questions from section A are show in Table 12.

Table 12. Selected questions from section A of the survey instrument

A- Please read the following statements which reflect opinions related to complementary therapies; state whether you **1 - Strongly disagree 2 - Disagree 3 - Neutral 4 - Agree 5 – Strongly Agree**	
1. Complementary and alternative medicine includes ideas and methods from which conventional medicine could benefit	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2. Most complementary therapies stimulate the body's natural therapeutic mechanisms	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3. Effects of complementary therapies are usually the result of a placebo effect	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4. Complementary therapies are useful/helpful for some individuals with specific diseases or health problems	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5. CAM therapies should be tested in a scientifically recognized manner before being presented to the public	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6. Complementary therapies should be included and covered by health insurance companies	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
7. Complementary therapies are a threat to the public's health	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

The second section of the instrument, section B, was designed to assess students' perceived knowledge of CAM therapies. A list of therapies was developed from a review of the literature and from the NCCAM site. Students were asked to respond to 26 different therapies/modalities using the following Likert scale (1 = no knowledge; 2 = basic understanding; 3 = very knowledgeable). Sample questions from section B are show in Table 13.

The third section of the instrument, section C, was designed to assess students' perceived effectiveness of CAM therapies. This section used the same list

Table 13. Selected questions from section B of the survey instrument

B- Please think about each therapeutic modality below and indicate your level of knowledge		
1 - No knowledge 2 - Basic understanding 3 - Very knowledgeable		
16	Acupuncture	☐ 1 ☐ 2 ☐ 3
17	Ayurvedic	☐ 1 ☐ 2 ☐ 3
18	Biofeedback	☐ 1 ☐ 2 ☐ 3
19	Chakra balancing (or other energy work)	☐ 1 ☐ 2 ☐ 3
20	Chelation therapy	☐ 1 ☐ 2 ☐ 3
21	Chiropractic	☐ 1 ☐ 2 ☐ 3
22	Feldenkrais	☐ 1 ☐ 2 ☐ 3

of 26 therapies/modalities as in section B. Students were asked to rate each therapy/modality regarding its perceived effectiveness using the following Likert scale (1 = harmful; 2 = not useful; 3 = no opinion 4 = useful; 5 = very useful). Sample questions from section C are show in Table 14.

The fourth section of the instrument was designed to collect demographic information; gender, age, and marital status. The instrument contained 72 questions.

Fink (1995) stated, "The aim (of a survey) is to produce reliable and valid data. Reliable data are the result of consistent responses over time and between and among observers and respondents. Valid data come from surveys that measure what they purport to measure" (p. 5). The use of Cronbach's alpha (or coefficient alpha) was one method to measure internal consistency (reliability) of the research questionnaire data. The Cronbach alpha of a scale should be at least .7.

Table 14. Selected questions from section C of the survey instrument

C- Please think of each therapeutic modality below and rate its effectiveness 1-Harmful 2-Not Useful 3-Neutral 4-Useful 5–Very Useful		
43	Acupuncture	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
44	Ayurvedic	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
45	Biofeedback	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
46	Chakra balancing (or other energy work)	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
47	Chelation therapy	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
48	Chiropractic	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
49	Feldenkrais	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Data Collection

Data were collected using the "Medical Students' Knowledge and Perceptions Related to Complementary and Alternative Medicine" survey instrument. Survey instruments along with Scantron answer sheets were distributed to DMU-COM and TCOM students during scheduled class periods. The researcher distributed the survey instruments to students at DMU-COM, and Dr. Michael Clearfield distributed survey instruments to students at TCOM. Students were informed that their participation was voluntary. They were assured that the survey results were confidential, and student names and any other type of identifying data were not requested. Students were informed that the survey would take about 15 minutes to complete. After completing the survey, the students were asked to hand in the survey instrument along with the Scantron sheet. Nothing related to CAM was discussed with either group of students before or after they completed the survey.

The survey was distributed to 310 second-year osteopathic medical students, 190 second-year students enrolled in Des Moines University's College of Osteopathic Medicine (DMU-COM), and 120 second-year students from the University of North Texas, College of Osteopathic Medicine (TCOM). The survey was distributed to TCOM students during the Fall of 2002, and to DMU-COM students during the Summer of 2003. Surveys were distributed during class sessions that had mandatory attendance. A total of 135 students (44.5%) completed the survey: 59 students from TCOM yielding a 49% response rate, and 76 students from DMU-COM yielding a 40% response rate (Table 15). Students responding from DMU-COM represent 56.3 percent of the total responding, whereas 43.7 percent of those responding were enrolled at UNT-COM.

Table 15. Survey distribution and response rate

Institution	Population	Response	Frequency (%)	Cumulative %
DMU-COM	190	76	40	56.3
TCOM	120	59	49	43.7
Total	310	135	44.5	100.0

The Scantron forms from each group of participants were scanned into an Excel database, which was downloaded into a Statistical Package for the Social Sciences (SPSS) version 10.1 for analysis. Each variable was named, and the database from the DMU sample and the North Texas sample were combined. Select recoding of variables was completed.

Data Analysis

A quantitative analysis was employed using data from the questionnaire. Absolute frequencies (numbers) as well as relative frequencies (in the form of percentages) were reported for each question. Table 16 provides an organization of the research questions, hypothesis statements, survey questions and the statistical tests selected for analysis.

The results of data analysis are reported in Chapter 4. Data related to each research question and hypothesis statement are included along with a discussion of the results.

Table 16. Organization of the data for analysis

Research Question	Variables	Hypotheses	Survey Questions & Tests
What are osteopathic medical students' opinions about general concepts related to complementary and alternative medicine?	Questions 1 – 15 5 = strongly agree 4 = agree 3= Neutral 2 = disagree 1 = strongly disagree	NA	Questions 1-15 Descriptive Statistics
How do osteopathic medical students rate their knowledge about specific complementary and alternative therapies and modalities?	Questions 16 – 41 3 = Very Knowledgeable 2 = Basic Understanding 1 = No Knowledge	NA	Questions 16-41 Descriptive Statistics
How do osteopathic medical students rate the effectiveness of specific complementary and alternative therapies and modalities?	Questions 42- 67 5 = Very Useful 4 = Useful 3 = no opinion 2 = Not Useful 1 = Harmful	NA	Questions 42-67 Descriptive Statistics
Is there a relationship between perceived knowledge and perceptions about the effectiveness of specific complementary and alternative therapies and modalities?	Questions 16 – 41 3 = Very Knowledgeable 2 = Basic Understanding 1 = No Knowledge Questions 42 – 67 5 = Very Useful 4 = Useful 3 = no opinion 2 = Not Useful 1 = Harmful	Osteopathic medical students who have lower perceived levels of knowledge of complementary and alternative therapies and modalities also have lower perceived levels of effectiveness.	Questions 16 – 41 and Questions 42 – 67 Correlation

Table 16. (Continued).

Research Question	Variables	Hypotheses	Survey Questions & Tests
Is there a significant difference between male and female students' opinions and perceptions about complementary and alternative therapies and modalities?	Independent variable = Question 71 (gender) 1 = male 2 = female Dependent variable = Questions 1 – 15 5 = strongly agree 4 = agree 3= Neutral 2 = disagree 1 = strongly disagree	Female medical students' opinions and perceptions about complementary and alternative therapies and modalities are higher than male medical students.	Question 71 (gender) and Questions 1 – 15 t-test
Is there a significant difference between male and female students' perceived levels of knowledge and the effectiveness of specific complementary and alternative therapies and modalities?	Independent variable = Question 71 (gender) 1 = male 2 = female Dependent Variables Questions 16 – 41 3 = Very Knowledgeable 2 = Basic Understanding 1 = No Knowledge Questions 42 – 67 5 = Very Useful 4 = Useful 3 = no opinion 2 = Not Useful 1 = Harmful	Female medical students' perceived knowledge and perceived effectiveness of complementary and alternative therapies and modalities are higher than that of male medical students.	Question 71 (gender) and questions 16 – 41 (knowledge) And Question 71 (gender) and questions 42 – 67 (effectiveness) t-test

Table 16. (Continued).

Research Question	Variables	Hypotheses	Survey Questions & Tests
What underlying structure exists related to opinions about complementary and alternative therapies and modalities?	Questions 1 – 15 5 = strongly agree 4 = agree 3= Neutral 2 = disagree 1 = strongly disagree	NA	Questions 1 – 15 Factor Analysis
What underlying structure exists related to perceived knowledge about complementary and alternative therapies and modalities?	Questions 16 – 41 3 = Very Knowledgeable 2 = Basic Understanding 1 = No Knowledge	NA	Questions 16-41 Factor Analysis
What underlying structure exists related to perceptions of effectiveness regarding complementary and alternative therapies and modalities?	Questions 42 – 67 5 = Very Useful 4 = Useful 3 = no opinion 2 = Not Useful 1 = Harmful	NA	Questions 42 – 67 Factor Analysis

CHAPTER 4. RESEARCH FINDINGS

Introduction

The purpose of this chapter is to present the findings of the study. The data related to each of the nine research questions and their corresponding hypothesis statements are presented in nine separate sections. This chapter begins with a demographic profile of the respondents.

Findings

Demographics

The demographic profile of the individuals who responded to the survey (n=135) includes data on age, gender, marital status, and medical school.

Age

As shown in Table 17, a majority (54.4%) of the 135 students who responded were between 22 and 25 years of age, and almost 90% were between 22 and 29 years of age. Only a small number of those responding, 12.2% were 30 years old or older.

Gender

As shown in Table 18, 30.4% of respondents chose not to answer the question on gender. Of the remaining respondents, a majority (55.3%) were female.

Table 17. Age of respondents

Age	Frequency	Percent	Valid percent	Cumulative percent
22-25 years old	67	49.6	54.5	54.5
26-29 years old	41	30.4	33.3	87.8
30-33 years old	6	4.4	4.9	92.7
34-37 years old	9	6.7	7.3	100.0
Total	123	91.1	100.0	100.0
Missing	12	8.9		
Total	135	100.0		

Table 18. Gender of respondents

Gender	Frequency	Percent	Valid percent	Cumulative percent
Male	42	31.1	44.7	44.7
Female	52	38.5	55.3	100.0
Total	94	69.6	100.0	
Missing	41	30.4		
Total	135	100.0		

Marital status

As shown in Table 19, 30.4% chose not to respond to the question on marital status. A slight majority (54.3%) of the students who responded stated they were single.

Medical school

As shown in Table 20, a slight majority (56.3%) of those responding were second-year osteopathic medical students at Des Moines University.

Table 19. Marital status of respondents

Marital status	Frequency	Percent	Valid percent	Cumulative percent
Married	41	30.4	43.6	43.6
Single	51	37.8	54.3	97.9
Divorced	2	1.5	2.1	100.0
Total	94	69.6	100.0	
Missing	41	30.4		
Total	135	100.0		

Table 20. Distribution of respondents by medical school

School	Frequency	Percent
DMU-COM	76	56.3
TCOM	59	43.7
Total	135	100.0

Research Questions

Research Question One

The first research question was: *"What are osteopathic medical students' opinions about general concepts related to complementary and alternative medicine?"* Students surveyed were presented with 15 general opinion questions regarding CAM. Table 21 includes frequencies and descriptive statistics regarding osteopathic medical students' opinions. The items have been listed in descending order according to the value of the mean score.

Table 21. Descriptive statistics for opinion questions [a]

Question	n	Mean	SD	Percent				
				Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Health professionals need to know more about CAM.	135	4.27	.796	1.5	2.2	5.9	48.1	42.2
2. Complementary and alternative medicine includes ideas and methods from which conventional medicine could benefit.	135	4.15	.877	1.5	3.0	14.1	42.2	39.3
3. CAM use has increased significantly over the past 10 years.	134	4.13	.802	1.5	1.5	12.7	50.7	33.6
4. Complementary therapies are useful/helpful for some individuals with specific diseases or health problems.	135	4.06	.780	1.5	3.7	7.4	62.2	25.2
5. Complementary therapies should be included and covered by health insurance.	135	3.73	.876	0.7	5.2	35.6	37.8	20.7
6. Those who use CAM perceive the combination of CAM and conventional care to be superior to either alone.	135	3.70	.804	1.5	3.7	31.9	49.6	13.3
7. The extent to which patients disclose their use of CAM therapies to their physicians is low.	135	3.68	.788	0.7	5.9	29.6	51.9	11.9
8. Most complementary therapies stimulate the body's natural therapeutic mechanisms.	135	3.61	.914	2.2	6.7	34.8	40.0	16.3
9. CAM therapies should be tested in a scientifically recognized manner before being presented to the public.	134	3.54	.971	0.0	17.2	29.1	36.6	17.2
10. The majority of those who use CAM do so not because they are dissatisfied with conventional medicine, but because they find CAM to be more congruent with their own values, beliefs, and philosophical orientation towards health	135	3.47	.809	1.5	8.9	37.0	45.9	6.7
11. Most physicians know something about CAM therapies.	135	3.44	.870	1.5	15.6	25.2	52.6	5.2
12. Most health care providers know little about the use of dietary supplements.	135	3.38	.953	1.5	20.7	24.4	45.2	8.1
13. CAM is available throughout the industrialized world.	135	3.27	.981	2.2	22.2	30.4	36.3	8.9
14. Effects of complementary therapies are usually the results of a placebo effect.	134	2.75	.905	6.0	35.1	39.6	16.4	3.0
15. Complementary therapies are a threat to the public's health.	135	2.27	1.02	20.0	49.6	18.5	6.7	5.2

[a] 1 = strongly disagree, 2 = disagree, 3 – neutral, 4 = agree, 5 = strongly agree

As can be seen, on average, respondents agreed with nine of the 15 opinion questions about CAM (mean scores above 3.49). Specifically, over 81.5% of the respondents agreed or strongly agreed that:

- Health professionals need to know more about CAM.
- Complementary and alternative medicine includes ideas and methods from which conventional medicine could benefit.
- CAM use has increased significantly over the past 10 years.
- Complementary therapies are useful/helpful for some individuals with specific diseases or health problems.

The majority of those responding (53.8% – 63.8%) agreed that:

- Complementary therapies should be included and covered by health insurance.
- Those who use CAM perceive the combination of CAM and conventional care to be superior to either alone.
- The extent to which patient disclose their use of CAM therapies to their physicians is low.
- Most complementary therapies stimulate the body's natural therapeutic mechanisms.
- CAM therapies should be tested in a scientifically recognized manner before being presented to the public.

Five questions had mean scores that fell within the neutral response range (2.50 – 3.49):

- The majority of those who use CAM do so not because they are dissatisfied with conventional medicine, but because they find CAM to be more congruent with their own values, beliefs, and philosophical orientation towards health.
- Most Physicians know something about CAM.
- Most health care providers know little about the use of dietary supplements.
- CAM is available throughout the industrialized world.
- The effects of complementary therapies are usually the results of a placebo effect.

Although mean scores for the above items fell within the neutral range, only 24 to 40% actually chose the neutral option. Between nine and 35% of respondents

disagreed with the statements. In addition, 19 to 58% of respondents agreed or strongly agreed with the statements.

Respondents on average disagreed with one opinion question. Nearly 70% of respondents (n=94) indicated they did not believe CAM therapies were a threat to the health of the public.

A significant difference in response by school was found for two of the 15 opinion questions tested. As shown in Tables 22 and 23, DMU-COM students on average agreed that: "CAM therapies should be tested in a scientifically recognized manner before being presented to the public", but TCOM students' mean score on the same question was in the neutral range. The eta-squared statistic indicates that the difference represents a large effect. In addition, TCOM students on average agreed that: "Most health care providers know little about the use of dietary supplements"; but DMU-COM students' mean score on the same question was in

Table 22. Mean scores of opinion questions by school

Question	Mean score		Mean Difference	Eta Squared	Magnitude of the Difference
	DMU-COM	TCOM			
9. CAM therapies should be tested in a scientifically recognized manner before being presented to the public.	3.97	2.97	1.00	.266	Large
12. Most health care providers know little about the use of dietary supplements.	3.22	3.58	-.36	.033	Small

Table 23. T-test results of opinion questions by school

Question	t	df	Sig (two tailed)
9. CAM therapies should be tested in a scientifically recognized manner before being presented to the public.	6.931	132	.000
12. Most health care providers know little about the use of dietary supplements.	-2.161	133	.032

the neutral range. The difference on this item represented a small effect. The guidelines for interpreting the eta-squared value are: .01 = small effect, .06 = moderate effect, and .14 = large effect.

Research Question Two

The second research question was: "How do osteopathic medical students rate their knowledge about specific complementary and alternative therapies and modalities?" Students were asked to rate their knowledge of 26 CAM therapies or modalities.

Table 24 includes frequencies and descriptive statistics regarding medical students' perceived knowledge of select CAM therapies. The items have been listed in descending order according to the value of the mean score. Means between 1 and 1.49 represent "no knowledge", between 1.50 and 2.49 represent "basic understanding" and between 2.50 and 3 represent "very knowledgeable".

As might be expected, more than three-fourths (78.2%) of the respondents felt they were very knowledgeable about osteopathic manipulative medicine. Mean scores indicate that, on average, respondents had a basic understanding of the following therapies/modalities:

Table 24. Descriptive statistics for knowledge of therapies questions [a]

Therapy/Modality	N	Mean	S.D	Percent		
				No Knowledge	Basic Understanding	Very Knowledgeable
Osteopathic manipulative medicine	133	2.74	.535	4.5	17.3	78.2
Chiropractic	133	2.21	.591	9.0	60.9	30.1
Massage	133	2.17	.571	9.0	64.7	26.3
Meditation	133	2.00	.603	18.0	63.9	18.0
Yoga	132	1.99	.486	12.1	76.5	11.4
Herbal medicine	133	1.94	.547	18.0	69.9	12.0
Acupuncture	133	1.91	.468	15.8	77.4	6.8
Hypnosis	133	1.84	.575	25.6	64.7	9.8
Biofeedback	132	1.71	.648	39.4	50.0	10.6
Homeopathy	133	1.69	.593	37.6	55.6	6.8
Magnet therapy	133	1.68	.597	39.1	54.1	6.8
Spiritual healing	132	1.64	.691	48.5	39.4	12.1
Tai Chi	132	1.57	.632	50.8	41.7	7.6
Healing touch	133	1.46	.609	60.2	33.8	6.0
Naturopathy	132	1.44	.570	59.8	36.4	3.8
Chelation therapy	132	1.39	.563	64.4	31.8	3.8
Reflexology	132	1.39	.601	67.4	26.5	6.1
Chakra balancing	133	1.29	.545	75.9	19.5	4.5
Shiatsu	132	1.26	.519	78.0	18.2	3.8
Ayurvedic	134	1.21	.476	82.1	14.9	3.0
Rolfing	132	1.17	.448	86.4	10.6	3.0
Reiki	132	1.15	.419	87.1	10.6	2.3
QiGong	133	1.14	.463	90.2	5.3	4.5
Prolotherapy	132	1.11	.403	91.7	5.3	3.0
Feldenkrais	132	1.09	.359	93.2	4.5	2.3
Trager	131	1.08	.342	94.7	3.1	2.3

[a] 1 = no knowledge, 2 = basic understanding, 3 = very knowledgeable

- Chiropractic
- Massage
- Meditation
- Yoga
- Herbal medicine
- Acupuncture
- Hypnosis
- Biofeedback
- Homeopathy
- Magnet therapy

- Spiritual healing
- Tai Chi

The mean scores indicated that, on average, respondents had no knowledge of the following therapies listed.

- Healing touch
- Naturopathy
- Chelation
- Reflexology
- Chakra balancing
- Shiatsu
- Ayurvedic medicine
- Rolfing
- Reiki
- QiGong
- Prolotherapy
- Feldenkrais
- Trager

As shown in Tables 25 and 26, there was only one significant difference between the two schools. DMU-COM students' reported a level of knowledge of Osteopathic Manipulative Medicine that was higher than the level of knowledge reported by T-COM students. The difference between the two schools represented a moderate effect.

Table 25. Mean scores for knowledge of selected therapies by school

Question	Mean score		Mean Difference	Eta Squared	Magnitude of the Difference
	DMU-COM	TCOM			
Knowledge of osteopathic manipulative medicine	2.86	2.58	.28	.068	Moderate

Table 26. T-test results knowledge question by school

Question	t	df	Sig (two tailed)
Knowledge of osteopathic manipulative medicine	3.098	105.422	.002

Research Question Three

The third research question was: *"How do osteopathic medical students rate the effectiveness of specific complementary and alternative therapies and modalities?"* Osteopathic medical students were asked to rate the effectiveness of 26 CAM therapies or modalities.

Table 27 includes frequencies and descriptive statistics for perceived levels of effectiveness. The items have been listed in descending order according to the value of the mean score. Mean scores can be interpreted as follows: harmful (1 – 1.49), not useful (1.50 – 2.49), Neutral (2.50 – 3.49), useful (3.50 – 4.49), and very useful (4.50-5).

More than 90% of those responding felt osteopathic manipulative medicine was useful or very useful. In addition, the majority (65% – 85%) of those responding felt the following therapies were useful or very useful:

- Massage
- Acupuncture
- Meditation
- Chiropractic
- Yoga
- Herbal Medicine

Table 27. Descriptive statistics for the effectiveness of therapies [a]

Therapy/Modality	N	Mean	SD	Percent				
				Harmful	Not Useful	Neutral	Useful	Very Useful
Osteopathic manipulative medicine	129	4.51	.782	1.6	0.8	6.2	27.9	63.6
Massage	129	4.21	.757	0.8	0.8	13.2	47.3	38.0
Acupuncture	130	4.04	.791	0.8	3.8	13.1	55.4	26.9
Meditation	127	4.03	.796	0.8	2.4	20.5	48.0	29.1
Chiropractic	129	3.91	.905	3.1	4.7	13.2	56.5	22.5
Yoga	132	3.71	.870	0.8	9.8	22.0	52.3	15.2
Herbal medicine	129	3.67	.903	3.9	3.9	27.1	51.2	14.0
Tai Chi	128	3.48	.710	1.6	0.0	54.7	35.9	7.8
Spiritual healing	128	3.46	.859	3.1	2.3	52.3	29.7	12.5
Biofeedback	128	3.45	.802	0.8	6.3	50.8	31.3	10.9
Hypnosis	127	3.43	.802	1.6	10.2	37.0	46.5	4.7
Healing touch	126	3.31	.774	1.6	6.3	59.5	24.6	7.9
Homeopathy	127	3.20	.807	3.9	7.9	57.5	26.0	4.7
Naturopathy	127	3.20	.595	0.8	3.9	72.4	19.7	3.1
Shiatsu	128	3.20	.593	1.6	1.6	75.0	18.8	3.1
Reflexology	128	3.17	.549	1.6	1.6	76.6	18.8	1.6
Rolfing	128	3.09	.524	2.3	0.8	83.6	11.7	1.6
QiGong	128	3.09	.486	1.6	0.8	87.5	7.8	2.3
Reiki	128	3.06	.498	1.6	2.3	86.7	7.0	2.3
Trager	131	3.06	.425	0.8	1.5	90.8	4.6	2.3
Prolotherapy	128	3.05	.458	1.6	2.3	85.9	9.4	0.8
Feldenkrais	127	3.04	.386	1.6	0.8	89.8	7.9	0.0
Ayurvedic	128	3.03	.531	3.1	2.3	83.6	10.2	0.8
Chakra balancing	128	3.02	.633	3.9	5.5	76.6	12.5	1.6
Chelation therapy	125	3.01	.735	5.6	5.6	75.2	9.6	4.0
Magnet therapy	127	2.67	.723	2.4	20.5	55.1	22.0	0.0

[a] 1 = harmful, 2 = not harmful, 3 = neutral, 4 = useful, 5 = very useful

The mean scores fell within the neutral response range for the following therapies:

- Tai Chi
- Spiritual Healing
- Biofeedback
- Hypnosis
- Healing Touch
- Naturopathy
- Shiatsu
- Homeopathy
- Reflexology
- Rolfing
- QiGong
- Reiki
- Trager
- Prolotherapy
- Feldenkrais
- Ayurvedic Medicine
- Chraka Balancing
- Chelation Therapy
- Magnet Therapy

However, between 30 and 51% of respondents found Tai Chi, Spiritual Healing, Biofeedback, Hypnosis, Healing Touch and Homeopathy to be useful. Less than four percent of the respondents felt any of the above therapies to be harmful and less than 10% indicated the above therapies were not useful. Although the mean score for Magnet Therapy fell within the neutral range, 20% felt it was not useful and two percent felt it was harmful.

The t-test for the equality of means revealed a significant difference in response by school for seven of the 15 questions tested. As shown in Tables 28 and 29, between four and nine percent of the difference in mean scores can be attributed

Table 28. Mean scores for effectiveness of therapies by school

Question	Mean score		Mean Difference	Eta Squared	Magnitude of the Difference
	DMU-COM	TCOM			
Effectiveness of Biofeedback	2.48	2.20	.28	.052	Small
Effectiveness of Chiropractic	2.60	2.85	-.25	.045	Small
Effectiveness of Herbal Medicine	2.44	2.73	-.29	.040	Small
Effectiveness of Homeopathy	2.06	2.34	-.28	.050	Small
Effectiveness of Magnet Therapy	1.88	2.12	-.24	.030	Small
Effectiveness of Message	2.73	2.97	-.24	.094	Moderate
Effectiveness of Yoga	2.41	2.76	-.35	.073	Moderate

Table 29. T-test results for effectiveness questions by school

Question	t	df	Sig (two tailed)
Effectiveness of Biofeedback	2.648	125.261	.009
Effectiveness of Chiropractic	-2.452	119.678	.016
Effectiveness of Herbal Medicine	-2.671	125.329	.009
Effectiveness of Homeopathy	-2.568	125.000	.011
Effectiveness of Magnet Therapy	-1.998	125.000	.048
Effectiveness of Message	-3.640	89.225	.000
Effectiveness of Yoga	-3.209	120.727	.002

to school. A small effect was found for five of the seven questions. TCOM students perceived that Herbal Medicine, Homeopathy, Magnet therapy, Massage, and Yoga were more effective than DMU-COM students did. DMU-COM students perceived that biofeedback was more effective than TCOM students did.

Research Question Four and Hypothesis One

The fourth research question was: *"Is there a relationship between perceived knowledge and perceptions about the effectiveness of specific complementary and alternative therapies and modalities?"* An associated hypothesis stated: "As osteopathic medical students' perceived levels of knowledge of complementary and alternative therapies and modalities increase, their perceptions of its effectiveness also increase."

Correlation analysis was selected to describe the strength and direction of the linear relationship between perceived knowledge and perceived effectiveness of each CAM modality or therapy. As shown in Table 30, there was a positive relationship between perceived knowledge and perceived effectiveness for 24 of the 26 therapies analyzed.

A moderate positive correlation of relationship between knowledge and effectiveness for the following CAM therapies was found:

- Ayurvedic Medicine
- Homeopathy
- Herbal Medicine
- Meditation
- Naturopathy
- Prolotherapy
- Qi Gong
- Reflexology
- Rolfing
- Shiatsu
- Spiritual Healing
- Tai Chi

Table 30. Correlations between knowledge and effectiveness

Variables	r	n	p	Relationship
Tai Chi	.65	127	.000	Moderate +
Qi Gong*	.53	127	.000	Moderate +
Shiatsu	.46	127	.000	Moderate +
Prolotherapy	.43	126	.000	Moderate +
Naturopathy	.42	125	.000	Moderate +
Spiritual Healing	.40	127	.000	Moderate +
Reflexology	.39	127	.000	Moderate +
Rolfing	.35	127	.000	Moderate +
Meditation	.34	127	.000	Moderate +
Ayurvedic Medicine	.31	128	.000	Moderate +
Homeopathy	.30	127	.000	Moderate +
Herbal Medicine	.30	129	.000	Moderate +
Feldenkrais	.29	126	.000	Weak +
Hypnosis	.27	127	.001	Weak +
Acupuncture	.26	135	.001	Weak +
Biofeedback	.26	127	.002	Weak +
Reiki	.26	127	.001	Weak +
Chiropractic	.25	129	.002	Weak +
Charka Balancing	.21	128	.008	Weak +
Osteopathic Medicine	.19	128	.013	Weak +
Healing Touch	.17	126	.024	Weak +
Yoga	.17	131	.020	Weak +
Magnet Therapy	.16	127	.029	Weak +
Massage	.14	129	.048	Weak +
Trager Therapy	.12	129	.078	No relationship
Chelation Therapy	.07	124	.190	No relationship

*The observed correlation for Qi Gong is spurious. Eighty-four percent of respondents had no knowledge of the technique and no opinion about its effectiveness.

The results indicated there is a weak positive correlation or relationship between knowledge and effectiveness for the following CAM therapies:

- Acupuncture
- Biofeedback
- Chakra Balancing
- Chiropractic
- Feldenkrais
- Healing Touch
- Hypnosis
- Magnet Therapy
- Massage
- Osteopathic Medicine
- Reiki
- Yoga

Because there was a positive relationship between perceived knowledge and perceived effectiveness for 24 of the 26 CAM therapies, the hypothesis was supported.

Research Question Five and Hypothesis Two

The fifth research question was: *"Is there a significant difference between male and female students' opinions and perceptions about complementary and alternative therapies and modalities?"* The associated hypothesis was: *"Female osteopathic medical students' opinions and perceptions about complementary and alternative therapies and modalities are more positive than male medical students' opinions and perceptions."*

The difference in mean scores between male and female respondents' opinions about CAM were evaluated using an independent sample t-test. The t-test revealed a significant difference in response by gender on one opinion question. As shown in Tables 31 and 32, only one question was statistically significant by gender:

Table 31. Mean score on opinion question by gender

Question	Mean score		Mean Difference	Eta Squared	Magnitude of the Difference
	Male	Female			
Most health care providers know little about the use of dietary supplements	3.07	3.69	-.62	.096	Moderate

Table 32. T-test results on opinion question by gender

Question	t	df	Sig (two tailed)
Most health care providers know little about the use of dietary supplements.	-3.135	92	.002

"Most health care providers know little about the use of dietary supplements." The female respondents' mean score was higher than male respondents. The eta squared indicates that the difference between male and female students is moderate. The results did not support the hypothesis.

Research Question Six and Hypothesis Three and Four

The sixth research question was: *"Is there a significant difference between male and female students' perceived levels of knowledge and the effectiveness of specific complementary and alternative therapies and modalities?"* There were two hypothesis statements associated with this research question. The first was: *"Female osteopathic medical students' perceived level of knowledge of complementary and alternative therapies and modalities is higher than male osteopathic medical students' perceived knowledge."* The second associated hypothesis statement was: *"Female osteopathic medical students perceive*

complementary and alternative therapies and modalities to be more effective than male osteopathic medical students."

The difference between male and female students in their perceived knowledge and effectiveness of select CAM therapies was evaluated using the independent sample t-test. As shown in Tables 33 and 34, the t-test for the equality of means revealed a significant difference in response by gender for five of the 52 questions tested (26 knowledge questions, and 26 effectiveness questions). Male and female students differed in their perceived levels of knowledge about Reiki therapy and Trager therapy. Though knowledge in both groups was low, female students' mean scores were slightly higher.

Table 33. Mean scores by gender for knowledge and effectiveness questions

Question	Mean score		Mean Difference	Eta Squared	Magnitude of the Difference
	Male	Female			
Knowledge of Reiki	1.10	1.27	.-17	.042	Small
Knowledge of Trager	1.00	1.16	-.16	.060	Moderate
Effectiveness of Ayurvedic medicine	2.22	2.00	.22	.060	Moderate
Effectiveness of Biofeedback	2.49	2.23	.26	.043	Small
Effectiveness of Rolfing	2.20	2.02	.18	.046	Small

Table 34. T-test results for knowledge and effectiveness questions by gender

Question	t	df	Sig (two tailed)
Knowledge of Reiki	-2.013	82.945	.047
Knowledge of Trager	-2.416	50.000	.019
Effectiveness of Ayurvedic medicine	2.420	57.686	.019
Effectiveness of Biofeedback	2.029	91.000	.045
Effectiveness of Rolfing	2.099	67.477	.040

An analysis of male and female students' perceived effectiveness of 26 CAM therapies revealed a significant difference in gender related to the effectiveness of Ayurvedic medicine, Biofeedback and Rolfing. On average both rated therapies as "not useful", and female students' mean scores were significantly lower than male scores related to effectiveness on Ayurvedic medicine, Biofeedback, and Rolfing. As a result, the second associated hypothesis statement could not be supported.

Research Question Seven

The seventh research question was: *"What underlying structure exists related to opinions about complementary and alternative therapies and modalities?"* The 15 opinion items were subjected to principal components analysis (PCA) to examine the underlying structure of opinion statements. Prior to performing PCA the suitability of data factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .4 or above. The Kaiser-Meyer-Oklin value was .809, exceeding the recommended value of .6. The Barlett's Test of Sphericity reached statistical significance (p=.000), supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of four components with eigenvalues exceeding 1, explaining 31.0%, 12.2%, 8.6%, and 7.8% of the variance, respectively. An inspection of the scree plot revealed a clear break after the third component (Figure 3). The scree plot is a graph which depicts the eigenvalue (Y axis) against the factor with which it is associated (X axis). By graphing the eigenvalues, the relative importance of each factor becomes apparent. The cut point for selecting factors is at the point of inflexion on the curve. After reviewing the scree plot, three components were retained.

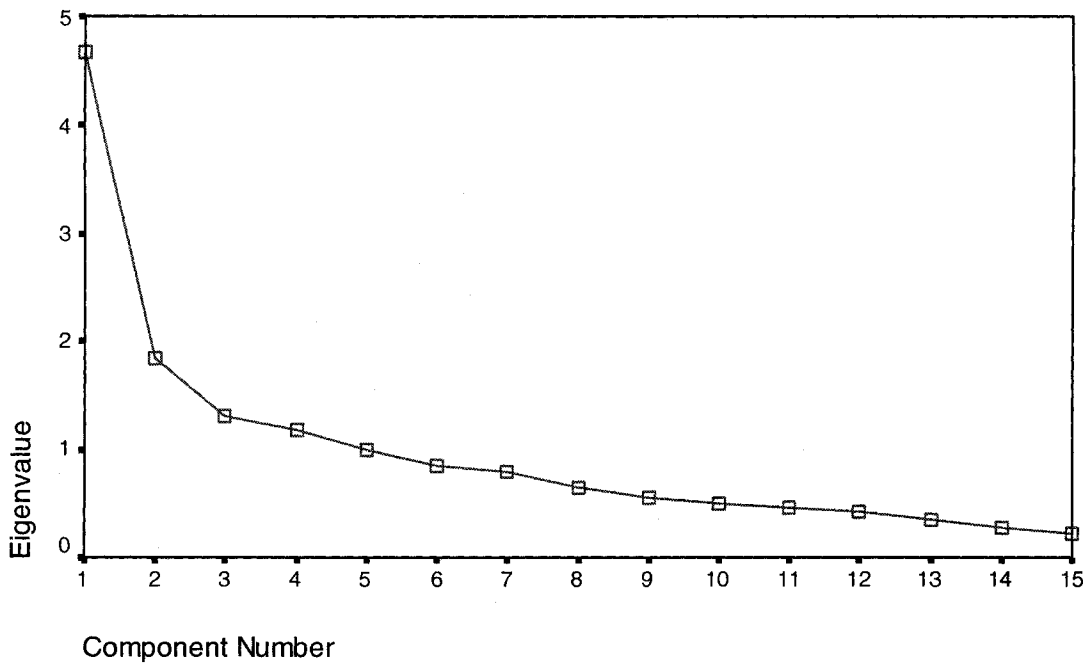


Figure 3. Scree plot for underlying structure related to opinion questions

To aid in the interpretation of the three retained components, Varimax rotation was performed. The rotated solution, which is presented in Table 36, revealed the presence of three strong loading components. After reviewing the three components, component number 1 was named "Usefulness of CAM" and component number 2 was named "Need for Communication and Education about CAM." The items that loaded on the third component could not be interpreted collectively.

The questions that loaded to each of the first two components were tested for reliability. Reliability analysis showed a satisfactory result with a Cronbach alpha coefficient of .80 for the component labeled "Usefulness of CAM". The Cronbach alpha coefficient for the component labeled "Need for Communication and Education about CAM" was .69.

The questions that loaded on the first component were then combined to compute a "Usefulness of CAM" score. The difference in mean scores between male and female respondents and school (TCOM and DMU-COM) was evaluated using an independent sample t-test (Tables 36 – 39). No difference between gender or school was found.

On average, male and female CAM Usefulness scores fell within the neutral range. A review of the frequencies of responses on the Usefulness of CAM scale, however, revealed that 62% of respondents agreed and 12% strongly agreed that CAM was useful. Only 4% of the respondents disagreed. On average, scores on the Usefulness of CAM scale by school fell in the neutral range (2.50 – 3.49).

Table 35. Varimax rotation of opinion questions

Rotated component matrix	Component 1	2	3
Complementary therapies are not a threat to the public's health.	.783		
Complementary and alternative medicine includes ideas and methods from which conventional medicine could benefit.	.690	.402	
Most complementary therapies stimulate the body's natural therapeutic mechanisms.	.688		
Effects of complementary therapies are usually not the results of a placebo effect.	.667		
Complementary therapies are useful/helpful for some individuals with specific diseases or health problems.	.608		
Complementary therapies should be included and covered by health insurance.	.595		.494
The extent to which patients disclose their use of CAM therapies to their physicians is low.		.719	
CAM use has increased significantly over the past 10 years.		.692	
Most health care providers know little about the use of dietary supplements.		.618	
Most physicians know something about CAM therapies.		.564	
Health professionals need to know more about CAM.	.519	.554	
Those who use CAM perceive the combination of CAM and conventional care to be superior to either alone.			.655
CAM therapies should be tested in a scientifically recognized manner before being presented to the public.			.599
CAM is available throughout the industrialized world.			.598
The majority of those who use CAM do so not because they are dissatisfied with conventional medicine, but because they find CAM to be more congruent with their own values, beliefs, and philosophical orientation towards health.			

The questions that loaded on the second component were combined to compute a "Need for Communication and Education about CAM" score. The difference in mean scores between male and female respondents and school (TCOM and DMU-COM) were evaluated using an independent sample t-test (Tables 40 – 43).

Table 36. Mean usefulness of CAM score by gender

Gender	n	Mean[a]	SD	Std Error Mean
Male	42	3.37	.378	.058
Female	51	3.43	.430	.059

[a] 1 = strongly disagree, 2 = disagree, 3 – neutral, 4 = agree, 5 = strongly agree

Table 37. T-test of usefulness of CAM score by gender

Usefulness of CAM score by	t	df	Sig (two tailed)
Gender	-.742	92	.460

Table 38. Mean usefulness of CAM score by school

School	n	Mean[a]	SD	Std Error Mean
DMU-COM	76	3.46	.374	.042
TCOM	58	3.38	.419	.054

[a] 1 = strongly disagree, 2 = disagree, 3 – neutral, 4 = agree, 5 = strongly agree

Table 39. T-test of usefulness of CAM score by school

Usefulness of CAM score by	t	df	Sig (two tailed)
School	1.156	133	.250

Table 40. Mean need for communication and education about CAM score by gender

Gender	n	Mean[a]	SD	Std Error Mean
Male	42	3.64	.733	.113
Female	51	3.89	.526	.072

[a] 1 = strongly disagree, 2 = disagree, 3 – neutral, 4 = agree, 5 = strongly agree

Table 41. T-test of need for communication and education about CAM score by gender

Need for communication & education by	t	df	Sig (two tailed)
Gender	-1.947	92	.055

Table 42. Mean need for communication and education about CAM score by school

School	n	Mean[a]	SD	Std Error Mean
DMU-COM	76	3.75	.460	.052
TCOM	58	3.80	.689	.089

[a] 1 = strongly disagree, 2 = disagree, 3 – neutral, 4 = agree, 5 = strongly agree

Table 43. T-test of need for communication and education about CAM score by school

Need for communication & education by	t	df	Sig (two tailed)
School	-.462	96.18	.645

On average, male and female respondents scores fell in the agree range (3.50 – 4.49). The difference in mean scores between schools (TCOM and DMU-COM) indicated that on average, scores by school fell within the agree range (3.50 – 4.49) as well. A review the frequencies for this scale revealed that 74% of those responding agreed and 8% strongly agreed that there is a need for communication and education about CAM. On this scale, only 2% of respondents scores fell in the disagree range (1 – 1.49). No significant difference was found by gender or school on the Need for Communication and Education about CAM scale.

Research Question Eight

The eighth research question was: *"What underlying structure exists related to perceived knowledge about complementary and alternative therapies and modalities?"* The 26 items related to knowledge about CAM therapies were subjected to principal components analysis (PCA) to examine the underlying structure of knowledge statements. Prior to performing PCA, the suitability of data factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .4 or above. The Kaiser-Meyer-Oklin value was .858, exceeding the recommended value of 0.6. The Barlett's Test of Sphericity reached statistical significance (p=.000), supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of six components with eigenvalues exceeding 1, explaining 34.1%, 13.6%, 5.6%, 4.2%, 3.8%, and 3.7% of

the variance, respectively. An inspection of the scree plot revealed a clear break after the third component (Figure 4).

To aid in the interpretation of the three retained components, Varimax rotation was performed. The rotated solution presented in Table 44 revealed the presence of three strong loading components. An assessment of component loadings did not reveal any commonality or opportunity for naming.

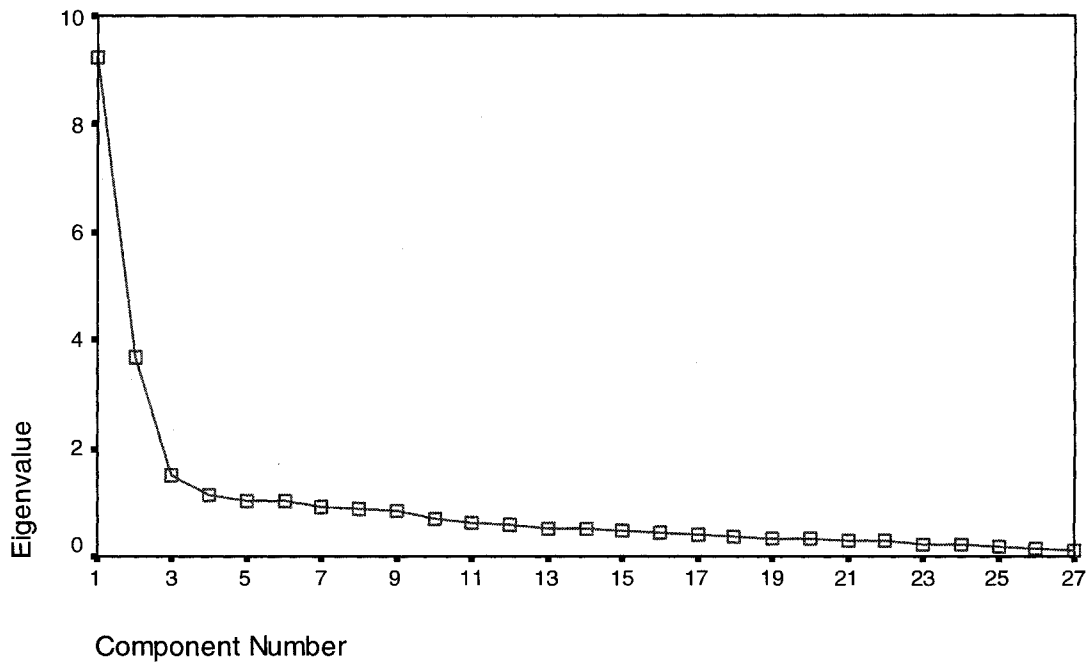


Figure 4. Scree plot for knowledge questions

Table 44. Varimax rotation of CAM knowledge questions

	Component		
Rotated component matrix	1	2	3
Feldenkrais	.864		
Trager	.843		
Prolotherapy	.824		
Ayurvedic	.711		
QiGong	.670		.412
Reiki	.667		.446
Rolfing	.613		.402
Reflexology	.421		
Chelation therapy	.420		
Acupuncture		.763	
Massage		.749	
Hypnosis		.699	
Homeopathy		.687	
Herbal Medicine		.681	
Magnet therapy		.643	
Chiropractic		.640	
Meditation		.633	.464
Yoga		.598	
Osteopathic Manipulative Medicine		.473	
Naturopathy	.424	.431	
Biofeedback		.426	
Spiritual healing			.808
Healing touch			.794
Shiatsu	.444		.552
Chakra balancing	.511		.549
Tai Chi			.483

Research Question Nine

The ninth research question was: *"What underlying structure exists related to perceptions of effectiveness regarding complementary and alternative therapies and modalities?"* The 26 effectiveness items were subjected to principal components analysis (PCA) to examine the underlying structure of effectiveness statements. An inspection of the correlation matrix revealed the presence of many coefficients of .4 or above. The Kaiser-Meyer-Oklin value was .705, exceeding the recommended value of .6. The Barlett's Test of Sphericity reached statistical significance (p=.000), supporting the factorability of the correlation matrix.

Principal components analysis revealed the presence of seven components with eigenvalues exceeding 1, explaining 27.2%, 14.3%, 6.7%, 5.5%, 5.3%, 4.3%, and 3.7% of the variance respectively. An inspection of the scree plot revealed a clear break after the third component (Figure 5).

To aid in the interpretation of the three retained components, Varimax rotation was performed. The rotated solution which is presented in Table 45 revealed the presence of three strong loading components. Although there were three components identified, an assessment of component loadings did not reveal any commonality or opportunity for naming.

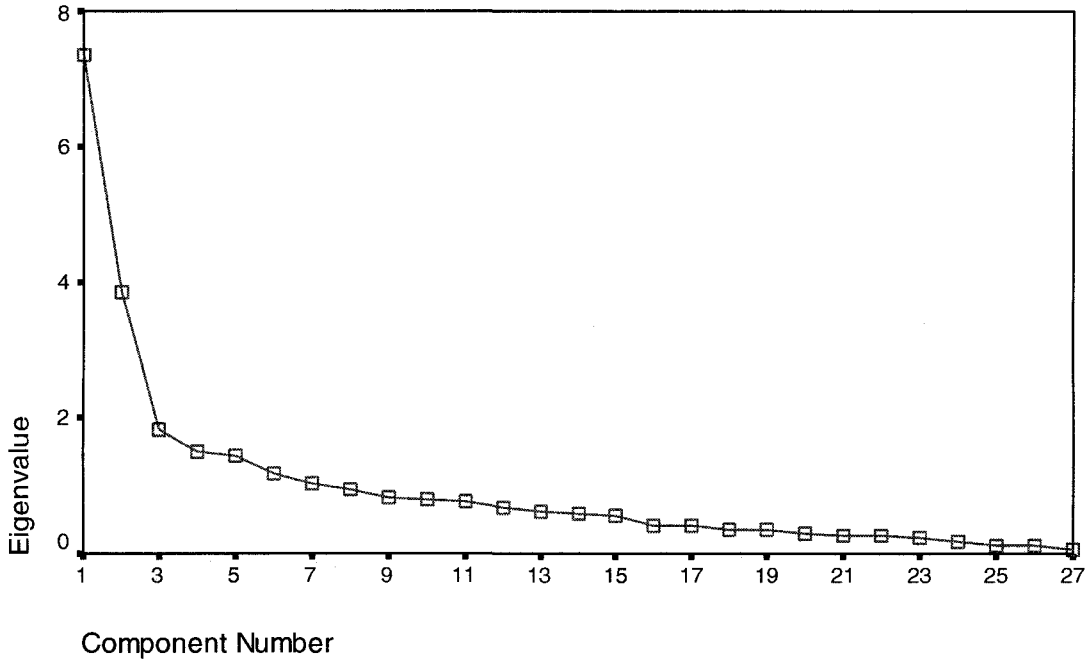


Figure 5. Scree plot for effectiveness questions

Summary

It was found that participants had generally positive attitudes about the usefulness of CAM, the need for physicians to know more about CAM, and the need for more scientific evidence about the effectiveness of CAM. Participants reported they were less than knowledgeable about most CAM therapies; however, the more they knew about a select therapy, the more effective they thought the therapy was. Participants' lack of knowledge about CAM therapies may explain why the conceptual groupings expected in the factor analysis did not occur. There were virtually no differences in results by gender.

Table 45. Varimax rotation of effectiveness questions

	Component		
Rotated component matrix	1	2	3
QiGong	.827		
Reiki	.727		
Rolfing	.717		
Prolotherapy	.688		
Shiatsu	.682		
Trager	.668		
Reflexology	.623		
Naturopathy	.607		
Tai Chi	.569	.479	
Ayurvedic	.478		.454
Homeopathy	.416		
Meditation		.788	
Massage		.744	
Yoga		.696	
Osteopathic Manipulative Medicine		.659	
Herbal Medicine		.618	
Hypnosis		.453	
Chiropractic		.449	
Spiritual healing			
Chelation therapy			.764
Healing touch			.699
Chakra balancing			.651
Acupuncture		.413	.471
Magnet therapy			.466
Feldenkrais			
Biofeedback			

CHAPTER 5. SUMMARY, DISCUSSION, AND RECOMMENDATIONS FOR FURTHER STUDY

Introduction

This chapter provides a summary and discussion of the findings of the study. The chapter is organized by content related to opinions, knowledge and effectiveness. Recommendations and suggestions for future study are also included.

Summary and Discussion

Opinions

In the current study, students' opinions about the usefulness of CAM were revealed in analysis of both individual survey items and a composite "Usefulness of CAM" score that resulted from a factor analysis of individual survey items. Results showed that the overwhelming majority of osteopathic students believe that CAM is useful and can offer ideas and methods from which conventional or western medicine can benefit. The students' perspective is not unlike that of the majority of CAM users in the general population who believe the combination of CAM and conventional medicine to be more beneficial than either alone (Eisenberg, 1998).

The majority of osteopathic medical students in the study also believed that CAM is effective for select medical problems. Their view is in harmony with the findings of research supported by the National Center for Complementary and Alternative Medicine (NCCAM). Through federally funded research projects, the NCCAM has deemed homeopathy, acupuncture, osteopathic manipulation,

chiropractic, relaxation and mind-body interventions, among others, to be effective for select conditions (http://nccam.nih.gov/health/bytreatment.htm). NCCAM has found CAM therapies to be helpful in the treatment of nausea, rhinitis, low back pain, osteoarthritis, insomnia, and fibromalgia. The credibility that students in the current study accorded to CAM is also reflected in their belief that CAM therapies found to be effective should be covered by health insurance plans.

The students in this study believed that CAM should be tested scientifically. This finding is in keeping with the trend to teach evidence-based medicine. Although most CAM therapies have not been tested scientifically, the majority of osteopathic students in this study did not feel CAM is a threat to the health of the public. In fact, the respondents felt that most complementary therapies stimulate the body's natural therapeutic mechanisms in some beneficial way. Respondents rejected the notion that the effects of CAM are the result of a placebo effect, indicating that there was a net positive impact on the health of the CAM recipient.

Differences in student opinions about CAM were found by school. Students from DMU-COM had stronger feelings about the need to test CAM therapies in a scientific manner and did not rate a number of therapies as effective as students from TCOM did. Although all of the osteopathic medical students included in this study were in their second year, the TCOM students were surveyed during the middle of their second year, and the DMU-COM students were surveyed at the end of the second year. The greater skepticism about CAM shown by the DMU-COM students is supported by the findings of Chez et al. (2001) who found that, as medical students move through their training, they exhibit stronger feelings about the

need for evidence in support of CAM use. As students move into the third and fourth years of training, they spend more time in practice with physician role models. Working more closely with physicians may in some way contribute to their thoughts related to the increased need for evidence. School differences on average opinions about CAM may also have resulted from other factors. For example, although most medical school curricula include basic science content in the first year and pre-clinical sciences in the second year, there is not a standard curriculum. Therefore, curricular differences may have contributed to the slight differences by school. The differences found by school may also be related to geographic differences, variation in the curricula, preparation of the faculty, and/or the research or practice focus of the university.

Geographic representation by school is significant. The Texas College of Osteopathic Medicine is a public institution that offers a tuition differential for in-state and out-of-state students. DMU-COM is a private institution with a flat tuition charge for all students. Public institutions typically have a larger portion of in-state students. Texas residents represented 93% of the 2003 TCOM class, whereas only 25% of the DMU-COM 2003 class was from Iowa. The TCOM class certainly represents the State of Texas and, in so doing, might account for select differences by school in the results presented in this study.

It was clear from analysis of individual items and a factor analytic composite that osteopathic medical students supported the need for more information and education about CAM therapies and modalities in medical school. This finding supports the work of others who have studied medical students' opinions related to

CAM (Baugniet et al., 2000; Chez, Jonas & Crawford, 2001; Furnham & McGill, 2003). In fact, students also seemed to believe that the entire health professions workforce would benefit from additional training.

The osteopathic medical students surveyed reported that they believe those who use CAM do not always disclose their use of CAM to their physicians. The majority of respondents also believed that those who use CAM find the combination of traditional and nontraditional treatment to be superior to either alone. Previous research (Astin et al., 1998; Barnes et al., 2004; Eisenberg, 2002) has shown that CAM users typically do not make dichotomous choices between conventional medicine and CAM. Those who use CAM tend to choose a mixture of treatments for a specific problem, and may use multiple therapies concurrently. Kelner and Wellman (1997) stated that in the 1990s health care consumers began to experiment with various forms of CAM as an expression of their desire for personal control over their health. This increased use of CAM and patients' need for control over their own health suggests that physicians should routinely inquire about CAM use among their patients. With the increasing use of CAM and its potential convergence with conventional medicine, physicians need to consider what, if any, implications may result from the implementation of a treatment plan. Thus, more dialog between physicians and patients about CAM use and health beliefs is essential for improved patient outcomes. Developing training that includes physician/patient communication would not only enhance understanding of CAM use among individual patients but in the population as well.

Although more females than males use CAM in the general population, little difference was found between male and female osteopathic medical students' opinions about CAM. Female medical students may not represent the general female population. Instead female medical students may more closely represent what it means to be successful in medical school. Female medical students tend to have high undergraduate science grade point averages and competitive Medical College Admission Test scores (Ferguson, James, O'Hehir, & Sanders, 2003) and also tend to demonstrate strategic thinking styles (Ferguson, James, & Madeley, 2002).

Differences related to income and patient satisfaction has been found between male and female physicians. An analyst for the American Medical Association found that after controlling for several physician and practice characteristics, the net income of female physicians was less than their male physicians counterparts (http://gateway.nlm.nih.gov/robot_pages/MeetingAbstracts/hstar/aHSR_sgm/GWHSR0001107.html). Perhaps more germane to this study are the differences in patient satisfaction by physician gender. Bertakis, Franks, and Azari (2003) reported that patients of female physicians are more satisfied. The increase in patient satisfaction with female physicians is attributed to the fact that women physicians tend to engage in more positive talk and more partnership building, provide more information, and are psychosocially oriented. Female physicians spent substantially more time than male physicians on preventive services and counseling, while male physicians devoted more time to technical practice behaviors. The length of the office visits did not differ by physician gender,

but how time was spent with the patient was significantly different. The fact that female physicians engage in more communication with their patients and are more in tune with the psychosocial aspects of their patients' health may support an increased understanding of CAM.

Knowledge

The NCCAM classifies CAM therapies into five categories: alternative medical systems, mind-body therapies, manipulative and body therapies, energy based therapies, and biologically based therapies. The results of factor analysis revealed that osteopathic medical students' perceived knowledge did not seem to fall naturally into this classification. In addition, their perceived levels of knowledge varied significantly by therapy in each category. For example, respondents were knowledgeable about some energy therapies and not others.

As would be expected, the vast majority of respondents felt they were very knowledgeable about osteopathic manipulative medicine. This was the only therapy for which the average response fell in the "very knowledgeable" range. Respondents on average reported only basic knowledge about a variety of therapies that are common in the United States: chiropractic, massage, meditation, acupuncture, biofeedback, and spiritual healing. In fact, it is unclear whether their responses represent actual knowledge about the therapies or simply familiarity with them.

Respondents reported no knowledge of 13 of the 26 therapies presented in the survey despite the fact that, as osteopathic medical students move through the clinical portion of the curriculum, they will be faced with many patients who use and

believe in these therapies. In addition, respondents did not feel knowledgeable about natural products and botanicals. Given that approximately 25% of the U.S. population use botanicals (Barnes et al., 2004; Eisenberg et al., 1998), a basic understanding of drug/botanical interactions is important, and in some cases critical. The use of Ginko Biloba and select prescription blood thinners may result in hemorrhage (Ang-Lee, Moss, & Yuan, 2001). In addition, the use of select botanicals can reduce the effectiveness of anti-rejection drugs and chemotherapeutic agents Sparreboom, Cox, Accharya, & Figg, 2004).

The fact that students' knowledge of CAM therapies was quite low may account for the fact that no meaningful groupings resulted from the factor analysis. Factor analysis revealed three strong loading components, but the assessment of the loadings did not reveal any commonality or opportunity for naming. Therefore, no conclusions could be made from the analysis.

In comparing the percentage of students who reported some knowledge of select therapies in this study to the percentage who reported knowledge of CAM in a study by Furnham and McGill (2003) (see Table 7), it was found that osteopathic medical students' basic understanding of chiropractic, meditation, acupuncture, hypnosis and homeopathy is higher than their allopathic counterparts. Further study about the differences in allopathic and osteopathic students may elicit a better understanding of this phenomenon.

There were significant differences between male and female students in their perceived knowledge of select therapies. On average, both groups reported "no knowledge" of Reiki and Trager therapy. Although female students' ratings were

higher on both Reiki and Trager therapy than their male counterparts, these results could represent a type I error. No obvious explanations could be found.

Effectiveness

The vast majority of osteopathic medical students surveyed in this study believed that osteopathic manipulative medicine is effective. The majority of respondents also believed that massage, acupuncture, meditation, chiropractic, yoga, and herbal medicine are useful therapies. Reports of effectiveness did not seem fall naturally into the NCCAM CAM classification system. For example, students did not seem to rate all body work as effective, even though more than 90% of them believed in the effectiveness of osteopathic manipulative medicine.

Osteopathic medical school curricula stress osteopathic manipulative medicine (OMM) as an effective therapy in general terms. Specifically, OMM is often found to be of great benefit to those suffering from back pain. Students' high ratings of the effectiveness of OMM can be attributed to the fact that all osteopathic medical students have received OMM. Osteopathic medical students begin training in OMM techniques early in their medical school training. By the completion of the second year of medical school, osteopathic medical students have developed basic OMM skills and have been recipients of OMM in skill building laboratories. OMM skills are developed through the use of high fidelity lab models or classmates.

In comparing the percentage of students who believe select therapies are effective in this study to the percentage who found select therapies effective in studies by Chez (2001) and Furnham (2003), it was found that a greater proportion

of osteopathic medical students' than allopathic students perceive that acupuncture, meditation, chiropractic, and yoga are effective. This comparison does not control for year in school or other variables that would need to be considered in research related to describing the differences between osteopathic and allopathic students.

Gender differences related to the effectiveness of CAM were evaluated. It was found that male osteopathic medical students rated three therapies more effective than female students: Ayurvedic medicine (classified as a medical system), Biofeedback (classified as a mind body therapy), and Rolfing (classified as body work). For these three therapies, both male and female average scores fell within the "neutral" range. The difference by gender for the effectiveness of the three therapies indicated may be the result of a type I error. No explanation for the gender difference in effectiveness could be made.

Correlation between knowledge and effectiveness

In this study, a direct positive correlation was found between knowledge of CAM and perceptions of the effectiveness of CAM. This finding is in harmony with the findings of Baugniet (2000) who revealed a direct relationship between knowledge and effectiveness. As knowledge increased, perceived effectiveness increased. This is in contrast with the research of Furnham and McGill (2003) who found a negative correlation. As knowledge increased, perceived effectiveness decreased. The inconsistency in results suggests that continued study may be beneficial. Specifically, longitudinal research related to student opinions, knowledge and perceived effectiveness across the four-year medical school curriculum may be

needed to better clarify the effect of medical education on the perceived effectiveness of CAM. Such research would help assess if formal training causes students to be more or less disposed to supporting select CAM therapies.

Need for curricular change

It is clear that osteopathic medical students believed that CAM is useful and that more information about CAM is needed. Respondents also revealed that they understand that patients do not always share important information with their physicians, and as a result, the physician/patient relationship could be enhanced.

The osteopathic medical students surveyed indicated that many patients have a health belief system that values both traditional and nontraditional medicine, and this belief system may be different from their own. The need to know and understand the health beliefs of individual patients is an important aspect of health care. Individual patient health beliefs are often grounded in the communities in which patients live; therefore, knowing and understanding the health beliefs and cultural context of the community is also important to enhancing the health of the population served by an individual physician.

Respondents also believed that more education and communication about CAM therapies and CAM use is necessary. In addition to teaching medical students about the CAM therapies that are most prevalent among the U.S. population, it may be more important to teach students about evidence-based CAM, i.e., what CAM therapies have been found to be effective and what therapies have side effects that can be harmful. Introducing students to an evidence-based CAM framework would

provide them with the tools they will need to effectively address patients' questions. The objective would not be to make medical students experts in CAM therapies, but rather make them experts in evaluating the evidence base that supports effective CAM use.

These findings support the need for an assessment of medical school curricula and the role the curriculum plays in preparing future physicians to meet the challenges of practice. The results of this study indicate that curricular change should focus on more than developing knowledge of CAM therapies.

Typical structure and focus of medical school curricula

U.S. medical school curricula tend to be divided into two distinct components. The first two years of medical school are typically called the pre-clinical years, or the pre-clinical curriculum. The second half of the curriculum is called the clinical years or clinical portion of the curriculum. The first two years are filled with intense basic science content and an introduction to physical diagnosis. The third and fourth years represent time in practice with physician mentors. The typical third and fourth year curriculum includes experiences in clinic and hospital settings. Most medical schools also allow students to select elective experiences that may be helpful in identifying or selecting a specialty career path. Curriculum reform, then, needs to address change in both the pre-clinical and clinical years of training.

Furthermore, medical education has focused on the treatment of acute disease and, as a result, physicians look for disease. The recent work of the Institute of Medicine (2003) calls for prospective approaches to health care that include

content related to social, cultural and behavioral change. The shift in medical education from a reactive acute disease perspective to a proactive comprehensive model, which focuses on prevention, health promotion and health beliefs, supports enhanced understanding of integrative medicine. Integrative medicine involves the blending of both conventional (Western) and nontraditional therapies (CAM).

Suggestions for curricular change

Curricular change should perhaps begin at the beginning, using the Evans and Stoddard (1990) model of the determinants of health (Figure 1 in Chapter 2). Evans and Stoddard framed health within a social and physical environment, which recognizes the genetic endowment each patient presents. The determinants of health help frame the impact of individual behavior, prosperity, functional status and access to care, indicating that education and socioeconomic status also contribute to health and well being. A better understanding of health involves improved communication and an appreciation of the breadth of factors that contribute to health. Integrating all of the content components included in the Evans and Stoddard model of the determinants of health (1990) will support the development of competencies needed for better physician/patient communication, and thus may improve the health outcomes of patients.

Because social and cultural underpinnings contribute to understanding CAM use, the preclinical years should include content in the social behavioral and cultural aspects of health. The time spent developing physical diagnosis skills should include

the development of competencies in communication and a holistic assessment of a patient.

Presenting CAM issues to medical students through the use of standardized patients is a good way to integrate CAM into the curriculum. Standardized patients are individuals who have been carefully trained to portray a simulated case based upon an actual patient's physical findings, personal and medical history, symptoms, and personality characteristics. The use of standardized patients enables medical students the opportunity to practice both clinical examination and interviewing skills in a safe and non-threatening environment. Standardized patients can be utilized to introduce communication, as well as social, cultural, and religious issues into the curriculum in an integrated meaningful way.

The clinical years should provide student exposure to diverse patient populations. Diversity can be represented by age, culture, socioeconomic status, and much more. The objective would be to provide students with exposure to patients who have diverse health beliefs and health behaviors.

Curriculum reform in support of the development of competencies in social, behavioral and cultural health is broader than a change in curricular content, educational objectives and competencies. Curricular reform in support of social, behavioral and cultural health competency development requires attention to the education, research and service missions of academic health centers. The education component should emphasize: (1) teaching of research-based best practice in a variety of clinical settings that model best practice; (2) an understanding of the determinants of health and illness; and (3) the use of evidence-based educational

methods. The patient care component should emphasize: (1) the development of structures and team approaches designed to improve health; (2) the modeling, testing and refinement of research-based best practice for clinical care regardless of its label (traditional/complementary); and (3) the use of collaborative approaches to health, especially for those in vulnerable populations or situations. The research component should emphasize: (1) the linkage of basic, clinical, health services and prevention research; (2) Improved understanding of the clinical, organizational, and cost effectiveness of new treatments and established practices; (3) a team approach to research that spans all the sciences that impact health and well being; and (4) the translation of knowledge into practice.

Embracing the call from the Institute of Medicine (2003) regarding social and behavioral curricular change would require medical schools to:

- develop courses, curricula, and other educational experiences designed to increase medical students' knowledge and skills in the behavioral and social sciences related to health. These educational experiences should be grounded in a framework of decision making that is based in evidence. Content related to evidenced based CAM would be included.
- provide training experiences in behavioral and social science for faculty, residents, researchers, health professionals, and practicing physicians. Introducing medical students to a more broadly based team of health care professionals and engaging students in educational experiences that are interdisciplinary will support student appreciation of the diversity of disciplines

engaged in health care delivery. The mix of professionals involved in training should include CAM providers.

- support health-related research and careers in the behavioral and social sciences within the medical school. Research should include the epidemiology of social and behavioral issues and the efficacy of CAM. Research related to quality of life and the impact of quality of life perceptions on health is also warranted.

Curricular reform should serve to support the development of learning experiences that span the entire duration of the medical school experience and should be grounded in an established set of competencies that promote the understanding of the role of psychological, social, cultural, and economic factors in health and illness. The competencies will provide a foundation for enhanced student performance in communication, counseling, behavioral management and behavioral interventions and the integration of best practice in medicine. Best practice will certainly include a mix of traditional and nontraditional medical approaches to health promotion and care delivery.

The relationships among curricular reform activities are diagramed in Figure 6. The curricular content identified supports the development of quality educational experiences that enhance competency development. Preclinical and Clinical experiences that support a more holistic approach to care should include content and experience in:

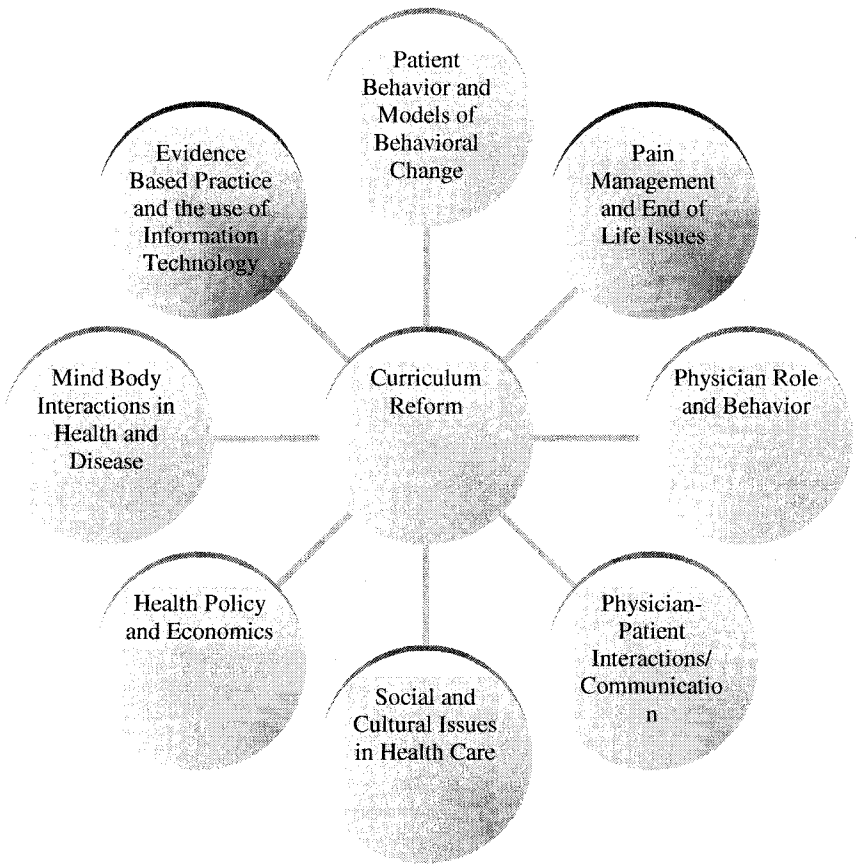


Figure 6. Framework for curricular reform

- mind-body interactions in health and disease; psychological, biological, social and behavioral factors and influences on health and disease, including the effect of quality of life on perceptions of health.
- patient behavior; heath promoting and health damaging behaviors, principles of behavior change, influences on health behavior patterns. Understanding patient behavior includes developing competencies related to understanding diversity, and the impact of community on patient actions. Understanding patient behavior also involves learning to appreciate that many patients'

health beliefs place value on systems and practices that are different from those of many practicing physicians.

- physician role and behavior; understanding of physician beliefs, behaviors and values on patient care, physician self-care and physician-patient interactions. Providing experiences that require medical students to assess their own beliefs and that of their patients will support a framework for understanding gaps between physician expectations and patient behavior. Assisting medical students in identifying their own behavior and beliefs will assist them in identifying and understanding the bias they bring into every exam room encounter.
- physician-patient interactions; communication and decision-making, managing difficult interactions, understanding a diverse patient population. Providing experiences that require decision making related to diverse populations, diverse patient behavior and patient values and beliefs will develop medical students' communications skills.
- social and cultural issues in health care; social determinants of health outcomes, role of complementary and alternative medicine. Understanding social and cultural issues requires experiences that are framed in social and cultural diversity. Content related to social and cultural issues should be delivered across all fours years of the medical school curriculum.
- health policy and economics; economic factors influencing health behaviors and patient care. The economic effects of behavior grounded in a social and

cultural context serves to assist in decision making. Clearly th economic impact of CAM is significant. and

- end of life issues; the psychosocial aspects of pain, pain management, cultural aspects of death and dying and the supportive processes from diagnosis to death. There are important end of life issues based in cultural. All medical schools include significant content on conception, pregnancy, and delivery, but little time is spent on end of life issues. Providing students with opportunities to help patients die is an important part of being a partner in health for life. Training students to learn and accept the end of life traditions held sacred by many cultures is necessary.

Adding more content to curricula that are already perceived as overcrowded can cause great concern to both faculty and students. Over the past 10 years, content related to public health, biostatistics, population-based medicine and behavioral change have all been added, yet little content has been removed. Perhaps the "best medicine" for curricular redesign would be to focus on evidence across the curricula. An evidence-based, integrated focus would effectively remove the "Western" and "alternative" labels used today. Focusing on evidence and/or best practice would not require adding content, but would re-direct the work of reform toward strategic competency development through the integration of content.

Curriculum reform of this nature would require engaging practitioners from disciplines not traditionally found with a medical school culture. This type of comprehensive reform would result in a broader understanding of the complex

nature of health care and supports the development of an environment that is more responsive to change.

Summary

The findings of the current study can assist medical school faculty at osteopathic institutions to develop didactic and clinical experiences related to CAM and the social, behavioral and cultural issues related to CAM use. Such curricula will assist physicians and primary care providers in becoming knowledgeable about CAM therapies and modalities. In particular, medical students need to be able to discern those CAM therapies that are helpful from those that may cause harm. Curricular reform should ensure that physicians are trained to ask questions that solicit patients to disclose information about their health beliefs and their use of CAM treatments. Unless there is a comprehensive medical history, a primary care physician cannot adequately assess the patient or develop an effective treatment plan. As curricula are revised, it is essential that medical schools include both didactic content and clinical experiences designed to develop competencies related to the social and behavioral issues that impact health and the effects of CAM. The development of competencies related to evidence-based CAM will enhance the physician-patient relationship and ultimately improve patient outcomes.

Directions for Further Research

It is clear that CAM means different things to different people. What is considered prayer to one individual might be considered spiritual healing by another, and both are classified as CAM by the CDC. To further advance understanding of

CAM and CAM culture in the U.S., it might be beneficial to develop universal CAM definitions. Universal definitions will result in better reporting and tracking of CAM utilization.

Learning more about CAM practice in the U.S. includes learning more about the patients seen throughout the delivery system. Though health care providers use broad-based and well-accepted history and physical formats, an equivalent tool does not exist to assist and aid in CAM assessment. Developing a common CAM assessment instrument would standardize how information is collected, assessed and in some cases shared from one physician to another. One might argue that, as physicians learn more about their patients' health practices and beliefs, they will learn more about how to support them as their health advisor.

The literature indicates that CAM use has grown as the U.S. population has become more culturally diverse. Research about student cultural competence and/or the effect of training in cultural awareness will contribute to our understanding of CAM and CAM use. Developing cultural competence in the health professions workforce is perhaps the best investment in improving physician/patient communication. Research on the effects of culture and community and the relationship of culture and community to CAM utilization and efficacy is also of value.

Continued research regarding the epidemiology of CAM is essential. Research regarding how perceived quality of life affects health outcomes is also necessary and may support reported CAM efficacy. Research may find that patients' perceived quality of life may be an important component to health and well-being. If

CAM utilization improves quality of life, which in turn reduces disability days, the economic impact could be significant as well.

Health policy is lagging when it comes to CAM. Policy makers have not yet addressed issues related to CAM access, scope of practice of CAM providers and health insurance coverage. Although select CAM therapies are extremely effective, policy directives have not been developed to support the seamless integration of effective CAM practice into traditional practice protocols. Research related to the effect of access to CAM providers on population health is also critical. Additional research related to the acceptance and integration of CAM by traditional physicians would also serve to define the best fit for CAM into the U.S. health care delivery system.

APPENDIX A. CAM DEFINITIONS

Acupuncture: A method of treatment that theorizes that there are more than 2,000 acupuncture points on the human body, and that these connect with 12 *meridians*. Chinese medicine practitioners believe these meridians conduct energy, or qi, throughout the body. Qi is believed to regulate spiritual, emotional, mental, and physical balance and to be influenced by the opposing forces of *yin* and *yang*. According to traditional Chinese medicine, when yin and yang are balanced, they work together with the natural flow of qi to help the body achieve and maintain health. Acupuncture is believed to balance yin and yang, keep the normal flow of energy unblocked, and maintain or restore health to the body and mind (http://nccam.nih.gov/health/whatiscam/#d8).

Acupuncture includes a family of procedures involving stimulation of anatomical locations on the skin by a variety of techniques. There are a variety of approaches to diagnosis and treatment in American acupuncture that incorporates medical traditions from China, Japan, Korea, and other countries. The most studied mechanism of stimulation of acupuncture points employs penetration of the skin by thin, solid, metallic needles, which are manipulated manually or by electrical stimulation.
http://nccam.nih.gov/health/whatiscam/#d9)

Allopathic Medicine: The use of substances, surgery, and treatments specifically targeted against a disease and intended to create a different effect from that produced by the disease. This term is generally used to describe the conventional approach to medicine or "Western" medicine (altmedicine.about.com/.../...f-allopathy.htm).

Ayurvedic Medicine: A medical system that has been practiced primarily in the Indian subcontinent for 5,000 years. Ayurveda includes diet and herbal remedies and emphasizes

the use of body, mind, and spirit in disease prevention and treatment (http://nccam.nih.gov/health/whatiscam/#d9).

Belief: Refers to the mental acceptance of an idea or conclusion, often a doctrine or dogma proposed to one for acceptance. Beliefs are often colored with emotion as one wishes to believe in its truth. (Webster's dictionary)

Biofeedback: A behavior-training program that teaches a person how to control certain autonomic reactions such as heart rate, blood pressure, skin temperature and muscular tension (www.hyperdictionary.com).

Chakra Balancing: A method that is based on the ancient Indian belief in a series of seven *chakras*, or energy centers. Chakra is the Sanskrit word for wheel. These energy centers are believed to be located at specific points between the base of the spine and the top of the skull. The concept of chakras plays a key role in *ayurvedic medicine* and *yoga*. Various approaches may be used to "balance" the chakras. Chakra balancing is believed to promote health by maximizing the flow of energy in the body.(http://hml.org/CHIS/altmed/links-c.html).

Chelation Therapy: An intravenous treatment designed to bind heavy metals in the body in order to treat heavy metal toxicity. Proponents claim it also treats coronary artery disease and other illnesses. The benefits of chelation for the treatment of lead poisoning and excessively high *calcium* levels are undisputed. The claims of benefits for those suffering from atherosclerosis, coronary artery disease, and other degenerative diseases are more difficult to prove. Reported uses for chelation therapy include treatment of angina, *gangrene, arthritis, multiple sclerosis, Parkinson's disease, psoriasis, and Alzheimer's disease* (http://www.informedhealthonline.org//item.aspx?review=002785).

Chiropractic Medicine: An alternative medical system that focuses on the relationship between bodily structure (primarily that of the spine) and function, and how that relationship

affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool. Chiropractic stems from a Greek word meaning done by hand. It is grounded in the principal that the body can heal itself when the skeletal system is correctly aligned and the nervous system is functioning properly. To achieve this, the practitioner uses his or her hands or an adjusting tool to perform specific manipulations of the vertebrae. When the bones of the spine are not correctly articulated, resulting in a condition known as subluxation, the theory is that nerve transmission is disrupted and causes *pain* and illness manifested in the back as well as other areas of the body (http://nccam.nih.gov/health/whatiscam/#6; http://www.acatoday.com/).

Complementary and Alternative Medicine: Defined by the *National Center for Complementary and Alternative Medicine* as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of western medicine (http://nccam.nih.gov/health/whatiscam/#d9).

Feldenkrais: Offers exercises that help the body to program the brain through movement, thus benefiting the total mind/body system. This method involves no pushing, prodding, or vigorous manipulation. Rather, it prescribes a series of light movements performed slowly and easily, without any strain or pain. Feldenkrais developed a theory that approached the human being as a complex system of physical functions and intelligence in which movement is a key that not only reflects the state of our nervous systems, but is also the basis of one's self-awareness. Since he believed that all our sensations, thoughts, and emotions necessarily result in some type of muscle change in the body, he believed the opposite to be also true: changes in the normal interrelationships of muscle patterns can affect and alter thoughts, emotions, and attitudes. Feldenchrais believed that if patients learned to move with greater fluidity, and motion, it would result in better health and an improved self-image (http://www.feldenkrais.com/).

***Healing Touch*:** Derived from an ancient technique called laying-on of hands. It is based on the premise that it is the healing force of the therapist that affects the patient's recovery; healing is promoted when the body's energies are in balance; and, by passing their hands over the patient, healers can identify energy imbalances. Therapeutic touch claims to assist the natural healing process by redirecting and rebalancing the energy fields within the body. A practitioner places his or her hands on or close to the body of the patient and redistributes the patient's energy or transmits his or her own energy as appropriate. This technique is employed as a healing system and claims to be useful for reducing pain and anxiety, promoting relaxation, and stimulating the body's natural healing process (nih.gov/health/whatiscam/#6).

Herbal Medicine: Involves the use of plants as medicines to restore and maintain health. Herbal remedies are employed in the western world by practitioners of holistic medicine who believe that all individuals possess an inner vital force that is constantly working to maintain physical, emotional, and mental health. Although they do not discount the germ theory of disease held by conventional western medicine, medical herbalists in the western world say that this theory does not fully explain why people become ill. They argue that many diseases and conditions come about because the individual's inner force or natural immune system is weakened or out of balance. Therefore, they prescribe herbal or plant remedies that are found in nature in order to return an individual's natural inner balance, strengthen the resistance to disease, and maintain good health (http://www.herbalgram.org/default.asp?c=reference_guide).

Homeopathic Medicine: A system based on the belief that "like cures like" meaning that small, highly diluted quantities of medicinal substances are given to cure symptoms, when the same substances given at higher or more concentrated doses would actually cause

those symptoms. (NCCAM) Homeopathic remedies are believed to stimulate the body's own healing processes (http://www.homeopathyusa.org/faq/).

Hypnosis: A state described as sleeplike. It is usually induced by another individual for the purpose of tapping into the unconscious mind. As a result of hypnosis, the subject may experience forgotten or suppressed memories. Hypnosis has also been described as a way to use a person's inherent healing capabilities that usually remain inaccessible to him and outside of his control.

Hypnosis can be helpful in relaxation and pain reduction by decreasing muscle tension. Hypnosis can also reduce pain by helping the subject visualize and create an alternate reality perceived as being safe and comfortable. Many doctors now use hypnosis to overcome the pain of headaches, backaches, childbirth, cancer, severe burns, and pain and fear resulting from dental procedures. In some cases, surgeons use hypnosis in the operating room, not only to reduce the amount of anesthesia needed by the patient, but also to lessen anxiety and postoperative bleeding and swelling. In other instances, hypnosis has been found useful in reducing the severity of asthma (http://apmha.com/page8.htm).

Magnet Therapy: The use of magnets to relieve *pain* in various areas of the body. Magnetic therapy dates as far back as the ancient Egyptians. Magnets have long been believed to have healing powers associated with muscle pain and stiffness. Chinese healers as early as 200 B.C. were said to use magnetic lodestones on the body to correct unhealthy imbalances in the flow of *qi,* or energy. Contemporary American interest in magnetic therapy began in the 1990s. There are two theories that are used to explain magnetic therapy. One theory maintains that magnets produce a slight electrical current. When magnets are applied to a painful area of the body, the nerves in that area are stimulated, thus releasing the body's natural response. The other theory maintains that when magnets are applied to a painful area of the body, all the cells in that area react to increase blood circulation, ion exchange,

and oxygen flow to the area. Magnetic fields attract and repel charged particles in the bloodstream, increasing blood flow and producing heat. Increased oxygen in the tissues and blood stream is thought to make a considerable difference in the speed of healing. (http://hml.org/CHIS/altmed/links-m.html)

Massage: A treatment where a therapists manipulates muscle and connective tissue to enhance function of those tissues and promote relaxation and well-being. (NCCAM) While massage therapy is applied primarily with the hands, sometimes the forearms or elbows are used. These techniques affect the muscular, skeletal, circulatory, lymphatic, nervous, and other systems of the body (http://nccam.nih.gov/health/whatiscam/#d9).

Meditation: A practice of concentrated focus upon a sound, object, visualization, the breath, movement, or attention itself in order to increase awareness of the present moment, reduce *stress*, promote *relaxation*, and enhance personal and spiritual growth.

Depending on the type of meditation, the techniques used may be concentrating on the sensation of the movement of the breath, counting the breath, silently repeating a sound, chanting, visualizing an image, focusing awareness on the center of the body, opening to all sensory experiences including thoughts, or performing stylized ritual movements with the hands.

There are two main types of meditation. These types are concentration meditation and mindfulness meditation. Concentration meditation practices involve focusing attention on a single object. Mindfulness meditation practices involve becoming aware of the entire field of attention. Many meditation practices are a blend of these two forms. (http://nccam.nih.gov/health/whatiscam/#d9)

Modality: The employment of, or the method of employment of, a therapeutic agent (Websters Dictionary on line http://www.m-w.com/)

Naturopathic Medicine: A system in which practitioners work with natural healing forces within the body, with a goal of helping the body heal from disease and attain better health. Practices may include dietary modifications, massage, exercise, acupuncture, minor surgery, and various other interventions. Naturopaths may use one or more types of therapy in treating patients. Most practitioners regard diet and nutrition as the core of naturopathic treatment, although some choose to specialize in specific approaches. Naturopaths in the United States have borrowed elements of Native American, Ayurvedic, and Chinese herbal medicine in their treatments of specific diseases. Naturopathic practitioners receive training in traditional herbalism as well as standard medical pharmacology. Herbal medicines are frequently used in naturopathy to strengthen weakened immune systems, as tonics, and as nutritional supplements (http://nccam.nih.gov/health/whatiscam/#d9).

Osteopathic Manipulative Medicine: A full-body system of hands-on techniques to alleviate pain, restore function, and promote health and well-being. Using a variety of Osteopathic Manipulative techniques, a Doctor of Osteopathic Medicine will apply manual forces to your body's affected areas to treat structural abnormalities and will then apply specific corrective forces to relieve joint restrictions and misalignments. Based upon the severity of the problem, more than one treatment may be required (http://nccam.nih.gov/health/whatiscam/#d9; http://www.osteopathic.org/index.cfm?PageID=ado_whatis).

Osteopathic Medicine: A form of conventional medicine that, in part, emphasizes diseases arising in the musculoskeletal system. There is an underlying belief that all of the body's systems work together, and disturbances in one system may affect function elsewhere in the body. Osteopathy is a "whole person" philosophy of medicine, where doctors of osteopathic medicine (DOs) endorse an approach that treats the entire person, rather than a specific complaint. Attention is given to prevention, wellness, and helping the body to heal itself

(http://www.osteopathic.org/index.cfm?PageID=ost_omed; http://nccam.nih.gov/health/whatiscam/#d8).

Opinion: A belief not based on absolute certainty or positive knowledge but on what seems true, valid, or probable to one's own mind; a judgment or an evaluation, impression, or estimation of the quality of something (Webster's Dictionary on line http://www.m-w.com/)

Prolotherapy: A treatment considered useful for many different types of musculoskeletal pain, including arthritis, back pain, neck pain, fibromyalgia, sports injuries, unresolved whiplash injuries, carpal tunnel syndrome, chronic tendonitis, partially torn tendons, ligaments and cartilage, degenerated or herniated discs, TMJ and sciatica. Prolotherapy uses a dextrose (sugar water) solution, which is injected into a ligament or tendon where it attaches to the bone. This causes a localized inflammation in these weak areas which then increases the blood supply and flow of nutrients and stimulates the tissue to repair itself (www.prolotherapy.com).

Qi gong: A component of traditional Chinese medicine that combines movement, meditation, and regulation of breathing to enhance the flow of qi (an ancient term given to what is believed to be vital energy) in the body. The practice of Qi gong is said to improve blood circulation, and enhance immune function. (http://www.qigonginstitute.org/main_page/main_page.php).

Reflexology: Generally consists of using the hands to apply gentle pressure to the feet in order to ease pain, relieve tension, and restore energy. The term can also be applied to applying pressure to specific points on the hands and ears (www.healthatoz.com/healthatoz/Atoz/dc/cen/cam/altdicnew.html).

Reiki: A Japanese word representing universal life energy. Reiki is based on the belief that when spiritual energy is channeled through a reiki practitioner, the patient's spirit is healed, which in turn heals the physical body (http://www.reiki.org/).

Rolfing or Rolf Therapy: The manipulation or deep tissue massage of the body's connective tissue and muscles, in order to realign and balance the body's structure. This leads to improved posture, function, and general physical and emotional health. During treatments the practitioner reworks by hand the fascial tissue of the patient's entire body until it becomes elastic and pliable again. This loosening and releasing of the adhesions in the fascia allows the muscles to lengthen and return to their normal, vertical alignment. It also restores a greater freedom of movement (http://www.rolf.org/).

Shiatsu: A manipulative therapy developed in Japan, incorporating techniques of anma (Japanese traditional massage), *acupressure*, stretching, and Western massage. Shiatsu involves applying pressure to special points or areas on the body in order to maintain physical and mental well being, treat disease, or alleviate discomfort. This therapy is considered holistic because it attempts to treat the whole person instead of a specific medical complaint. All types of acupressure generally focus on the same pressure points and so-called energy pathways, but may differ in terms of massage technique. Shiatsu, which can be translated as finger pressure, has been described as needle-free *acupuncture*. Shiatsu and other forms of Japanese acupressure are based on the concept of *ki*, the Japanese term for energy that flows through everything in the universe. Ki tends to flow through the body along special energy pathways called meridians, each of which is associated with a vital organ. In Asian systems of traditional medicine, diseases are often believed to occur due to disruptions in the flow this energy through the body. These disruptions may stem from emotional factors, climate, or a host of other causes including stress, the presence of impurities in the body, and physical trauma (http://hml.org/CHIS/altmed/links-s.html).

Tai chi: A Chinese exercise system which uses slow, smooth body movements to achieve a state of relaxation of both body and mind. Developed originally in China as a self-defense

strategy, or martial art, tai chi is practiced in modern times primarily as a gentle exercise technique. Described as "meditation in motion," tai chi consists of a standing person performing a series of postures or bodily movements in a slow and graceful manner, with each movement flowing without pause to the next. Tai chi is an ancient form of exercise, about 2,000 years old, which at one point had over 100 separate movements or postures. In current practice, there are two popular versions of 18 and 37 movements respectively. The fact that in China 10 million people practice some type of tai chi daily suggests that it is the one of the most popular forms of exercise in the world. (http://hml.org/CHIS/altmed/links-t.html).

Therapy: The treatment of disease or of any physical or mental disorder by medical or physical means, usually excluding surgery (Webster's Dictionary on line http://www.m-w.com/).

Trager: Psychophysical integration therapy, also known as the Tragerwork system of physical integration, is a combination of hands-on tissue mobilization, *relaxation*, and movement reeducation called Mentastics. The underlying principle of psychophysical integration is that clients learn to be lighter, easier, and freer in terms of body movement. The Trager method is a psychologically grounded physical approach to muscle relaxation, which is induced when a practitioner and patient achieve a state of mind called hook-up. Hook-up is described as a connection to a state of grace or powerful and nourishing life force. It is the opposite of strain or effort (http://www.wholehealthmd.com/refshelf/substances_view/1,1525,741,00.html).

Transcendental Meditation: Has its origins in the Vedic tradition of India and was introduced to the West by Maharishi Mahesh Yogi. TM has been taught to somewhere between two and four million people. It is one of the most widely practiced forms of meditation in the West. In TM the meditator sits with closed eyes and concentrates on a

single syllable or word (mantra) for 20 minutes at a time, twice a day. When thoughts or feelings arise, the attention is brought back to the mantra (http://www.tm.org/).

Yoga: A system that benefits the body, mind, and spirit by teaching self-control through a series of postures and exercises, as well as through breathing, relaxation, and meditation techniques. The ultimate goal of yoga is self-realization -- so that each individual can attain his or her complete physical, emotional, mental, and spiritual potential. Another, and more limited, goal of yoga as a system of exercises is to restore the whole person to balance and to improve and maintain good health.

The word "yoga" derives from the Sanskrit language and means "union." Altogether, there are six major "paths," schools, or styles of yoga -- known by such names as Hatha Yoga, Raja Yoga, Karma Yoga, Bhakti Yoga, Jnana Yoga, and Tantra Yoga — each is distinguished by a different approach. Despite the different focus or emphasis of each, all paths emphasize proper breathing techniques and meditation, and all are grounded in the belief that internal balance of mind and body is essential to good health (http://hml.org/CHIS/altmed/links-y.html).

APPENDIX B. THE WHITE HOUSE COMMISSION ON COMPLEMENTARY AND ALTERNATIVE MEDICINE: TEN PRINCIPLES

1. *A wholeness orientation in health care delivery.* Health involves all aspects of life-mind, body, spirit, environment-and high-quality health care must support care of the whole person.
2. *Evidence of safety and efficacy.* The Commission is committed to promoting the use of science and appropriate scientific methods to help identify safe and effective CAM services and products and to generate the evidence that will protect and promote the public health.
3. *The healing capacity of the person.* The person has a remarkable capacity for recovery and self-healing, and a major focus of health care is to support and promote this capacity.
4. *Respect for individuality.* Every person is unique and has the right to health care that is appropriately responsive to him or her, respecting preferences and preserving dignity.
5. *The right to choose treatment.* Every person has the right to choose freely among safe and effective care or approaches, as well as among qualified practitioners who are accountable for their claims and actions and responsive to the person's needs.
6. *An emphasis on health promotion and self-care.* Good health care emphasizes self-care and early intervention for maintaining and promoting health.

7. *Partnerships as essential for integrated health care.* Good health care requires teamwork among patients, health care practitioners (conventional and CAM), and researchers committed to creating optimal healing environments and to respecting the diversity of all health care traditions.
8. *Education as a fundamental health care service.* Education about prevention, healthful lifestyles, and the power of self-healing should be made an integral part of the curricula of all health care professionals and should be made available to the public at all ages.
9. *Dissemination of comprehensive and timely information.* The quality of health care can be enhanced by promoting efforts that thoroughly and thoughtfully examine the evidence on which CAM systems, practices, and products are based and make this evidence widely, rapidly, and easily available.
10. *Integral public involvement.* The input of informed consumers and other members of the public must be incorporated in setting priorities for health care, health care research, and in reaching policy decisions, including those related to CAM, within the public and private sectors.

The White House Commission developed the above principles in support of *Healthy people 2010: Understanding and improving health* (http://www.healthypeople.gov/), and various reports published by the Institute of Medicine (IOM) related to improving the health care delivery system (http://www.iom.edu/).

APPENDIX C. HUMAN SUBJECTS APPROVAL

Des Moines University Institutional Board Approval

DES MOINES UNIVERSITY-OSTEOPATHIC MEDICAL CENTER

Institutional Review Board

Date: July 1, 2003

To: Mary Pat Wohlford-Wessels, MS, MA

From: S. Juanita Robel, Chairperson

Re: "Medical Students' Knowledge and Perceptions Related to Complementary and Alternative Medicine"

Thank you for submitting an Exempt Review Request to the Institutional Review Board for your above project. An administrative review of the proposal has determined that it meets the qualifications for exemption. This decision will be reviewed at the next committee meeting.

If there are any significant changes in your protocol, please inform the Institutional Review Board prior to initiating the changes.

Thank you for the opportunity to review your project. Best wishes for its success!

Iowa State University Institutional Board Approval

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office of Research Compliance
Vice Provost for Research
2810 Beardshear Hall
Ames, Iowa 50011-2036
515 294-4566
FAX 515 294-7288

DATE: November 12, 2004

TO: Mary Pat Wohlford Wessels

FROM: Ginny Eason, IRB Administrator

RE: **IRB ID # 04-504**

STUDY REVIEW DATE: November 10, 2004

The Institutional Review Board has reviewed the project, "Osteopathic Medical Students' Knowledge and Perceptions of Complementary and Alternative Medicine" requirements of the human subject protections regulations as described in 45 CFR 46.101(b) 2. The applicable exemption category is provided below for your information. Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

The IRB determination of exemption means that this project does not need to meet the requirements from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects, unless required by the IRB. We do, however, urge you to protect the rights of your participants in the same ways that you would if your project was required to follow the regulations. This includes providing relevant information about the research to the participants.

Because your project is exempt, you do not need to submit an application for continuing review. However, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent if you have stated in your application that you will do so or required by the IRB.

Any modification of this research must be submitted to the IRB on a Continuation and/or Modification form, prior to making any changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

cc: Mary Huba
ELPS

ORC 04-21-04

APPENDIX D. SURVEY INSTRUMENT

Medical Students Knowledge and Perceptions Related to Complementary and Alternative Medicine

You are invited to participate in a survey research project designed to assess medical students' knowledge and perceptions related to Complementary and alternative Medicine (CAM). This project is being conducted by the Division of Health Management, Des Moines University - Osteopathic Medical Center. The findings of this research will be used to assess educational needs.

As a participant in this study you are assured that your identity will not be revealed. The information you share is confidential and your participation is voluntary.

A- Please read the following statements which reflect opinions related to complementary therapies; state whether you

1-Strongly Disagree 2-Disgree 3-Neutral 4-Agree 5–Strongly Agree

1.	Complementary and alternative medicine includes ideas and methods from which conventional medicine could benefit	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2.	Most complementary therapies stimulate the body's natural therapeutic mechanisms	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3.	Effects of complementary therapies are usually the result of a placebo effect	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4.	Complementary therapies are useful/helpful for some individuals with specific diseases or health problems	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5.	CAM therapies should be tested in a scientifically recognized manner before being presented to the public	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6.	Complementary therapies should be included and covered by health insurance companies	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
7.	Complementary therapies are a threat to the public's health	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
8.	Health professionals need to know more about Complementary and Alternative Medicine (CAM)	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
9.	CAM use has increased significantly over the past 10 years	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
10.	The extent to which patients disclose their use of	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	CAM therapies to their physicians is low.	
11.	The majority of those who use CAM do so not because they are dissatisfied with conventional medicine, but because they find CAM to be more congruent with their own values, beliefs, and philosophical orientation towards health.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
12.	Those who use CAM perceive the combination of CAM and conventional care to be superior to either alone.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
13.	CAM is available throughout the industrialized world.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
14.	Most health care providers know little about the use of dietary supplements	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
15.	Most physicians know something about CAM therapies.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B- Please think about each therapeutic modality below and indicate your level of knowledge

1- No knowledge 2- Basic understanding 3- Very knowledgeable

16.	Acupuncture	☐ 1	☐ 2	☐ 3
17.	Ayurvedic	☐ 1	☐ 2	☐ 3
18.	Biofeedback	☐ 1	☐ 2	☐ 3
19.	Chakra balancing (or other energy work)	☐ 1	☐ 2	☐ 3
20.	Chelation Therapy	☐ 1	☐ 2	☐ 3
21.	Chiropractic	☐ 1	☐ 2	☐ 3
22.	Feldenkrais	☐ 1	☐ 2	☐ 3
23.	Healing Touch	☐ 1	☐ 2	☐ 3
24.	Herbal Medicine	☐ 1	☐ 2	☐ 3
25.	Homeopathy	☐ 1	☐ 2	☐ 3
26.	Hypnosis	☐ 1	☐ 2	☐ 3
27.	Magnet Therapy	☐ 1	☐ 2	☐ 3
28.	Massage	☐ 1	☐ 2	☐ 3
29.	Meditation	☐ 1	☐ 2	☐ 3

30.	Naturopathy	☐ 1	☐ 2	☐ 3
31.	Osteopathic Manipulative Medicine	☐ 1	☐ 2	☐ 3
32.	Prolotherapy	☐ 1	☐ 2	☐ 3
33.	QiGong	☐ 1	☐ 2	☐ 3
34.	Reflexology	☐ 1	☐ 2	☐ 3
35.	Reiki	☐ 1	☐ 2	☐ 3
36.	Rolfing	☐ 1	☐ 2	☐ 3
37.	Shiatsu	☐ 1	☐ 2	☐ 3
38.	Spiritual healing	☐ 1	☐ 2	☐ 3
39.	Tai Chi	☐ 1	☐ 2	☐ 3
40.	Trager	☐ 1	☐ 2	☐ 3
41	Yoga	☐ 1	☐ 2	☐ 3

C- Please think of each therapeutic modality below and rate its effectiveness

1-Harmful 2-Not Useful 3-Neutral 4- Useful 5– Very Useful

42.	Acupuncture	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
43.	Ayurvedic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
44.	Biofeedback	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
45.	Chakra balancing (or other energy work)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
46.	Chelation Therapy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
47.	Chiropractic	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
48.	Feldenkrais	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
49.	Healing Touch	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
50.	Herbal Medicine	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
51.	Homeopathy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
52.	Hypnosis	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
53.	Magnet Therapy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
54.	Massage	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
55.	Meditation	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
56.	Naturopathy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

57.	Osteopathic Manipulative Medicine	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
58.	Prolotherapy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
59.	QiGong	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
60.	Reflexology	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
61.	Reiki	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
62.	Rolfing	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
63.	Shiatsu	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
64.	Spiritual healing	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
65.	Tai Chi	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
66.	Trager	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
67.	Yoga	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Demographic Questions

69. Your year in medical school:

A. 1st year
B. 2nd year

70. Your age:

A. 22 – 25
B. 26 – 29
C. 30 – 33
D. 34 – 37
E. 38 and older

71. Your gender:

A. Male
B. Female

72. Your martial status:

A. Married
B. Single
C. Divorced
D. Widowed
E. Other

Thank you for your participation.

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