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Scientific benefits of Yoga: A Review

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ABSTRACT

In the world of yoga there are "Eight limbs path" which helps in different aspects like coordination of body and mind and helps to create positivity of mind and help the body healthy and fit by which the functioning of the body improves. In today's modern life various type of disease and deformity takes place most of the things takes place due to unbalanced food, & other. The mind is always wondering and being rebellious, never focusing on the moment. It is the mind job to think, it is relentlessly interpreting everything. That is seen, perceived and experienced and this pattern of habit goes through change to behavior and attitude. Many people who practice yoga do so to maintain their health and well-being, improve physical fitness, relieve stress, and enhance quality of life. In addition, they may be addressing specific health conditions, such as back pain, neck pain, arthritis, and anxiety. Basically yoga has been more effective than control and waitlist control conditions, although not always more effective than treatment comparison groups such as other forms of exercise. More randomized controlled studies are needed in which yoga is compared to active exercise groups. Having established the physical and mental health benefits of yoga makes it ethically questionable to assign participants to inactive control groups. Shorter sessions should be investigated for cost-effectiveness and for daily practice.

1. Introduction

Yoga is a philosophical system of exercise and meditation originating in what is now India 2000-4000 years ago. There are many forms of yoga which differ in specific practices, while maintaining the purpose of directing the mind and body (1). Common elements of many forms include postures (asanas), which are held for a certain period of time, controlled breathing exercises (pranayama) and meditation. Yoga practice has the general aim of facilitating the development and integration of the body, mind and breath to produce structural, physiological and psychological effects (2). Specifically, the development of a strong and flexible body which is free of pain, a balanced autonomic nervous system enabling all physiological systems to function optimally and a calm, clear and tranquil mind (3).

The science of Yoga is a psychology of a philosophical nature. The very introduction of the system of Yoga by Patanjali is by way of an instruction that the mind has to be controlled- **Yogahs-chitta-vritti-nirodhah**. Patanjali does not go into the details of the philosophical background of the necessity to control the mind, the background that comes in Samkhya and Vedanta. He very simply explains that Yoga is control of the mind, restraint of the mind-stuff.

Yoga is an experiential science. The most important benefit of yoga is it balances our physical and mental conditions. The aging process, which is largely an artificial condition, caused mainly by autointoxication or self-poisoning, can be slowed down by practicing yoga (Alleger, I. 2007). By keeping the body clean, flexible and well lubricated, we can significantly reduce the catabolic process of cell deterioration. To get the maximum benefits of yoga we need to combine the practices of yogasanas, pranayama and meditation.

Hatha yoga is the most common form of yoga practiced in Western societies. It involves asana to develop strength, flexibility, balance and the co-ordination of the mind, body and breath, in combination with pranayama and meditation exercise to calm the mind and develop self awareness (4). The different styles of hatha yoga that have developed are characterized by the rate at which asanas are performed, the physical intensity and level of difficulty, the relative emphasis on body alignment and relaxation and the ambient temperature in which it is practiced (5). Bikram yoga is a style that was synthesized from traditional yoga methods by Bikram Choudhury. It is performed in a warm/hot environment **(~105 degree F, at least 40% humidity)** for 90 minutes and comprises a set series of 26 postures as well as breathing exercises. Although many of the asanas may be common to both systems, others have been modified or omitted according to different schools of thought and which asanas are considered to be manageable and safe to perform.

Yoga as a way of life is more true to its ancient tenets. It constitutes asana, regulated breathing (pranayama), and awareness of yoga sutms (principles) that govern the mind. Regular practice of yoga enhances awareness of mind and body, which is needed in the self- management of diet and exercise plan in diabetes. According to Patanjali, yoga consists of eight steps or limbs, which are all equally important and are related as parts of a whole. The pmpose of these eight limbs is discriminative enlightenment or self-realization. But here the emphasis will be on health benefits. The eight steps or limbs of yoga are as follows:

1. Yama: Codes of restraint, abstinences, self-regulations;
2. Niyama: Observances, practices, self-training;

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3. Asana: Meditation posture (Figure 1);
4. Pranayama: Expansion of breath and prana, regulation, control;
5. Pratyahara: Withdrawal of the senses, bringing inward;
6. Dharana: Concentration;
7. Dhyana: Meditation and
8. Samadhi: Deep absorption, meditation in its higher state, the state of perfected concentration.

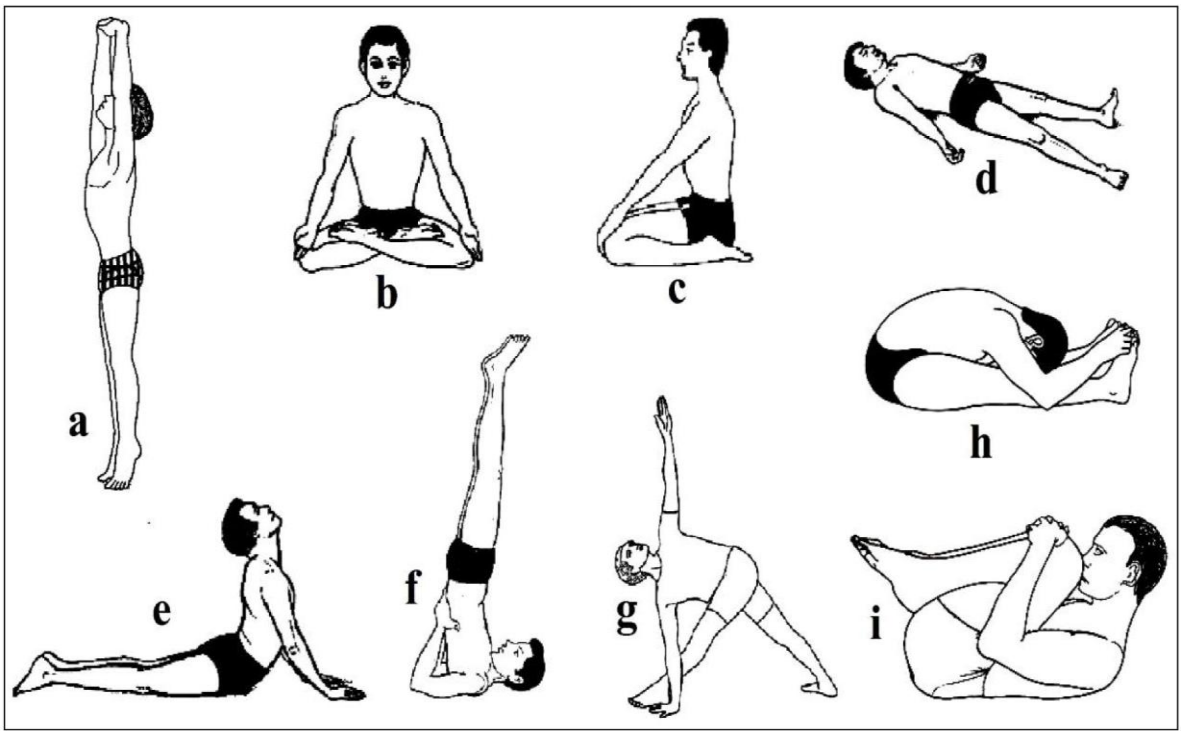

Fig.1: *Various Popular Asanas (Postures) Useful for Physical and Mental Health. (a) Tadasana; (b) Padmasana; (c) Vajrasana; (d) Shavasana; (e) Bhujangasana; (f) Sarvangasana; (g) Trikonasana; (h) Paschimottasana; (i) Pawanmuktasana.*

Yoga Lifestyle is about **two actions**: "cleaning the mirror" and "spreading the Light".

The mirror is the mind and body. They have to be clean and pure to catch the light in the first place. Yoga lifestyle is therefore about purifying the mind and keeping the body healthy. Yoga lifestyle includes certain principles and values, some of which refer to the 5 rules of social conduct, the **YAMAS**:

AHIMSA	=	non-violence
SATYA	=	truthfulness
ASTEYA	=	non-stealing
BRAHMACHARYA	=	faithfulness
APARIGRAHA	=	non-greed

Yoga lifestyle (Healthy Habits): Swami Satchidananda "When you do something, do it with one hundred percent of the mind. Don't do it half way. Whatever you do, do it with full concentration. That is Yoga. It's not that you are just going into a corner, sitting with the spine erect and then doing some japa or some breathing and that is Yoga. My Yoga is everything. All that you do is Yoga. When you start doing something, do only that — one hundred percent that. 'Yogaha karmasu kaushalam,' the Bhagavad Gita says. That means perfection in your every action is Yoga."

AHIMSA is the first and (commonly thought of as) the most important yoga principle.

AHIMSA applies to everything:

How we treat ALL other beings;
How we treat OUR OWN bodies and minds;
How we think and what we think about;
How we talk and what we talk about; and
How we eat and what we eat.

2. Aim of this study

Yoga is now practiced widely for fitness and wellbeing in health clubs, community centres, yoga studios and schools. This popularity has created a need for well controlled research and clinical trials to evaluate its efficacy for improving general health and preventing disease, and to evaluate its role as an adjunctive or complementary therapy for the management of pain or chronic diseases. The majority of available yoga studies in the published literature have been conducted with adults, although studies of children and young adults have also been undertaken. The Aim of review study was to search the scientific literature, primarily seeking out systematic reviews, critical reviews and narrative reviews that have included studies with a focus on the health benefits of yoga in healthy individuals and clinical populations.

Only one study of hot yoga (Bikram) was found and this is discussed in section 4.3. Hence, the review was focused on yoga more generally, and provides an overview of studies that

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investigated the health impacts of different yoga styles performed at normal ambient temperatures.

3. Relative health benefits of exercise and Yoga

3.1 Health Benefits of Exercise

Evidence for the use of exercise in the maintenance of optimal health and rehabilitation can be traced back to ancient cultures. As early as the ninth century B.C., the ancient Indian system of medicine (Ayurveda) recommended exercise and massage for the treatment of rheumatism and the Greek philosopher Hippocrates ('the father of medicine') acknowledged the virtues of exercise for physical and mental health in the 4th century B.C. (6). In more recent times, a body of epidemiologic research has demonstrated inverse associations of varying strength between habitual exercise and the risk of several chronic diseases, including coronary heart disease, thromboembolic stroke, hypertension, Type 2 diabetes mellitus, osteoporosis, obesity, anxiety and depression (7-9). Additionally, a growing body of research during the last 20 years has provided 'convincing' evidence of an inverse association between physical activity and risk of colon cancer (10). There is also evidence of a 'probable' inverse association between physical activity and risk of other cancers, including post-menopausal breast and endometrial cancer and limited 'suggestive' evidence of a similar association between physical activity and lung, pancreatic and pre-menopausal breast cancer (10).

Aside from the important role it plays in the primary prevention of a range of chronic diseases, a physically active lifestyle can bring manifold health benefits to individuals who are carrying the burden of chronic disease. There is evidence that regular exercise is associated with physical and psychosocial health benefits in many chronic disease conditions (11) and hence, keeping fit and healthy is now promoted by Government health departments as an essential element of self-care for boosting general wellbeing, improving mobility and easing of symptoms. A physically active lifestyle can have an important role in controlling or reducing the impact of a chronic disease, prolonging survival and enhancing overall health-related quality of life (secondary and tertiary prevention).

3.2 Health Benefits of Yoga

The relative health benefits of yoga in relation to disease risk and its role in the management of chronic diseases is less clearly established. Studies have investigated physiological responses evoked by yoga practice in comparison to those evoked by more conventional forms of exercise. The heart rate response to typical yoga sessions in healthy adults at normal ambient temperatures has been shown to be equivalent to low intensity walking exercise in some studies (12, 13). Exercise at this intensity does not meet the currently recommended level of physical activity needed to promote health and cardiovascular fitness. However, other studies have provided conflicting evidence for healthy adults, with higher levels of cardiopulmonary stress being recorded during yoga sessions (14). Additionally, improvements in indices of cardio metabolic health have been observed in some (but not all) studies in healthy adults following programmes of yoga practice. A number of single group (uncontrolled) studies have reported improvements in maximum oxygen capacity (15-18), muscular strength (17,19), flexibility (18) and blood cholesterol profile (15), as well as reduced physiological effort at sub-maximal exercise intensities (20) and a lower level of perceived exertion at maximal exercise capacity (17). Such cardio metabolic adaptations suggest that yoga can provide a level of cardiopulmonary stress that is sufficient to achieve health benefits. Other benefits from yoga practice in healthy participants have been reported to be improved respiratory inspiratory and expiratory pressures and visual and auditory reaction times (19) and attenuated weight gain in overweight individuals (21). While some studies have found no improvement in cardiopulmonary variables after programmes of yoga practice (e.g. Blumenthal and others (22)), the actual level of physical exertion experienced during a session, and thus the stimulus for cardio metabolic adaptations, is likely to be strongly influenced by the type of yoga, the level of experience of the practitioner and the ambient temperature during the session. Yoga practice also involves a spiritual dimension and specific breathing exercises, not common to conventional forms of exercise, which may evoke other health benefits.

A recent report and comprehensive review of evidence and guidelines by the Canadian Agency for Drugs and Technologies in Health (CADTH) analyzed the quality of the evidence for yoga as a treatment for a few specific mental health disorders and provided references to studies and guidelines for each of these mental health areas. To summarize the conclusions of this evidence-review, the report found evidence supporting yoga as a treatment or adjunctive treatment for depression. However, depending the type and severity of depression, yoga may be recommended as a second-line or third line treatment after medication and psychotherapeutics. In more severe depression where suicide is a major risk, yoga is best viewed as adjunctive to other treatments.

4. Materials and Methods

Most recent literature based on the effect of yoga and meditation on human health, particularly on psychological disorders (e.g., metal stress, anxiety, etc.), endocrine disorders (e.g., thyroidism, gigantism, etc.), metabolic disorders (e.g., diabetes, hyperlipidemia, cancers, etc.) and neurological disorders (e.g., Alzheimer's disease, etc.) was thoroughly reviewed. All the literature was accessed from four most popular search engines i.e. PubMed, Scopus, Web of Science and Google Scholar. The papers from the standard scientific journals were only included, in which the researches on clinical trials were mainly focused in the present review.

5. Role of Yoga in maintaining the Physical Health

Yoga plays a greater role in the management of physical - mental health (Chen, K.-M. et. al.2010). Yogic Intervention has been shown a significant effect on General Well Being; (Kumar K 2012). Yoga might play role as a safety measure. Other study also performed in Toronto, Canada, clearly states that physically active individuals are less likely to develop hypertension than sedentary individuals (Shephard RJ. 2001). Pokhariyal K P & Kumar K (2013) reported in their study that there is a significant effect of Hatha Yogic Practices on Body

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weight of the Human subjects. Study conducted on patients with angina and coronary risk factors have showed a positive response in lipid profile after 4-14 weeks of yogic practices. A study held in Ontario, Canada also corroborate with our study and state that training increases HDL cholesterol and several studies have confirm this belief (Katzmarzyk PT 2001). Kumar K (2013) reported in his study that practice of Yoga cleansing (Shatkarma) lower down the serum glucose and serum cholesterol level of the Human subjects. In another study it has been seen that there is an Effect of Yogic Intervention on General Body weight of the subjects (Kumar Kamakhya 2015). On several parameters of general health factors practice of Yoga shows a positive impact towards Physical Health.

6. Yoga is helpful in managing Common Disorder

Diabetes, Hypertension, Obesity and joints related problems are very common now days. Kumar K (2012) there is a significant effect of Yogic intervention on serum glucose level on Diabetics. I Haslock, et al. (1994) find that people with rheumatoid arthritis who participated in a yoga program over a three-month period had greater handgrip strength compared with those who did not practice yoga. Negi A & Kumar K; observed in their study that there is a significant effect of Yogic Intervention on R A Factor in Gout Patients. It was observed that yoga practice has also significantly improved BP among people with hypertension (Blumenthal JA 1989). In another study it has been observed that there is a significant effect of Yogic intervention on Blood uric acid Level in Gout Patients (K Kumar 2013).

7. Yoga improves cardio-respiratory efficiency

Madanmohan et al (2008) have reported that yoga training of six weeks duration attenuates the sweating response to step test and produces a marked increase in respiratory pressures and endurance in 40 mm Hg test in both male and female subjects. In another study, they reported that 12 weeks of yoga practice results in significant increase in maximum expiratory pressure, maximum inspiratory pressure, breath holding time after expiration, breath holding time after inspiration, and hand grip strength (Madanmohan, 1992). Kumar K (2013) shows in his study that there is a Significance of Nadi Sodhan and Kapalbhati on forced ventilation capacity (FVC), maximum voluntary ventilation (MVV) and picks expiratory flow rate (PEFR). Joshi et al (1992) have also demonstrated that six weeks of pranayam breathing course resulted in improved ventilatory functions in the form of lowered respiratory rate, and increases in the forced vital capacity, forced expiratory volume at the end of 1st second, maximum voluntary ventilation, peak expiratory flow rate, and prolongation of breath holding time. Similar beneficial effects were observed by Makwana et al (1988) after 10 weeks of yoga practice. Increase in inspiratory and expiratory pressures suggests that yoga training improves the strength of expiratory and as well as inspiratory muscles. Respiratory muscles are like skeletal muscles. Yogic techniques involve isometric contraction which is known to increase skeletal muscle strength. Breath holding time depends on initial lung volume. Greater lung volume decreases the frequency and amplitude of involuntary contractions of respiratory muscles, thereby lessening the discomfort of breath holding. During yoga practice, one consistently and consciously over-rides the stimuli to respiratory centers, thus acquiring control over the respiration. This, along with improved cardio-respiratory performance may explain the prolongation of breath holding time in yoga trained subjects.

8. Yoga balances Autonomic nervous system

Autonomic nervous system consists of two limbs; sympathetic nervous system and parasympathetic nervous system. Although individual asan and pranayam practices can selectively affect sympathetic or parasympathetic nervous system, the overall effect of yoga practice is to bring a state of parasympathetic dominance. Vempati and Telles (2002) assessed the effect of yoga based guided relaxation on autonomic variables and found that power of the low frequency component of heart-rate variability spectrum reduced, whereas the power of high frequency component increased, suggesting a reduced sympathetic activity. Also, subjects with a baseline ratio of LF/HF > 0.5 showed a significant decrease in the ratio after guided relaxation, while subjects with a ratio < or = 0.5 at baseline showed no such change. The results suggest that sympathetic activity decreased after yoga based guided relaxation. Vijayalakshmi et al (2004) studied the effect of yoga based relaxation training on modulation of stress induced by isometric handgrip test in hypertensive patients and found that after 4 weeks of supervised yoga training, there was optimization of sympathetic response and restoration of autonomic regulatory reflex mechanisms. Telles et al (1994) have demonstrated that pranayam breathing through right nostril results in an increase in sympathetic activity whereas left nostril breathing reduces it. Shannahoff-Khalsa et al (1993) studied the effects of unilateral forced nostril breathing on the heart and found that forced right nostril breathing increases heart rate compared to left forced nostril breathing whereas end diastolic volume and stroke volume was more with forced left nostril breathing. These results demonstrate a unique autonomic modulation by uni-nostril breathing that can be used therapeutically. Telles et al (1993) found that after giving 3 months yoga training to sports teachers (average 8.9 years physical training), there was significant improvement in their general health in terms of body weight and blood pressure reduction and improved lung functions. There was also evidence of decreased autonomic arousal and psychophysiological relaxation, heart rate and respiratory rate reduction and improved somatic steadiness demonstrated by decreased errors in steadiness test. They suggested that practicing yoga may help to bring about a balance and optimization of autonomic functions. Sharma et al (2008) have reported a decrease in pulse and respiratory rates and increase in galvanic skin resistance in healthy subjects after 2 months practice of sahaj yoga meditation. Physiological basis of galvanic skin resistance is change in sympathetic tone occurring in the skin and subcutaneous tissue in response to a change in affective state of the subject. Changes in peripheral autonomic tone alter sweating and cutaneous blood flow, which in turn change galvanic skin resistance.

9. Conclusion

The public interest towards yoga and meditation is increasing day by day due to their beneficial effects in mental and physical health. Since the ancient time, yoga has been

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used as a holistic relaxation practice which is effective against hypertension, obesity, anxiety, insomnia and aging The weight of available evidence suggests that yoga practice is safe and can bring many health benefits to practitioners, whether they are young, old, healthy, recovering from illness or looking for a therapeutic option to help them to manage a chronic condition.

It is important to be mindful of the fact that most positive evidence to date has emanated from studies that are considered to have only poor to moderate methodological quality, e.g. non-randomized controlled trials and uncontrolled, single group studies. In addition, many of the available studies in the scientific literature have been conducted in India and there is a relative shortage of good quality studies involving Western populations. However, these methodological weaknesses should be weighed against the inherent limitations in RCT design. Additionally, although RCTs offer the highest level of evidence, it is not always possible to discern the full range of health benefits that might be gleaned from this type of study. RCTs usually have a pre- selected set of outcome measures that are assessed before and after the intervention in both experimental and control groups. It is possible that this way of assessing efficacy might miss some important physiological or psychosocial variable that has a key impact on health or quality of life. The inclusion of qualitative outcomes in future studies, such as focus groups and structured interviews, and a greater involvement of yoga practitioners, teachers and patient groups in the design of studies, could help to overcome this.

The linkage between the mind and body, particularly in reference to Yogic sciences, was widely accepted in the ancient wisdom and oriental learning, but later developed an artificial dichotomy between these two components. Modern medical science focuses, only on body as something which is apart from the mind. However psychosomatic linkages have now got its due importance by both modern medicine practitioners and therapists of Indian tradition. It has now been proverb by scientific researches beyond doubt that yoga practices brings in better balance equilibrium in the autonomic function and metabolic rate at one hand and neurohumaral functions at the other hand, so that the state of both physical and mental well-being is achieved. This itself reflects that physiological and psychological conditionings go hand-in – hand and operate simultaneously.

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