

BACKGROUND

NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE

Mind-Body Medicine: An Overview

About This Series

“Mind-Body Medicine: An Overview” is one of five background papers on the major areas of complementary and alternative medicine (CAM). The series was prepared as part of the National Center for Complementary and Alternative Medicine’s (NCCAM’s) strategic planning efforts for the years 2005 to 2009. These brief reports should not be viewed as comprehensive or definitive reviews. Rather, they are intended to provide a sense of the overarching research challenges and opportunities in particular CAM approaches. For further information on any of the therapies in this paper, contact the NCCAM Clearinghouse (see “For More Information”).

“I would rather know the person who has the disease than know the disease the person has.”

Hippocrates

Introduction

Mind-body medicine focuses on the interactions among the brain, mind, body, and behavior, and the powerful ways in which emotional, mental, social, spiritual, and behavioral factors can directly affect health. It regards as fundamental an approach that respects and enhances each person’s capacity for self-knowledge and self-care, and it emphasizes techniques that are grounded in this approach.

Definition of Scope of Field

Mind-body medicine typically focuses on intervention strategies that are thought to promote health, such as relaxation, hypnosis, visual imagery, meditation, yoga, biofeedback, tai chi, qi gong, cognitive-behavioral therapies, group support, autogenic training, and spirituality.* The field views illness as an opportunity for personal growth and transformation, and health care providers as catalysts and guides in this process.

Mind-body interventions constitute a major portion of the overall use of CAM by the public. In 2002, five relaxation techniques and imagery, biofeedback, and



* Certain mind-body intervention strategies listed here, such as group support for cancer survivors, are well integrated into conventional care and, while still considered mind-body interventions, are not considered to be complementary and alternative medicine.

hypnosis, taken together, were used by more than 30 percent of the adult U.S. population. Prayer was used by more than 50 percent of the population.¹

Background

The concept that the mind is important in the treatment of illness is integral to the healing approaches of traditional Chinese and Ayurvedic medicine, dating back more than 2,000 years. It was also noted by Hippocrates, who recognized the moral and spiritual aspects of healing, and believed that treatment could occur only with consideration of attitude, environmental influences, and natural remedies (ca. 400 B.C.). While this integrated approach was maintained in traditional healing systems in the East, developments in the Western world by the 16th and 17th centuries led to a separation of human spiritual or emotional dimensions from the physical body. This separation began with the redirection of science, during the Renaissance and Enlightenment eras, to the purpose of enhancing humankind's control over nature. Technological advances (e.g., microscopy, the stethoscope, the blood pressure cuff, and refined surgical techniques) demonstrated a cellular world that seemed far apart from the world of belief and emotion. The discovery of bacteria and, later, antibiotics further dispelled the notion of belief influencing health. Fixing or curing an illness became a matter of science (i.e., technology) and took precedence over, not a place beside, healing of the soul. As medicine separated the mind and the body, scientists of the mind (neurologists) formulated concepts, such as the unconscious, emotional impulses, and cognitive delusions, that solidified the perception that diseases of the mind were not "real," that is, not based in physiology and biochemistry.

In the 1920s, Walter Cannon's work revealed the direct relationship between stress and neuroendocrine responses in animals.² Coining the phrase "fight or flight," Cannon described the primitive reflexes of sympathetic and adrenal activation in response to perceived danger and other environmental pressures (e.g., cold, heat). Hans Selye further defined the deleterious effects of stress and distress on health.³ At the same time, technological advances in medicine that could identify specific pathological changes, and new discoveries in pharmaceuticals, were occurring at a very rapid pace. The disease-based model, the search for a specific pathology, and the identification of external cures were paramount, even in psychiatry.

During World War II, the importance of belief reentered the web of health care. On the beaches of Anzio, morphine for the wounded soldiers was in short supply, and Henry Beecher, M.D., discovered that much of the pain could be controlled by saline injections. He coined the term "placebo effect," and his subsequent research showed that up to 35 percent of a therapeutic response to any medical treatment could be the result of belief.⁴ Investigation into the placebo effect and debate about it are ongoing.

Since the 1960s, mind-body interactions have become an extensively researched field. The evidence for benefits for certain indications from biofeedback, cognitive-behavioral interventions, and hypnosis is quite good, while there is emerging evidence regarding their physiological effects. Less research supports the use of CAM approaches like meditation and yoga. The following is a summary of relevant studies.

Mind-Body Interventions and Disease Outcomes

Over the past 20 years, mind-body medicine has provided considerable evidence that psychological factors can play a substantive role in the development and progression of coronary artery disease. There is evidence that mind-body interventions can be effective in the treatment of coronary artery disease, enhancing the effect of standard cardiac rehabilitation in reducing all-cause mortality and cardiac event recurrences for up to 2 years.⁵

Mind-body interventions have also been applied to various types of pain. Clinical trials indicate that these interventions may be a particularly effective adjunct in the management of arthritis, with reductions in pain maintained for up to 4 years and reductions in the number of physician visits.⁶ When applied to more general acute and chronic pain management, headache, and low-back pain, mind-body interventions show some evidence of effects, although results vary based on the patient population and type of intervention studied.⁷

Evidence from multiple studies with various types of cancer patients suggests that mind-body interventions can improve mood, quality of life, and coping, as well as ameliorate disease- and treatment-related symptoms, such as chemotherapy-induced nausea, vomiting, and pain.⁸ Some studies have suggested that mind-body interventions can alter various immune parameters, but it is unclear whether these alterations are of sufficient magnitude to have an impact on disease progression or prognosis.^{9,10}

Mind-Body Influences on Immunity

There is considerable evidence that emotional traits, both negative and positive, influence people's susceptibility to infection. Following systematic exposure to a respiratory virus in the laboratory, individuals who report higher levels of stress or negative moods have been shown to develop more severe illness than those who report less stress or more positive moods.¹¹ Recent studies suggest that the tendency to report positive, as opposed to negative, emotions may be associated with greater resistance to objectively verified colds. These laboratory studies are supported by longitudinal studies pointing to associations between psychological or emotional traits and the incidence of respiratory infections.¹²

Meditation and Imaging

Meditation, one of the most common mind-body interventions, is a conscious mental process that induces a set of integrated physiological changes termed the relaxation response. Functional magnetic resonance imaging (fMRI) has been used to identify and characterize the brain regions that are active during meditation. This research suggests that various parts of the brain known to be involved in attention and in the control of the autonomic nervous system are activated, providing a neurochemical and anatomical basis for the effects of meditation on various physiological activities.¹³ Recent studies involving imaging are advancing the understanding of mind-body mechanisms. For example, meditation has been shown in one study to produce significant increases in left-sided anterior brain activity, which is associated with positive emotional states. Moreover, in this same study, meditation was associated with increases in antibody titers to

influenza vaccine, suggesting potential linkages among meditation, positive emotional states, localized brain responses, and improved immune function.¹⁴

Physiology of Expectancy (Placebo Response)

Placebo effects are believed to be mediated by both cognitive and conditioning mechanisms. Until recently, little was known about the role of these mechanisms in different circumstances. Now, research has shown that placebo responses are mediated by conditioning when unconscious physiological functions such as hormonal secretion are involved, whereas they are mediated by expectation when conscious physiological processes such as pain and motor performance come into play, even though a conditioning procedure is carried out.

Positron emission tomography (PET) scanning of the brain is providing evidence of the release of the endogenous neurotransmitter dopamine in the brain of Parkinson's disease patients in response to placebo.¹⁵ Evidence indicates that the placebo effect in these patients is powerful and is mediated through activation of the nigrostriatal dopamine system, the system that is damaged in Parkinson's disease. This result suggests that the placebo response involves the secretion of dopamine, which is known to be important in a number of other reinforcing and rewarding conditions, and that there may be mind-body strategies that could be used in patients with Parkinson's disease in lieu of or in addition to treatment with dopamine-releasing drugs.

Stress and Wound Healing

Individual differences in wound healing have long been recognized. Clinical observation has suggested that negative mood or stress is associated with slow wound healing. Basic mind-body research is now confirming this observation. Matrix metalloproteinases (MMPs) and the tissue inhibitors of metalloproteinases (TIMPs), whose expression can be controlled by cytokines, play a role in wound healing.¹⁶ Using a blister chamber wound model on human forearm skin exposed to ultraviolet light, researchers have demonstrated that stress or a change in mood is sufficient to modulate MMP and TIMP expression and, presumably, wound healing.¹⁷ Activation of the hypothalamic-pituitary-adrenal (HPA) and sympathetic-adrenal medullary (SAM) systems can modulate levels of MMPs, providing a physiological link among mood, stress, hormones, and wound healing. This line of basic research suggests that activation of the HPA and SAM axes, even in individuals within the normal range of depressive symptoms, could alter MMP levels and change the course of wound healing in blister wounds.

Surgical Preparation

Mind-body interventions are being tested to determine whether they can help prepare patients for the stress associated with surgery. Initial randomized controlled trials—in which some patients received audiotapes with mind-body techniques (guided imagery, music, and instructions for improved outcomes) and some patients received control tapes—found that subjects receiving the mind-body intervention recovered more quickly and spent fewer days in the hospital.¹⁸

Behavioral interventions have been shown to be an efficient means of reducing discomfort and adverse effects during percutaneous vascular and renal procedures. Pain increased linearly with

procedure time in a control group and in a group practicing structured attention, but remained flat in a group practicing a self-hypnosis technique. The self-administration of analgesic drugs was significantly higher in the control group than in the attention and hypnosis groups. Hypnosis also improved hemodynamic stability.¹⁹

Conclusion

Evidence from randomized controlled trials and, in many cases, systematic reviews of the literature, suggest that:

- Mechanisms may exist by which the brain and central nervous system influence immune, endocrine, and autonomic functioning, which is known to have an impact on health.
- Multicomponent mind-body interventions that include some combination of stress management, coping skills training, cognitive-behavioral interventions, and relaxation therapy may be appropriate adjunctive treatments for coronary artery disease and certain pain-related disorders, such as arthritis.
- Multimodal mind-body approaches, such as cognitive-behavioral therapy, particularly when combined with an educational/informational component, can be effective adjuncts in the management of a variety of chronic conditions.
- An array of mind-body therapies (e.g., imagery, hypnosis, relaxation), when employed presurgically, may improve recovery time and reduce pain following surgical procedures.
- Neurochemical and anatomical bases may exist for some of the effects of mind-body approaches.

Mind-body approaches have potential benefits and advantages. In particular, the physical and emotional risks of using these interventions are minimal. Moreover, once tested and standardized, most mind-body interventions can be taught easily. Finally, future research focusing on basic mind-body mechanisms and individual differences in responses is likely to yield new insights that may enhance the effectiveness and individual tailoring of mind-body interventions. In the meantime, there is considerable evidence that mind-body interventions, even as they are being studied today, have positive effects on psychological functioning and quality of life, and may be particularly helpful for patients coping with chronic illness and in need of palliative care.

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For More Information

NCCAM Clearinghouse

The NCCAM Clearinghouse provides information on CAM and on NCCAM, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

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