

RAJ YOGA AS ADJUVANT THERAPY FOR OBESITY AND DYSLIPIDEMIA IN METABOLIC SYNDROME SUBJECTS: A PROSPECTIVE STUDY

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Abstract

Background: Metabolic syndrome has been recognized as a looming epidemic of 21st century and characterized by insulin resistance, hyperinsulinemia, abdominal obesity, impaired glucose tolerance, dyslipidemia, hypertension etc. Raj Yoga being a meditation practice (not physical activity) is said to have beneficial effect in controlling the Obesity and Dyslipidemia. **Aims & Objectives:** The aim of this study was to compare the effect of Raj yoga on obesity & dyslipidemia in medication group doing Raj yoga, only medication group & non-intervention group and if Raj Yoga practice be incorporated as a therapy to control Obesity and Dyslipidemia. **Material & Method:** Study was carried out in School of Medical Science & Research & Prajapita Brahm Kumari Raj Yoga Center, Greater Noida after the ethical approval from the institute. After screening based on central obesity (waist circumference), increased fasting plasma glucose & blood pressure (IDF criteria of Metabolic syndrome, 2005), total of 160 subjects of Metabolic syndrome were selected and recruited for the study. Subjects were divided in to four groups: Group 1 (Raj Yoga + Medication), Group 2 (Raj Yoga - Medication), Group 3 (Only medication) and Group 4 (No intervention). Triglyceride and HDL-C were measured at the start of study, after six months and one year and compared for results. **Result:** The study revealed that medication and Raj Yoga together has beneficial effects on various parameters of obesity and dyslipidemia. Although medications is used frequently to control the obesity and dyslipidemia but Raj Yoga can be added in lifestyle as adjuvant therapy.

INTRODUCTION

Since time immemorial, yoga and meditation have been practiced for healthy life in India. Although, it has been a part of ancient Indian tradition, its positive effect has been globally accepted. With the advent of fast food culture and 'on the go' life-style, problems like obesity, hypertension, coronary heart disease are on the exponential rise.

With increasing health consciousness, people are now opting for life-style modification practices like regular physical activity, various forms of yoga, diet/calorie control and weight reduction. Since the celebration of International Yoga day on June 21, 2015 more people have been motivated towards Yoga and other non-medical forms of therapy like meditation while opting the normal lifestyle.

Raj yoga is a meditation technique which has been propagated by Prajapita Brahma Kumaris Ishwariya Vishwa Vidhyalaya and is gaining popularity in Indian masses and other countries.

Raj yoga word has been derived from ‘Raja’ meaning king and ‘Yoga’ meaning union between soul (spiritual energy) and supreme soul (ocean of spiritual energy)¹. Another reason for calling it ‘Raj yoga’ is that it is related mainly to mind and mind is considered as the king that rules the sense organs and the body. The technique of Raj yoga meditation does not require practice of breath control, physical postures or use of a mantra or an image, nor does it require one to stop all thoughts. One only needs to control worldly or negative thoughts and concentrate on the ‘supreme power’². Raj yoga meditation may therefore, be defined as a disciplined exercise of awareness, utilizing such processes as creative thinking, intuitive perception and silent reflection leading to comprehension of the metaphysical truths of life³.

This study has been done to find out the effect of Raj yoga on Obesity and Dyslipidemia in metabolic syndrome subjects and to compare the with the groups who is neither practicing Raj yoga nor taking Medicines.

Aim

The aim of study was to observe the effect of Raj yoga practice on obesity and dyslipidemia in metabolic syndrome subjects.

Objectives

1. To study the effect of Raj yoga on obesity by BMI and dyslipidemia by lipid profile in metabolic syndrome subjects who follow the average life-style.
2. To compare the results of effect of Rajyoga practitioners with the Non-practitioners (no intervention group) taking medication and Non-practitioners without any medication.

METHODOLOGY

Study Design

After the ethical clearance, the study was conducted on subjects of metabolic syndrome (screening based on IDF 2005 criteria having parameter waist circumference, systolic and diastolic blood pressure and fasting plasma glucose⁴) of age group 30-50 years visited Prajapita Brahma Kumaris Center, Greater Noida and Sharda hospital, Sharda University, Greater Noida over a period of 1 year (March 2016 – September 2017). Voluntary participation was sought and informed consent taken. Subjects were asked to fill a questionnaire having relevant general, personal and socio- economic data. Anthropometric measurements (weight by digital weighing machine, height by measuring tape keeping both bare foot together and keeping the head straight in standing position) measured and BMI calculated (weight/height²), fasting blood sample was collected and analyzed for HDL-cholesterol (HDL-C) & triglyceride (TG) in the Department of Biochemistry of School of Medical Sciences and Research & Sharda Hospital, Greater Noida at the beginning of the study, after six months and after one year. Triglyceride was analysed by using enzymatic (lipoprotein lipase) method, HDL Cholesterol by precipitation with phosphotungstate/Mg²⁺ method.

Subjects were divided into four groups. Subjects (Group I & II) were given instructions to do Raj yoga meditation by trained Raj yoga instructor at Prajapita Brahmkumari Raj yoga Centre for half an hour for at least 5 days in a week, Greater Noida.

Group I: - 40 subjects doing Raj yoga meditation and on medication (medication to control blood pressure and dyslipidemia)

Group II: - 40 subjects only on Raj yoga but not willing to take medication

Group III: - 40 subjects only on medication, not doing Raj yoga

Group IV: - 40 subjects were neither doing meditation nor taking medicine

Inclusion Criteria

1. Patients of Metabolic syndrome on the basis of IDF (2005)
 - a. Raised fasting plasma glucose > 100 mg/L or treatment of previously diagnosed type-2 diabetes
 - b. Waist circumference ≥ 90 cms for male & ≥ 80 cms for female
 - c. Systolic blood pressure ≥ 130 mm Hg & diastolic blood pressure ≥ 85 mm Hg or, previously diagnosed hypertension
2. Age group of 30 - 50 years
3. Willing to participate in the study

Exclusion Criteria

Psychiatric and psychological disorders, Chronic liver disease, H/O Chronic infection viz Tuberculosis, Leprosy, HIV etc. Interstitial lung disease or pulmonary fibrosis, Morbid obesity, Chronic inflammatory conditions such as Psoriasis, Lupus, Rheumatoid arthritis, Ulcerative colitis, or Crohn's disease.

Statistical Analysis: All statistical analysis was done using Microsoft excel and IBM SPSS software version 20. Mean value of every parameter of subjects were compared and paired t-test (2-tailed) was applied. p value <0.005 was considered as significant.

RESULTS

Table 1: Age and Gender Distribution of Different Groups

Group		Male	Female
Group – 1	Gender distribution	20	20
	Mean age	44.32 yrs.	43.27 yrs.
Group – 2	Gender distribution	20	20
	Mean age	44.40 yrs.	42.55 yrs.
Group – 3	Gender distribution	22	18
	Mean age	44.45 yrs.	42.33 yrs.
Group – 4	Gender distribution	18	22
	Mean age	39.79 yrs.	40.54 yrs.

Table: 2 Comparison of change of body weight in different groups

Body weight of different groups in Kg						
Group	At the start of study	At the end of six months	p - Value	At the start of study	At the end of one year	p - Value
1	79.76±8.39	79.62±8.16	.210	79.76±8.39	78.95±8.25	.023
2	85.80±8.22	85.72±7.95	.653	85.80±8.22	85.31±7.65	.032
3	81.93±7.70	81.52±7.61	.174	81.93±7.70	81.27±7.39	.050
4	87.56±7.33	87.62±7.26	.445	87.56±7.33	87.83±7.19	.011

Table 3: Comparison of changes in BMI of different groups

BMI of different groups						
Group	At the start of study	At the end of six months	p -Value	At the start of study	At the end of one year	p -Value
1	31.26±3.41	31.21±3.31	.127	31.26±3.41	30.95±3.36	.046
2	34.12±4.49	34.08±4.35	.069	34.12±4.49	33.92±4.28	.086
3	33.22±2.79	33.07±2.82	.117	33.22±2.79	32.96±2.72	.131
4	35.86±2.93	35.89±2.96	.032	35.86±2.93	35.98±2.94	.040

Table 4: Comparison of TG of different groups

TG of different groups (mg/dL)						
Group	At the start of study	At the end of six months	p - Value	At the start of study	At the end of one year	p - Value
1	242.14±34.41	235.25±35.13	.000	242.14±34.41	228.92±33.98	.000
2	231.80±7.43	230.20±7.61	.038	231.80±7.43	229.92±8.144	.036
3	236.48±23.89	230.50±24.75	.000	236.48±23.89	225.75±23.91	.000
4	232.13±7.79	235.02±12.22	.039	232.13±7.79	235.70±12.02	.019

Table 5: Comparison of HDL-C of different groups

HDL-C of different groups (mg/dL)						
Group	At the start of study	At the end of six months	p - Value	At the start of study	At the end of one year	p - Value
1	35.39±6.60	35.83±6.40	.016	35.39±6.60	36.72±6.37	.000
2	39.25±5.73	40.43±4.88	.026	39.25±5.73	41.28±3.78	.007
3	36.70±5.87	36.23±6.08	.595	36.70±5.87	36.95±6.08	.778
4	39.93±4.88	40.65±6.43	.274	39.93±4.88	38.88±5.52	.182

DISCUSSION

The study found that there was non-significant decrease in body weight in group- 1 & 2 subjects after six months and significant decrease after one year. Group- 3 subjects showed non-significant decrease and group 4 subjects showed significant increase in body weight after one year. Group- 1 subjects who were on medication (most common being Metformin for control of diabetes) might have loss of weight because of effect of Metformin⁵; however, subjects who were on Raj yoga meditation alone (group- 2) also showed significant decrease in body weight after one year indicating the positive effect of Raj yoga on weight loss. Group -3 subjects who were on medication only showed non-significant decrease in body weight after

six months and after one year which also strengthens the view regarding synergistic effect of Raj yoga on weight loss (when compared with the result of group-2 subjects). Studies conducted by Neelam D. Sukhsohale and Mrunal S. Pathak⁶ compared body weight of short-term meditators (six months up to five years) and long-term meditators (more than five years), observed decrease in body weight of both group subjects but results were not statistically significant.

However, this study had included 100 subjects who were not on any kind of medication, apparently healthy subjects and not having Metabolic Syndrome. Mandape, *et al.* also compared the body weight of Raj yoga meditators (Raj yoga meditation for more than five years) and non-meditators of healthy adults and revealed non-significant decrease in body weight. Similar result were also found by Jyotsana. R. Bharshankar et al in a similar study of “Autonomic functions in raj yoga meditators”⁷. In our study, group-3 subjects who were medication alone (not doing Raj yoga) showed decrease in body weight non-significantly after six month and one year of medication. Different result was seen in a study done by Gokcel et al. in 2002⁸ & found that with the use of Metformin, Sibutramin and Orlistat in obese women (BMI>30) there was significant decrease in body weight after six months of treatment. Fontbonne et al. also found the similar results (significant decrease) after 12 months of Metformin use in 324 subjects with abdominal obesity by waist –hip-ratio and had 2 kg decrease in mean body weight.

Group 4 subjects had non-significant increase in body weight after six months while significant increase after one year. Increase in weight in control subjects may have been because these subjects were not on any medication and may not have followed any form of lifestyle modification during the course of study. Stress is supposed to effect altered human eating behavior. Raj yoga meditation reduces stress^{9,10} and brings calmness which is indicated by lower level of stress- hormones such cortisol¹¹.

Under stressful condition, hypothalamus releases excess of cortico-trophic releasing hormone which stimulates adrenal cortex to produce cortisol. This excess of cortisol increases hunger, craving for food¹², hyperglycemia, increased insulin production and amount of fat deposited in the abdominal area and thus increasing body weight. Moreover, low level of serotonin is associated with weight gain. Another probable explanation for decrease in weight with Raj yoga can be that Raj yoga meditation increases serotonin level and thus helps in decreasing body weight.

Effect on BMI of Different Groups

Group-1 subjects showed non-significant decrease in BMI after six months and significant decrease after one year. Group-2 & 3 subjects showed non-significant decrease after six months and after one year. Group-4 subjects showed significant increase in BMI after six months and after one year. Group-2 subjects who did Raj yoga only and group-4 subjects who were on medication only showed non-significant decrease in BMI after six months and one year which proves similar benefit of Raj yoga and medication over BMI. No study has been found so far where BMI evaluation has been done in Raj yoga meditators taking medication also. However,

a study by Moumita Ghar et al¹³ studied 200 healthy young adults in the age group of 18-35 years for at least 12 months divided into Raj yoga meditators (n=100) and non meditators (n=100), found that BMI were significantly more in non-meditators in comparison to meditators. In another study by Neelam D. Sukhsohale and Mrunal S. Pathak⁶ compared BMI of Short-term meditators (six months up to five years) and long-term meditators (more than five years) and revealed that decrease in BMI was not statistically significant.

However, this study had included 100 subjects who were not on any kind of medication, apparently healthy subjects and not having Metabolic Syndrome. Similar result was also found in study conducted by Mandape, *et al.*⁷ also compared the BMI of Raj yoga meditators and non-meditators of healthy adults and revealed that decrease in BMI was not statistically significant. Since weight is decreased after Raj yoga practice, this explains the decrease in BMI as well (refer to physiological basis of weight loss).

Effect on TG of Different Groups

Group- 1 subjects showed highly significant decrease in TG after six months and after one year, whereas group- 2 subjects had significant decrease in TG six months and after one year, group- 3 subjects showed highly significant decrease in TG after six months and after one year. Group- 4 subjects showed highly significant increase in TG after six months as well as after one year. The values of lipid profile (TG, HDL-C) in Raj yoga meditators (Group -2) is comparable with other studies done by various researchers on different kind of yoga and meditation^{14,15-18}. Similarly, highly significant decrease in TG were noted from baseline after one year in a study by- Manchanda SC, Mehrotra UC, Makhija A, Mohanty A, Dhawan S, et al. in Metabolic syndrome subjects diagnosed by modified criteria for south Asians and performing Yoga regularly¹⁹. Significant reduction in TG were noticed by -Vyas and Dikshit when lipid profile of short term (6 months – 5 years) and long term (more than 5 year) Rajayoga meditators were compared with non meditator subjects²⁰.

Similar results were also reported by Mandape, et al. in study of 100 subjects grouped into Raj yoga mediators (meditation for more than 5 year) and non mediators. However, these subjects were healthy and could not be included in the category of Metabolic Syndrome. Raj yoga practice decreases TG probably due to increased hepatic lipase and lipoprotein lipase activity at cellular level, which affects the metabolism of lipoprotein and thus increases the uptake of triglycerides by adipose tissue²¹. Moreover, decreased cortisol prevents mobilization of fatty acids from adipose tissue.

Effect on HDL-C of Different Groups

Group-1 & 2 subjects showed significant increase after six months and highly significant increase after one year. Group-3 subjects showed non-significant decrease after six months and non-significant increase after one year. Group-4 subjects showed non-significant increase after six months and non-significant decrease after one year. A study on subjects performing Yoga and suffering from Metabolic Syndrome (diagnosed by modified criteria for south Asians),conducted by- Manchanda SC, Mehrotra UC, Makhija A, Mohanty A, Dhawan S, et al. revealed significant increase in HDL-C from baseline after one year in both control and

study group¹⁹. Mandape et al showed that meditators who were practicing Raja yoga meditation have significantly high HDL-C than in non-meditators⁷. A study done by Prasad KV, Sunita M, Raju PS, Reddy MV, Sahay BK, Murthy KJ¹⁶ to find out the effect of pranayama and yoga on lipid profile of 41 Male and 23 female healthy volunteers found increased HDL-C in men while no changes were observed in HDL-C of women. Another study showed an increase in HDL-C after 8 days of Sudarshan Kriya yoga workshop¹⁷. In another study of 100 healthy people by Maini et al in 2104 found that mean value of HDL-C were lower in non- meditators than those in meditators²².

Social relevance

Although medications is used frequently to control the obesity and dyslipidemia but Raj Yoga can be added in lifestyle as adjuvant therapy.

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Conflicts of Interest: None

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