

Highlighting Neuro-Psycho-Physiological Aspects of Yogic Meditation in Respect to Psychological Stress and Anxiety in New Era

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Abstract

We live under stress, anxiety, worry and other preoccupations in contemporary era, and the more technology advances and the more modernity speeds up, the more our preoccupation grows. We therefore seek different approaches to alleviate our worry and pains in such stressful atmosphere. By considering the fact that stress and anxiety are the major problems and subject matters of the new era and also limited options which are in front of the human for the efficient cope with stress and anxiety, meditation can play a major role to overcome them. Multidimensional capabilities of meditation enable us to create new strategies for the regulation, integration and reconciliation of various existential, mental, emotional, physical and behavioral crisis in our life so among many different approaches, generally meditation seems to be an impressive, secure, and cost-effective method which not only decreases tension, anxiety and stress but also promotes mental health and concentration as well as expands self-awareness.

Key words: meditation, anxiety, stress, neurophysiology, psychophysiology

Introduction

Psychological stress occurs when an individual perceives that environmental demands exceed his or her adaptive capacity. Generally continuous stressful events are thought to influence the pathogenesis of physical disease and make the existing problems worse by causing negative affective states as feeling of anxiety and depression, which in turn, exert direct effects on the biological processes or behavioral patterns that exacerbate disease risk. Exposures to chronic stress are considered the most toxic factor because they are most likely to result in long term or permanent change in the emotional, physiological and behavioral responses that influence susceptibility for the commencement of disease^{1,2}. David Barlow defines anxiety as a future-oriented mood state in which one is ready or prepared to attempt to cope

with upcoming negative events³. This is a difference between future and present dangers through which fear and anxiety is distinguished.

In positive psychology, anxiety is described as the mental state that results from a difficult challenge for which the subject has insufficient coping skills⁴. Anxiety is also defined as a subjective unpleasant emotion often accompanied by nervous behavior, somatic complaints, muscular tension, restlessness, fatigue and problem in concentration^{5, 6}. Anxiety can be either a short term state or long term trait. Trait anxiety reflects a stable tendency to respond with state anxiety in anticipation of threatening situations⁷. Anxiety can be appropriate, but when experienced regularly an individual may suffer from anxiety disorder⁴.

Anxiety and Stress According to the Ancient Yogic Text

The trace of anxiety in ancient yogic text refers to mind fluctuations. According to the ancient traditional text of Hatha Yoga Pradipika, Prana (breath) and mind are intricately linked. Fluctuation of one means fluctuation of the other. When either the mind or Prana becomes balanced, the other is steadied⁸. Hatha yoga says control the Prana subsequently the mind will be controlled. When Prana moves, Chitta (the mental stuff) moves, when Prana is without movement, Chitta is without movement. By this (steadiness of Prana) the yogi attains steadiness and should thus restrain the Vayu (air)⁹. Hatha Yoga Pradipika says with the help of breathing exercises individual is able to calm the mind accordingly cope with anxiety. According to the prominent and authentic ancient yogic text of Patanjali Yoga Sutras, yoga is defined as a systematic method for the restriction of the fluctuations of mind. As Patanjali has described, pain and despondency, unsteadiness of the body and improper inspiration and expiration are the accompaniments of the mind destructions. Ashtanga yoga has designed to help the individual for the restriction of the fluctuations of mind which can be assumed as a systematic method for the treatment of stress and anxiety¹⁰.

Literature review

Literature review carried out through the different health related data base resources. Out of near about 3000 recent studies in the field of meditation, only 25 have specifically focused on the different yogic meditation traditions and only two studies were published regarding Anapanasati and Soham meditation but no study has been published on the title of Ajapajapa. Following statements are the extracts of some more outstanding and recent studies related to neurological, physiological, psychological and therapeutic aspects of meditation in which

parameters are mostly based on the concrete and objective methods. Since 2005 Sara Lazar's study which provides the first structural evidence for experience dependent cortical plasticity¹¹, various studies have come to disclose multidimensional mysteries of neuro-structural-functional and physiological features of different meditation techniques. In one study Magneto Encephalography (MEG) was used to investigate the effects of focused attention and open monitoring among the Theravada Buddhist monks who revealed the modulation of the dynamic balance between fronto-parietal and default mode networks in the brain¹². Another study in 2014 shows, significant cortical thickness increment in the right insula and the somatosensory cortex which is coupled with a significant reduction of worry and state anxiety¹³. EEG and respiration based classifier in a trial disclosed that these could be proper viable objective markers for meditation ability¹⁴. 64 channels EEG of 50 participants of various meditation proficiencies was measured in a trial suggests that such a state of meditative conscious awareness, might be different from the higher cognitive and mentally focused states but also from the states of sleep and drowsiness¹⁵. A hypothetical physiological homeostatic response examined in a study indicates that how synchronization of cardiac and respiratory rates during meditation may lead to a homeostatic increase in cellular membrane potentials in neurons and other cells throughout the body¹⁶. One study provides evidence that regular concentrative meditation can improve emotional stability through the recording of physiological responses¹⁷. Electrophysiological changes in response to meditation were observed in a trial, concluded that increasing heart coherence and the accompanying alpha activations or heart-brain synchronicity would help to recover physiological synchrony following a period of homeostatic depletion¹⁸. Healthy novice participants underwent

FMRI during focused breathing meditation, disclosed parietal and prefrontal attention network activation¹⁹

Psychophysiological aspects of meditation

Meditation has been considered a multidisciplinary subject which covers various dimensions of human knowledge as art, literature, philosophy, mysticism, spirituality and religion since ancient times. But what has brought meditation into the gravity center of attention in new era is in fact, scientific, objective and concrete aspects of meditation so that meditation has penetrated into the heart of major contemporary therapeutic and health-related approaches as cognitive-behavior psychotherapy, positive psychology, existential psychotherapy, transpersonal psychology, psychosomatic medicine and also basic and clinical neuroscience, cognitive and meta-cognitive sciences, molecular and biochemical studies, complementary and integrative medicine and philosophy of mind. However the trace of meditation in existential psychotherapy, specifically gestalt therapy of Fritz Perls, goes back to mid-twentieth century but just recently it has captured the core aspect of third wave cognitive-behavior therapy. Nowadays meditation has a unique and outstanding place in positive psychology and mind-body medicine but special features of meditation are not limited only to the numerous psychological schools and approaches.

Neurophysiological aspects of meditation

One of the new scopes which has established a particular realm of studies for meditation is basic and clinical neuroscience. Studies of the neuroscientist, regarding the structural and long term impacts of meditation, on the brain and nervous system has been considered as a revolutionary influence in the promotion of neuro-psycho-physiological imple-

mentation of meditation in health related fields which has also changed the viewpoint of the contemporary man. However since mid-twentieth century, various positive neurophysiological impacts of meditation as changes in the secretion of neurotransmitters and hormones were confirmed but sustainable and long term effects of meditation in the form of neuroplasticity and neurogenesis is a fascinating and newborn field amongst the major meditation studies. It should be reminded that, apart from neuropsychological aspects of meditation, it has a unique place between the numerous other therapeutic methods and strategies in complementary and integrative medicine and naturopathy especially for the treatment of psychosomatic disorders, depression, anxiety, sleep disorders and stress management since the past decades. Although, scientific studies in the different scopes of neuroscience and psychology including; neuropsychology, neuro-cognition and basic and clinical neuroscience in respect of meditation have been started since the past decade but the number of comprehensive and reliable scientific studies regarding yogic meditation is rare and not considerable.

Research on neuro-psycho-physiological aspects of yogic meditation

Despite all the positive results discovered through a plenty of research works which carried out during the recent years regarding neurological, psychological and physiological influences of different styles of meditation and their effectiveness for the treatments of various physical and mental disorders, a systematic review and meta-analysis in 2014 related to the efficacy of meditation on psychological stress, concluded that meditation program can result in small to moderate reduction of multiple negative dimensions of psychological stress, therefore suggested that stronger study designs are needed to determine the effects of meditation

programs in improving the positive dimensions of mental health and stress related behavior²⁰. A review of the controlled research which carried out to clarify the impact of mindfulness based stress reduction in a range of clinical population depicted no reliable effects of Mindfulness Based Stress Reduction (MBSR) on anxiety and depression²¹. Finally a methodological review of meditation concludes that more results can be obtained by expanding the methodological paradigm to encompass multiple domains including: the cultural setting, the life situation of the meditator, details of the particular meditation practice, and the state of consciousness of the meditator (the phenomenology). Inclusion of variables from all these domains will improve the ability to predict psychophysiological variables associated with specific meditation states and thus

explore the mysteries of human consciousness²². Although meditation has a long history in human culture and numerous methods have been labeled as meditation especially in eastern countries and by considering the fact that yoga is one of the main sources of various meditation schools since long time ago and also importance of highlighted studies which investigated multidimensional features of different meditation methods, neuro-psycho-physiological impacts of several yogic meditation techniques, specifically Ajapajapa Yogic Meditation and their therapeutic influences is still less known therefore necessity to carry out a comprehensive well conducted randomized controlled trial to find out the multidimensional impacts of yogic meditation on psychological stress and anxiety is truly felt.

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