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THERAPEUTIC EFFECT OF YOGA FOR METABOLIC SYNDROME

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ABSTRACT

Metabolic syndrome is a serious health disease worldwide. Approximately 20-25% of population is suffering from metabolic syndrome. Co-morbidities are associated with metabolic syndrome, as the individual suffering with metabolic syndrome have higher risk of developing type 2 diabetes mellitus. Modern lifestyle is a key factor for developing metabolic disorder that results in improper functioning of body. In this study, we tried to understand the effect of yoga therapy on metabolic syndrome, as yoga provide various health benefits to cure disease.

KEYWORDS*: Metabolic Syndrome, Cardiovascular Dysfunction, Yoga and Vedic Science.*

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INTRODUCTION

Metabolic syndrome is a major health problem in both developed and developing countries. There are 20-25% of adult population is affected by metabolic syndrome. This syndrome disturbs the utilization of metabolic functions resulting in development of co-morbidities such as diabetes, hypertension, obesity, high LDL and low HDL. BP, hypertension and cardiovascular disease. Lifestyle modification is one of the major causes of disease development. Hence, yoga becomes one of the source to overcome from these co-morbidities. Yoga has been proven to be beneficial in various aspects to cure disease. Hence, yoga therapy is implemented worldwide followed by meditation and relaxation technique.

YOGA AND ITS COMPONENTS

Yoga is an ancient technique originates in India and was practiced by Maharishis over five thousands year ago. It is union of body and mindfulness to keep body calm health and relaxed and also help to improves overall well being. The National Health Statistics report that about 21 million adults living in the United States use yoga as a complementary health approach (6). Pathanjali is considered the father of modern yoga. He described eight components (limbs) of Yoga: Yama (moral behavior), Niyama (healthy habits), Asana (postures), Pranayama (breathing exercises), Pratyahara (sensory-motor activity withdrawal), Dharana (contents of the mind), Dhyana (contemplation) and Samadhi (higher consciousness) (7-15).

YOGA AND METABOLIC SYNDROME:

Physical activity helps to maintain healthy lifestyle. Yoga is the combination of meditation and physical exercise to keep body calm and disease free. Physical activity consist of postures tat maintain fitness and also reduces risk of metabolic syndrome. Yoga was found to be beneficial in cardiovascular disease (16, 30) as asanas and breathing exercises help to maintain BP, hypertension and other health parameters. There are specific asanas for different disease. Nadisodhana is good for cardiac patient that help to maintain breathing. The meditation, asanas and pranayama's practice together reinforces the connection between mind and body.

YOGA AND CARDIOVASCULAR DISEASES

Cardiovascular disease (CVD) involves of the heart or blood vessels (37). The disease may range from Coronary Artery Diseases (CAD) such as hypertensive

heart disease, heart failure, abnormal heart rhythms, congenital heart diseaseand myocardial infraction (called as heart attack)(37-38). Regular exercise and yoga help in improving quality oflife and effective in prevention of chronic diseases. (39-40).

In a study conducted by Patel & North (1975) it was shown in a randomized control trial of yoga practice in 34 subjects age 75 years having diastolic blood pressure of 110mm/Hg or higher. They randomized the patients into two groups that is yoga group and general exercises group and evaluated them every 2 weeks for the period of 3 months. It was found that systolic and diastolic blood pressures in both groups found to be significant but this drop is a much greater in yoga group (41).

Another study by Ramos Jimenez et al. (2009) evaluatedthe effect on 4 middle aged and 9 older yoga practitioners in an 11-week intensive hatha yoga program with 5 sessions per week for 90 minutes.Hatha yoga*(HY)* is a deep breathing exercise and meditation with warm-up exercise followed by stretching and aerobic and resistance exercises, (42). It was found to be significant changes in hatha yoga group. In order to determine maximal expired air volume (VE_{max}) and VO_{2max}, the percentages of O_2 and CO_2 in inhaled and exhaled air as well as minute pulmonary ventilation were measured with a gas analyzer (Sensor Medics 29n; Yorba Linda, CA)(43). The practice of hatha yoga increasedthe maximal O_2 consumption (VO_{2max}),maximal expired air volume (VE_{max}) and high-density lipoprotein HDL-cholesterol levels, while triglycerides and low-density lipoprotein cholesterolLDL-cholesterol levels remained stable[44]. Lifestyle modifications, including eating habits, weight reductionand physical activity programs as well ashatha yoga program decrease these diseases (45-46).

Manchanda et al. (1998, 2000) conducted studies on coronary heart disease (CHD) patients and observed a significant improvement with yoga practice in the number of angina attacks, body weight and ST segment depression during exercise as well as less progression of coronary atherosclerosis in patients with established coronary heart disease(CHD)(47- 48).

Pullen et al. (2010) 40 patients (African-Americans) were randomized with high or low systolic or diastolic heart failure in yoga group and the control group.

All patients were prescribed for walking program. In this study, it was found that Yoga therapy was beneficial to African-Americans heart failure patients as they improves cardiovascular endurance, quality of life, inflammatory markers, and flexibility (49).

Hence, on the basis of reviewed studies, it can be concluded that cardiovascular diseases such as hypertension, systolic or diastolic heart failure, angina attacks and low density lipoprotein cholesterol decrease with regular yoga therapy, walking and physical exercise.

YOGA AND DIABETES

Diabetes mellitus (DM) characterized by a high blood sugar level over a long duration called hyperglycemia (50). It includes symptoms such as increased thirst, urination and increased appetite (51). It can cause various complicationsthat includes cardiovascular disease, chronic kidney disease, stroke, damage to the nerves, eyes and cognitive impairment (51-52). Yoga has a positive effect in reducing the associated complication with diabetes that can be seen in various studies as follows:

In a systematic review by Innes et al. (2005) collective analyzed 70previous studies which suggested that yoga may reduce cardiovascular diseases related with insulin resistance (53). In a study by Jyotsna (2012) on type 2 diabetes subjects which were evaluated for a period of three months showed that there is improvement in quality of life (54).

Thus, Diabetes is considered as one of the metabolic syndrome which can be prevented by the yoga practice as many researchers observed benefits of yoga that reduce insulin resistance among individuals who also have cardiovascular diseases.

YOGA AND OBESITY

Obesity is a condition of characterized by accumulation of excessive fat. It is a health disorder that is growing in high income countries as well as in low and middle income countries (55-57). Western lifestyle and urbanization leads to health obesity with more prevalence in male (58-60).

Regular Yoga practice helps in maintaining healthy weight and reduces the stress level. A randomized controlled trial by Rshikesan & Subramanya (2016) on 72 obese adult males resulted in normal range of Body Mass Index (BMI) appear to be more content with their body weight as compared to yoga practitioners, (63). Yoga/meditation users with normal BMI appeared to be more satisfied with their body weight and shape than non-yoga/meditation users as reported by Lauche (2017)(64).

Another study by Voroshilov et.al. (2017) provides a strong evidence that the modified Qigong (pronounced as chee-gong) breathing exercise leads to significantly reduction or suppression of feeling of hunger on an empty stomach. Qigong practice involves moving meditation, coordinating slow flowing movement, deep rhythmic breathing and calm meditative state of mind. Qigong is now practiced throughout China and worldwide for recreation, exercise and relaxation, preventive medicine and self-healing, alternative medicine and cultivation. pH of Stomach was elevated by 3 and intestinal pressure was reduced by 12 mmHg in the experimental group and did not change significantly in the control group. The breathing exercise provides comforting in different situations, such as lack of irregular meals, absence of meal, limited volume or caloric diet (65).

In another study in a randomized controlled trial by Rshikeshan et.al. (2016), found that yoga practice help in controlling obesity in males with anthropometric and psychological parameters (66).

Cramer et.al. (2016) administrated 60 women's with abdominal obesity. women were enlocated into yoga intervention or waiting list group in ratio 2:1 significant differences was found in yoga group (67).

A study has been conducted by Yadav et.al. (2016) on the quality of life for the obese people. A short-term yoga-based lifestyle intervention study, including asana, pranayam, relaxation techniques, lectures, group support, nutrition awareness program and individualized advice, had positive effect on the overall health the obese people (68).

Thus, obesity is a health disorder which leads many communicable diseases that can be reduced by inculcating yoga, breathing exercise as (Qigong) in daily life

with proper use of yogic diet that helps an individual in weight reduction and helps to maintain their ideal body weight.

CONCLUSION

Metabolic syndrome is one of the leading diseases and most of the diseases are associated with metabolic syndrome such as diabetes, cardio-vascular diseases, obesity etc. Cardiovascular diseases are considered as the first leading cause and diabetes mellitus represents fourth or fifth leading causes of death in the men and women. Mostly people are suffering from these diseases worldwide, that's why these are called as world leading diseases. It is very challenging for researchers and scientists to overcome these problems. Various studies have shown that yoga is playing a very important role in maintaining health and body and one of the effective therapies in combating these metabolic disorders. Yoga therapy, meditation, breathing exercise (pranayam, Qigong), and asanas (postures) proved to be beneficial therapies on people suffering with metabolic syndrome that have a greater risk of developing diabetes and cardiovascular diseases. Yoga therapy is effective in maintaining good health by regulating Body Mass Index (BMI), improves biochemical functions of the body and helpful to overcome the complications of obesity and reduces the metabolic risk factors. Thus, Yoga therapy is considered as safe and cost effective therapeutic modality in combating metabolic syndrome.

REFERENCES

1. Alberti, K.G., Eckel, R.H., Grundy, S.M., Zimmet, P.Z., Cleeman, J.I., Donato, K.A., Fruchart, J.C., James, W.P., Loria, C.M., Smith, S.C. (2009). International Diabetes Federation Task Force on Epidemiology and Prevention, National Heart, Lung, and Blood Institute, American Heart Association, World Heart Federation, International Atherosclerosis Society, International Association for the Study of Obesity Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. Circulation. 120 (16). 1640–1645.

2. National Center for Health Statistics, Division of Health Interview Statistics. Crude and age-adjusted percentage of civilian, noninstitutionalized adults with diagnosed diabetes, United States, 1980–2010. National Center for

Chronic Disease Prevention and Health Promotion, Ed. Atlanta, GA, Centers for Disease Control and Prevention, Division of Diabetes Translation, 2012.

3. Palaniappan, L.P., Wong, E.C., Shin, J.J. et al. (2017). Asian Americans have greater prevalence of metabolic syndrome despite lower body mass index. In J Obesity.35. 393–400.

4. Wang, Y., Mi, J., Shan, X. et al. (2007). Is China facing an obesity epidemic and the consequences? The trends in obesity and chronic disease in China. Int J Obesity.31. 177–188.

5. Obesity collaborators GBD. Health effects of overweight and obesity in 195 countries over 25 years. N Engl J Med. 2017.

6. Clarke, T.C., Black, L.I., Stussman, B.J., Barnes, P.M., Nahin, R.L. (2015). Trends in the use of complementary health approaches among adults: United States, 2002-2012. Natl Health Stat Report. (79). 1-16.

7. Cajka, V. (2015). Effectiveness of yoga exercises in prevention and treatment of metabolic syndrome.Dissertation.

8. Cohen, B.E., et al. (2008). Restorative yoga in adults with metabolic syndrome: A randomized, controlled pilot trial. Metabolic Syndrome Related Disorder. 6. 223-229.

9. Yadav, R.K., et al. (2012). Efficacy of a short-term yoga-based lifestyle intervention in reducing stress and inflammation: preliminary results. The Journal of Alternative and Complementary Medicine. 18. 662-667.

10. Seo, Y.D., et al. (2012). Yoga training improves metabolic parameters in obese boys. Korean J Physiol Pharmacol. 16. 175-180.

11. Ross, A., Thomas S.(2010). The health benefits of yoga and exercise: A review of comparison studies. The Journal of Alternative and Complementary Medicine. 16. 3-12.

12. Hartley, L., et al. (2014). Yoga for the primary prevention of cardiovascular disease. Cochrane Database of Systematic Reviews.

13. Hagins, M., et al. (2013). Effectiveness of yoga for hypertension: Systematic review and meta-analysis. Evid Based Complement Alternat Med. 649836.

14. Siu, P.M., et al. (2015). Effects of 1 year yoga on cardiovascular risk factors in middle-aged and older adults with metabolic syndrome: A randomized trial. Diabetol Metab Syndr. 7,40.

15. Sharma, M., Knowlden, A.P.(2012).Role of yoga in preventing and controlling type 2 diabetes mellitus. J Evid Based Complementary Altern Med. 17. 88-95.

16. Jimenez, A.R., et al. (2009).Cardiovascular and metabolic effects of intensive hatha yoga training in middle-aged and older women from northern Mexico.Int J Yoga. 2. 49-54.

17. Sarvottam, K., et al. (2013). Adiponectin, interleukin-6, and cardiovascular disease risk factors are modified by a short-term yoga-based lifestyle intervention in overweight and obese men. The Journal of Alternative and Complementary Medicine. 19. 397-402.

18. McDermott, K.A., et al. (2014). A yoga intervention for type 2 diabetes risk reduction: A pilot randomized controlled trial. BMC Complement Altern Med. 14.212.

19. Manchanda, S.C., Madan, K. (2014).Yoga and meditation in cardiovascular disease.Clinical Research in Cardiology. 103. 675-680.

20. Yang, K., et al.(2011). Utilization of 3 month yoga program for adults at high risk for type 2 diabetes: A pilot study. Evid Based Complement Alternat Med. 257891.

21. Kwong, J.S., et al.(2015).Yoga for secondary prevention of coronary heart disease.Cochrane Database Syst Rev.1.

22. Cade, W.T., et al. (2010). Yoga lifestyle intervention reduces blood pressure in HIV-infected adults with cardiovascular disease risk factors. HIV Med. 11. 379-388.

23. Yeung, A., et al. (2015).Yoga and cardiac rehabilitation – a brief review of evidence. J Yoga Phys Ther. 5. 207.

24. Groessl, E.J. (2015).An overview of yoga research for health and well-being. J Yoga Phys Ther. 5. 210.

25. Tay. K., Baldwin. A.L.(2015). Effects of breathing practice in vinyasa yoga on heart rate variability in university students- a pilot study. J Yoga Phys Ther. 5. 214.

26. Dada, R., et al.(2015). Yoga and meditation as a therapeutic intervention in oxidative stress and oxidative DNA damage to paternal genome. J Yoga Phys Ther. 5. 217.

27. Mullur, R.S., Ames, D.(2016). Impact of a 10 min seated yoga practice in the management of diabetes. J Yoga Phys Ther. 6. 224.

28. Joshua, S., Dunbar, C.C.(2016).Cardiovascular and metabolic responses to vinyasa yoga and paced suryanamaskar. J Yoga Phys Ther. 6. 230.

29. Mondal, S., et al.(2014). Blood sugar and lipid profile adaptations to yoga therapy. J Yoga Phys Ther. 4. 175.

30. Manchanda, S.C., et al. (2013).Reversal of early atherosclerosis in metabolic syndrome by yoga – a randomized controlled trial. J Yoga Phys Ther. 3. 132.

31. Bhavanani, A.B., et al. (2012).Suryanadi pranayama (right unilateral nostril breathing) may be safe for hypertensives. J Yoga Phys Ther. 2. 118.

32. Omkar, S.N. (2012). Surya namaskaar for holistic well being: a comprehensive review of suryanamaskaar. J Yoga Phys Ther. 2. e109.

33. Jain, G., et al. (2011).Effect of bhramari pranayama on volunteers having cardiovascular hyper-reactivity to cold pressor test. J Yoga Phys Therapy.1.102.

34. Dvivedi, J., et al.(2011).A study of the effects of training of 61-point relaxation in women suffering from stress of premenstrual syndrome. J Yoga Phys Therapy. 1. 106.

35. Rao, R.R. (2003).Yoga chaitanyapradeepika. Yoga chaitanyaramam, Viginigiri, India.

36. Harinath, K., et al. (2004). Effects of hatha yoga and omkar meditation on cardio respiratory performance, psychological profile and melatonin secretion. The Journal of Alternative and Complementary Medicine. 10. 261-268.

37. Mendis, S., Puska, P., Norrving, B. (2011). Global Atlas on Cardiovascular Disease Prevention and Control (PDF). World Health Organization in collaboration with the World Heart Federation and the World Stroke Organization. pp. 3–18.

38. Naghavi, M., Wang, H., Lozano, R., Davis, A., Liang, X., Zhou, M., et al. (2013). (GBD 2013 Mortality and Causes of Death Collaborators) (January 2015). Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease study. Lancet. 385 (9963). 117–71.

39. Franco, A.N., Avila, J.A., Ruiz, A.L., Gutierrez, L.M.(20017). Determinants of malnutrition risk among the older adult community: A secondary analysis of the Health, Wellbeing, and Aging Study (SABE) in Mexico. Rev Panam Salud Publica. 22. 369-75

40. Lemura, L.M., Duvillard, S.P., Mookerjee, S. (2000). The effects of physical training of functional capacity in adults. Ages 46 to 90: A meta-analysis. J Sports Med Phys Fitness. 40. 1-10.

41. Patel, C., North, W.R. (1975). Randomised controlled trial of yoga and bio-feedback in management of hypertension. Lancet. 2(7925). 93-95.

42. Kim, E., Park, S., Kwon, Y.(2008).The effects of combined exercise in functional fitness and risk factors of metabolic syndrome in the older women. Jpn J Phys Fitness Sport Med. 57. 207-16.

43. Skiner, S.J. (1993). Exercise testing and exercise prescription for special cases. Second Edition. Philadelphia, PA: Lea and Febiger.

44. Ramos, J.A., Hernandez, R.P., Wall, M.A., Munoz, D.M., Torres, P.V., et al. (2009). Cardiovascular and metabolic effects of intensive Hatha Yoga training in middle-aged and older women from northern Mexico. Int J Yoga. 2(2). 49-54.

45. Innes, K.E., Vincent, H.K.(2007). The influence of yoga-based programs on risk profiles in adults with type 2 diabetes mellitus: A systematic review. Evid Based Complement Alternat Med. 4. 469-86.

46. Yang, K. (2007). A review of yoga programs for four leading risk factors of chronic diseases. Evid Based Complement Alternat Med.4. 487-91

47. Manchanda, S.C., Narang, R., Reddy, K.S., Sachdeva, U., Prabhakaran, D., et al. (2000) Retardation of coronary atherosclerosis with yoga lifestyle intervention. J Assoc Physicians India. 48(7). 687-694.

48. Manchanda, S.C., Narang, R. (1998). Yoga and coronary artery disease. Indian Heart J 50. 227-228.

49. Pullen, P.R., Thompson, W.R., Benardot, D., Brandon, L.J., Mehta, P.K., et al. (2010). Benefits of yoga for African American heart failure patients. Med Sci Sports Exerc. 42(4). 651-657.

50. World Health Organization. Archived from the original on 31 March 2014. Retrieved 17 May 2020.

51. "Diabetes Fact sheet N°312". *WHO*. October 2013. Archived from the original on 26 August 2013. Retrieved 18 May 2020

52. Saedi, E., Gheini, M.R.,Faiz, F., Arami, M.A. (2016).Diabetes Mellitus and cognitive impairments World Journal of Diabetes. **7** (17). 412–22

53. Innes, K.E., Bourguignon, C., Taylor, A.G. (2005). Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: a systematic review. J Am Board Fam Pract. 18. 491-519.23.

54. Jyotsna, V.P., Joshi, A., Ambekar, S., Kumar, N., Dhawan, A., Sreenivas, V. (2012). Comprehensive yogic breathing program improves quality of life in patients with diabetes. Indian JEndocrinolMetab.16. 423-8.

55. WHO Obesity. World Health Organization; cited 2016 Mar 31; Available from:http://www.who.int/topics/obesity/en/

56. Prasad, D., Dash, A., Kabir, Z., Das, B. (2012). Prevalence and risk factors for metabolic syndrome in Asian Indians: A community study from urban Eastern India. J Cardiovasc Dis Res.3(3). 204.

57. Ramachandran, A., Snehalatha, C. (2010). Rising burden of obesity in Asia. J Obesity.868573.

58. Singh, R.B., Pella, D., Mechirova, V., Kartikey, K., Demeester, F., Tomar, R.S., et al. (2007). Prevalence of obesity, physical inactivity and undernutrition, a triple burden of diseases during transition in a developing economy. The Five City Study Group. Acta Cardiol. 2007. 62(2).119–27.

59. Dhurandhar, N.V., Kulkarni, P.R.(1992). Prevalence of obesity in Bombay. Int J Obes Relat Metab Disorr. 16(5). 367–75.

60. Yadav, K., Krishnan, A. (2008). Changing patterns of diet, physical activity and obesity among urban, rural and slum populations in north India. Obes Rev., 9 (5). 400–08.

61. Deepa, M., Farooq, S., Deepa, R., Manjula, D., Mohan, V. (2009). Prevalence and significance of generalized and central body obesity in an urban Asian Indian population in Chennai, India. Eur J Clin Nutr. 63 (2). 259–67.

62. Misra, A., Chowbey, P., Makkar, B.M., Vikram, N.K., Wasir, J.S., Chadha, D., et al.(2009). Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. J Assoc Physicians India.57. 163–70.

63. Rshikesan, P.B., Subramanya, P. (2016). Effect of Integrated Approach of Yoga Therapy on Male Obesity and Psychological Parameters-A Randomised Controlled Trial.JClinDiagn Res. 10. KC01-KC06.

64. Lauche, R., Sibbritt, D., Ostermann, T., Fuller, N.R., Adams, J., Cramer, H. (2017). Associations between yoga/meditation use, body satisfaction, and weight management methods: Results of a national cross-sectional survey of 8009 Australian women. Nutrition. 34. 58-64.

65. Voroshilov, A.P., Volinsky, A.A., Wang, Z., Marchenko, E.V. (2017). Modified Qigong Breathing Exercise for Reducing the Sense of Hunger on an Empty Stomach. J. Evid Based Complementary Altern Med. 1. 21

66. Rshikesan, P.B., Subramanya, P., Nidhi, R. (2016). Yoga Practice for Reducing the Male Obesity and Weight Related Psychological Difficulties-A Randomized Controlled Trial. J ClinDiagn Res. 10. OC22-OC28.

67. Cramer, H., Thomas, M.S., Anheyer, D., Lauche, R., Dobos, G. (2016). Yoga in Women With Abdominal Obesity. a Randomized Controlled Trial. DtschArzteblInt. 30. 113. 645-52

68. Yadav, R., Yadav, R.K., Pandey, R.M., Kochar, K.P.(2016). Effect of a Short-Term Yoga-Based Lifestyle Intervention on Health-Related Quality of Life in Overweight and Obese Subjects. J Altern Complement Med. 22. 443-9.

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