National Yoga Week-2015
A Mass Awareness Programme for Health, Happiness and Harmony through Yoga

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Theme
Yoga
For
Middle Aged

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SOUVENIR
ROLE OF YOGA IN NON-COMMUNICABLE DISEASES: A BRIEF REVIEW.

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INTRODUCTION

Yoga as a mode of therapy (yoga chikitsa) has become extremely popular, and a great number of studies and systematic reviews offer scientific evidence of its potential in treating a wide range of psychosomatic conditions. Yoga understands health and well-being as a dynamic continuum of human nature and not merely a 'state' to be reached and maintained. Yoga helps the individual to establish "sukha sthanam", which may be defined as a dynamic sense of physical, mental, and spiritual well-being. Yogamaharishi Dr. Swami Gitananda Giri Guru Maharaj, the visionary founder of Ananda Ashram at the ICYER, Pondicherry (www.icyer.com) and one of the foremost authorities on Yoga in the past century exclaimed lucidly, "Yoga chikitsa is virtually as old as yoga itself, indeed, the return of mind that feels separated from the Universe in which it exists represents the first yoga therapy. Yoga chikitsa could be termed as man's first attempt at unitive understanding of mind-emotions-physical distress and is the oldest wholistic concept and therapy in the world." (1)

To achieve this yogic integration at all levels of our being, it is essential that we take into consideration the all-encompassing multi-dimensional aspects of yoga that include the following: a healthy life-nourishing diet, a healthy and natural environment, a wholistic lifestyle, adequate bodywork through asana, mudra-bandha and kriya, invigorating breath work through pranayama and the cultivation of a healthy thought process through jnana yoga and raja yoga.

The International Association of Yoga Therapists (IAYT), USA has taken this idea into account in defining Yoga therapy as follows (2): "Yoga therapy is the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of yoga." This has been further elaborated by the IAYT in its "Recommended Educational Standards for the Training of Yoga Therapists", published on 1 July, 2012. (3) This is one of the best documents on standards in yoga therapy and is a path breaking effort covering comprehensively all aspects of yoga as a holistic therapy.

The need of the hour is for a symbiotic relationship between yoga and modern science. To satisfy this need, living, human bridges combining the best of both worlds need to be cultivated. It is important that more dedicated scientists take up yoga and that more yogis study science, so that we can build a bridge between these two great evolutionary aspects of our civilization. The process as well as the goal of yoga is all about becoming "one" with an integrated state of being. (4)

PROMOTES POSITIVE HEALTH

Healthy life can be considered as a by-product of practicing yogic techniques since it has been observed that Yoga practitioners are physically and mentally healthier and have better coping skills to stressors than the normal population. Knowledge of inexpensive, effective and easily administrable yogic techniques by health professionals will go a long way in helping us achieve the goal of the World Health Organisation to provide "physical, mental, spiritual and social health" for all sections of human society.

Some of the important documented health-promoting benefits of mind-body practices such as yoga and meditation include:

1. Improvement in cardio-respiratory efficiency (5,6)
2. Improvement in exercise tolerance (7,12)
3. Harmonious balance of autonomic function (13-16)
4. Improvement in dexterity, strength, steadiness, stamina, flexibility, endurance, and neuro-musculo-skeletal coordination (9,17-22)
5. Increase in alpha rhythm, inter-hemispheric coherence and homogeneity in the brain (23-26)
6. Improved sleep quality (27)
7. Improved cognitive functions (5,28-34)
8. Alteration in brain blood flow and brain metabolism (35-38)
9. Modulation of the neuro-endocrine axis (38-44)
We can say that the Yoga affects every cell of the human body bringing about better neuro-effector communication, improve strength, and enhance optimum functioning of all organ-systems while increasing resistance against stress and diseases with resultant tranquillity, balance, positive attitude and equanimity.

MANAGING STRESS

It is well established that stress weakens our immune system. Scientific research in recent times has shown that the physiological, psychological and biochemical effects of yoga are of an anti-stress nature. A majority of studies have described beneficial effects of yoga interventions in stress with an Agency for Healthcare Research and Quality (AHRQ) report stating that "Yoga helped reduce stress." Reductions in perceived stress following yoga are reported to be as effective as therapies such as relaxation, cognitive behavioural therapy and dance therapy.

Mechanisms postulated include the restoration of autonomic balance as well as an improvement in restorative, regenerative and rehabilitative capacities of the individual. A healthy inner sense of wellbeing produced by a life of yoga percolates down through the different levels of our existence from the higher to the lower levels producing health and wellbeing of a holistic nature. Streeter et al recently proposed a theory to explain the benefits of yoga practices in diverse, frequently co-morbid medical conditions based on the concept that yoga practices reduce allostatic load in stress response systems so that optimal homeostasis is restored. They hypothesized that stress produces an:

- Imbalance of the autonomic nervous system with decreased parasympathetic and increased sympathetic activity,
- Under activity of the gamma amino-butyric acid (GABA) system, the primary inhibitory neurotransmitter system, and
- Increased allostatic load.

They further hypothesized that yoga-based practices i) correct under activity of the parasympathetic nervous system and GABA systems in part through stimulation of the vagus nerves, the main peripheral pathway of the parasympathetic nervous system, and ii) reduce allostatic load.
According to the theory proposed by them, decreased parasympathetic nervous system and GABAergic activity that underlies stress-related disorders can be corrected by yoga practices resulting in amelioration of disease symptoms. A review by Bhavanani concluded that heart rate variability (HRV) testing has a great role to play in our understanding of the intrinsic mechanisms behind such potential autonomic balancing effects of yoga. (47) Innes et al had earlier postulated two interconnected pathways by which yoga reduces the risk of cardiovascular diseases through the mechanisms of parasympathetic activation coupled with decreased reactivity of sympathoadrenal system and HPA axis. (48)

It is notable that one of the newer applications of yoga has been in managing the aftermaths of natural disasters. Studies have shown that yoga significantly reduces symptoms of posttraumatic stress disorder (PTSD), self-rated symptoms of stress (fear, anxiety, disturbed sleep, and sadness) and respiration rate. (49)

CARDIOVASCULAR CONDITIONS

Many studies have tried to explore the mechanisms by which yoga modifies coronary artery disease risk factors. Manchanda et al (50), Ornish et al (51) and Yogendra et al (52) have conducted prospective, randomized and controlled trials on angiographically proven coronary artery disease patients with yoga intervention and demonstrated that yoga based lifestyle modification helps in regression of coronary lesions and improvement in myocardial perfusion. The effect of yogic lifestyle on some of the modifiable risk factors could probably explain the preventive and therapeutic beneficial effect observed in coronary artery disease.

A review of 70 eligible studies investigating the effects of yoga on risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga, reported that most had a reduction of systolic and/or diastolic pressure. However, the reviewers also noted that there were several noted potential biases and limitations that made it difficult to detect an effect specific to yoga. (46) Another literature review reported significant improvements in overall cardiovascular endurance of young subjects who were given varying periods of yoga training. (53) Physical fitness increased as compared to other forms of exercise and longer duration of yoga practice produced better cardiopulmonary endurance. In fact a detailed review of yoga in cardiac health concluded that it can be beneficial in the primary and secondary prevention of cardiovascular disease and that it can play a primary or a complementary role in this regard. (54)

RESPIRATORY DISORDERS

Scientific basis of using yoga as an adjunct therapy in chronic obstructive pulmonary diseases is well established with significant improvements in lung function, quality of life indices and bronchial provocation responses coupled with decreased need for regular and rescue medicinal usage. (55,56) Behera reported perceptible improvement in dyspnea and lung function in patients of bronchitis after 4 weeks of yoga therapy that used a variety of postures and breathing techniques. (57) Yogic cleaning techniques such as dhautikriya (upper gastrointestinal cleaning with warm saline or muslin cloth) and netikriya (warm saline nasal wash) remove excessive mucous secretions, decrease inflammation and reduce bronchial hypersensitivity thereby increasing provocation threshold while kapalabhati through forceful exhalations improves the capacity to exhale against resistance. (58) A nonspecific broncho protective or broncho relaxing effect has been also postulated (59) while improved exercise tolerance has been reported following yoga therapy in patients of chronic severe airways obstruction. (60) It has been reported that well-performed slow yogic breathing maintains better blood oxygenation without increasing minute ventilation, reduces sympathetic activation during altitude-induced hypoxia (61) and decreased chemoreflex sensitivity to hypoxia and hypercapnia (62). These help bring about both objective and subjective improvements in the condition of patients with bronchitis. Yoga as a therapy is also cost effective, relatively simple and carries minimal risk and hence should be advocated as an adjunct, complementary therapy in our search for an integrated system of medicine capable of producing health and wellbeing for all.

METABOLIC/ENDOCRINE CONDITIONS

A few RCTs have suggested that yoga and meditation practices act on the hypothalamic–pituitary–adrenal axis (HPA) axis to reduce cortisol levels in plasma, (63,64) as well as reduce sympathetic nervous system tone, increase vagal activity, (65,66) and elevate brain GABA levels. (67)

Major systematic reviews of the effects of yoga on risk indices associated with insulin resistance syndrome and
**Fig. 2. POSTULATED MECHANISMS BY WHICH YOGA CAN HELP REDUCE RISK FOR TYPE 2 DIABETES MELLITUS AND ITS COMPLICATIONS**

Yoga intervention: Pathway 1
- ↓ Perceived stress
- ↓ Activation/reactivity of sympathoadrenal system and HPA axis

Yoga intervention: Pathway 2
- ↓ Vagal stimulation
- ↓ Parasympathetic activation

Enhanced metabolic and psychological profile
- ↑ Insulin sensitivity
- ↑ Glucose tolerance
- Improved lipid profile
- ↓ Visceral adiposity
- Improved mood

↓ Inflammatory cytokines
- ↓ Heart rate, blood pressure

Improved coagulation
- ↓ Fibrinolytic profile
- ↑ Endothelial function

Reduced risk for:
- Type 2 diabetes and complications of Type 2 Diabetes


Risk profiles in adults with type 2 diabetes have been done in recent times. They reported post-intervention improvement in various indices but with results varying by population and study design. Another systematic review addressed the management of type 2 diabetes and concluded that the reviewed trials suggest favourable effects of yoga on short-term parameters related to diabetes but not necessarily for long-term outcome. The AHRQ cites two studies comparing yoga versus medication which reported a large and significant reduction of fasting glucose in individuals with type 2 diabetes in one, and a smaller but still significant improvement in the other.

A recent systematic review of yoga on menopausal symptoms reported small effects on psychological symptoms with no effects on total menopausal symptoms, somatic symptoms, vasomotor symptoms, or urogenital symptoms.

**MUSCULOSKELETAL CONDITIONS**

A review by Posadzki et al found that 10 of 11 RCTs reported significantly greater effects in favor of Yoga when compared to standard care, self-care, therapeutic exercises, relaxing yoga, touch and manipulation, or no intervention. Yoga was more effective for chronic back pain than the control interventions such as usual care or conventional therapeutic exercises though some studies showed no between group differences. Recently two well-designed trials of yoga for back pain reported clinically meaningful benefits over usual medical care but not over an intensive stretching intervention.

**CANCER**

According to the findings of a comprehensive meta-analysis of role of yoga in cancer, improvements in psychological health were seen in yoga groups when compared to waitlist or supportive therapy groups. With
respect to overall quality of life, there was a trend towards improvement. To explain the positive outcomes, Smith and Pukall suggested various complex pathways which may involve relaxation, coping strategies, acceptance, and self-efficacy. Kochupillai et al reported increase in natural killer cells in cancer patients who had completed their standard therapy after practicing Sudarshan Kriya Yoga and pranayam breathing techniques.

A systematic review and meta-analysis of RCTs on the physical and psychosocial benefits of yoga in cancer patients and survivors by Buffart and colleagues concluded that yoga may be a feasible intervention as beneficial effects on several physical and psychosocial symptoms were reported. They showed that it has strong beneficial effects on distress, anxiety and depression, moderate effects on fatigue, general HRQoL, emotional function and social function, small effects on functional well-being, and no significant effects on physical function and sleep disturbances. It was suggested that yoga can be an appropriate form of exercise for cancer patients and survivors who are unable or unwilling to participate in other traditional aerobic or resistance exercise programs.

IN CONCLUSION

All of the above studies and reviews suggest a number of areas where mind-body therapies such as yoga may be beneficial, but more research is required for virtually every one of them to establish their benefits conclusively. This is true in the process of introducing any new therapy into the modern health care system and is not surprising when we realize that the proper studies on yoga as a therapeutic modality are not older than a few decades.

Some of the major issues highlighted by these studies and reviews include:

1. Individual studies on yoga for various conditions are small
2. Poor-quality trials in general with multiple instances for bias
3. Substantial heterogeneity with regards to the populations studied, yoga interventions, duration and frequency of yoga practice, comparison groups, and outcome measures.
4. Compliance was not routinely noted, thus preventing an understanding of the apt 'dosage' requirements with regard to the mind-body interventions
5. Yoga requires active participation and motivation

that requires active efforts from both the researcher as well as the participants.

6. Changes in attitudes and behavior need to be documented and understood better, especially in the lifestyle, stress induced psychosomatic conditions.

7. It is not clear which patients may benefit from the yogic interventions, and which aspects of the interventions or which specific styles were more effective than others.

It has been suggested that yoga may help improve patient self-efficacy, self-competence, physical fitness, and group support, and may well be effective as a supportive adjunct to mitigate medical conditions. Büssing et al concluded that yoga may have potential to be implemented as a safe and beneficial supportive/adjunct treatment that is relatively cost-effective, may be practiced at least in part as a self-care behavioral treatment, provides a life-long behavioral skill, enhances self-efficacy and self-confidence, and is often associated with additional positive side effects.

It is important to develop objective measures of various mind-body therapies and their techniques while including them in intervention trials. It has also been suggested that the publication of specific interventions used in future studies in manual form can allow reliable replication and future implementation. It is also important to develop tools to monitor objectively the participants' self-practice, compliance, and adherence to the interventions. Yoga has preventive, promotive as well as curative potential and a yogic lifestyle confers many advantages to the practitioner. Since lifestyle related diseases are alarmingly on the rise in our modern society, yogic lifestyle should be given a special place in preventing and managing these diseases.

As suggested by Büssing et al, "Yoga may well be effective as a supportive adjunct to mitigate some medical conditions, but not yet a proven stand-alone, curative treatment. Larger-scale and more rigorous research with higher methodological quality and adequate control interventions is highly encouraged because yoga may have potential to be implemented as a beneficial supportive/adjunct treatment that is relatively cost-effective, may be practiced at least in part as a self-care behavioural treatment, provides a life-long behavioural skill, enhances self-efficacy and self-confidence and is often associated with additional positive side effects."
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