



# EFFECT OF YOGA AND EXERCISE ON HEALTH: A REVIEW

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## ABSTRACT

*In 21<sup>st</sup> century everyone needs to fit and healthy. According to WHO (world health organisation) health may refer to complete physical and mental well-being. There are two things which can make a person healthy: - Yoga and Exercise. In this the suppression of all activity of body, minds and make them in order for distinction and liberations. It includes breathing control, meditation and adoption of specific portion of the body. By the yogic method person can obtained control on latent power and self-realization. In modern time, yoga is used for the medication and therapeutic purpose. It can help patients to reduce their medications and slow down the disease spread. It also helps to maintain the body activity and enhanced the physical activity of a person. Improve strength and growth, cardio-vascular system. Exercise and yoga have some advantages and disadvantages.*

**KEYWORDS:** - *yoga and exercise, medications and therapeutic purpose, advantages and disadvantages*

## INTRODUCTION

In 21<sup>st</sup> century everybody needs to be totally fit and fine. For this yoga and yogic practise is the most important one.<sup>1</sup> Yoga can originate from Sanskrit root which means the suppression of all activity of body, minds and make them in order for distinction and liberations. It includes breathing control, meditation and adoption of specific portion of the body.<sup>2,3,4</sup> By the yogic method person can obtained control on latent power and self-realization. In modern time, yoga and exercise is used for the medication and therapeutic purpose.<sup>5,6</sup> It can help patients to reduce their medications and slow down the disease spread.<sup>7</sup>

Some yoga practises like asanas and pranayama help to improve the oxidative stress and glycaemia of diabetes patients by neuro endocrinal mechanism. Yoga can reduce the cholesterol level.<sup>8,9</sup> By the help of yoga, the body can be connected to its solar plexus and batteries where the energy is stored.<sup>10</sup> When it's done or in mid-session of yoga this energy can be release may give the useful effects on their mental, physical and spiritual rejuvenation.<sup>11,12</sup> Regular practise of yoga removes the obstructions and flow of energy is more and bring back the harmony and health to the system.<sup>13,14</sup> Daily practise of yoga (pranayama) increases the lungs capacity, breathing capacity, blood circulation and cardiovascular efficiency. It also helps to normalized

the blood pressure, increases strength, increases the tone of nervous system, improve sleep etc.<sup>15,16</sup>

Yoga helps to synchronizes the function of mind, muscles, eliminate the stress and stain which can improves the mental and physical fitness. Physical fitness gives support to body to perform daily activity without any fatigue. It prepares the mind to face tough challenges and task.<sup>17,18,19</sup>

Yoga gives benefits to all ages of peoples. It gives direct effects on physical, physiological and the regeneration of strength process.<sup>20</sup> It can also use for warm up, cool down, regeneration and synthesis of mind and body. It also used for the relief from lower and upper extremities of pain.<sup>21,22</sup> It included stretching the different part of body like spine cord, backbone. Yoga helps to maintain the health of endocrine gland it maintains the overall functions of different system of body.<sup>23,24</sup> Seriously, daily practise of yoga can improve your health and cardio-respiratory efficiency.

## TYPES OF YOGA

Yoga is the most important heritage of India. In modern era, world depend on yoga for their various answers. It is the art of living and it may affect various part of the body. Yoga may help to maintain the mental, physical health and may help to develop the moral and intellectually.<sup>25,26,27</sup>



Different types of yoga are: -

- Bhakti yoga
- Hatha yoga
- Swarayoga
- Asthanayoga
- Mantrayoga
- Raj yoga
- Trantra yoga
- Karma yoga

### IMPORTANCES OF YOGA

Daily practising of yoga makes you happy and free from body problems. It helps to maintain the physical and mental discipline to achieve a peaceful mind and soul. Yoga can help in many ways like<sup>28,29,30</sup>

- Yoga helps to improve the old and new injuries
- Yoga helps to improves overall organ functioning
- It helps to reduces the stress and enhance the relaxation
- It helps in healthy and glowing skin
- Yoga helps to reduces the pain and enhancing mental clarity
- It helps to Boost the physical strength, stamina, flexibility and immune system
- Yoga helps to enhance the posture and muscles tones and improve the blood circulation
- Yoga help to improve the power of concentration and also self-control

### BENEFIT OF YOGA AND EXERCISE

Now a day, everyone needs to be fit. Yoga and exercise are one the best way to get fit. It has both therapeutic and preventive benefits.<sup>31</sup> Yoga and exercise may help to connect mind and body. It also helps to improve health and well-being. Yoga has several types of positions which help them to connect with meditation.<sup>32,33</sup> Yoga help to control the breath throughout the practise it will help to clearing the mind. Regular practise of yoga and exercise gives health benefits. There are some benefits of yoga and exercise are: <sup>34,35</sup>

#### 1. Stress and anxiety management

Yoga and meditation help to reduce the stress level. It also helps to reduce the blood pressure and cardiovascular diseases.<sup>36,37</sup>

#### 2. Fitness and flexibility

Now a day, everyone is busy with their life. Most of the work are on the office bench, it lead to reduces the muscle mass, fitness and flexibility and raises the neck pain, shoulder pains by bending over computers all the time. Possess of yoga may help to stretching and elasting the muscles. Around the globe many athletes may doing yoga in their practises.<sup>38,39,40</sup>

### 3. Emotions

For overall well-being, yoga and medications are help to improve the focus of mind. Yoga practisers are happy, calm and focused on their daily life style. Meditations may lead to deep relaxation.<sup>41,42</sup>

### 4. Diabetic health

Meditation and yoga are used to decreases the sugar level in the blood and also reduces the blood pressure. It also reduces and lower the symptoms of diabetes.<sup>43,44</sup> Stress is the main reason for sugar level increasing. Daily practising of yoga and meditation can help to reduces the stress level which in turn reduces the level of glucagon and also reduces the insulin levels.<sup>45,46</sup>

### 5. Better health and diet improvement

In modern era, the life is full of stressful, persons are busy with their schedules. It can exhaust for long hours and sleep less, hypersensitivity and anxiety disorder.<sup>47</sup> Yoga and meditations are helps to reduces these problems and improve the value and possibilities of the life. Yoga help to improve the health benefit and leading to better habit of eating.<sup>48</sup>

### HISTORY OF YOGA

It is been believe that yoga is developed or originate thousand year ago. Many scientists and Indologists believe that yoga is been develop in late 500 B.C.<sup>49,50</sup> Now Archaeology survey and scientists confirmed that yoga is been 5000-year-old. This yoga practices came from Harrapan cultures. Vedas are the oldest scriptures.<sup>51,52</sup> Veda means “Knowledge”. Rig Vedas is the praise of higher power. Yajur Ved, Sama Ved, and Atharva Ved another three vedas. Archaic yoga another name of vedic yoga, peoples are believed in ritualistic way of life. Rituals means the connection to spirt world. For illumination people turn into rishis or Vedic yogis. There are lots of yogic positions which were used by Indian yogic now a days.<sup>53,54,55</sup>

#### Vedas

In India, Vedas are the foundation of cultures by philosophy and religion. Major and important Vedas are Rigveda, Yajurveda, Samaveda and Atharvaveda. Rig Veda is the collection of hymns.<sup>56,57</sup> It is a praise of higher power. There is no direct explanation of word yoga are mentions in any types of Veda but a word ‘dhira’ is mention in every Vedas means self-realized. Vedas explains every sitting position like Asana, the Pranayama, the Mudras, Meditation techniques, the cleanliness Yama and Niyama, the Dharanas. Asanas are mainly used for meditations.<sup>58,59,60</sup> In every morning sun salute is the routine activity. Pranayama is done by daily basis. Vedas explain some meditation technique also. Vedas also give information about the Tapas, Vratas and Moka. Vedas are the oldest scriptures. By Vedic yoga, persons are believed in rituals, sacrifices and ceremonies which means connections to spirit world. For this illumination peoples are turn into rishis



munis. These rishi munis is blessed with the supreme hymns speaks in their marvellous intuitions.<sup>61,62,63</sup>

### Upanishads

Philosophy of yoga was based on Upanishads. It said that when the fire is produced by rubbing, where the air is controlled, then mind takes perfection.<sup>64,65</sup> According to Katha Upanishad, yoga is a chariot, reasoning consciousness is the driver and the body is like a cart. Upanishads shows the true knowledge of reality and essence of Vedas.<sup>66,67</sup> It is also used for the treatment of diseases. Samadhi were explained by Kathopanishad. It can also explain the qualities of soul. Kenopanishad, Ishavasya Upanishad, Shwetavatara Upanishads these three gives detail about yoga.<sup>68,69,70</sup>

According to Katha Upanishad, yoga is holding of the senses. According to Maiti Upanishad, yoga is breath, mind and sense oneness.<sup>71</sup>

### Smriti

Smriti is a text and it deal with disciplines. Manusmrti, Yajavalkya Smrti, and Harita Smriti this three gives detailed about the yoga.<sup>72</sup> According to Smrti, Brahmacharya, Grhastha, Vanaprastha and Sanyasa are the four stages of life. The muse of asanas is myths and legends. Asanas and text are the parallel tracks to self-realization.<sup>73,74</sup>

### Jainism

Yoga is very well explained in Jainism. According to Jainism, yoga may be defined as the movement of mind and body towards soul. Liberation of spirit is also explained in Jainism.<sup>75,76</sup>

## TEACHINGS OF BUDDHA

Yoga was also found in Buddhism. Study of yoga was first done by lord buddha. Buddhism teaching was similar to yoga. Yogachara was the first school which taught about yoga and Buddhist. Now it can open throughout the world. Buddhism include meditation and physical postures. Suksma dhyana and Nirhara Dhyana types of meditation.<sup>77,78</sup>

### Panini

According to Panini, yoga is union with the supreme. It is also a grammarian. lessons of grammar, Astadhyayi were written.

### The Epics

Detail of yoga, were also written in Ramayana and Mahabharata. Yoga Vasishtha were return in this time. Yama and Niyama were explain in Ramayana. Definition of dharma were defined in this book. Mahabharata and Bhagavad-Gita also show the details of yoga.<sup>79</sup>

According to yoga sutra, yoga helps to control the mind. Some puranas give detail about yoga. Bhagavata purana show the bhakti yoga. Yama, Niyama and Pranayama are shown by Linga purana. Purana also show the details about Pratyahara, Dharana, and Dhyana.<sup>80,81</sup>

## EVOLUTION OF YOGA

### 1. Pre-Vedic period (before 3000BC)

According to western scholars, it was believed that yoga was originated in 500BC it was the time of Buddhism. Depiction of yoga were found at Harappa and Mohenjo-Daro. This shows that yoga was originated around 5000 years ago but there is no evidence about that.<sup>82,83</sup>

### 2. Vedic period (3000 BC to 800BC)

According to Vedic period, yoga was ritually, concentration development and transcend to mundane. This practise is very much different present yoga.<sup>84,85</sup>

### 3. Preclassical (Upanishad) period (800 BC to 250 BC)

According to Upanishad, yoga can be explained in Mahabharata and Bhagavad Gita. According to Bhagavad Gita, Jnana yoga, Bhakti yoga, Karma yoga and Raja yoga are the form of yoga. during the Gitopadesha, Krishna explain that at higher state of consciousness, person seek their reality with humility and reverence.<sup>86,87</sup>

### 4. Classical period (184 BC to 148 BC)

According to classical period, Patanjali has 195 yoga sutras. It is also known as raja yoga. Some classical limbs of yoga are: - Yama (social conduct), Niyama (personal conduct), Asana (physical postures), Pranayama (breathing regulation), Prathyahara (withdrawal of senses), Dharana (concentration), Dhyana (meditation) and Samadhi (transcendence). Postures and breathing regulation were added by Patanjali for the regulation of yoga it was used as secondary practises after Dhyana and samadhi. It also hasn't any name of asanas and pranayama.<sup>88,89,90</sup>

### 5. Post classical period (800 AD to 1700 AD)

The followers of Patanjali gave very impotence to every yoga practises like asanas, kriyas and pranayama, can help to stable or maintenance of body and mind. Body and mind purification can help some practitioners to reaches at higher level like samadhi it is called hatha yoga.<sup>91,92,93</sup>

### 6. Modern period (From 1863 AD onwards)

At the parliament of religions Chicago, swami Vivekananda introduces yoga to the world. He wrote four paths: raja yoga (meditation), karma yoga (selfless action), bhakti yoga (devotion), and jnana yoga (metaphysics).<sup>94,95</sup> In 20<sup>th</sup> century yoga become most popular around the world. Scientist of kaivalya Hama yoga institute and yoga institute Mumbai have initiated systemic practice and research in yoga and it were spread worldwide. It includes teaching set and practitioners in yoga. Now a day, swami Ramdev from India makes yoga more popular and done research on it and make it effectiveness in health care.<sup>96,97</sup>



## FOUNDATIONS OF YOGA PRACTICE

In modern era everyone needs to healthy and fit. Yoga makes that possible. It works on mind, emotion and energy level. Yoga will be classified into following groups:<sup>98,99</sup>

1. karma yoga- utilization of body
2. bhakti yoga- utilization of emotions
3. Gyana yoga- utilization of mind and intellect
4. kriya yoga- utilized energy

All are practicing the yoga under these four classifications. For ancient times, yoga was directed under the guidance of Guru. Only guru can mix these four-fundamental paths. Guru can give yoga education to daily practiser persons. This education imparted with knowledge, experienced and seers (Rishis/Munis/Acharyas),<sup>100,101</sup> Yoga education, helps to take care individual. In modern era, yoga education is been given to Yoga Institutions, Yoga Colleges, Yoga Universities, Yoga Departments in the Universities, Naturopathy colleges and Private trusts & societies. Many yoga clinic, preventative health care unit of, yoga therapy etc has been stabilised in hospital, medical institutions.<sup>102,103</sup>

## PHYSICAL ASPECTS OF YOGA

In modern era, yoga and exercises can be a game changer. Physical molding and cantered fixation both are the striking component of yoga. Daily yogic practise makes the person healthy and physical wellness.<sup>104</sup> Yoga asanas gives the development of spine, for control breath, focus on daily schedules. Dur to muscular and physical stress, body imbalance is occurring which may lead to different aches and pains. Asana is done by smooth, control movement to provide the maximum stretch to body.<sup>105,106</sup>

## PHYSIOLOGICAL ASPECTS OF YOGA

Yoga helps to improve the legitimate working of the body. Yoga nourishes the endocrine gland which is useful for development and advancement. It has been proved that yoga can increases the capacity of processing and breathing.<sup>107,108</sup> It helps to blood flow to the mind and improve the mental health. Yoga can improve muscle strands and nerves for physiological work. Legitimate can be improve the joints, breath and blood pressure.<sup>109,110</sup>

## YOGA IMPROVES HEALTH

### 1. Improves your flexibility

Flexibility is the first and most beneficial of yoga. Normal person cannot touch his feet's but continuous practices of yoga can help them. Continuous using of yoga can remove or decreases the pain and aches.

### 2. Muscle strength

Strong muscle help to protect us from arthritis, back pain etc. strength is made up by yoga.

### 3. Protect your spine

Crave movement help the spine to take their nutrition. Some asana practices may keep this disk supple.

### 4. Blood flow

Yoga helps to increases the blood flow in the body. it helps to circulate the blood specially hands and feet. Yoga boots the haemoglobin and red blood cells level; it carries oxygen to cells and helps to increases the blood flow in heart and may reduce the swelling in kidney or heart problems. Blood clot is responsible for heart attack and stocks, yoga may help to remove or dilute theses clots and make person healthy.<sup>111,112,113</sup>

### 5. Focusing

Now a day, focus is much more important then everything. For any kind of work focus is important. Yoga helps to improve your focus, reaction time, memory and IQ.

### 6. Improve system and balance

Yoga can encourages relax, slow your breath, focus and sift the balance the sympathetic nervous system. This improve the blood flow to intestine and reproductive organs, decreases the blood pressures. Regular practices of yoga exercise improve body balance. It removes or decreases the back pain, knee pains and other body problem.<sup>114,115,116</sup>

### 7. Immune system

Yoga (asana and pranayama) can improve or boost the immune system. Meditation is the important way of boosting immune system.

### 8. IBS and other digestive problems

Now a day, everyone suffers with many kinds of diseases or problems. Some are ulcer, irritable bowel syndromes and constipations. Some yoga practices may help to improve the constipation problems and also lower the risk of colon cancers. In physical practises body can move which help in digestion and removes the waste product from the body.<sup>117,118,119</sup>

## PHYSICAL FITNESS

Physical fitness is defined as the combination of qualities it enables to perform physical activity. Physical fitness is the ability of aspects of sports, occupation and activity.<sup>120,121</sup> It can be achieved by proper nutrition, physical activity and sufficient rest. In modern era, fitness may be defined as the person and machine's ability to perform a function and ability to perform various activity. Physical fitness may help in to reduces the many types of heart disease.<sup>122,123</sup>

## CATEGORIES OF PHYSICAL FITNESS:

It can be sub-divide into 5 categories: -



### 1. Cardiovascular fitness: -

On a sustained period of time, the body is able to deliver the oxygen and nutrition to the tissue and to remove the waste product. Aerobic exercise can be used to improve this cardiovascular fitness. This may moderate the level of intensity over a long period of time.

### 2. Muscular strength

It may define as the ability of the muscle to exert force for a long period of time.

### 3. Muscular endurances

In which a muscle, a group of muscles continue to apply the force against the objects. Weight training may help to develop the strength and it may increase the size of skeletons.<sup>124,125</sup>

### 4. Flexibility

It may be defined as the ability of the muscles to roll over and to move the joints in full motions.

### 5. Body composition

Composition means the lean mass and fat mass. Body/mass index help to optimized the ratio of fat to lean mass. It may also help to determine whether the person is healthy in their body type.<sup>126,127</sup>

## IMPORTANCE OF PHYSICAL FITNESS

Physical fitness may produce the positive effects on body's blood pressure. It may also help in making a stronger heart. There is some importance of physical fitness are: <sup>-128,129</sup>

### 1. Health booster

Regular exercise can boost your health and maintain whole body. It can also help to maintain the lungs and heart. It can reduce the chronic illnesses. It is used for better sleep, immune booster, increase stamina.

### 2. Improve mental health

Physical fitness can also help to improve the mental health of the person. It can help to improve the concentration, increases memory and also increase the learning capacity. It can reduce the stress, anxiety, depression and fatigue.<sup>130,131</sup>

### 3. Social benefits

Physical fitness can increase the cohesion with families and community. It helps to improve the social and community networks with others. It can reduce the sense of isolation and loneliness.

### 4. Strength and stamina

Physical fitness increases the bone density, flexibility and muscular strength. It helps to bones stronger and muscle grow. It can give better balance and better protective against the injuries.<sup>132,133,134</sup>

## REFERENCES

1. Matthews M, Comfort P. Crebin Complex training in ice hockey the effects of a heavy resisted sprint on subsequent ice-hockey sprint performance.

2. Srinivasan, Ramakrishna. Effect of weight training and interval training on selected motor fitness and psychological variables of men handball players. *Pesy Quarterly International Journal of Physical Education Sports Management and Yogic Sciences*. 2013; 3(1):10-14.
3. Jayaraman. Effects of Different Depth of Aqua Training on Selected Physical Fitness Variables among College Men. *Horizon Palaestra International Journal of Health, Sports and Physical Education*. 2012; 1(2):67-71.
4. Croucher Paul E. Effects of an assisted jump training stimulus on explosive performance. *Master's thesis, Wintec 2010*.
5. Singh. Effect of Speed, Agility and Quickness (SAQ) Based Soccer Drill on Fitness and Skill Abilities of Football Players. *Horizon Palaestra International Journal of Health, Sports and Physical Education*. 2012; 1(2):43-48.
6. Allen Phillips D, James E, Horuak. *Measurement and evaluation in physical education*, New York: Hon Wiley and Sons, Inc, 1979.
7. Barrow Harold M, Rosemary Gree Mc. *A practical approach to measurement in physical education (3rd ed.) Philadelphia, Complex Training Lea and Febiger, 1979*.
8. Frank W, Dick. *Sports Training Principles*, London: The A & C Black Publishers Ltd, 1980, 189.
9. Grosset Dunlop. *Enjoying Track and Field Sports*, London: Paddington Press Ltd, 1979, 82.
10. Haerricecil F. Wyed Eric, Patride H. *Wenstar UIniversal Dictionary Bombay, the Tulsisash Enterprise, 1970, 712*.
11. Hardayal Singh. *Science of Sports Training*, New Delhi: D.V.S. Publications, 1991, 2.
12. Ahilan R, Nathan, Senthil. Effect of Asana and Pranayama on physiological variables. *Internet. J. Phy. Edu.* 2012; 5(1):24-26.
13. Anis Chaouachi et al. Anthropometric, physiological and performance characteristics of elite team-handball players. *Journal of Sports Sciences*. 2009; (27):151-157.
14. Chidambara Raja S. Effect of Yogic Practice and Physical Fitness on Flexibility, Anxiety and Blood Pressure. *Indian Journal for Research in Physical Education and Sports Sciences*. 2010; 5:1.
15. Komathi R, Kalimuthu M. Effect of Yogic Practices on Abdominal Strength among School Boys" *Recent Trends in Yoga and Physical Education*. 2011; 1:51.
16. Madanmohan et al. Effect of Yoga Training on Reaction Time, Respiratory Endurance and Muscular Strength. *Indian Journal of Physiology and Pharmacology*. 1992; 30(6):22.
17. Rajakumar J. The Impact of Yogic Practices and Physical Exercises on Selected Physiological Variables among the Inter-Collegiate Soccer Players. *Journal for Bloomers of Research*. 2010, 2(2).



18. Sekarbabu K, Kulothugan P. *Effect of Yogic Practices on Selected Physiological Variables of Men Hockey Players, Recent Trends in Yoga and Physical Education.* 2011; 1:321.
19. Tran et al. *Effects of Hatha Yoga Practice on the Health Related Aspects of Physical Fitness, Preventive cardiology.* 2001; 2:165.
20. Serwah N, Marino FE. *The combined effects of hydration and exercise heat stress on choice reaction time. J Sci Med Sport* 2006; 9: 157–164.
21. Yokesh TP, Chandrasekaran K. *Effect of yogic practice on selected physical fitness among overweighted school boys, Recent Research in Science and Technology.* 2011; 3(9):43-45. ISSN 2076-5061.
22. Fan JT, Chen KM. *Using silver yoga exercises to promote physical and mental health of elders with dementia in long-term care facilities. International Psychogeriatrics* 2011; 23:1222-1230.
23. Fazelifar S. *A comparative study of physical fitness in 11-13-year old male students of Amol City. Iranian Journal of Motion* 28 107-126. Gaurav V (2011). *Effects of Hatha Yoga training on the health-related physical fitness. Journal of Sports Science and Engineering* 2007; 5:169-173.
24. Hittleman R. *Yoga for Health (Ballantine Books).* Mirghafouri H, Touranloo H and Mirfakhrudini H. *An analysis of the barriers to women's participation in sport activities: A case study of female students of Yazd University. Iranian Journal of Sports Management.* 2009; 183-100, 2013.
25. Olufemi AJ, Aadaeze N. *Effectiveness of an eight-week low impact aerobic dance programme on the management of osteoarthritis. International Journal of Humanities and Social Science* 2013; 2:286-291.
26. Roma MF, Busse AL, Betoni RA, Melo AC, Kong J, Santarem JM, Jacob Filho W *Effects of resistance training and aerobic exercise in elderly people concerning physical fitness and ability: a prospective clinical trial. Einstein (Sao Paulo)* 2013; 11:153-7.
27. Sadeghi H. *An Introduction to Sports Biomechanics (Tehran: SAMT).* Shahana A, Nair US, Hasrani SS. *Effect of aerobic exercise programme on health-related physical fitness components of middle-aged women. British Journal of Sports Medicine.* 2010; 44:19-23.2006.
27. Bangsbo J, Nørregaard L, Thorsø F. *Activity profile of competition soccer. Can J Sport Sci* 1991; 16: 110–116.
28. Berch DB, Krikorian R, Huha EM. *The corsi block-tapping task: methodological and theoretical considerations. Brain Cogn* 1998; 38: 317–338.
29. Byrne C, Lim CL. *The ingestible telemetric body core temperature sensor: a review of validity and exercise applications. British Journal of Sports Medicine* 2007; 41: 126–133.
30. Cian C, Barraud PA, Melin B, et al. *Effects of fluid ingestion on cognitive function after heat stress or exercise-induced dehydration. Int J Psychophysiol* 2001; 42: 243–251.
31. Cousins MS, Corrow C, Finn M, et al. *Temporal measures of human finger tapping: effects of age. Pharmacol Biochem Behav* 1998; 59: 445–449.
32. Crandall CG. *Heat stress and baroreflex regulation of blood pressure. Med Sci Sports Exerc* 2008; 40(12): 2063–2070.
33. Crandall CG, Wilson TE, Marving J, et al. *Effects of passive heating on central blood volume and ventricular dimensions in humans. J Physiol* 2008; 586: 293–301.
34. Draelos MT, Jacobson AM, Weinger K, et al. *Cognitive function in patients insulin-dependent diabetes mellitus during hyperglycemia and hypoglycemia. Am J Med* 1995; 98: 135–144.
35. Edwards AM, Mann ME, Marfell-Jones MJ, et al. *Influence of moderate dehydration on soccer performance: physiological responses to 45 min of outdoor match-play and the immediate subsequent performance of sport-specific and mental concentration tests. Br J Sports Med* 2007; 41: 385–391.
36. Ekblom B. *Applied physiology of soccer. Sports Med* 1986; 3: 50–60. Havenith G, Heus R, Daanen HA. *The hand in the cold, performance and risk. Arctic Med Res* 1995; 54(Suppl. 2):37–47.
37. Hogervorst E, Bandelow S, Schmitt J, et al. *Caffeine improves physical and cognitive performance during exhaustive exercise. Med Sci Sports Exerc* 2008; 40: 1841–1851.
38. Lieberman HR. *Hydration and cognition: a critical review and recommendations for future research. J Am Coll Nutr* 2007; 26: 555S–561S.
39. Maughan RJ, Shirreffs SM, Watson P. *Exercise, heat, hydration and the brain. J Am Coll Nutr* 2007; 26: 604S–612S.
40. Nunneley SA, Martin CC, Slauson JW, et al. *Changes in regional cerebral metabolism during systemic hyperthermia in humans. J Appl Physiol* 2002; 92: 846–851. Nybo L, Nielsen B. *Hyperthermia and central fatigue during prolonged exercise in humans. J Appl Physiol* 2001a; 91: 1055–1060.
41. Nybo L, Nielsen B. *Middle cerebral artery blood velocity is reduced with hyperthermia during prolonged exercise in humans. J Physiol* 2001b; 534: 279–286.
42. Owen AM, Herrod NJ, Menon DK, et al. *Redefining the functional organization of working memory processes within human lateral prefrontal cortex. Eur J Neurosci* 1999; 11: 567–574.
43. Racinais S, Gaoua N, Grantham J. *Hyperthermia impairs short-term memory and peripheral motor drive transmission. J Physiol* 2008; 586: 4751–4762.



44. Shirreffs SM, Merson SJ, Fraser SM, et al. The effects of fluid restriction on hydration status and subjective feelings in man. *Br J Nutr* 2004; 91: 951–958.
45. Sternberg S. High-speed scanning in human memory. *Science* 1966; 153: 652–654.
46. Sternberg S. Memory-scanning: mental processes revealed by reaction-time experiments. *Am Sci* 1969; 57: 421–457.
47. Szinnai G, Schachinger H, Arnaud MJ, et al. Effect of water deprivation on cognitive-motor performance in healthy men and women. *Am J Physiol* 2005; 289: R275–R280.
48. Warren RE, Frier BM. Hypoglycaemia and cognitive function. *Diabetes ObesMetab* 2005; 7: 493–503. Wilson MG, Morley JE. Impaired cognitive function and mental performance in mild dehydration. *Eur J Clin Nutr* 2003; 57(Suppl. 2): S24–S29.
49. Anjali Joglekar (1999), “A Study of the Effect of Yogic Exercises for the promotion of Physical Fitness and Badminton skills of College Girls of Age between 18 to 20 Years.” Masters’ Dissertation in Physical Education, BPCA’s College of Physical Education, University of Mumbai, pp.1- 138.
50. B K Acharya, et. al. (2010), “Effect of Pranayama (voluntary regulated breathing) and Yogasana (yoga postures) on lipid profile in normal healthy junior footballers *International Journal of Yoga*, 3(2): P 70.
51. B. Donohue, et.al. (2006), “Effects of brief yoga exercises and motivational preparatory interventions in distance runners: results of a controlled trial” *British Journal of Sports Medicine*. January; 40(1): Pp 60–63.
53. Bandelow S, et.al. (2010) “The effects of exercise, heat, cooling and rehydration strategies on cognitive function in football players.” *Scandinavian Journal of Medicine and science in Sport* .” Oct; 3: Pp 148-60.
52. Brechue W.F and Mayhew J L. Upper -body work capacity and IRM prediction are unaltered by increasing Physical fitness in college football players. *Journal of Strength and Conditioning Research*. 2009; 23(9): Pp 2477 - 86.
53. Cowen, V.&Admas t. (2005). “Physical and perceptual benefits of yoga asana practice: results of a pilot study”. *Journal of Bodywork and Movement Therapies*.9:3:211-219.
54. Ledoux, M. et al., (1997), “A Comparative Analysis of Weight to Height and Waist to Hip Circumference Indices as Indicators of the Presence of cardiovascular Disease Risk Factors”, *Canadian Medical Association Journal*, 157(S-1), pp.32-38.
55. Petrofsky JS., et al., (2005), “Muscle Activity during Yoga Breathing Exercise Compared to Abdominal Crunches”, *The Journal of Applied Research*, 5(3), pp.501-507.229.
56. Tran, M.D., Holly, R.G., Lashbrook, J. et al. Effects of Hatha yoga practice on the health-related aspects of physical fitness. *Preventive Cardiology*. 2001;4:165–170.
57. 59. Anderson, S. & Sovik, R. (2000). *Yoga: Mastering the basics*. Honesdale, PA: Himalayan Institute Press.
- Aranya, H. (1983). *Yoga philosophy of Patanjali*. Albany, NY: State University of New York Press.
- Bhatt, (2004). *The Forceful yoga: Being the translation of Hathayoga-pradipika, Gheranda-samhita and Siva-samhita* (P. Singh, R. Bahadur, & S. C. Vasu, Trans.). New Delhi, India: Motilal Banarsidass Publishers.
58. Bhavanani, A. B. (2007). *Swarodaya vigyan: A scientific study of the nasal cycle*. *Yoga Mimamsa*, 39, 32–38.
59. Bhavanani, A. B. (2008). *A primer of yoga theory*. Pondicherry, India: Dhivyananda Creations.
60. Bhavanani, A. B. (2013). *Yoga chikitsa: Application of yoga as a therapy*. Pondicherry, India: Dhivyananda Creations.
61. Bhavanani, M. D. (2012). *The history of yoga from ancient to modern times*. Pondicherry, India: Satya Press.
62. Bryant, E. (2009). *The yoga sutras of Patanjali*. New York: North Point Press.
63. Feuerstein, G. (1996). *The Shambala guide to yoga*. Boston, MA: Shambala Publications Inc.
64. Feuerstein, G. (2001). *The yoga tradition: Its history, literature, philosophy, and practice*. Prescott, AZ: Hohm Press.
65. Feuerstein, G. (2003). *The deeper dimension of yoga theory and practice*. Boston, MA: Shambala Publications Inc.
66. Giri, G. S. (1976). *Yoga: Step-by-step*. Pondicherry, India: Satya Press.
67. Giri, G. S. (1999). *Ashtanga yoga of Patanjali*. Pondicherry, India: Satya Press.
68. Goswami, S. S. (1999). *Laya yoga: The definitive guide to the chakras and kundalini*. From the preface by G. Feuerstein.
69. Nikhilananda, S. (1931). *Vedantasara*. Almora, U.P., India: Swami Vireswarananda, Advaita Ashram.
- Panikkar, R. (1977). *The vedic experience*. New Delhi, India: Motilal Banarsidass.
70. Rama, S. (1990). *Wisdom of the ancient sages: The mundaka upanishad*. Honesdale, PA: Himalayan Institute Press.
- Saraswati, S.S. (1999). *Four chapters on freedom*. (Commentary on yoga sutras of Patanjali). Munger, India: Bihar School of Yoga.
71. Saraswati, S. M., & Saraswati, S. S. (1985). *Hatha yoga pradipika*. Munger, India: Bihar School of Yoga.
- Schweig, G. (2007). *The bhagavad gita*. New York: HarperCollins Publishers.
72. Tignait, R. (2008). *The pursuit of power and freedom: Katha upanishad*. Honesdale, PA: Himalayan Institute Press.
73. Tignait, R. (2014). *The secret of the yoga sutra: Samadhi pada*.
74. Honesdale, PA: Himalayan Institute Press.
- Venkatesananda, S. (2007). *The supreme yoga:*



- Yoga  
Vashishta. Delhi, India: Mothilal Banarsidass.
75. Walker, M. (2015, February 11). Yoga gains popularity with adults, children. *MedPage Today*.
  76. Radhakrishnan S, Moore CA, A Sourcebook in Indian Philosophy, 1967.
  77. Dasgupta, Surendranath A History of Indian Philosophy. I. Delhi, India: 1975; 226.
  78. Dass, Baba Hari the Yoga Sytras of Patanjali, A Study Guide for Book I, Samadhi Pada; Translation and Commentary. Santa Cruz, California: Sri Rama Publishing. 1999; 5.
  79. Aranya, Swami Hariharananda, Yoga Philosophy of Patanjali with Bhasvati. Calcutta, India: University of Calcutta. 2000, 1.
  80. Stephen Phillips Yoga, Karma, and Rebirth: A Brief History and Philosophy. Columbia University Press. 2009, 28-29.
  81. Patrick Olivelle the Early Upanishads: Annotated Text and Translation. Oxford University Press. 1998.
  82. Satish Chandra Historiography, Religion, and State in Medieval India, Archived from the original on 4 February 2013. Retrieved 29 August 2012, 135–136.
  83. Satish Chandra Historiography, Religion, and State in Medieval India. 2007; 135-136.
  84. Matilal BK, "Perception. An Essay on Classical Indian Theories of Knowledge", Oxford University Press, 1986.
  85. Rethorst CD, Wipfli BM, Landers DM. The antidepressive effects of exercise: a meta-analysis of randomized trials. *Sports Med* 2009; 39:491–511.
  86. Wipfli BM, Rethorst CD, Landers DM. The anxiolytic effects of exercise: a meta-analysis of randomized trials and dose-response analysis. *J Sport Exercise Psychol* 2008; 30:392–410.
  87. Breus M, O'Connor P. Exercise induced anxiolysis: a test of the "time out" hypothesis in high-anxious females. *Med Sci Sports Exercise* 1998; 30:1107–1112.
  88. Abrantes AM, Strong DR, Cohn A, Cameron AY, Greenberg BD, Mancebo MC, Brown RA. Acute changes in obsessions and compulsions following moderate-intensity aerobic exercise among patients with obsessive-compulsive disorder. *J Anxiety Disorders* 2009; 23:923–927.
  89. Smith MA, Schmidt KT, Iordanou JC, Mustroph ML. Aerobic exercise decreases the positive-reinforcing effects of cocaine. *Drug Alcohol Depend* 2008; 98:129–135.
  90. Taylor AH, Ussher MH, Faulkner G. The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: a systematic review. *Addiction* 2007; 102:534–543.
  91. Williams DM, Dunsiger S, Whiteley JA, Ussher MH, Ciccolo JT, Jennings EG. Acute effects of moderate intensity aerobic exercise on affective withdrawal symptoms and cravings among women smokers. *Addict Behav* 2011; 36:894–897.
  92. Ussher M, Sampuran A, Doshi R, West R, Drummond D. Acute effect of a brief bout of exercise on alcohol urges. *Addiction* 2004; 99:1542–1547.
  93. Kessler RC, Angermeyer M, Anthony JC, De Graaf R, Demyttenaere K, Gasquet I, De Girolamo G, et al. Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* 2007; 6:168–176.
  94. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *The Lancet* 2012; 379:55–70.
  95. Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2007; 64:830–842.
  96. Compton WM, Thomas YF, Stinson FS, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV drug abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry* 2007; 64:566–576.
  97. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005;62:593–602.
  98. Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry* 2005;62: 617–627.
  99. Kessler RC, Wang PS. The descriptive epidemiology of commonly occurring mental disorders in the United States. *Annual Review of Public Health. Palo Alto: Annual Reviews, 2008:115–129.*
  100. Schuckit MA. Comorbidity between substance use disorders and psychiatric conditions. *Addiction* 2006; 101:76–88.
  101. Adrian M, Barry SJ. Physical and mental health problems associated with the use of alcohol and drugs. *Subst Use Misuse* 2003; 38:1575–1614.
  102. Schuckit MA. Alcohol use disorders. *The Lancet* 2009;373: 492–501.
  103. McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness. *JAMA* 2000; 284:1689–1695.
  104. Ramo DE, Brown SA. Classes of substance abuse relapse situations: a comparison of adolescents and adults. *Psychol Addictive Behav* 2008; 22:372–379.
  105. Connors GJ, Maisto SA, Donovan DM. Conceptualizations of relapse: a summary of





- psychological and psychobiological models. *Addiction* 1996;91: S5–S13.
106. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet* 2012; 380:247–257.
107. Carlson SA, Fulton JE, Schoenborn CA, Loustalot F. Trend and prevalence estimates based on the 2008 Physical Activity Guidelines for Americans. *Am J Prevent Med* 2010;39: 305–313.
108. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet* 2012;380:219–229.
109. Liangpunsakul S, Crabb DW, Qi R. Relationship among alcohol intake, body fat, and physical activity: a population-based study. *Ann Epidemiol* 2010; 20:670–675.
110. Berrigan D, Dodd K, Troiano RP, Krebs-Smith SM, Barbash RB. Patterns of health behavior in U.S. adults. *Prevent Med* 2003;36: 615–623.
111. French MT, Popovici I, Maclean JC. Do alcohol consumers exercise more? Findings from a national survey. *Am J Health Promot* 2009; 24:2–10.
112. Smothers B, Bertolucci D. Alcohol consumption and healthpromoting behavior in a U.S. household sample: leisure-time physical activity. *J Stud Alcohol* 2001; 62:467–476.
113. Vickers KS, Patten CA, Lewis BA, Clark MM, Ussher M, Ebbert JO, Croghan IT, et al. Binge drinking in female college students: the association of physical activity, weight concern, and depressive symptoms. *J Am Coll Health* 2004; 53:133–140.
114. Lisha NE, Sussman S, Fapa F, Leventhal AM. Physical activity and alcohol use disorders. *Am J Drug Alcohol Abuse* 2013;39: 115–120.
115. Kwan M, Bobko S, Faulkner G, Donnelly P, Cairney J. Sport participation and alcohol and illicit drug use in adolescents and young adults: a systematic review of longitudinal studies. *Addict Behav* 2014; 39:497–506.
116. Schuit AJ, van Loon AJM, Tijhuis M, Ocke MC. Clustering of lifestyle risk factors in a general adult population. *Prevent Med* 2002; 35:219–224.
117. Weinstock J, Barry D, Petry N. Exercise-related activities are associated with positive outcome in contingency management treatment for substance use disorders. *Addict Behav* 2008; 3:1072–1075.
118. Ussher MH, Taylor AH, Faulkner GEJ. Exercise interventions for smoking cessation. *Cochrane Database of Systematic Reviews*. New York: John Wiley & Sons, Ltd; 2014.
119. Zschucke E, Heinz A, Strohle A. Exercise and physical activity in the therapy of substance use disorders. *Scientific World J* 2012.
120. Hoffman MD, Hoffman DR. Exercisers achieve greater acute exercise-induced mood enhancement than nonexercisers. *Arch Phys Med Rehabil* 2008; 89:358–363.
121. Roberts V, Maddison R, Simpson C, Bullen C, Prapavessis H. The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect, and smoking behaviour: systematic review update and meta-analysis. *Psychopharmacology* 2012; 222:1–15.
122. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, Macera CA, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exercise* 2007; 39:1423–1434.
123. Nelson M, Rejeski W, Blair S, Duncan P, Judge J, King A, Macera CA, Castaneda-Sceppa C. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exercise* 2007; 39:1435–1445.
124. Martin C, Church T, Thompson A, Earnest C, Blair S. Exercise dose and quality of life. *Arch Internal Med* 2009; 169:269–278.
125. Hillman C, Erickson K, Kramer A. Be smart, exercise your heart: exercise effects on brain and cognition. *Nature Rev Neurosci* 2008; 9:58–65.
126. Sparling P, Giuffrida A, Pilmelli D, Roskopf L, Dietrich A. Exercise activates the endocannabinoid system. *Neuro Report* 2003; 14:2209–2211.
127. Dunn AL, Trivedi MH, Kampert JB, Clark CG, Chambliss HO. Exercise treatment for depression: efficacy and dose response. *Am J Prevent Med* 2005; 28:1–8.
128. Blumenthal JA, Babyak MA, Doraiswamy PM, Watkins L, Hoffman BM, Barbour KA, Herman S, et al. Exercise and pharmacotherapy in the treatment of major depressive disorder. *Psychosomatic Med* 2007; 69:587–596.
129. Trivedi M, Greer T, Grannemann B, Chambliss H, Jordan A. Exercise as an augmentation strategy for treatment of major depression. *J Psychiatric Practice* 2006; 12:205–213.
130. Daley AJ. Exercise and depression: a review of reviews. *J Clin Psychol Medical Settings* 2008; 15:140–147.
131. Rethorst CD, Wipfli BM, Landers DM. The antidepressive effects of exercise: a meta-analysis of randomized trials. *Sports Med* 2009; 39:491–511.
132. Wipfli BM, Rethorst CD, Landers DM. The anxiolytic effects of exercise: a meta-analysis of randomized trials and dose-response analysis. *J Sport Exercise Psychol* 2008; 30:392–410.