

## Course Objectives

The goal of this program is to inform nurses about the science related to the practice of meditation and its clinical application. After studying the information presented here, you will be able to:

- Describe two techniques of meditation.
  - Identify research studies that support the use of meditation in nursing.
  - Discuss three diseases, conditions, or symptoms shown to improve with the use of meditation.
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The nurse practitioner looked at her patient and said, “Mrs. James, your physical symptoms are being caused by stress. One of the ways to reduce stress and think more clearly is to meditate.”

Just what does meditation mean? It can mean many things to many people. But no matter what the meditation style or technique, during meditation people sit quietly, witnessing internal thoughts and external stimuli without getting caught up in them. Some of the practice forms are ancient, and they come from numerous sources.

Modern science has developed sophisticated tools to explore meditative practice for clues about how it affects our body and brain. The findings shed new light on the power of meditation to make a measurable difference in our experience of the world. A wide variety of studies examining different approaches to meditation show that we can exercise some degree of control over things we didn't think we could change. These scientific studies show that new possibilities for self-healing may be possible through meditation.

Concentration practices found in Transcendental Meditation and mindfulness meditation are perhaps the best-known meditation techniques. TM is a technique derived from Hindu traditions that promotes deep relaxation through the use of a mantra. A mantra is a sacred word or sound that is used to focus attention or concentration. Mindfulness meditation uses a process of intentionally paying attention to what is happening in the present moment, both internally and externally, without being distracted by what has already happened or what may happen. Mindfulness meditation trains the participant to be an observer without passing judgment.

The relaxation response described by Herbert Benson, MD — the author of the 1970s best seller *The Relaxation Response* and a pioneer in studying the effects of relaxation and meditation techniques — cites four basic elements common to eliciting such a response: a quiet environment, a mental device like a word, a passive attitude, and a comfortable posture.<sup>1,2</sup> Benson's framework has been established as the “relaxation response” that produces the opposite of the fight-or-flight response.<sup>3</sup> The response includes decreases in oxygen consumption; CO<sub>2</sub> elimination; respiratory rate and volume; heart rate; blood pressure, especially in hypertensive people; and muscle tension. This relaxation response, or relaxation response meditation, has been used in a wide variety of health care settings to treat hypertension and anxiety.<sup>4,5</sup> Because of its physiological benefits, relaxation response meditation is used in most stress-reduction programs.

While other relaxation methods such as prayer, visualization, guided imagery, and hypnosis help people work through stressful issues, they are not categorized as meditation. That is because they keep the client focused on the body, mind, and senses. Meditation, in contrast, allows the client to quiet the mind to ultimately go beyond it. This can be achieved only without engaging the senses — sight, hearing, touch, smell, and taste — and thoughts.

About 12% of U.S. adults use deep breathing exercises and 8% use meditation as complementary to their health care, according to a National Institutes of Health (NIH) survey. These numbers are higher than those for yoga and massage therapy, at 5% each.<sup>6</sup> Relaxation and meditation have been shown to be beneficial in the treatment of many diseases as they improve psychological and physical health. As complementary modalities, including meditation, gain more acceptance, nurses and other health care providers need to be informed about their uses and application to clinical practice.

## Ancient origins

Today's meditation techniques have their origins in ancient spiritual and healing practices, mostly from Asian religions, particularly those of India, China, and Japan. But similar techniques can be found in many other cultures around the world and throughout history. These cultures viewed the mind and the body as inseparable, and meditation was the way to access the mind-body-spiritual matrix, allowing for greater awareness.<sup>1</sup> Meditation has been traditional in the East, and it became more accessible to the West in the 1960s within the context of science. Researchers began recording changes in physical functions — such as the production of stress hormones and changes in blood pressure, heart rate, and respiratory function — that occur with meditation.

Although Benson's description of a relaxation response was convenient as an initial explanation for what happens in the meditative state, later

work showed that what was happening physiologically was much more complex than a reduction in heart and respiratory rate. By the 1990s, meditation was becoming accepted as part of Western medicine, especially through the stress-reduction programs in health care facilities. One well-known example is the mindfulness programs organized by Jon Kabat-Zinn, PhD, author, professor, and stress-reduction expert at the Stress Reduction Clinic at the University of Massachusetts Medical Center.

## Inside the brain

Using brain research, medical science has found concrete evidence for meditation's effect on the body and the mind. Research has found that mental discipline and meditative practice can change the workings of the brain and allow people to achieve different levels of awareness.<sup>7</sup> Studies on the meditating brain are becoming more sophisticated with advances in brain imaging and other techniques. Imaging advances have led neuroscientists to reject the view that the brain is fixed early in life and does not change in adulthood, replacing it with a belief that the brain can adapt and change, a concept called neuroplasticity.

Some of the first research studies mapping the brain during meditation have used electroencephalography, recording the electrical activity of the brain during meditation using an EEG monitor. Probes are placed on the scalp, and the changes in electrical activity occur as brain waves. Different regions of the brain are recorded and compared. Such studies on meditation usually report increased alpha waves, the waves that are extensive in anterior channels in the central and frontal regions of the brain and are associated with relaxation of the entire nervous system.<sup>8,9</sup> Theta waves have also been recorded during meditation. Theta waves are dominant in the frontal region, indicating a deeper state of mental silence and pleasant experiences.<sup>10,11</sup> Because these waves occur mostly in the part of the brain occupied by the limbic system — the home of the emotional response — they are believed to activate our emotions. During deep meditation, experienced subjects sometimes enter into delta waves, associated with dreamless sleep.<sup>8</sup>

Through EEG monitoring during meditation, scientists have discovered increased correlated activity between the two hemispheres with respect to the distribution of alpha activity between the four anatomically distinct regions of the brain — left, right, anterior, and posterior — or what is termed brain synchronicity. The research outcome linked hemispheric coherence (the correlated activity) to clear and pure thinking and creativity.<sup>12,13</sup> This provides evidence that meditation can train the mind to influence and change the structure and connectivity of the brain.<sup>14</sup>

In the past 16 years neuroimaging techniques — such as positron emission tomography (PET), single photon emission computed tomography (SPECT), and functional magnetic resonance imaging (fMRI) — have been used to explore meditation's effects on the brain. These techniques all measure cerebral blood flow and therefore record the metabolic activity in the brain. Because of their expense, these techniques have not been used as extensively as EEG monitoring. The first published study using neuroimaging to examine the meditative state recorded the metabolic state using glucose as the marker.<sup>15</sup> Later a study measuring oxygen metabolism among meditators proved to be more sensitive in detecting the increased frontal lobe activity.<sup>16</sup>

Recent studies involving fMRI imaging and meditation are advancing the understanding of mind-body mechanisms.<sup>17</sup> With fMRI it is possible to get a reading on brain activity in just seconds. The research involving fMRI 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. Studies have shown signal increases in the areas that govern concentration, mood, and memory, namely dorsolateral prefrontal and parietal cortices, hippocampus/parahippocampus, temporal lobe, pregenual anterior cingulate cortex, striatum, and pre- and postcentral gyri.<sup>17</sup> Data have shown a thicker cerebral cortex (the area playing a critical role in decision making) in people who meditated 40 minutes a day compared with those who did not.<sup>18</sup> This research suggests that daily meditation can alter the physical structure of the brain and may have positive applications related to aging, such as enhanced memory. Meditation has been shown to produce significant increases in left-sided anterior brain activity, which is associated with positive emotional states. Neuronal firings in the amygdala have been associated with positive emotions and have led researchers to discover and measure the connection between the brain's lighted activity centers and mood.<sup>19</sup> Not only did this map brain activity, but it also took the concept of neuroplasticity a step further by showing that meditation may change the mapping of brain circuitry.

## Mind over matter

Many studies have shown the benefits of meditation on various disorders and diseases. Examples include —

**Affective disorders:** Studies have examined the effects of meditation-based practices on the treatment of depression and anxiety. In one study, patients diagnosed with general anxiety disorder with or without acrophobia showed a reduction in symptoms after a stress-reduction program based on mindfulness meditation.<sup>20</sup> Patients who participated in a three-year follow-up study using mindfulness meditation techniques — which included body scanning (a practice of turning one's attention to various areas of the body to de-stress), sitting meditation, and mindful hatha yoga — showed a significant improvement in the number of occurrences and severity of anxiety symptoms.<sup>21</sup>

**Sleep disturbances:** A common problem for patients with cancer, sleep disturbance has remained largely unaddressed in the clinical intervention literature. In a study examining the effects of an eight-week program of mindfulness-based stress-reduction on a sample of 63 outpatients with cancer, clinical benefits included improved sleep and mood and reduced stress and fatigue. The study findings suggest that programs based on meditation may improve quality of life in patients with cancer.<sup>22</sup>

**Chronic pain:** There's been strong evidence that relaxation practices are useful for pain. Mindfulness meditation was the basis for a behavioral

program in self-regulation for patients experiencing chronic low-back, neck, and shoulder pain and headache. The 10-week study showed an improvement in patients while traditional medicine had not.<sup>23</sup> Another examination of mindfulness meditation in a 10-week study of 90 patients with chronic pain showed positive results in measures of pain, negative body image, symptoms, mood disturbance, and anxiety and depression as compared with those of patients who were given traditional treatment protocols.<sup>24</sup>

**Fibromyalgia:** The chronic illness fibromyalgia is characterized by widespread pain, fatigue, sleep disturbance, and resistance to treatment. Seventy-seven patients meeting the 1990 criteria of the American College of Rheumatology for fibromyalgia took part in a 10-week group outpatient program to evaluate the effectiveness of a meditation-based stress-reduction program on their illness. The program proved effective, with patients experiencing increased pain relief and global well-being and reduced fatigue.<sup>25</sup>

**Immunity:** A study was done comparing 10 male runners who practiced meditation for a mean of 12 years to a control group of runners who did not practice meditation. Blood samples were taken before, immediately after, and two hours after a race. The study found that runners practicing meditation had lower lymphocyte counts at rest before the race. Just after the race, both groups had more than doubled their white blood cell counts. The study suggests that the long-term practice of meditation may influence absolute lymphocyte counts at rest.<sup>26</sup>

Recent studies involving imaging are advancing the understanding of mind-body mechanisms. One study showed that meditation produces significant increases in left-sided anterior brain activity, which is associated with positive emotional states. Moreover, in the same study, meditation was associated with increases in antibody titers to influenza vaccine, suggesting possible links between meditation, positive emotional states, localized brain responses, and improved immune function.<sup>26</sup>

**Stress:** Scientists now understand that under stress, the nervous system activates the fight-or-flight response. The activity of the sympathetic portion of the nervous system increases, causing an increased heartbeat, increased respiratory rate, elevated blood pressure, and increased oxygen consumption. This fight-or-flight response has an important survival function: It helps an organism to run quickly to escape an attack or to fight off an attacker. But if the fight-or-flight response is activated repeatedly, as often happens among people in modern societies, the effects are harmful. Many researchers believe that the epidemic of hypertension and heart disease in the Western world is a direct result of this stress. Through meditation, the body gains a state of deep relaxation that diminishes accumulated stress and fatigue.<sup>2</sup>

The meditation state is described as a very relaxed but very alert state. Increased cardiac output, increased cerebral blood flow, reduction or cessation of CO<sub>2</sub> generation by muscle, a fivefold increase in arginine vasopressin (AVP) elevation, and EEG synchrony play critical roles in this type of mindful but relaxed state. Such changes support the relevance of meditation to physiology in reducing stress.<sup>14</sup>

## **The contemplative connection**

Health care practitioners and patients use meditation in a variety of settings. A nurse's relationship with patients can influence the outcome of clinical problems as well as the satisfaction of provider and patient. A nurse's physical, emotional, and mental health can influence the nurse-patient relationship. A study showed that nurses practicing hospice care benefited from meditation practice and that patients in general benefited when their nurses practiced meditation.<sup>27</sup> Mindfulness training has been shown useful in helping patients deal with pain and depression.<sup>28</sup> And meditation and relaxation techniques are part of a program to help patients reverse heart disease.<sup>29</sup>

Meditation is being incorporated into many clinical practices. By reducing stress and developing concentration, meditation not only can increase concentration, but also may help prevent job burnout.<sup>30</sup> The result is a better relationship with patients and perhaps a method for self-healing.

Meditation is contraindicated in certain conditions and situations. A rule of thumb is that meditation should be used with caution if concerns exist about a patient's reality testing, ego boundaries, lack of empathy, or rigid overcontrol. For example, when treating a schizophrenic patient with active psychotic symptoms, it may be inadvisable to include meditation as part of treatment as reality testing may be impaired.<sup>31</sup>

Similarly, meditation may be inadvisable in treating some personality disorders that involve a lack of empathy (e.g., those listed in cluster B in the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition: antisocial, borderline, histrionic, or narcissistic). In such cases, meditation could reinforce the preoccupation with the self that characterizes the disorders.<sup>32</sup>

Meditation is becoming more accessible. The National Center for Complementary and Alternative Medicine (NCCAM) considers meditation a "mind-body method," a category of complementary and alternative medicine that includes interventions that employ a variety of techniques designed to facilitate the mind's capacity to affect bodily function and symptoms. Research on meditation and mind-body interventions continues through the NIH. With the growing concern about stress-related illness, there may be room for meditation programs as a component of protocols.

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