

## Therapeutic benefits of *Raj Yoga* – A review

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*Raj Yoga* has been recognized internationally and UN has declared 21<sup>st</sup> June as international *Yoga* day. *Raj Yoga* is a procedure of meditation to free *atma* (soul) from the clutches of *maya* (illusions) and unite with *paramatma* (prime soul) and for this purpose a healthy body is mandatory. *Raj Yoga* comprises of three components they are *asanas* (physical postures), *pranayama* (regulated breathing) and *samadhi* (self-realization or enlightenment). *Raj Yoga* has been accepted worldwide for its positive effect on human body. It is seen as an important prophylactic & therapeutic modality in various health conditions. Researchers and clinicians of various fields are keen interested in learning about the benefits of *Yoga*. In the present paper, an attempt has been made to review the various biomedical research work done over few decades in field of *Raj Yoga*.

**Keywords** – Biomedical, Meditation, *Raj Yoga*, Review

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The word “*Yoga*” comes from a Sanskrit root “*yu*” which means union, or yoke, to join, and to direct and concentrate one's attention. *Yoga* is the means for transforming consciousness and attaining *moksha* (liberation) from circle of *karma* (result of doings) and *punarjanama* (rebirth). *Raj Yoga* practice consists of three components they are *asanas*, *pranayama* and *samadhi*. The word “*Raj*” means the king, sovereign or the supreme. *Raj Yoga* is the supreme or the highest *Yoga* that empowers the self to rule the mind, sense-organs and the body. Another aspect of it is, a person like king, who hold the supreme administrative post, who is always busy in some or other matter can also adopt this mode of attaining holistic peace in mind and body. In today's scenario this aspect of *Raj Yoga* is of prime importance since every one today have a lifestyle that of a king. People are extremely busy and they have extreme mental, physical and spiritual pressures in their life. In this 21<sup>st</sup> century age new and new disease and syndromes are emerging and the pathophysiology of these has no rational explanations. A new concept of individual medicine and life style modification is arising within a few decades. There is much need of a therapeutic modality which can benefit healthy and diseased community at large. It should have minimum side

effects, risks and interactive capacity with existing prescribed medication. *Raj Yoga* is also known as *Ashtanga Yoga* (eight steps of *Yoga*), because it is organized in eight parts they are *yamas* (ethical disciplines), *niyamas* (individual observances), *asana*, *pranayama*, *pratyahara* (withdrawal of senses), *dharana* (concentration), *dhyana* (meditation), and *samadhi* (self-realization or enlightenment). The five *yamas* are *Ahimsa* (nonviolence), *Satya* (truthfulness), *Asteya* (non-stealing), *Brahmacharya* (continence) and *Aparigraha* (non-covetousness). The five *Niyamas* are *Saucha* (cleanliness), *Santosha* (contentment), *Tapas* (heat, spiritual austerities), *Svadhyaya* (study of sacred scriptures and of one's self) and *Ishvara Pranidhana* (surrender to God). These eight steps of *Raj Yoga* provide systematic instruction to attain inner peace, clarity, self-control and realization. *Raj Yoga* meditation (RM) is a meditation without rituals or mantras and can be practiced anywhere at any time. It is practiced with ‘open eyes’, which makes this method of meditation versatile, simple and easy to practice<sup>1</sup>. The primary prerequisite to practice RM is to find a place that is quiet and peaceful. The next thing needed is to be in *asana* (sit in a comfortable posture on the mat). Keep focusing attention on the present moment with a controlled and rhythmic breath pattern (*pranayama*). It will be good if eyes are kept open. Now attention is withdrawn

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from the sounds that surround (*pratyahara*). Making notes of thoughts. One should be aware of what he is thinking. Now it is slowing them down along with deep breathing. Now as one's thoughts have started to slow down, trying to create a peaceful thought in mind. One could tell himself "I am a peaceful soul" in mind (*dharana*). Let this thought make him aware of the world around him. One should be seated throughout this. Continue saying "I am a peaceful soul". These thoughts and words will soon become a part of one's soul as well as his nature (*dhyana*). It will bring profound experience of peace. Once he is done with this, one should go ahead and finish the chores. Spreading the peace and happiness one had discovered in workout in all the work that one do throughout the day. When he starts doing this, he will get deeper into the depths of meditative experience which will become an integral part of his lifestyle (*samadhi*). The primary aim of RM is the development of attentive mental capacity termed as 'mindfulness', which is a holistic awareness of present-moment stimuli without cognitive elaboration. RM gives a clear spiritual understanding of self and helps one to re-discover the positive qualities which are already latent within oneself, this enables to develop strengths of character and to create new attitudes and responses to life<sup>2</sup>. When a person practices *Yoga*, with *yogic* attitude (attitude of patience, persistent practice, overcoming obstacles within self, that is, trouncing laziness, anger, delusion, and desire for being different or better than others), there are several changes in physiology<sup>3</sup>. Regular practice of *Yoga* promotes strength, endurance, flexibility and facilitates characteristics of friendliness, compassion, and greater self-control, while cultivating a sense of calmness and well-being<sup>4</sup>. It is reported to produce changes in mental state and resting electroencephalogram patterns that persist beyond the time-period of active practice<sup>5</sup>. RM is affordable, appealing, and accessible for many people, and there are plausible cognitive/affective and biologic mechanisms by which *Yoga* could have a positive impact on depression and anxiety<sup>6</sup>. *Yoga* has been the subject of research in the past few decades for therapeutic purposes for modern epidemic diseases like mental stress, obesity, diabetes, hypertension, coronary heart disease, and chronic obstructive pulmonary disease. *Yoga* encourages one to relax, slow the breath and focus on the present, shifting the balance from the sympathetic nervous

system and the flight-or-fight response to the parasympathetic system and the relaxation response. Empirical evidence and theories for *Yoga* mechanisms are prevalent in areas of hormonal regulation, sympathetic activity in the nervous system and the betterment of physical health attributes such as improved balance, flexibility, strength and cardio respiratory health. Hypothetical effects of *Yoga* on metabolism, circulation, behavior, oxidative stress, inflammation and psychological thought processes are also examined, while new hypotheses in immunology, nerve conduction and bioelectro-magnetism are been reviewed<sup>7</sup>. Thus growing scientific evidence, clinical experience and community attitudes are encouraging a shift to more natural and holistic forms of therapy as alternatives or adjuncts to pharmacological approaches to a variety of conditions<sup>8</sup>.

**Purpose of this review** - *Yoga* has been seen as an important prophylactic & therapeutic modality in various health conditions. Researchers and clinicians of various fields are keen interested in learning about the benefits of *Yoga*. The purpose of this review is to summarize the various research work done over few decades in field of *Raj Yoga*.

## Methodology

### Inclusion criteria

**Type of articles** - Peer-reviewed clinical investigation, review or evidence synthesis articles published on-line within public medical research databases (Pubmed, Cochrane Library, Medline, Scopus, Ebscohost) having *Yoga* as the prime focus in a health related context is included.

**Type of description** - description that includes effects of practicing *Yoga* on health is included.

**Type of Yoga** - for the purpose of review intervention including *Dhyana* as primary focus along with *Pranayama*, *Asana* is included.

**Exclusion criteria** - Articles that discuss interventions similar to *Yoga* and asanas as only intervention are excluded, since it resembles more of a physical exercise, which may lead to the perception that *Yoga* is another kind of physical exercise

**Search strategy Databases** - An on-line search of five databases includes the Pubmed, Cochrane Library, Medline, Scopus, Ebscohost databases. Websites of *Yoga* institutions and references from found articles are also searched. Hand-searches in *Yoga*-specific journals and books also performed.

**Online search terms and limitations** - A rapid systematic search employs free-text terms – (*Raj Yoga*) and (Meditation). The literature search is current as of December 2016.

## Results

**Description of included articles** - The title-search identified 800 potential articles, 110 abstracts were screened and 45 full-text articles were assessed for eligibility. Twenty four original articles are included in this literature review. A variety of outcome effects are presented in the literature, including effect of RM on affective & cognitive functions, autonomic changes, physiological effects and oxidative stress treatment and prevention of depression and anxiety, neurodegenerative diseases, psychosomatic diseases, cardiovascular disease, chronic pain, respiratory ailments, gastrointestinal disorders, diabetes and menopausal disorders.

## Empirical evidence

**Physiological benefits** – Health is a condition of body when normal physiology of the body is restored, this is a prime aim of all the therapeutic modalities. There are scientific evidences that *Yoga* have positive effect on physiological process of the body. During meditation vital capacity, tidal volume and breath holding are significantly improved thus enhancing the capacity of respiratory system. *Yoga* decreases levels of salivary cortisol, blood glucose, as well as plasma rennin levels, and 24 hrs urine nor-epinephrine and epinephrine levels. The beneficial effect of *Yoga* on cardiovascular system is that it significantly lowers diastolic blood pressure and heart rate. On analyzing lipid profile it was noted that there was significant reduction of serum cholesterol thus minimizing the risk of atherosclerosis and its complications. This shows that *Raja Yoga* meditation provides significant improvements in respiratory functions, cardiovascular parameters and lipid profile<sup>9</sup>.

**Nervous system**– Nervous system is the prime system of the body. *Yoga* is believed to cause a shift toward parasympathetic nervous system dominance, possibly via direct vagal stimulation<sup>10</sup>. Regular practice of meditation is associated with increased thickness in a subset of cortical regions related to somatosensory, auditory, visual and interoceptive processing. Regular meditation practice may slow age-related thinning of the frontal cortex<sup>11</sup>. These evidences suggest that *Yoga* may prove beneficial in

neurodegenerative diseases. Studies suggest long-term practitioners of meditation have structural differences in brainstem regions concerned with cardio respiratory control. This could account for some of the cardio respiratory parasympathetic effects and traits, as well as the cognitive, emotional, and immunoreactive impact<sup>12</sup>.

**Immune system** - Effect of meditation on immune function is slowly moving from hypothetical stage to an established concept. There some encouraging studies, in a study effect of *Yoga* was evaluated, and it suggests that there was significant increases in antibody titers to influenza vaccine among meditators<sup>13</sup>. In patients of breast and prostate tumors meditation practice reduced stress, activate the immune system in combating infection and growth of malignant tumors<sup>14</sup>. In patients with psoriasis meditation-based stress reduction intervention delivered during ultraviolet light therapy can increase the rate of resolution of psoriatic lesions<sup>15</sup>. Thus, we can conclude that *Yoga* have positive effect on immune system, although to make concrete evidence there is a long way to go.

**Antioxidant**– Today a lot of stress is given on antioxidants since oxidative stress is a causative factor in the pathophysiology of various chronic diseases associated with aging and there is no satisfactory management in these types of conditions. Randomized controlled studies have proved that regular use of RM have proved effective in geriatric population in management of Alzheimer's<sup>16</sup>, dementia<sup>17</sup>, Neurodegenerative diseases<sup>18</sup>, Parkinson's disease<sup>19</sup>. In a study it was reported that Transcendental Meditation (TM) program was found to lower Lipid peroxide levels, thus attributing the antioxidant capacity of *Yoga*<sup>20</sup>. Thus, it can be concluded that RM have antioxidant property and plays an important role in delaying ageing. Thus, *yoga* can emerge as the prime conservative modality in treating aging.

**Circulatory system**– *Yoga* has been proved effective in reducing the risk for cardio vascular diseases by reducing blood pressure, use of tobacco and alcohol, lowering of high cholesterol and lipid oxidation and decreased psychosocial stress. These factors result in reversal of atherosclerosis, reduction of myocardial ischemia and left ventricular hypertrophy. Research on mechanisms suggests that some of the cardio vascular diseases related benefits arise from normalization of neuroendocrine systems

which were distorted by chronic stress<sup>21</sup>. *Yoga* intervention can be used as additive therapy in ischaemic heart disease, hypertension<sup>22</sup>, coronary heart disease, stroke heart failure. *Yoga* has also been found to be particularly helpful in the management of obesity. A randomized controlled study revealed that practicing *Yoga* for a year helped significant improvements in the ideal body weight and body density<sup>23</sup>. Thus, it can be concluded that RM has positive effects on the cardiovascular system and it can be encouraged as a non pharmacological method to prevent heart diseases<sup>24</sup>.

**Mental health**– The most promising benefit of *Yoga* is its capability of improving the mental health of the practitioner. Today modern medicine is least helpful for psychologically diseased population, in such conditions *Yoga* emerged as much needed aid. *Yoga* intervention has proved effective in reducing levels of stress and anxiety in patients with stress-related symptoms. *Yoga* has been proved beneficial in conditions like insomnia<sup>25</sup>, positive and negative symptoms of schizophrenia<sup>26</sup>, unipolar depression<sup>27</sup> mild to moderate major depression and dysthymia, epilepsy, post-traumatic stress disorder<sup>28</sup>, obsessive-compulsive disorder<sup>29</sup>, Psychoneurosis and chronic primary insomnia<sup>30</sup>. Researches on the mechanism suggest that *Yoga* improves depression and can lead to significant increases in serotonin levels coupled with decreases in the levels of monamine oxidase, an enzyme that breaks down neurotransmitters and cortisol. This reduction in the cortisol levels in the blood result in reducing risk of diseases that arise from stress such as psychiatric disorder, peptic ulcer and migraine<sup>31</sup>.

**Pain management**– Another most common symptom suffered by a large population is pain, it could be of various origin and intensity but it is always distressing. Most of the medications available have limited benefits but negative effects are at par. *Yoga* have proved as a superior analgesic and aids in functional improvements in chronic neck pain<sup>32</sup>, chronic low back pain<sup>33</sup>, chronic pain, migraine<sup>34</sup>, chronic tension headache<sup>35</sup>, fibromyalgia<sup>36</sup> and carpal tunnel syndrome<sup>37</sup>. *Yoga* showed significant clinical relief in pain, tenderness, stiffness and swelling of the joint affected by rheumatoid arthritis. It have analgesics and anti-inflammatory effect, it probably relieves pain by stimulating the pituitary gland to release its own potent pain suppressing compound, endorphins and enkephalins<sup>38</sup>. Similar study reveals

benefit of *Yoga* in pain management in osteoarthritis of the knee<sup>39</sup>. Thus it can be concluded that *Yoga* can serve as extraordinary aid in pain management.

**Respiratory system** – Nowadays with air pollution increasing at alarming rate, there is emergence of various types of respiratory ailments and there is limited scope of management. *Yoga* has proved effective in management of ailments of respiratory system. Studies suggest that *Yoga* also have protective action by preventing acute respiratory infection<sup>40</sup>. In mild or moderate bronchial asthma there was a steady and progressive improvement in pulmonary functions. Research on mechanisms suggests that *Yoga* improves subjective measures as well as airway hyper responsiveness to methacholine<sup>41</sup>. *Yoga* has positive effect on musculoskeletal and cardiopulmonary function<sup>42</sup>. Studies suggest that *Yoga* therapy decreases dyspnea-related distress and improves functional performance in people with chronic obstructive pulmonary disease<sup>43</sup>.

**Quality of life** – The modern medicine is not as developed as it should be when management of patient's quality of life is concerned. *Yoga* has proved beneficial in improving the quality of life of diverse populations. *Yoga* interventions have improved the bone health<sup>44</sup>, lean body mass and balance in elderly population and reduced fall and risk of injury and fracture. RM has positive effect on mood and cognitive disorders<sup>45</sup>, late-life depression, anxiety, and sleep disturbance in geriatric population<sup>46</sup>. Studies have proved that *Yoga* has positive effect on mood disturbance, depression, anxiety, anger, confusion, cognitive disorganization and emotional irritability and reduces cardiopulmonary, gastrointestinal symptom in cancer patients<sup>47</sup>. Similarly *Yoga* intervention has proved beneficial in improving the quality of life and functional capacity of African American origin patients of chronic heart failure<sup>48</sup> and patients of multiple sclerosis<sup>49</sup>.

**Behavior and cognition** – The much needed thing at this moment is there should be some mean by which behavior harmony of a being should be maintained at personal, professional and community level. The cause of most of the crimes of the day is because people are not in peace with oneself. *Yoga* has proved efficient in promoting and maintains the harmony of body and mind at work place<sup>50</sup>. The results of the studies suggest that *Yoga* increases the efficiency in attention processing by extensive mental training. RM helps in significantly increasing

self-satisfaction and happiness in life by enhancing positive thinking<sup>51</sup>, reduces neurotic symptoms, scored higher cognitive functions. These results may be due to personality development, self-actualization and better attention and concentration achieved due to training in RM<sup>52</sup>. Practicing of RM has positive effects on substance abuse<sup>53</sup>, smoking cessation<sup>54</sup> and alcohol dependent individuals<sup>55</sup>. Further studies suggest that regular *Yoga* practice can effectively mitigate workplace stress<sup>56</sup>, examination stress<sup>57</sup>, stress-induced inflammation<sup>58</sup> and caregiver stress.

**Digestive system** – Digestive system is most commonly disturbed system due to various faulty eating habits. A large population is suffering with some or other minor to major ailments. And at times these conditions are distressing and seem to be incurable. Present medications have benefits for limited period of time. Regular use of RM has proved to be a positive effect on symptoms of diarrhea-predominant irritable bowel syndrome<sup>59</sup>, chronic pancreatitis<sup>60</sup>. A case study suggested RM along with prescribed proton pump inhibitors can control the severe symptoms of gastroesophageal reflux disease and can avoid or delay the need for invasive procedures<sup>61</sup>. Thus, it could be concluded that *Yoga* could aid in treating disorders of digestive system.

**Endocrine system** – *Yogic* practices have proved that it promotes improvements in several indices of importance in diabetes mellitus II (DM2) management, which includes glycemic control, lipid levels, and body composition. Studies also suggest that *Yoga* may also lower oxidative stress and blood pressure; enhance pulmonary and autonomic function, mood, sleep, quality of life and reduce medication use in adults with DM2<sup>62</sup>. Similar encouraging results were obtained on hyperinsulemia, dyslipidaemia and hyperglycemia in coronary artery disease, hypercholesterolemia and metabolic syndrome<sup>63</sup>. Thus, it can be concluded that RM have significant role in correcting endocrine and metabolic disorders. Regular practitioners of *Yoga* asanas showed a significant reduction in urinary excretion of catecholamines, aldosterone, as well as serum testosterone and luteinizing hormone levels. In an experimental study, they also showed an increase in the urinary excretion of cortisol<sup>64</sup>.

**Female health** – The overall development of a family is dependent on health of females of the family. Studies have proved that *Yoga* can aid to this need of the society. RM have positive effect on hot

flushes<sup>65</sup>, a disturbing symptoms of menopause, lipid profile<sup>66</sup>, obesity, improving autonomic functions in post menopausal women by reducing body fat and weight<sup>67</sup>. *Yoga* has proved effective in treating premenstrual symptoms among working female population<sup>68</sup>. RM has positive effect on somatization, psychological symptoms, and stress related biomarkers of healthy women<sup>69</sup>. It alleviates depressive symptoms in women with fibromyalgia<sup>70</sup>. Randomized studies suggest that *Yoga* has improved physical activities and sexual satisfaction function of women with multiple sclerosis<sup>71</sup>. RM has proved to improve the quality of life in women with breast cancer undergoing radiotherapy<sup>72</sup>.

**Rehabilitation** – Yet another challenge of modern medicine is the field of rehabilitation, till now very little is explored and achieved in this aspect. A study suggests that *Yoga* have proved as an adjunctive therapy in managing the rehabilitation of patient's undergone coronary artery bypass graft, percutaneous transluminal coronary angioplasty. There was improved recovery after surgery, reduced postoperative pain and suffering, and lower hospital stay and costs, similar results were obtained for tinnitus rehabilitation<sup>73</sup>, spinal cord injury rehabilitation, in solid organ transplant recipients<sup>74</sup> and HIV patients<sup>75</sup>.

**Side effects and risks**- Side effect and risk of *Yoga* are rare but few cases are reported and the reason attributed is they are not practiced under the guidance and supervision of a qualified trainer. If practiced under the guidance and supervision of a qualified trainer, *Yoga* is a safe and effective intervention to increase strength, flexibility and balance, it is adopted in management of cardiovascular, respiratory disorders, chronic pains and psychosomatic disorders. In practice it is observed that it have low risk of side-effects and injury, and it is proved that it does not have interactions with prescription medications. A study was conducted on 25 MBBS first year students for assessing the safety of various *Asana* in hypertensive patients, it was found that the *sukhasana*, the *asana* which is prominently used for RM is the safest<sup>76</sup>.

## Conclusion

The various areas of study of *Yoga* practices were reviewed in the present article indicated physiological benefits of *Yoga* and effect of *Yoga* on nervous system, immune system, circulatory system,

respiratory system, digestive system and endocrine system. Antioxidant property of *Yoga*, treatment and prevention of neurodegenerative disorders, cardiovascular disorders, psychosomatic disorders, analgesic effect on pain, benefits of *Yoga* on female population and role of *Yoga* on rehabilitation. It could be concluded that under supervision *Yoga* can be adopted by a large healthy and diseased population.

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