‘Meditation: The Future Medication’

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Introduction:

Complementary medicine is a seven billion dollar business in the U.S. and meditation is one of the top 10 alternative therapies used by its population. The National Center for Complementary and Alternate Medicine reports that 8% of Americans use meditation as a health tool.

Meditation can be used as a technique or it can be a meditative life style. Medicine and meditation come from same root word ‘medere’ – making whole. Even Healing and Holy have the same origin.

Meditation is found in all cultures, religions and regions, both West and East. The standard dictionary definition is ‘thinking deeply or spiritually about a subject.’ Yet it is different from ordinary cognitive processes – being more than relaxation, concentration, contemplation or posturing. It is a technique or method of freeing one’s mind from emotions and other distractions to allow deeper insights into ourselves and the world around us. The ultimate goal is illumination, and while this may not be fully achieved, along the way peace and relaxation, quietening of emotions, insights and perspectives may be accomplished.

The mind during meditation connects us with our inner selves, the ‘Master Within’. Meditation has taken on a very esoteric meaning but is just a disciplined way of reflecting on self, one’s relationship with the world and God, the present and future path of life and the meaning and higher purpose in life. The technique and range differs from practices of concentration, awareness or altered states of consciousness. It may be focused (using a mantra) or non-directional. Meditation may be practiced for a short period or as a way of Being (with a particular life style). It is most effective when practiced with a sense of gratitude while letting go of thoughts, emotions and judgements. It may be practices alone or in a group and may be accompanied by incense, music, special colours or light.

Many practices of meditation may not change, or even address, the belief system of the participant although for some, holding a belief system may be required for the practice of meditation. Similarly, spirituality may be a component of some meditational practices, although certain meditation techniques may be practiced without any underlying spiritual belief system.

Well-known meditations include Raj Yoga, Mantra, Mindfulness, Vipassana, Transcendental Meditation, Kundalini, Sudershan Kriya, Kirtan Kriya, Sahaj Samadhi, Osho’s Meditations, Silence, and Pranayama.

Principles of meditation involve relaxation, oxygenation, imagery, visualization, concentration, self-hypnosis, cognitive restructuring, peak experiences and secretion of endorphins.

How does meditation work?

Meditation raises energy levels and strengthens the immune system to fight or ward off illnesses. It induces the relaxation response and associated psychophysiological processes. It acts on the Karmic/Sanskar levels to neutralize the causes and effects of illness. It enhances the positivity of the person about self and healing, thus setting off chain reactions of healing. It induces a connection to the source (God) to draw the power to heal. It stimulates life style changes, which are useful for self-healing and allows external healing forces to act better. If practiced regularly for 20-45 minutes once or twice daily, all meditations, to various degrees, produce:

- Decreased heart rate and blood pressure.
- Increased blood flow to brain and heart.
- Positive changes in EEG, EMG and skin resistance.
- Improved sleep and digestion.
- Less irritability, anxiety and depression on rating scales.
- Less frequency and duration of illnesses.
- Decreased accidents and days lost at work.
- Improved interpersonal relationships.
- Improved scores on self-actualization inventories, and emotional and spiritual quotients.

Benefits of meditation at body-mind level:

These are found in allergies, asthma, anxiety, acid-peptic disease, cancer, coronary disease, depression (neurotic), diabetes, hypertension, irritable bowel syndrome, migraine, substance abuse (tobacco & alcohol also), tension headache, healing and enhanced recovery from all diseases.

Relative Contra-Indications include: psychosis, severe depression, confusional states, extreme anxiety and the dementias.

Evidence of Efficacy: A recent substantive review has shown evidence of benefit from many therapeutic techniques like Yoga, Meditation, Prayers and Spirituality-based interventions (U.S. Department of Health (2007). The review consists of 813 studies (547 intervention studies and 266 observational/analytical studies). This is out of 11200 references which were searched and those meeting rigorous criteria selected. The highest have been in healthy populations (553 comprising 196 intervention and 257 observational, analytical studies). The second highest is

for individuals with mental health disorders (66 studies, 65 interventional and 1 observational).

The populations studied include those with physiological illnesses like hypertension, CVA, CAD, HIV, infections, dental problems, psoriasis, obesity, diabetes, irritable bowel syndrome, infertility, menopause, PMS, epilepsy, chronic fatigue, MS, muscular dystrophy, pain syndromes, osteoporosis, developmental disabilities, migraine and tension headache, COPD, asthma, chronic bronchitis and tinnitus.

Healthy populations included college and school students, the elderly, healthy volunteers, army, industrial workers, athletes, prison inmates etc.

The mental health disorders studied include: insomnia, anxiety, binge eating, burnout, anger, depression, mood disorders, 'neurosis', OCD, personality disorders, PTSD, psychosis, substance abuse, early cognitive deficits and parents of children with behaviour problems.

Other Studies:

- Pooled search of 82 studies, of which 20 were RCTs (958 subjects - 397 clients, 561 controls).
- No reported serious adverse effects;
- strong efficacy for epilepsy, PMS, menopause;
- benefit for mood and anxiety disorders; auto immune illnesses and emotional disturbance in neoplastic disease. (Aries et al; 2006)

Outcomes measured include: psychosocial, clinical, neuropsychological, neurophysiologic, neurochemical, neurobiological and health care utilization.

Established correlates of meditation: neurobiological, neurochemical, neuropsychological, neurophysiological and neuroplastic.

Different meditative techniques may produce different and differential neurobiological effects, with corresponding subjective feelings and clinical changes.

Neurobiological explorations into Spirituality and Meditation:

There is a paucity of evidence regarding the neural correlates of spiritual practices and most studies that have explored spirituality have concentrated on meditative practices. They include Positron Emission Tomography (PET) studies on Yoga, Tantric Yoga and Yoga Nidra; Magnetic Resonance Imaging (MRI) on

Kundalini Yoga and Single Photon Emission Computerized Tomography (SPECT) on Tibetan meditation (Mohandas, 2008).

Neurobiology:

- Regional maps of brain blood flow/perfusion differ between meditation, slow-wave sleep and wakefulness. PET, SPECT and fMRI allow examination of changes in regional blood flow, metabolism or receptor (sites of neurochemical and drug actions) activation in the brain in response to various tasks.
- Some studies have compared meditation tasks with restful wakefulness. Test results at baseline are mathematically subtracted from the meditative state. Such studies thus show changes in blood flow or metabolism that are related to the task.
- Most types of meditation, which involve an initial focusing of attention, are associated with increased regional blood flow or glucose metabolism in the prefrontal and cingulate cortex, areas that are important in selection of a mental task.
- During visualization, regional blood flow increases in the visual cortex and visual association areas in the occipital lobes. In contemplation of 'self' the parietal lobes on both sides are activated.

Thus, meditation appears to begin by activating the prefrontal and cingulate cortex, associated with the will or intent to clear one's mind of thoughts or to focus on an object. However, studies on the guided type of meditation (externally guided word generation show a decrease in frontal activity when compared to volitional (internal) word generation. Thus, prefrontal and cingulate activation may be associated with the volitional aspects of meditation.

The studies point to prefrontal activation, transient hypofrontality, increased frontal lobe and decreased parietal lobe activity and also to a deafferentation of the posterior superior parietal lobule (PSPL). The functional deafferentation means a decrease in the arrival of distracting stimuli to the striate cortex and PSPL, enhancing the sense of focus during meditation. This deafferentation results in an altered perception of self-experience during spiritual or meditative practices. The PSPL deafferentation is supported by three neuroimaging studies, all of which showed decreased activity in the region during intense meditation (Newberg and Iversen, 2003).

Some studies during meditation show increased activity in the hippocampus or inner aspect of the temporal lobe. The hippocampus is part of the limbic system and has close functional connections with the hypothalamus and autonomic nervous system. Thus, during meditative practice, there is enhanced opportunity for the autonomic nervous system to integrate with those aforementioned parts of the brain that show increased activation without the constraints imposed by ego-directed activity.

There is activation and increased activity of the hippocampus and amygdala as well as limbic stimulation in experiences similar to meditation. FMRI studies of Kundalini Yoga support this notion of increased activity of the hippocampus and amygdala in meditation (Newberg and Iversen, 2003). Stimulation of the right lateral amygdala results in stimulation of the ventromedial hypothalamus with stimulation of the peripheral parasympathetic system. The increased parasympathetic activity is associated with a subjective sensation, first of relaxation and later, a more profound sense of quiescence. Activation of parasympathetic system results in decreased heart and respiratory rate. All these physiological responses are observed during meditation.

Neurochemical changes:

- When the breathing and heart rates slow down, as they do in meditation, there is decreased activity of a centre in the brainstem known as the locus ceruleus.
- Relatively greater activity of the parasympathetic than sympathetic nervous system in meditation leads to decreased production by the adrenal medulla of the catecholamines, epinephrine and norepinephrine.
- There is evidence for increased brain serotonin during meditation. Serotonin is important in regulating mood, as shown by the antidepressant effect of the antidepressants known as specific serotonin re-uptake inhibitors or SSRIs, resulting in increased serotonin activity in the brain. In addition to elevating mood, serotonin can stimulate increased production of acetylcholine, involved in memory mechanisms and attention.
- There is decreased noradrenaline, a finding seen in urine and plasma studies of subjects practicing meditation.
- The urine and plasma studies show decreased cortisol level during meditation.

EEG and Meditation:

Meditation has been reported to be ‘the fourth state’ (apart from dreaming, sleep and wakefulness) with mainly increased alpha and then theta rhythms, and increased alpha coherence (with increased blood flow and melatonin being observed in mediation, unlike sleep) (Cahn & Polich, 2006).

There is also reporting of increased cortical coherence and left right brain interaction. Additionally, there is increased gamma wave activity during the practice of ‘compassion’ technique in meditation.

EEG studies during meditation have revealed continued, awake-and-aware type activity in the mid and posterior part of the brain, while the frontal lobes show greatly modified, simplified activity.

Evoked Potentials and Meditation:

Meditation sometimes produces altered amplitudes, with practitioners seeming to demonstrate decreased amplitude and latency for sensory EPs and with mindfulness inducing a decrease in habituation.

Meditation and Neuroplasticity:

A recent MRI study was conducted to assess the cortical thickness in 20 participants with extensive 'insight meditation' experience, involving focused attention to internal experiences. The participants were typical Western meditation practitioners who incorporated their meditation practices into their careers and family life. The study showed that brain regions associated with attention, interoception and sensory processing like the PFC and right anterior insula were thicker in meditation practitioners in comparison with matched controls. The prefrontal cortical thickness was most pronounced in older participants, suggesting that meditation probably offsets age-related cortical thinning.

The data provides structural evidence for experience-dependent cortical plasticity associated with meditation practice, suggesting that meditation practices promote neuroplasticity (Lazar et al. 2005).

Meditation and Psychiatric Disorders: Neural Correlates of Anxiety:

Meditation due to the neurochemical changes can produce an anxiolytic effect. The factors decreasing anxiety during meditation are an increased parasympathetic activity, decreased LC firing with decreased noradrenaline, increased GABAergic drive, increased serotonin and decreased levels of the stress hormone cortisol. The increased levels of endorphins and AVP also contribute to the anxiolytic effects of meditation (Newberg and Iversen, 2003).

Depression:

Spiritual practices can have considerable antidepressant effects due to the associated increase in serotonin and dopamine. Additional factors like increased levels of melatonin and AVP contribute to the antidepressant effects. There is an observed increase of β-endorphin, as also NMDAr antagonism during meditation, both of which have antidepressant effects. The decreased level of CRH and cortisol also play an important role in alleviating depression. Thus, via multiple neurochemical changes, spiritual practices can counteract depression (Mohandas, 2008)

Psychosis:

Meditation can induce psychotic states via mechanisms such as increased 5HT 2 receptor activation, increased DMT, increased NAAG and increased dopamine. The mechanisms include the 5HT inhibition of LGB, the hallucinogenic effects of DMT, the dissociative hallucinogenic effects of NAAG and the action of increased dopamine in the temporal lobe. A variety of schizophrenomimetic effects can be seen as a result of these complex neurochemical changes.

Psychological benefits that can help us in our day-to-day lives include:

- Improved concentration and attention, allowing for greater productivity, problem-solving, creativity, learning ability and organization of memory.
- Enhanced self-image.
- Less 'catastrophic reaction' to stressful situations, e.g., in survivors of attempted suicide.
- Better sociability and tolerance.
- Improved mood.
- Improved sleep.
- Improved scores on self-actualization.

Areas of concern:

- Adverse events during Meditation and Yoga with certain types of personality and psychosocial experiences (specially handling silence). These need to be kept in mind while initiating a practice and preferably should be guided by a practitioner who is aware of these aspects.
- Forced implementation of certain ways of living/philosophy on an unsuspecting individual, sometimes leading to emotional abuse/guilt.
- Psychotic reactions (mostly uncovering in susceptible individuals) with certain types of meditative practice.
- Religious conversions/religious philosophy being perpetrated in subtle/gross manner by a leader/group.
- Stoppage of required/appropriate mainstream treatment as experimentation/ due to lack of knowledge.
- Conflicting ideas about causation and possible management of distress/disease leading to worsening of symptoms or lack of proper, holistic treatment.
- Outright exploitation of various types in the name of religion/spirituality during meditative practices.

Implications for Psychiatry:

- Constraints experienced by mental health professionals and resources could be lessened by 'meaningful, appropriate integration' of CAM – based treatments (complementary and alternative medicine).
- Low cost treatment, with continuation for life (if possible/desired) with little or no updating.
- Group dynamics and group practice may economise on resource requirements.
- Combination with therapy as in Mindfulness-Based Cognitive Behaviour Therapy or Spiritually Augmented CBT.
- More research may provide insight into matching of techniques/life styles for different symptoms/ syndromes.
- The techniques/life style could be incorporated into models of preventive psychiatry.
- Meditation used as enhancing one's psychological resources/holistic living/self actualization.
- Meditative state changes may develop into traits, leading to long-term consolidation and prevention of future episodes of anxiety/depression/psychosomatic/stress-mediated and other illnesses.

The Therapists:

- These techniques may be used to improve the mental health of the therapist, especially to prevent burnout.
- Therapists should have experience of the technique, if possible, to be able to best guide the integration.
- Meditation to be used as one of the many ways of 'cleansing the toxic reactions' in the therapeutic processes.
- Need to be in touch with one's own mental health issues and to prevent them from spilling into therapy.
- There need to be studies on the neurobiological correlates of the effects of therapy on therapists, with possible ways of reversing them if maladaptive.

The Clients:

- Meditation techniques are already being used by clients for anxiety, depression, OCD, panic attacks, PTSD, PMS, menopause, substance abuse, tobacco/alcohol abuse, psychosomatic illnesses, insomnia, early cognitive deficits etc.
- A planned, strategic, appropriate combination would reduce costs to the client and service providers and minimize investigations and waiting time, promote 'holistic health' and provide what many clients may want as component of therapy.

- Care givers may need support for their burnout, guilt and failure to understand the meaning of disease, and additionally may benefit from such techniques/life style.

Future needs:

- Strategies to enhance wellness and well-being in healthy population.
- Standardization of therapeutic meditation.
- Dose response of meditation practices to determine effective duration of intervention.
- Development of varieties of meditation to suit different sets of distress and dis-ease.
- Development of specific target organs with subsets of meditative/spiritual practices.
- Seeking co-relations between neurobiological changes in specific illnesses and the meditative practices for reversal of those changes.
- Aiming for person-centred, rather than disease-specific health care.
- Becoming aware of the existing and potential techniques of complementary medicine for liaising with practitioners of 'other systems'.
- Being knowledgeable about the 'spiritual practices and techniques' which could be/are utilized by the clients.
- Learning about (if possible through practice of) the techniques first hand, to see how best a network for delivery could be established.

In conclusion:

Meditation, which has been with humanity for thousands of years and which has stood the test of time, is highly relevant today in the management of myriad illnesses, as well as for research into states of consciousness. The challenge in future will be to see how it can be used both as a stand-alone treatment and in conjunction with other medication. There is every reason to think that its place in 21sts century medicine will not be confined to alternative or complementary healthcare but available as a mainstream treatment.

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