NCC Pediatrics Continuity Clinic Curriculum: **Complementary Alternative Medicine (CAM)** ***Faculty Guide***

Goals & Objectives:

- Define complementary, alternative, and integrative medicine.
- Become familiar with CAM therapies and professionals, appreciating the risks and benefits.
- Know the epidemiology of CAM use, particularly within military pediatrics.
- Perform a literature search to critically evaluate a specific CAM therapy.

Pre-Meeting Preparation:

Please read the following enclosures:

- "Overview of Complementary Alternative Medicine" *(UpToDate, 2016)*
- "CAM Used by Children in Military Pediatric Clinics" *(J Alt & Compl Med, 2011)*
- **EBM Exercise:** Select 1 of the CAM therapies discussed in the review article. ***Perform a literature search*** to find medical evidence for its efficacy & safety.

Conference Agenda:

- *Review* CAM Quiz
- **Round Table:** Residents should present the results of their literature search regarding the scientific merits of their selected CAM therapy.
- **Hands-on-CAM (20-30 min):**
  - **"Battlefield Acupuncture"** (pro/con) (Drs. Goldman & Sharp)
  - Osteopathic Manipulative Treatment (Drs. Lantang & Engelhardt)
  - Essential Oils & Cupping Therapy supplies will also be available for review

Extra-Credit:

- **AAP Section on Integrative Medicine** *(links to PIR articles by therapy and by condition)*
- EBM Resources: The National Center for Complementary & Alternative Medicine *(NIH resource);*Natural Standard *(requires subscription)*
- Herb Resources: Natural Medicines Comprehensive Database; Longwood Herbal Task Force
- HealthyChildren.org *(parent resource)*

Overview of complementary and alternative medicine in pediatrics

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All topics are updated as new evidence becomes available and our peer review process is complete.
Literature review current through: Feb 2016. | **This topic last updated:** Dec 03, 2015.

INTRODUCTION — Many Americans integrate complementary and alternative medical (CAM) therapies into overall health strategies for themselves and their children. Pediatric clinicians should have some knowledge regarding CAM because they may be asked to advise patients regarding these therapies or provide referrals to CAM practitioners. Clinicians should ask about the CAM therapies their patients are using and know where to turn for additional information when questions arise (table 1) [1].

This topic will provide an overview of the use of CAM therapies in pediatrics. The use of CAM therapies for specific disorders, such as autism spectrum disorder, is discussed in the relevant treatment topics. As an example, see Autism spectrum disorder in children and adolescents: Complementary and alternative therapies.

DEFINITIONS — Integrative medicine is relationship-based care that focuses on the whole person; is informed by evidence; and makes use of all appropriate therapeutic approaches, healthcare professionals, and disciplines to promote optimal health and healing [2].

Complementary therapies are a subset of integrative medicine; they are used as adjuncts to conventional care. The list of practices that are considered to be complementary or alternative changes as practices and therapies become part of mainstream medicine over time and in different cultures. Integrative medicine encompasses some common basic values. These values reflect the importance of individual rights and the increasing education levels and access to information that characterize modern society:

- Recognition of the primary importance of treating the patient as an individual rather than a constellation of symptoms (patient-centered care)
- Recognition that the family has the primary role in providing care and that the role of the clinician is one of counselor, teacher, and advice giver rather than issuer of orders
- Recognition that family-clinician relationships are partnerships, as opposed to hierarchies
- Recognition of the importance of a sustainable healing environment
- Recognition of the inherent healing ability of the individual
- Recognition of the importance of prevention and health promotion

Alternative — Alternative medicine refers to therapies that used in place of conventional care.

Complementary — Complementary therapies are used in conjunction with mainstream medical therapies. These therapies do not replace medical regimens for serious medical problems but are offered to support the patient and family. Examples include massage, support groups, guided imagery, biofeedback, and hypnosis [3].

Folk — Folk medicine refers to therapies that are provided by family or group members as part of a family or cultural tradition. Examples include using "cold" foods for "hot" illnesses, religious or ritual healing practices (eg, coining or sand painting), and using chicken soup to treat upper respiratory infections [4].

Integrative — Integrative medicine refers to the integration of CAM therapies into mainstream medical practice based upon evidence of safety and effectiveness within the context of relationship-based care promoting optimal health and well-being (table 2) [5]. As an example, a pediatric clinician may recommend ginger or acupuncture as a

treatment for nausea for a patient who does not want to take an antiemetic medication [6].

Holistic — Holistic medicine refers to the care of the whole patient (eg, body, mind, emotions, spirit, and relationships) in the context of his or her values, beliefs, culture, and community. Holistic medicine is closely related to comprehensive care and contextual pediatrics. Examples of holistic medicine include promotion of literacy, screening for depression or alcohol use in family members, assessment of spirituality, and promotion of housecleaning to reduce allergic symptoms [7,8].

EPIDEMIOLOGY — The annual number of outpatient visits to CAM professionals is greater than the number of outpatient visits to mainstream clinicians in the United States. In addition, out-of-pocket expenditures for CAM are greater than those spent for hospitalization [9-11].

The percentage of general pediatric patients using CAM care increased from approximately 11 to 20 percent between 1994 and 1997. The percentage may be greater than 70 percent for children and families who have chronic, recurrent, or fatal conditions (eg, rheumatoid arthritis, cancer), depending upon age, cultural background, and access to services [1,12-19]. As an example, oncology patients accounted for 63 percent of the consultations to a holistic medicine consultation service in an urban tertiary-care pediatric hospital [20]. (See "Complementary and alternative therapies for cancer" and "Complementary and alternative remedies for rheumatic disorders".)

Chiropractors, acupuncturists, naturopaths, and massage therapists are the CAM professionals most often used by children [21,22]. The CAM therapies most often sought include prayer and spiritual healing, vitamins and minerals (which are so common they are no longer included in some surveys of CAM use), herbs and other dietary supplements, special diets, and mind/body techniques, such as relaxation training, hypnosis, and biofeedback [23,24].

RELATIONSHIP BETWEEN CAM AND MAINSTREAM MEDICINE — Patients and families may or may not discuss their use of CAM with their mainstream healthcare professionals [1,9,23,25]. As an example, in an online survey of 134 adolescents with juvenile arthritis, 72 percent reported using one or more CAM therapies, but only 46 percent told a conventional clinician [26]. However, the percentage of parents who inform their child's physician about CAM use appears to be increasing [27,28]. It is important for the pediatric clinician to routinely obtain a complete history, including use of CAM therapies, products, and services (table 3), because CAM and mainstream medical therapies may have adverse interactions [29,30].

Pediatric clinicians may be concerned that families who use CAM are unsatisfied with mainstream medical care and will abandon effective therapies for unproven alternatives, which has been associated with adverse outcomes [30]. However, families who use CAM therapies rarely abandon their mainstream pediatric clinicians, and adverse effects associated with CAM and CAM/conventional interactions appear to be less frequent than known adverse effects from conventional therapies. CAM typically is used as an adjunct rather than an alternative to mainstream medical care [20,31,32]. As examples:

- In a random sample of children admitted to a general pediatric service, the proportion of children who had seen their primary care pediatrician during the acute illness did not differ according to use of complementary treatments [31]
- The majority of consultations with a holistic medicine team in a tertiary-care pediatric hospital were for management of symptoms, rather than cure (70 versus 9 percent) [20]

Families seek care from professionals who respect them as individuals and who offer them time and attention. They also seek information on healthy lifestyle choices, dietary supplements, and environmental therapies over which they may exert some control [33]. Thus, they turn to therapists who offer them personal attention, hope, time, and therapies consistent with their values, world view, and culture [34,35].

DISCUSSING CAM THERAPIES WITH PATIENTS AND FAMILIES

Overview — Pediatric clinicians may find it helpful to use a structured approach when discussing therapeutic

options, including complementary therapies, with their patients or families (table 3). Such an approach permits the clinician to obtain a complete history, a better understanding of the values and belief systems of their patients, and a better framework from which to offer advice regarding potential adverse effects [36].

The American Academy of Pediatrics has established recommendations for pediatric clinicians who discuss CAM therapies with their families [1]:

- Seek information for yourself and be prepared to share it with families
- Evaluate the scientific merits of specific therapeutic approaches
- Identify risks or potential harmful effects
- Provide families with information on a range of treatment options
- Educate families to evaluate information about all treatment approaches
- Avoid dismissal of CAM in ways that communicate a lack of sensitivity or concern for the family's perspective
- Recognize when the family feels threatened and guard against becoming defensive
- If the CAM approach is endorsed, offer to assist in monitoring and evaluate the response
- Actively listen to the family and the child with chronic illness

When discussing CAM therapies with families, evidence about efficacy and safety can be used to guide recommendations [37,38]:

- Medical evidence supports efficacy and safety– the therapy can be **recommended**; efficacy should be monitored.
- Medical evidence supports safety, but evidence regarding efficacy is negative or inconclusive – the therapy can be **tolerated**; efficacy should be monitored.
- Medical evidence supports efficacy, but the therapy has side effects – the response to therapy should be **monitored** closely or discouraged.
- Medical evidence indicates serious risk and inefficacy – the therapy should be **avoided** and actively discouraged.

Medicolegal considerations — Medicolegal considerations are listed in the table (table 4) [39]. In addition to the standard documentation of the history, physical examination, diagnostic test results, and reports from consultants, the documentation in the medical record should include [40]:

- The conventional medical therapies that have been discussed, offered, tried, or refused
- Discussion of the risks and benefits of the recommended CAM treatment
- That the clinician has determined the extent to which the CAM therapy could interfere with any other recommended or ongoing treatment
- Appropriate informed consent
- Treatments and medications (including date, type, dose, and quantity prescribed)
- Instructions and agreements
- Periodic reviews

CAM THERAPIES — The number and types of CAM therapies (table 2) and professionals who practice CAM continue to grow (table 5). These professionals include:

- Chiropractors
- Acupuncturists
- Biofeedback therapists (usually psychologists)
- Biofield therapists such as Reiki Masters, Healing Touch and Therapeutic Touch practitioners

- Guided Imagery professionals (usually psychologists)
- Naturopathic doctors
- Licensed massage therapists and bodyworkers
- Registered yoga teachers
- Meditation instructors

Chiropractic — Chiropractors believe that malalignment of the spine is a major source of morbidity. Spinal manipulation is their principal therapeutic option; chiropractors do not prescribe drugs or perform surgery. Chiropractors are licensed in all 50 states [41]. In 2010, 52,600 chiropractics were employed in the United States [42].

The chiropractic community is divided into two professional organizations [43]:

- The International Chiropractic Association promotes chiropractic as essential to health promotion and is opposed to mandatory childhood immunizations
- The American Chiropractic Association tends to focus upon treatment of low back pain and other musculoskeletal disorders and includes exercise, dietary, and nutritional supplement counseling among their therapeutic maneuvers

Chiropractors are the CAM therapists most often used by adults and children in Canada and the United States [44]. Chiropractors see an average of 120 to 150 patients per week [43]. Initial visits typically last 45 minutes. Patients with acute conditions are scheduled for follow-up two to three times per week. Follow-up visits generally are 15 to 20 minutes long. Nearly one-half of chiropractor fees are covered by third-party payers, including Medicare and most major medical insurance carriers.

Children and adolescents account for 10 to 20 percent of chiropractor visits, and most chiropractic schools offer courses in pediatric care [43]. When treating children, chiropractors tend to take fewer radiographs, to use lighter force when making adjustments, and to use a device called an activator to make adjustments. They treat children in the parents' laps or use special pediatric tables.

Many chiropractors, particularly members of the International Chiropractic Association, promote regular chiropractic care for children as an essential part of pediatric health promotion. However, only about one-third of chiropractors actively recommend childhood immunizations.

In addition to health promotion, some chiropractors claim to treat otitis media, asthma, allergies, infantile colic, and enuresis [45]. A few randomized trials have evaluated the chiropractic treatment of these acute conditions [46,47]. No well-designed prospective double-blind randomized studies have shown that chiropractic care is as effective or more effective than mainstream care for these conditions, nor have studies demonstrated the effectiveness of chiropractic care in preventing mild or serious pediatric disorders. On the other hand, significant adverse effects from chiropractic adjustments are rare [48], and the rate of malpractice claims against chiropractors is much lower than the rate of suits against medical doctors [49].

Acupuncture — Acupuncture, a component of traditional Chinese medicine, is based upon the theory of a vital energy or chi (qi) that circulates through the body in channels called meridians. Disease occurs when the flow of vital energy is disrupted or blocked. Health returns when the flow is restored, balanced, and harmonized. Acupuncture restores the flow of vital energy through stimulation of specific points along the energy meridians.

Most American acupuncturists are trained in America. Acupuncturists are licensed in more than 43 states and the District of Columbia according to data from the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM). Approximately 80 percent of licensed acupuncturists also recommend dietary changes, herbs and other supplements, and changes in lifestyle, exercise, rest, and relationships to enhance health. Acupuncture visits increasingly are covered by insurance. The Affordable Care Act section 2706 mandates nondiscrimination in payment to licensed healthcare professionals. Thus, pediatricians are likely to see increased

availability of affordable acupuncture services for their patients.

Approximately 28,000 practicing acupuncturists are licensed in the United States [50]. Acupuncturists typically see 30 to 60 patients per week. Initial visit length is approximately 90 minutes, and follow-up visits last approximately one hour. Acute conditions typically are treated two to three times per week for two to three weeks, after which the visit frequency gradually is reduced until treatment is no longer needed [51]. Benefits of therapy, when they occur, usually are evident within the first five treatments.

Most acupuncturists rarely treat children; less than 10 percent of acupuncturists see three or more children per week. Most acupuncturists who treat children use special techniques, including non-needle methods (eg, heat, magnets, lasers, and vigorous massage or tapping) to stimulate points along the energy meridians. In addition, they may use the Japanese style of acupuncture, which is gentler than the Chinese style.

Acupuncture commonly is recommended by clinicians; over one-third of North American pediatric pain treatment programs provide acupuncture services [52]. Many of the major teaching hospitals with a pediatric pain service offer acupuncture to treat chronic pain in children. The National Institutes of Health Consensus Conference on Acupuncture concluded that it was effective in treating several kinds of pain and nausea in adults [53]. It also appears to be effective for certain conditions in children. As examples:

- A 2015 systematic review of randomized trials of wrist acupuncture for postoperative nausea and vomiting (in children and adults) found that acupuncture reduced postoperative nausea, vomiting, and need for rescue antiemetics compared with sham treatment and that acupuncture and antiemetics had similar efficacy in preventing postoperative nausea, vomiting, and need for rescue antiemetics [54].
- In a randomized trial, laser acupuncture was more effective than placebo in reducing headache frequency and severity in 43 children with migraine and tension type headaches [55].

An analysis of 24 systematic reviews involving 142 randomized trials and over 12,000 pediatric participants concluded that needle acupuncture is safe for children when it is performed by appropriately trained practitioners who follow detailed protocols [56]. Among 1422 patients treated with acupuncture, there were 279 adverse events. Most adverse events (91 percent) were mild (eg, pain, bruising, worsening of symptoms). Serious adverse events may have been related to substandard practice.

Naturopathy — Naturopathic medicine is based upon the belief that the body has an innate power to heal and that symptoms are the manifestation of the body's attempt to achieve wholeness in the face of internal and external stress. Treatment is focused on restoring the whole person to healthy balance and resilience. Similar to mainstream clinicians, naturopaths help patients to avoid unhealthy habits (eg, smoking, excessive alcohol use, illicit drug use). In addition, naturopathic doctors focus on health promotion, including:

- Healthy diet (low in fat, high in fiber and micronutrients, and free of pesticides, herbicides, and antimicrobials)
- Exercise
- Rest
- Positive mental and emotional state (enhanced by meditation, imagery, and counseling)

Naturopathic therapies include hot and cold baths, steam baths, massage, and dietary supplements such as herbs and vitamins. Some naturopaths incorporate elements of other CAM therapies into their practice (eg, chiropractic, acupuncture, homeopathy, and midwifery).

According to the American Association of Naturopathic Physicians, in 2015, 17 states, the District of Columbia, the US territories of Puerto Rico, the US Virgin Islands, and five Canadian provinces licensed naturopathic physicians. The seven accredited schools of naturopathy in the United States and Canada require four years of training. Internship and residency are not required. Naturopathic doctors are certified by the national board for naturopathy (Naturopathic Physicians Licensing Exam [NPLEX]) [36,41]. Third-party coverage of naturopathic doctor services varies by state, but most pediatric care is paid out of pocket by families; this may change with the implementation of the Affordable Care Act which includes a clause about nondiscrimination against licensed health

professionals for payment.

Lengths of visits are typically 60 to 90 minutes for an initial visit and 30 to 45 minutes for follow-up. Some families rely upon their ND as the only source of primary care. Children and adolescents account for 20 to 30 percent of naturopathic doctors' patient loads.

Massage and bodywork — Massage therapists focus on muscles and connective tissues. Hundreds of types of bodywork and massage exist because almost every cultural group has a tradition of massage therapy. The most common types of bodywork and massage practiced in the United States include:

- Swedish massage (long, gliding strokes; kneading; and stroking)
- Deep tissue massage (eg, Rolfing and Hellerwork)
- Craniosacral therapy
- Infant massage
- Pressure-point techniques (eg, shiatsu and acupressure)
- Movement integration (eg, Feldenkrais and Alexander techniques)
- Sports massage
- Neuromuscular massage
- Aromatherapy massage

Massage therapy is regulated by the municipality in some areas and by the state in others. A certifying examination may or may not be required [41]. Massage therapy is licensed within the health care field by some states and within the entertainment field by others. Nurses and physical therapists provide massage therapy for children in some hospital settings.

The American Massage Therapy Association is the largest national professional organization of bodyworkers. Membership in this association requires training in an accredited school and hundreds of hours of supervised practice. Most massage schools provide little training in pediatrics, and therapists rarely treat children.

A survey of licensed massage therapists in the Boston area revealed that practitioners received 1000 hours of training in massage therapy [57]. Typical visits lasted approximately one hour; the cost of the visit was rarely covered by insurance. Most therapists saw an average of 20 patients per week, with less than one visit per week from a child or adolescent [57].

Substantial and growing evidence indicates that massage helps children and adolescents who suffer from a wide range of conditions. It can ease suffering from anxiety and depression in adolescents who are hospitalized for psychiatric disorders, reduce the severity of asthma in school-age children, and may enhance the growth rate of premature infants [58-67]. Massage therapy also is helpful in relieving pain, improving circulation, loosening tight joints, decreasing levels of stress hormones, enhancing endogenous levels of serotonin, and enhancing an overall sense of relaxation and well-being [68,69].

Yoga — An increasing number of pediatric patients use yoga as a form of exercise or stress management [70]. A review of 34 studies in pediatrics, including 19 randomized controlled trials, concluded that yoga is generally safe and preliminary data suggest positive health outcomes [71]. Yoga teachers are registered with the national Yoga Alliance, which provides credentialing for teachers. A minimum of 200 hours of training are needed for beginner teacher certification; many experienced teachers have over 500 hours of training.

Meditation — Meditation is a mind-body therapy that is intended to enhance focus or attention [70]. Meditation practices are commonly used to promote health or to relieve stress, anxiety, insomnia, depression, chronic pain, or fatigue. In a 2007 survey, approximately 1 percent of children reported using meditation for health purposes [44]. Resources related to meditation for children are provided in the Table (table 6).

Major types of meditation practice used for health purposes include [70]:

- Concentration on a word, thought, sensation, or image (eg, transcendental meditation, breathing awareness, including Relaxation Response)
- Mindfulness (the intention to notice without judgment the experiences that arise in each moment)
- Movement (eg, yoga, mindful walking, tai chi, qi gong, Sufi dancing)

A growing body of research supports the effectiveness of several kinds of meditation practice [72-76]. There is some evidence to suggest that one or more of these meditation techniques may be beneficial in reducing blood pressure and improving attention, behavior, and psychological functioning in children and adolescents [71,72,77-81]. Although additional studies are necessary to confirm these benefits, meditation practices are unlikely to be harmful [70].

There is no national or state certification for meditation teachers, but meditation is generally considered a safe form of mental-emotional self-management training.

Homeopathy — Homeopathy is a system of medical treatment invented in the 1800s and currently popular in Europe, Russia, India, and South America [82] (see "Homeopathy", section on 'Basic theory'). It is based upon two principles:

- The law of similars
- The law of dilutions

According to the law of similars, a remedy that would cause a symptom in a healthy person is used to treat the same symptom in a sick person ("like cures like"). As an example, poison ivy might be used to treat a child suffering from eczema. Serious side effects from homeopathic treatments rarely occur. The safety of homeopathy is attributed to its second principle. According to the law of dilutions, the more the remedy is diluted, the more powerful it becomes. Homeopaths believe that dilute remedies contain energy or information that is used by the patient to heal his or her symptoms. In contrast, most mainstream clinicians believe that dilute homeopathic remedies contain no active molecules and that the remedies have a placebo effect that triggers the patient's psycho-neuro-immunologic healing systems.

In 2007, an estimated 3.9 million adults and 910,000 children used homeopathy [83]. Approximately 50 percent of homeopathy practitioners are lay practitioners, 35 percent are chiropractors, 10 percent are clinicians; the remainder includes naturopaths, nurses, and other health professionals [84]. Practitioners of homeopathy are licensed in fewer than 10 states [36]. Insurance coverage for homeopathic care varies by state, carrier, and the professional status of the practitioner. Homeopathic services provided by clinicians and chiropractors are covered more often than are services provided by non-clinicians.

Homeopathic remedies are available over the counter, through mail-order catalogs, and over the Internet without a prescription. Homeopathic visits are scheduled approximately every four to six weeks [85]. The initial visit usually lasts 90 minutes, and follow-up visits 30 to 45 minutes. Children and adolescents account for 20 to 30 percent of the patient load of the typical homeopathic practitioner. In addition to homeopathic remedies, many practitioners of homeopathy discuss and recommend dietary therapies, dietary supplements, and relaxation techniques.

Studies evaluating homeopathic remedies in children and adults are discussed separately. (See "Homeopathy", section on 'Clinical evidence'.)

Biofield therapy — Therapeutic Touch, Healing Touch, and Reiki are forms of biofield therapy in which healing energy is transferred from the healer to the patient through the healer's hands.

Therapeutic Touch — Therapeutic Touch can be performed without touching the patient. The process was developed in the 1970s by a nursing professor and a lay healer and does not require a specific religious faith or belief. The process has five steps:

- Having a clear and conscious intent to be helpful and heal

- Being centered in a peaceful state of mind
- Using the hands to assess the patient's energy (typically moving the hands 1 to 3 inches away from the body in a slow downward sweep from the head to the toes)
- Using the hands to help restore the patient's energy to a balanced, harmonious, peaceful state (again, slowly moving the hands a few inches away from the body)
- Releasing the patient to complete his healing process while the healer returns to his own centered, peaceful state of mind

Therapeutic Touch is taught in nursing schools across the United States. Nursing practice in many hospitals includes policies and procedures for performing Therapeutic Touch. Credentialing is provided through Therapeutic Touch International Association. Most practitioners are nurses practicing under the professional nurses' scope of practice.

Studies in adults report that Therapeutic Touch is effective in reducing pain and anxiety and for enhancing sleep and a sense of well-being. Few studies have been performed in children [86,87]. Side effects are rare.

Healing Touch — Healing Touch grew out of Therapeutic Touch and other energy-based healing traditions. It uses a variety of nontouch or light touch techniques to affect the patient's bioenergy. Nurses are the largest professional group of Healing Touch practitioners; there are several levels of training to become a certified Healing Touch Practitioner. Practitioners of Healing Touch may be certified through various Healing Touch groups.

Reiki — Reiki is a practice similar to Therapeutic Touch that is based on Japanese tradition. The practice of Reiki relies upon a belief in an invisible energy that may be transmitted from healer to patient through intention; the energy is focused by placing the hands on particular parts of the patient's body. Reiki healers perform long-distance healing in some cases: the patient is visualized, and energy is transmitted through intention rather than direct physical contact.

Practitioners of Reiki are trained by a Reiki master through apprenticeship and spiritual/energetic initiation. It has no national certifying examinations and no state licensure requirements.

Reiki training for caregivers has been offered in at least one children's hospital in the United States [88].

Guided imagery and biofeedback — Guided imagery, hypnosis, and biofeedback are part of mainstream medical practice. They are used by clinicians, psychologists, social workers, and other mainstream health professionals. Training in these techniques is available through workshops sponsored by the Society for Behavioral and Developmental Pediatrics, the American Society for Clinical Hypnosis, the Biofeedback Certification International Alliance, and others. The techniques have been shown to be useful in promoting optimal performance and in treating pain, behavior problems, and a variety of other pediatric conditions when used as an adjunct to other therapies [89-94].

The use of biofeedback in the management of specific conditions is discussed separately. (See "Tension-type headache in children", section on 'Frequent or chronic headaches' and "Management of bladder dysfunction in children", section on 'Biofeedback and pelvic floor muscle training' and "Preventive treatment of migraine in children", section on 'Behavioral interventions' and "Complementary, alternative, and integrative therapies for asthma", section on 'Biofeedback and functional relaxation'.)

Herbs/supplements — Herbs, vitamins, minerals, and other dietary supplements are used by families of children and adolescents for a variety of indications (table 7) [6].

Multivitamins and minerals are promoted as therapies for children who have autism spectrum disorder, Down syndrome, and other developmental disabilities. (See "Autism spectrum disorder in children and adolescents: Complementary and alternative therapies", section on 'Biologic-based interventions'.)

Fish oils, antioxidants, and herbs are marketed for children with attention deficit hyperactivity disorder. (See

"Attention deficit hyperactivity disorder in children and adolescents: Overview of treatment and prognosis", section on 'Dietary interventions' and "Attention deficit hyperactivity disorder in children and adolescents: Overview of treatment and prognosis", section on 'Other alternative therapies'.)

Vitamin B2, magnesium, feverfew, and butterbur are increasingly recommended by conventional neurologists to prevent migraine headaches. (See "Preventive treatment of migraine in children", section on 'Nutraceuticals' and "Preventive treatment of migraine in adults", section on 'Other agents'.)

Magnesium and a variety of Asian herbs are sought as a natural approach to management of asthma [95]. Adolescents spend money on dietary supplements to lose weight, build strength, enhance mood, and clear skin blemishes. Gastroenterologists may recommend probiotics to ease symptoms of irritable bowel syndrome and inflammatory bowel disease [96], and neonatologists have begun recommending probiotics to reduce the risk of necrotizing enterocolitis [97]. (See "Chinese herbal medicine for the treatment of allergic diseases" and "Probiotics for gastrointestinal diseases" and "Prevention of necrotizing enterocolitis in newborns", section on 'Probiotics'.)

Pediatric clinicians should advise caution about potential toxicities from herbs and dietary supplements (table 8). Natural products (eg, digitalis, hemlock, tobacco) can have potent physical effects, some of which are obvious after one dose, others of which occur over years of accumulated exposure [98]. (See "Overview of herbal medicine and dietary supplements", section on 'Safety' and "Hepatotoxicity due to herbal medications and dietary supplements".)

Lifestyle therapies — Lifestyle therapies include special diets, exercise, and environmental manipulation.

Diet — Diet is a lifestyle therapy that is used commonly by families who pursue complementary and alternative approaches because diet, particularly for young children, is controlled by the family. Diet typically is discussed by pediatric clinicians as part of routine health supervision visits. However, families also may seek advice regarding diet from other health professionals (eg, nutritionists, naturopathic doctors, chiropractors, and licensed acupuncturists) or lay advisers within their cultural communities. Increasingly, special diets, such as the low FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) diet and exclusive enteral nutrition are recommended by conventional gastroenterologists to treat irritable bowel syndrome and inflammatory bowel diseases, such as Crohn disease. (See "Functional abdominal pain in children and adolescents: Management", section on 'Dietary triggers' and "Overview of the management of Crohn disease in children and adolescents", section on 'Exclusive enteral nutrition'.)

Parents may choose vegetarian, macrobiotic, or other special diets for religious, ethical, or health reasons. They may choose to purchase only organically grown meat and produce. They may wish to have their children avoid possible allergens (eg, wheat, dairy products, tree nuts, shellfish, corn, soy, and peanuts). (See "Vegetarian diets for children" and "Organic foods and children".)

Severely restrictive diets, particularly for infants, may result in failure to thrive, malnutrition, and, occasionally, death [30]. Parents may not be aware of the potential nutritional deficiencies of restrictive diets for their children or of the means to address these deficiencies within their dietary framework. They should be referred to a qualified pediatric dietitian for specific advice before restricting gluten, dairy, or other commonly consumed foods.

Exercise — In addition to making dietary recommendations, pediatric clinicians also encourage physical activity as part of routine health supervision. Pediatric clinicians should be aware that certain exercise therapies may be useful in the management of specific conditions. As an example, yoga may be particularly useful for children suffering from asthma [95].

Environmental — Environmental manipulation has long been used in the mainstream medical care of children. Examples include phototherapy for jaundice, vibration for colic, cold for pruritus, music for anxiety, and mattress and pillow covers for children with allergy to dust mites. Environmentally based complementary and alternative therapies include crystals, lights, sounds, magnets, ionizers, aromatherapy, and radionic devices. These therapies are marketed as being safe and effective for children. Although data to evaluate these claims are lacking, most of

the therapies appear to be benign.

SUMMARY

- Integrative medicine is relationship-based care that focuses on the whole person; is informed by evidence; and makes use of all appropriate therapeutic approaches, healthcare professionals, and disciplines to promote optimal health and healing. Complementary therapies are a subset of integrative medicine. (See 'Definitions' above.)
- Complementary and alternative medicine (CAM) typically is used as an adjunct rather than an alternative to mainstream medical care. Families may turn to CAM therapists who offer them personal attention, hope, time, and therapies consistent with their values, world view, and culture. (See 'Relationship between cam and mainstream medicine' above.)
- CAM therapies include acupuncture, massage and other types of bodywork, chiropractic, prayer, homeopathy, bioenergetic therapies (prayer, Therapeutic Touch, Healing Touch, Reiki), guided imagery and biofeedback, herbs and supplements, and lifestyle therapies (diet, exercise, and environmental manipulation) (table 2). (See 'CAM therapies' above.)
- Pediatric clinicians may find it helpful to use a structured approach when discussing therapeutic options, including complementary therapies, with their patients or families (table 3). (See 'Discussing CAM therapies with patients and families' above.)
- Medicolegal considerations related to the use of CAM therapies are listed in the Table (table 4). (See 'Medicolegal considerations' above.)

Topic 2851 Version 15.0

How to talk with caregivers/patients about therapeutic options for children and adolescents

Do talk about the different kinds of therapies families may have tried to help their child.
Do **not** wait for families to bring it up.
Ask in an open-minded, non-judgmental fashion. Avoid using potentially pejorative terms such as "unproven", "unconventional", or "alternative".
Elicit further information with questions about specific therapies:
- Have you tried any **herbal** therapies, such as echinacea or ginkgo?
- Have you tried any **dietary** therapies, like avoiding wheat or milk?
- Have you sought care from any **other health professionals**, such as acupuncturists or chiropractors?
Elicit the values, beliefs, and influences that led parents to these therapies:
- Suggested by family members?
- Consistent with their religious, spiritual, or cultural beliefs?
- Value of natural or organic approaches?
- Fear of side effects of mainstream treatments?
Whenever possible, join with the parents and support their decision to pursue avenues that may help their child; be an ally rather than a tyrant.
Ask how well the family thinks the therapies worked or didn't work **before** offering your opinion.
Offer to talk with other therapists involved in the child's care to better maintain coordinated, comprehensive care.
Offer to learn more to help answer the family's questions.
Offer families additional information and resources to address their questions about alternative and complementary therapies.

Graphic 57149 Version 7.0

Holistic pediatrics: Integrative approach to therapies

Biochemical therapies
Medications
Vitamins and minerals
Dietary supplements
Herbs
Amino acids
Hormones (melatonin, DHEA)
Other
Fish oil
Probiotics
Biomechanical
Massage and bodywork
Chiropractic
Osteopathy and other spinal adjustments
Surgery and transfusions
Bioenergetic
Acupuncture
Therapeutic Touch, Healing Touch
Reiki, polarity therapy
Prayer and ritual
Homeopathy
Radiation therapy
Magnets and electromagnetic field therapies

Lifestyle therapies
Diet
Vegetarian, vegan, organic
Low fat, high fiber
Gluten-free, casein-free
Paleolithic, Mediterranean
Low FODMAP
Exercise
Aerobic
Weight training
Yoga, tai chi, qigong
Environment
Light, music, vibration, heat, cold
Aromatherapy
Magnets
Media
Social
Mind-body
Hypnosis
Biofeedback
Meditation
Counseling, support groups
Social/communication skills

DHEA: dehydroepiandrosterone; FODMAP; fermentable oligosaccharides, disaccharides, monosaccharides, and polyols.

Graphic 82394 Version 3.0

Commonly used herbal therapies

Herb	Common uses
Aloe	Burns, minor wounds, skin irritations, aphthous stomatitis, constipation, gastric and duodenal ulcers
Calendula	Skin soother
Cascara	Constipation
Cayenne	Topical treatment for pain, post-herpetic neuralgia, nasal spray for migraines and cluster headaches
Chamomile	Sedative, colic, antiinflammatory, antispasmodic
Clove oil	Teething pain
Coffee	Stimulant, ADHD, bronchodilator
Dandelion	Mild diuretic, liver tonic
Dill	Antispasmodic, colic, decrease flatulence
Echinacea	Immune stimulation, antiinflammatory
Feverfew	Migraine headaches, rheumatoid arthritis
Garlic	Antimicrobial, cholesterol lowering
Ginger	Antiemetic, antinausea
Ginseng	Stimulant, enhance endurance and performance, adaptogen
Hops	Sedative
Lavender	Sedative
Licorice	Antiinflammatory, demulcent
Milk thistle	Hepatoprotection; cirrhosis, hepatitis
Oats	Antipruritic; eczema, varicella
Pine bark extract	Antioxidant promoted to treat ADHD
Rhubarb root	Constipation, chronic renal failure
Saint John's wort	Depression, antiviral
Slippery elm bark	Demulcent; pharyngitis
Tea tree oil	Antimicrobial; acne; minor skin infections, including fungal and yeast infections
Thyme	Antimicrobial; colds, sore throats; cough; expectorant
Valerian	Sedative

ADHD: attention deficit hyperactivity disorder.

Graphic 60567 Version 5.0

Cautions about herbs and dietary supplements when used in children

Product **purity** is questionable; there is potential for misidentification and contamination with:
- Pesticides
- Herbicides
- Pharmaceuticals
- Heavy metals
- Excipients such as alcohol
Particularly for products imported from developing countries.
Reliability of products is uncertain; there is great variability in concentration of active ingredients within plants used, growing conditions, processing, and storage.
Effectiveness of active ingredients in children often not studied.
Safety and toxicity for short-term use in children is often unknown.
Safety and toxicity for chronic use in children is often unknown.
Unknown **interactions** with other medications and treatments.
Unknown **metabolism** in children with renal, hepatic, and other disorders.
Cost of products is not necessarily related to quality, purity, or concentration of active ingredients.

Graphic 65283 Version 4.0

THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 17, Number 6, 2011, pp. 531–537

DOI: 10.1089/acm.2010.0339

Complementary and Alternative Medicine Used by Children in Military Pediatric Clinics

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Abstract

Objectives: The objective of this study was to evaluate the prevalence, types, perceived effects, and factors that influence the use of complementary and alternative medicine (CAM) by military children.
Design: A parent survey was administered in two military general pediatric clinics from June to September 2009. Parents completed surveys about their children including the following items: demographic information, a list of specific CAM therapies, family CAM use, and child health status.
Results: Caregivers completed 278 surveys. The overall use of CAM was 23%. The most common type of CAM used was herbal therapy (34%). The CAM therapies most commonly reported to be very helpful were special diets (67%), melatonin (57%), vitamins and minerals used at doses higher than the recommended daily allowance (50%), and massage therapy (50%). The majority of users reported no side-effects (96%). Among CAM users, 53% had discussed their CAM use with a physician and 47% had seen a CAM practitioner. Factors associated with CAM use in multiple regression analysis included chronic conditions ($p = 0.001$), parent/sibling use of CAM ($p < 0.001$), and parent age over 30 years ($p = 0.02$). Primary sources of CAM information were friends and family (68%) and doctors (44%). Common reasons for using CAM were to promote general health (70%), to relieve symptoms (56%), and to improve quality of life (48%). Eighty percent (80%) of all respondents indicated they would use CAM if recommended by a physician.
Conclusions: In this military population with access to universal health care, CAM use is higher than the U.S. national average and nearly double that of the 2007 National Health Interview Survey study. Patients with chronic conditions, family members using CAM, and parental age over 30 years are more likely to use CAM. CAM is perceived as helpful with minimal to no side-effects. Pediatricians should inquire about CAM use and be prepared to provide guidance on this topic.

Introduction

Many clinic-based and national surveys have described the use of complementary and alternative medicine (CAM) in children.[1–11*] The use of CAM in the United States has consistently increased over time in both adult and pediatric populations.[1,12] The U.S. military has a broad ethnic diversity, a transient population from all U.S. regions and territories, a variety of educational backgrounds, and a broad but consistent range of income. All service members and their families have equal access to universal health care without co-pays or associated expenses. These demographics may result in significantly different use of CAM when compared to the general U.S. population. There have been limited studies on the use of CAM by adults in the military.[13–15] The prevalence of CAM use in service members appears to be similar to the general population, but the prevalence in their children is not known. There have been no published studies on the prevalence of CAM use in children who have a parent in the military. In 1998, Ottolini surveyed families in the Washington, DC area that included a small subset of children at the National Naval Medical Center, but this subset was not separately evaluated.[8] In an unpublished study from 2003, Randall surveyed service-member families in the DC area and found that 32% of typically developing children and 75% of children with special health care needs were considering or using CAM.*

CAM can include a wide variety of treatments and therapies. It is defined by the National Center on Complementary

*Randall VF, Flake EM, Hanson JL. Parent decision-making about complementary and alternative medicine. In: Proceedings from the Uniformed Services Pediatric Seminar March, 2003, Washington, DC.

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and Alternative Medicine as "a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine."[16] U.S. prevalence of CAM use in children was 11.8% in the 2007 National Health Interview Survey (NHIS).[1] CAM use in children was found to be associated with adolescent age, presence of a chronic illness, increased parent education, living in the West, and prescription medication use.[2] Prevalence in general pediatric clinics has varied from 12% to 45% in the United States[6–10] and 11%–54% in Canada.[4,11] Higher rates have been described in specific populations such as adolescents (54%–79%),[17–19] homeless youth (70.1%),[20] cerebral palsy (35%–56%),[21,22] cancer (6%–91%),[23] attention deficit hyperactivity disorder (67.6%),[24] autism (31.7%–92%),[25–28] and other chronic conditions (23%–64%).[22,29,30]

It was hypothesized that CAM use in a military pediatric population would be less than the national average due to ready access to conventional medical care. On the basis of previous studies, rates of use were proposed to correlate with increasing parent age and education, household income, child age, presence of chronic illness, and parents or siblings who used CAM.

The primary objectives of this study were to determine (1) the prevalence of CAM use among children of U.S. service members in a general pediatric clinic, (2) the types of CAM use, and (3) child CAM use based on sociodemographic and child health factors. Secondary objectives were to evaluate (1) whether CAM was perceived as helpful, (2) whether there were notable side-effects, (3) reasons for using CAM, (4) sources of information regarding CAM use, and (5) care providers consulted regarding CAM.

Materials and Methods

Study design

An anonymous, cross-sectional survey was conducted from a convenience sample in two military general pediatric clinics from June to September 2009. The clinics were located at a large military treatment facility in the Pacific Northwest. All children were dependents of active duty or retired military personnel and qualified for full conventional medical care without co-pays or direct cost.

Survey development

A parent survey was developed based on prior surveys used in local and national studies[1,10*] and the published results of multiple prior studies.[6–9,11,17–19,30] The survey was piloted with a group of 10 parents to ensure understandability. The primary survey consisted of 39 questions. Family demographics were obtained, which included number of children, annual income, primary language at home, and branch of military service and rank of the service-member parent, caregivers' age, ethnicity, marital status, educational level, and relationship to the child. Caregivers were also asked if they were born outside of the United States and, if so, how long they have lived in the United States. Child information included age and gender, birth order, the child's health including immunization and general health status, chronic medical conditions, annual physician visits, and the use, efficacy, and any noted side-effects of prescription medications. For additional children in the family, a supplemental survey was developed consisting of the same child demographic, health, and CAM therapy use questions as the primary survey.

Caregivers were asked information about their child's use of specific CAM therapies in 25 categories over the past 12 months. A Likert scale was used to evaluate whether the therapy was helpful (not, somewhat, moderately, very), and whether there were any side-effects (none, mild, moderate, severe). CAM therapies included herbal remedies, probiotics, special diets, vitamins, or minerals used at doses greater than the recommended daily allowance (RDA), food supplements, melatonin, natural performance enhancers, special exercise programs, acupuncture or acupressure, massage therapy, hypnosis, guided imagery or biofeedback, homeopathy, Ayurveda, naturopathy, reflexology, Traditional Chinese Medicine, chiropractic manipulation, dance, music, art, or writing therapy, therapeutic touch or Reiki, faith healing (not prayer), environmental products (air filters, aromatherapy), sensory integration therapy, hyperbaric oxygen, magnets, and chelation.

The caregiver was also asked about the use of CAM by other family members, if they would use CAM recommended by a physician, whether they have discussed CAM with their physician, reasons for using CAM, where they obtained information regarding CAM, and how often they have seen other practitioners for CAM therapies.

Survey administration

Parents were approached on a consecutive basis as they entered the clinic for routine and acute appointments and were asked to complete a survey. Participation was voluntary and answers were anonymous. They were asked to complete a primary survey based on the child who had an appointment that day. They were also asked to complete a supplemental survey for each additional child in the family. The supplemental surveys were attached to the primary survey to link family demographic information. The survey took 5–20 minutes to complete. They were collected and scanned into an electronic database. Families were excluded from the study if a primary caregiver was not present at the clinic visit or if they did not read English well enough to understand and complete the survey.

Analysis

Demographic characteristics were reported using frequency distributions. Associations between CAM use and socioeconomic factors were analyzed using a χ^2 test. Factors significantly associated with CAM use were included in a multiple regression model using negative binomial regression to examine the association between each factor and CAM use, with adjustment for the other factors. Risk differences were calculated. $P < 0.05$ was considered statistically significant. Data were analyzed using Stata 9.0.

Results

Among the 461 parents who were approached, 344 (78%) consented to complete the survey. Of those that accepted the survey, 66 (19%) returned incomplete questionnaires, leaving 278 for study analysis. Information was not collected on those who declined the survey or did not complete the survey. Two

hundred and fifty-five (225) supplements for each families' additional children were obtained for analysis. Eighty percent (80%) of the surveys were collected at one site and the remainder were collected at the second site. No statistically significant difference was noted in responses between the two sites; therefore, the data were combined for the analysis.

The average age of the children in this sample was 6.6 years with 55% male, and the average family size was 2.4 children. Mothers completed 80% of the surveys as the primary caregiver, 56% were over 30 years old, and 84% were born in the United States (Table 1). The ethnicity of the primary caregivers was white (61%), African American (8.6%), Hispanic (11.5%), Asian (3.5%), and other (15.4%). The education level of the primary caregiver was high school or less (23%), some college (35.6%), and college degree or higher (41.4%). Of the secondary caregivers in the home, 72% were male and their ethnicity was white (61.7%), African American (14.2%), Hispanic (11.2%), Asian (5.6%), and other (7.3%). The secondary caregiver education level was high school or less (25.5%), some college (33.9%), and college degree or higher (40.6%). English was the primary language spoken at home (96%) followed Spanish and German. The Army was the branch of service of 78% of the families. The service member parents included 78% enlisted (20% junior and 58% senior) and 22% officers.

Over the last year, one or more CAM therapy was used by 23% of the children in the survey and 10% used multiple CAM therapies. The most common types of CAM used were herbal therapies (34%), massage therapy (20%), probiotics (19%), food supplements (19%), melatonin (17%), special exercise programs (16%), special diets (14%), and vitamins and minerals used at doses greater than the RDA (11%). Based on the four categories of Kemper's Holistic Model, children in this sample used 57% biochemical, 18% lifestyle, 16% biomechanical, and 9% bioenergetic based therapies.[31]

From the univariate analysis, important factors associated with CAM use were presence of chronic conditions ($p < 0.001$), parent/sibling use of CAM ($p < 0.001$), and more than two doctor appointments over the last 12 months ($p = 0.05$) (Table 2). Parent age over 30 years ($p = 0.094$) and parent college degree ($p = 0.069$) approached significance (Table 1). Factors associated with CAM use in multiple regression analysis included chronic conditions (24% increase; 95% confidence interval [CI]: 9%, 38%, $p = 0.001$), parent/sibling use of CAM (31% increase; 95% CI: 20%, 43%, $p < 0.001$), and parent age over 30 years (8% increase; 95% CI 2%, 17%, $p = 0.02$) (Table 3). Income, rank, branch of service, race, number of children, child age, prescription medicine use, gender, non-U.S. birthplace of the caregiver, and primary language were not associated with increased CAM use.

Table 1. Demographics of Participants ($N = 278$)

Characteristic	*Total* (N = *278*)	*CAM users* (N = *63*)	*CAM nonusers* (N = *215*)	p-*Value*
Primary caregiver age				0.25
<30 years	121 (44%)	22 (35%)	99 (46%)	
>30	157 (56%)	41 (65%)	116 (54%)	
Primary caregiver ethnicity				0.49
White	170 (62%)	45 (72%)	125 (59%)	
African American	24 (9%)	4 (6%)	20 (9%)	
Hispanic	32 (12%)	5 (8%)	27 (13%)	
Other	48 (17%)	9 (14%)	39 (19%)	
Primary caregiver education				0.14
High school or less	64 (23%)	10 (16%)	54 (25%)	
Some college	99 (36%)	20 (32%)	79 (37%)	
College degree or more	115 (41%)	33 (52%)	82 (38%)	
Annual family income				0.15
<$25,000	29 (11%)	4 (6%)	25 (12%)	
$25,000–$49,999	104 (39%)	21 (35%)	83 (41%)	
$50,000–$99,999	95 (36%)	29 (48%)	66 (32%)	
$100,000 or more	38 (14%)	7 (11%)	31 (15%)	
Primary home language				0.07
English	265 (96%)	58 (92%)	207 (97%)	
Spanish	5 (2%)	1 (2%)	4 (2%)	
Other	6 (2%)	4 (6%)	2 (1%)	
Rank of military service-member				0.29
Junior enlisted	56 (20%)	11 (18%)	45 (21%)	
Senior enlisted	162 (58%)	43 (68%)	119 (57%)	
Junior officer	31 (11%)	5 (8%)	26 (12%)	
Senior officer	29 (11%)	4 (6%)	20 (10%)	
Branch of service				0.79
Army	217 (79%)	48 (76%)	169 (80%)	
Air Force	52 (19%)	13 (20%)	39 (18%)	
Navy	4 (1%)	1 (2%)	3 (2%)	
Marines	2 (1%)	1 (2%)	1 (0%)	

CAM, complementary and alternative medicine.

Table 2. Child Characteristics ($N = 278$)

Characteristic	*Total (N = 278)*	*CAM users (N = 63)*	*CAM nonusers (N = 215)*	p-*Value*
Child's age (years)	6.59	7.58	6.31	0.05
Child's gender				0.16
Male	152 (55%)	39 (62%)	113 (53%)	
Female	124 (45%)	23 (38%)	101 (47%)	
Number child in family	1.62	1.69	1.61	0.56
Number of children	2.37	2.5	2.64	0.50
Family member used CAM				<0.001
Yes	84 (30%)	37 (59%)	47 (22%)	
No	194 (70%)	26 (41%)	168 (78%)	
Parent born in the US	232 (83%)	53 (84%)	179 (83%)	0.87
Immunizations current	261 (94%)	57 (91%)	204 (95%)	0.20
Health status				0.004
Excellent/very good	249 (90%)	50 (79%)	199 (93%)	
Good	28 (10%)	12 (19%)	16 (7%)	
Fair/poor	1 (0%)	1 (2%)	0 (0%)	
Chronic medical condition	49 (18%)	22 (35%)	27 (13%)	<0.001
Annual doctor visits				0.02
0	8 (3%)	2 (3%)	6 (3%)	
1–2	153 (56%)	28 (45%)	125 (59%)	
3 or more	113 (41%)	32 (52%)	81 (38%)	
Prescription medication use	87 (31%)	21 (33%)	66 (31%)	0.68
Prescription medications helpful				0.66
Very/moderately	92 (76%)	22 (73%)	70 (75%)	
Somewhat/not	31 (24%)	8 (27%)	23 (25%)	
Prescription medication side Effects				0.52
Severe/moderate	12 (9%)	8 (23%)	4 (4%)	
Mild/none	129 (91%)	27 (77%)	102 (96%)	

CAM, complementary and alternative medicine.

Immunizations were reported to be up to date in the majority of children (94%).

Of 255 supplemental surveys for additional children in participating families, 11 were incomplete and the remaining 244 were analyzed. Findings were similar to those of children in the primary survey sample. The average age was 6.8 years, with 46% male. CAM therapy was used by 22% of these children. The most common types of CAM used were herbal therapies (27%), probiotics (27%), food supplements (20%), megadoses of vitamins and minerals (18%), special diets (16%), massage therapy (9%), and melatonin (7%). Immunizations were reported by the parents as "up to date" in 96% of the children. Chronic conditions were reported in 12% of the children.

The therapies most commonly reported to be "very helpful" were: special diets (67%), melatonin (57%), megadoses of vitamins and minerals (50%), and massage therapy (50%). The majority of parents reported no side-effects in their children from CAM (96%). Frequent reasons for using CAM were to promote general health (70%), to treat a specific illness (57%), to relieve symptoms (56%), to improve quality of life (48%), preference for a more natural therapy (35%), preference for a combination of alternative therapies and prescription medications (34%), and knowledge of others who have benefited from alternative therapies (32%). Only 1 reported dissatisfaction with conventional medicine.

The most common sources of CAM information were friends and family (68%) and doctors (44%). Among those who reported using CAM, 53% had discussed their CAM use with a physician and 47% had seen a CAM practitioner. Of all respondents, 80% indicated they would use CAM if recommended by a physician.

Table 3. Multivariate Results for Evaluating Factors Associated with Complementary and Alternative Medicine Use

Risk factor	*Risk difference (95% CI)*[a]	p-*Value*
Chronic condition	24% (9%–38%)	0.001
Parent or sibling use	31% (20%–43%)	<0.001
Primary caregiver age ≥30 years	9% (2%–17%)	0.02

[a]Risk difference represents increased rate of use relative to no chronic condition, no parent or sibling use, and caregiver <30 years of age, respectively, controlling for the other factors in the model.

CI, confidence interval.

Discussion

This study describes the use of CAM in a U.S. sample with comprehensive conventional health care. Almost 1 in 4 children (23%) in military families in this sample used CAM. This prevalence is nearly twice that found by the 2007 NHIS study and higher than most other clinic-based studies.[1,8–11]

Prevalence of CAM use by adults in the military (37%–81%)[13,14] is similar to national averages (38.3%–42.1%).[1,12] Our sample appears to be representative of healthy children, with 18% reporting a chronic condition that is below the national average of 26.6%.[32]

Parent CAM use, older child age, and chronic medical conditions are associated with CAM use in most studies, while parental age, maternal education, family ethnicity, insurance coverage, and parent income have been associated CAM use in some studies.[5] Consistent with data from the NHIS study, the current study found that CAM use was associated with chronic medical conditions and parent/sibling use of CAM. Parent education was significantly associated with CAM use in the NHIS study and approached significance ($p = 0.069$) in the current study. In contrast to the NHIS study, this found an association between increased parent age, and no association was found with age of the child or prescription medication use.

The NHIS study found that those with health insurance had a higher prevalence of CAM use than the uninsured. However, those with delayed access to medical care had a higher prevalence as well.[1] The present findings are consistent with higher CAM use in those with health insurance. All families surveyed had access to free conventional medical care, similar to a national health care system. In the current study, equal access to care may have eliminated some sociodemographic effects such as the effects of varied education and income. However, the authors did not inquire whether families had private health insurance that included types of CAM.

CAM use is associated with chronic conditions. However, there may be an increased risk of interaction with prescription medication and CAM therapies in this population.[33,34] This study sought to evaluate not only the types of CAM used, but also whether it was felt to be helpful and whether there were any appreciated side-effects. Overwhelmingly, CAM was perceived as helpful with minimal to no side-effects in this survey. About one half (53%) had discussed CAM use with their physician, which is increased compared to previous studies but remains relatively low.[8,10] A large majority (80%) indicated a willingness to use CAM if it was recommended by a physician. Using immunization status as a proxy of conventional medicine, the authors hypothesized that CAM use would be associated with delayed immunizations, but an "up to date" immunization rate in 94% was found by self-report. As described in previous studies, CAM use in the current study was not associated with dissatisfaction with conventional medicine.[5,8,9] In this study, CAM use appears to be a complementary rather than a true alternative treatment.

This study shares limitations consistent with prior studies that examined the prevalence of CAM use. No standard survey approach was used: Each study developed their own questionnaire. Studies of CAM are complicated by definition of specific therapies and populations surveyed.[35] Studies that have used insurance reimbursements for policies that cover CAM have demonstrated CAM use prevalence of 1.8%–6.2%.[3,36] However, these studies involve a narrow definition of CAM use confined to CAM practitioners who seek reimbursement from insurance policies. The landmark study by Spigelblatt et al.[11] found that 11% of the children had been treated with CAM, but again this study defined CAM as therapy by a CAM practitioner. The majority of CAM involves independently administered treatments and is missed by narrowly defined interventions. Likewise, some studies broadly defined CAM and obtained different survey results. Lanski et al.[6] included a more inclusive definition of CAM and found that 45% of children had been given herbal therapies. Some of the published studies did not include treatments that can be considered CAM, and the therapy may not be reported by the caregiver. This was noted by Lanski et al.,[6] who found 18 additional herbal remedies on direct interview with caregivers that were not included in their initial survey. An attempt was made to use a broad yet defined set of criteria for CAM in the current study. For example, "faith healing" was included but prayer was excluded. Also included were "dance" and "environmental" therapies on the survey, but these were excluded in the final analysis due to potential confusion.

The current study was conducted in the Pacific Northwest, where there is a higher prevalence of reported CAM use.[1,2] This is typically a few percentage points (14.4%) above the national average (11.8%).[1] However, the sampled population is of service-member families who come from all regions of the United States, its territories, and other foreign countries and typically remain at one location for 3 years before moving. This military sample allows for survey of families from a variety of U.S. regions, ethnic, educational, and economic backgrounds, all with equal access to conventional medicine. Therefore, it is less likely that location had a significant impact on the results. Compared to nationwide Army demographics, the sample in this study was not significantly different for race, gender, rank, or education.[37] Conducting the survey in other regions of the country could have clarified a regional bias due to media or the effect of community practitioners.

Clinic-based findings are potentially biased by self-selection. Families indicate a certain degree of confidence in conventional medicine by seeking care in a pediatric clinic. Those who have little confidence in conventional medicine may further pursue alternative treatments and not be detected by clinic-based surveys. The current survey included the children of military members who sought treatment in a pediatric clinic. Although this is an ethnically diverse group from across the United States, these findings might not be generalizable to the general population.

Conclusions

CAM use in children of U.S. military service-members appears to be at least as common or more common than in the general U.S. pediatric population, even in the setting of free, fully accessible conventional medicine. It is more commonly used in children with chronic conditions, whose family members use CAM and who have older parents. With few noted side-effects and parental impression of efficacy, it is likely that CAM use will continue. CAM use should not be seen as a rejection of conventional medicine. Parents continue to seek guidance from their pediatricians in its use. Pediatricians should inquire about CAM use and be prepared to provide guidance on this topic, especially among those with greater likelihood of CAM use. Further research into CAM therapies and increased training of physicians on

this topic may improve parent–physician communication and allow for the recommendation of evidence-based therapies in the context of conventional care.

Acknowledgments

We would like to thank Wendy Harsha, MD for her assistance with data collection at the second site. Kathi Hamilton from the Nursing Research Department provided long hours and tremendous assistance with data entry. Anju Sawni-Sikand, MD provided a copy of a prior questionnaire for review. Funding for this study was provided by the Department of Clinical Investigation, Madigan Army Medical Center. The views expressed in this article are those of the authors and do not reflect the official policy of the Department of the Army, the Department of Defense, or the U.S. Government.

Disclosure Statement

No competing financial interests exist.

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CAM Quiz

1. Many former CAM therapies are now **"part of mainstream medicine."** List some examples:
Massage for newborns; acupuncture for chronic pain; biofeedback for bladder dysfunction; fish oils for inflammation (and other health benefits); probiotics for colic (amongst other GI uses); fenugreek for breastmilk supply; hypnosis for anxiety & nocturnal enuresis.

2. What percent of children with **chronic, recurrent, or fatal conditions** utilize CAM? **70%**

3. Match the following **CAM modalities** with their underlying principles:

Chiropractic	**C**	A. Long-distance healing via transmission of invisible energy
Acupuncture	**B**	B. Restores flow of energy through stim of energy meridians
Naturopathy	**D**	C. Malalignment of the spine is a major source of morbidity
Homeopathy	**E**	D. Sxs are the body's attempt at wholeness in the face of stress
Reiki	**A**	E. Based on the "law of similar" and "law of dilutions"

4. Match the following **herbs** with their intended use:

Ma Huang	**H**	A. Colic
Ginger root	**B**	B. Nausea
Valerian	**F**	C. Migraine headaches
St. John's Wort	**G**	D. Constipation
Feverfew	**C**	E. URI's
Aloe Vera	**D**	F. Insomnia
Echinacea	**E**	G. Depression
Chamomile	**A**	H. Weight loss

5. When considering use of herbs, vitamins, minerals, and dietary supplements in children, what **cautions** should you investigate and counsel parents about? Purity, reliability, effectiveness, safety/toxicities, interactions, metabolism in kids with underlying disorders, cost.

6. In the study of **CAM use at Madigan**, which therapies were reported by families to be "very helpful"? Was immunization status associated with use of CAM?
– Special diets, melatonin, mega-doses of vitamins and minerals, and massage therapies.
– No apparent association with immunization status. CAM used in 23% of their study sample; whereas immunizations were reported as UTD in 94%.

7. Do you **ask *all* your patients** about CAM use? How do you counsel them, if at all?
* ***Discussion question***—see final table in UpToDate review article.
* Key point from research article is that "Parents continue to seek guidance from their pediatricians in [the use of CAM]. Pediatricians should inquire about CAM use and be prepared to provide guidance on this topic, especially among those with greater likelihood of CAM use".

CAM EBM Round Table

Imagine that the parents of one of your healthy continuity patients ask you about starting a particular CAM modality for their child. How might you advise them?

(1) Select 1 CAM therapy or provider-type.

(2) Perform literature search to evaluate its efficacy & safety.

(3) Consider the questions below when evaluating the literature and advising your family:

Do parents elect to abandon effective care when the child's condition is serious or life-threatening?
Courts are likely to respect parental choices that are supported by some medical authority and that present reasonable alternatives as long as the child's life is not in danger and conventional care is not imminently necessary. The child's condition should be monitored so that conventional interventions can be used if necessary.
Will the use of complementary and alternative medicine (CAM) therapy otherwise divert the child from imminently necessary conventional treatment?
If not, a "time-limited" trial of the proposed approach may be appropriate[1,2], provided that the child can be monitored conventionally and conventional therapy can be continued as appropriate[3,4].
Are the CAM therapies that have been selected known to be unsafe or ineffective?
The medical evidence can be categorized as follows, with increasing risk of liability[3]:
1) Medical evidence supports efficacy and safety—the therapy can be **recommended**; efficacy should be monitored.
2) Medical evidence supports safety, but evidence regarding efficacy is inconclusive—the therapy can be **tolerated**; efficacy should be monitored.
3) Medical evidence supports efficacy, but evidence regarding safety is inconclusive—the therapy should be **monitored closely or discouraged**.
4) Medical evidence indicates serious risk and inefficacy—the therapy should be **avoided and actively discouraged**.
The clinician caring for the patient should continue to monitor the patient and the literature for new information that would change the category.
Have the proper parties consented to the use of the CAM therapy?
Informed consent is particularly important when informing the patient about CAM therapies may affect the patient's choice of treatment[5].
Is the risk-benefit ratio of the proposed CAM therapy acceptable to a reasonable, similarly situated clinician, and does the therapy have at least minority acceptance or support in the medical literature?

(4) Would your advice change if your patient had an underlying condition (e.g. chronic pain syndrome; neuro-developmental disability; cancer)?