Reducing psychological distress and obesity through Yoga practice

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ABSTRACT

Background: Yoga practice has been effectively prescribed in conjunction with other medical and yogic procedures in the management of severe psychosomatic diseases, including cancer, bronchial asthma, colitis, peptic and ulcer. It improves strength and flexibility, and may help control physiological variables such as blood pressure, lipids, respiration, heart rate, and metabolic rate to improve overall exercise capacity.

Aim of the study: To evaluate the effects of Yogic Practice on anxiety/depression associated with obesity.

Materials and Methods: Patients were recruited from the Department of Physiology, C.S.M. Medical University (erstwhile KGMU), Lucknow, Uttar Pradesh, India. A total of 272 subjects were divided into two groups: 1) group of 205 subjects (with yogic practice) and 2) a control group of 67 subjects (with aerobic exercise). Assessment of anxiety and depression were done by Hamilton Rating Scale.

Result: This study supports yoga as an effective tool with no diet restriction to improve anxiety and depression symptoms as well as obesity in obese subjects.

Conclusion: Incorporating yogic asana in the treatment protocol of patients suffering from anxiety and depression may prove beneficial in the long run.

Key words: Anxiety; depression; obesity; yoga practice.

INTRODUCTION

Obesity is a growing public health concern in modern societies. Physical inactivity and unhealthy diet have been identified as major risk factors for obesity.^[1] Ample research has highlighted the role of obesity as a risk factor for a large number of chronic health complications, such as cardiovascular disease, hypertension, type 2 diabetes, stroke, sleep apnea and certain types of cancer, as well as in mood change and depression in obese individual.

Abdominal obesity has been suggested to be associated with overstimulation of the hypothalamic pituitary-adrenal

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(HPA) axis^[2,3] due to chronic stress^[4] and altering diurnal cortisol secretion. Abnormal regulation of the HPA axis and perceived stress-dependent cortisol levels are strongly related to perturbations of the endocrine axis as well as abdominal obesity with metabolic abnormalities.^[5] A complex set of interrelationships occur between life style, anthropometric, psychological and physical activity variables^[6] of particular interest is the apparent relationship between physical and mental health.^[7,8]

Depression is generally associated with low physical activity levels.^[9-11] Conversely, increasing physical activity has the dual benefit of increasing physical fitness and alleviating depression and anxiety.^[8] Even without the physical health benefits, increasing physical activity may block negative thoughts, distract people from worries, increase social contact and change the brain chemistry to improve mood.^[12]

A growing number of research studies have shown that Hatha yoga can improve strength and flexibility, and may help control physiological variables such as blood pressure, lipids,^[13] respiration, heart rate and metabolic rate to improve overall exercise capacity.^[14,15]

Yoga is also easy and inexpensive tool requiring little in the way of equipment or professional personnel, with some studies indicating excellent long-term adherence and benefits.^[16-18]

The aim of this study was to evaluate the effects of Yogic Practice on anxiety/depression associated with obesity.

MATERIALS AND METHODS

Study design and setting

The present study was a case control trial for obese patients with psychological problems. Subjects were assigned to a standardized six-month protocol of *Yoga* classes. The study was approved by the ethical committee of CSMMU, Lucknow, UP, India.

Study participants

A total of 272 obese subjects, age matched between 20-45 years were recruited for the study. Motivated subjects were enrolled (waist circumference >90 cm for men or >80 cm for women). The experimental group consisted of 205 *Yoga Practicing* subjects with a control group of 67 *Aerobic exercising* subjects. Subjects having cardiac diseases, asthma and any other metabolic diseases, pregnant females, men with waist circumference <90 cm and women with <80 cm and age group <20 and >45 years were excluded. Interested individuals were initially screened for eligibility under supervision of a senior consultant. Informed consent was obtained on the first visit and anthropometrical measurements were taken.

Data collection

The socio-demographic data, details of personal and medical history were taken. Assessments of all the subjects were carried out by hamilton rating scale for depression (HAMD) and Hamilton Anxiety Rating Scale (HAM-A) were administrated to both the groups at the beginning of the study to assess the baseline levels of anxiety and depression and again after six months.

Yoga practice

We used the *Yoga Practices* from SVYASA, Bangalore, India. The yoga instructor was selected by an expert panel and trained from SVYASA for this study. The final protocol (yoga classes) consisted of 60 min per day, five days a week practice in the department of physiology, CSMMU Lucknow, UP, India for six months.

The yoga group practiced a set of yoga techniques daily, in the form of asana (postures) and deep relaxation technique, pranayama (breathing techniques) and meditation.^[19] Yoga practices included: Stretching techniques; Ardhakati chakrasana; Padahastasana; Ardha chakrasana; Sarvangasana; Dhanurasana; Supta-vajrasana Matsyendra (ardha matsyendra); Kapalabhathi pranayama; Anuloma Viloma Pranayama and Shavasana.

Data analysis

The data were summarized as Mean \pm SD. The continuous demographic characteristics of two groups were compared by independent Student's *t test* while discrete data (gender) was compared by Chi-square (χ^2) test. The pre and post outcome measures of two groups were compared by repeated measures analysis of variance (ANOVA) using general linear models (GLM) and the significance of mean difference within and between the groups was done by Newman-Keuls post hoc test after ascertaining the homogeneity of variances among the groups by Leven's test. The depression and anxiety scores were analyzed after square root transformation.^[20] A two-sided (α =2) *P* < 0.05 was considered statistically significant.

RESULTS

The demographic (gender, age, height, weight, BMI, WC, HC, WHR, depression and anxiety) and socioeconomic status (economic status, educational status, occupational status, marital status and food habits) of two groups at the time of admission (baseline) have been shown in Table 1. In both groups, the number of male participants was higher than females. The age of participants of Aerobic and Yoga groups ranged from 20 to 45 years with mean (\pm SD) 32.87 \pm 7.23 years and 34.24 \pm 7.82 years respectively. The height, weight, HC and depression were slightly higher of Aerobic group than Yoga group while age, BMI, WC, WHR and anxiety were slightly higher of Yoga group than Aerobic group. In both groups, the participants were mostly of high economic status, graduates, sedentary workers, married and vegetarian. The demographic as well as socioeconomic status of two groups at admission were found similar i.e., not statistically significant (P > 0.05). In other words, the participants of two groups were demographically and socio-economically matched and therefore, the outcome measures of two treatments (Aerobic and Yoga) were comparable.

The pre and post practice levels of different parameters (outcome measures) of two groups were summarized in

Characteristics	Aerobic (n=67)	Yoga (n=205)	P value
Gender			
Μ	35 (52.2%)	113 (55.1%)	0.680
F	32 (47.8%)	92 (44.9%)	
Age (years)	32.87±7.23 (20.0-45.0)	34.24±7.82 (20.0-45.0)	0.205
Height (cm)	161.85±8.99 (145.0-182.0)	161.06±9.32 (140.0-181.0)	0.543
Weight (kg)	81.84±15.49 (62.0-124.0)	80.64±14.72 (60.0-125.0)	0.569
BMI (kg m²)	31.30±5.79 (19.1-52.4)	31.37±6.64 (19.8-51.5)	0.940
WC (cm)	101.60±11.70 (82.0-133.0)	102.08±10.25 (83.0-133.0)	0.747
HC (cm)	102.66±10.86 (81.0-138.0)	101.75±10.60 (72.0-139.0)	0.545
WHR	0.99±0.09 (0.8-1.3)	1.01±0.08 (0.9-1.4)	0.204
Economic status			
Moderate	24 (35.8%)	52 (25.4%)	0.085
High	43 (64.2%)	156 (76.1%)	
Educational status			
Intermediate	27 (40.3%)	71 (34.6%)	0.481
Graduate	32 (47.8%)	115 (56.1%)	
Post graduate and above	8 (11.9%)	19 (9.3%)	
Occupational status		, , , , , , , , , , , , , , , , , , ,	
Sedentary	52 (77.6%)	179 (85.9%)	0.112
Moderate	15 (22.4%)	29 (14.1%)	
Marital status			
Married	44 (65.7%)	138 (67.3%)	0.804
Unmarried	23 (34.3%)	67 (32.7%)	
Food habit			
Vegetarian	38 (56.7%)	124 (60.5%)	0.585
Non vegetarian	29 (43.3%)	81 (39.5%)	
Depression	9.60±1.78 (6.0-12.0)	9.56±1.61 (6.0-12.0)	0.936
Anxiety	13.94±3.52 (9.0-23.0)	14.39±3.74 (9.0-23.0)	0.394

Table 1:	Demographic	characteristics	summary	(mean±SD) of two	groups	at admission	(baseline)
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Numbers in parenthesis indicates the range (min-max)

Table 2. Table 2 showed that after practice, the levels of all parameters decreased (improved) in both the groups and the decrease (improvement) was higher in Yoga group than Aerobic group. On comparing the levels within the groups (i.e., between periods), all parameters in Yoga group showed significant (P < 0.001) decrease from day 30 while Aerobic group showed improvement from day 90. Similarly, comparing the levels between the groups, the weight, WC, HC and depression decreased more significantly (P < 0.01 or P < 0.001) at day 90 and day 180 in Yoga group than Aerobic group. The depression also decreased significantly (P < 0.01) in Yoga group than in Aerobic group at day 30. Further, at the end of these practices, the weight, BMI, WC, HC, WHR, depression and anxiety in Aerobic group improved (day 0 - day 180) by 8.3%, 8.4%, 4.2%, 2.4%, 1.9%, 19.6% and 10.2% respectively while it was 16.3%, 16.4%, 12.9%, 7.7%, 5.5%, 44.8% and 19.4%, respectively in Yoga group. In other words, weight, BMI, WC, HC, WHR, depression and anxiety improved 2.0, 1.9, 3.0, 3.3, 2.9, 2.3 and 1.9 fold more in Yoga group, than in Aerobic group.

To see the relative improvements among variables, the change (pre-post) in each variable was correlated with each other and summarized in Table 3. Table 3 shows that the improvements among variables were significantly (P < 0.05 or P < 0.01 or P < 0.001) associated with each. The change (improvement) in weight positively (direct

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association) and significantly correlated with change in BMI (r = 0.98, P < 0.001), WC (r = 0.22, P < 0.001), HC (r = 0.21, P < 0.01), depression (r = 0.13, P < 0.05) and anxiety (r = 0.14, P < 0.05). Similarly, change in BMI positively and significantly correlated with change in WC (r = 0.21, P < 0.01), HC (r = 0.21, P < 0.01), depression (r = 0.12, P < 0.05) and anxiety (r = 0.16, P < 0.01). Further, improvement in WC positively and significantly correlated with improvement in HC (r = 0.52, P < 0.001), WHR (r= 0.75, P < 0.001, depression (r = 0.54, P < 0.001) and anxiety (r = 0.23, P < 0.001). The change in HC showed negative (inverse association) and significant correlation with change in WHR (r = -0.17, P < 0.01) while significant and positive correlation with change in depression (r= 0.54, P < 0.001) and anxiety (r = 0.26, P < 0.001). The Change in WHR showed positive and significant correlation with change in depression (r = 0.20, P < 0.01). The change in depression correlated significantly with change in anxiety (r = 0.23, P < P < 0.001). However, the improvements in depression and anxiety mostly correlated with the improvements in WC and HC.

DISCUSSION

The present study evaluates the impact of yogic practices on psychological parameter (anxiety and depression) resulting from overweight, poor lifestyle, and bad dietary habits. Dietary control and lifestyle modification are

Parameters	Groups	Pre treatment	Post treatment				
		day 0	Day 30	Day 90	Day 180		
Weight (kg)	Aerobic	81.84±15.49	80.54±15.20	77.90±15.01 ^{ab}	$75.04 \pm 15.00^{\text{abc}}$		
		(62.0-124.0)	(60.0-122.0)	(55.0-119.0)	(53.5-114.0)		
	Yoga	80.64±14.72	76.46±12.13°	71.70±11.93 ^{ab**}	67.46±11.64 ^{abc***}		
		(60.0-125.0)	(56.0-125.0)	(52.0-120.0)	(47.0-117.0)		
BMI (kg m²)	Aerobic	31.30±5.79	30.79±5.64	$29.77 \pm 5.54^{\text{ab}}$	$28.67 \pm 5.49^{\text{abc}}$		
		(19.1-52.4)	(24.1-51.1)	(22.3-50.2)	(21.7-47.6)		
	Yoga	31.37±6.64	29.72±5.53°	27.87±5.36 ^{ab}	26.23±5.19 ^{abc**}		
		(19.8-51.5)	(19.2-46.9)	(18.0-44.1)	(16.6-43.0)		
WC (cm)	Aerobic	101.60±11.70	100.40±11.53°	$98.94 \pm 11.15^{\text{ab}}$	97.29±11.03 ^{abc}		
		(82.0-133.0)	(81.0-139.0)	(79.0-136.0)	(77.0-137.0)		
	Yoga	102.08±10.25	97.03±9.93°	92.00±10.01 ^{ab***}	88.95±10.16 ^{abc***}		
	-	(83.0-133.0)	(79.0-128.0)	(74.0-121.0)	(56.0-117.0)		
HC (cm)	Aerobic	102.66±10.86	102.48±10.37	101.31 ± 10.67^{ab}	100.24 ± 10.70^{abc}		
		(81.0-138.0)	(82.0-135.0)	(79.0-135.0)	(78.0-133.0)		
	Yoga	101.75±10.60	100.27±10.45°	96.46±10.35°b**	93.87±10.27 ^{abc***}		
	2	(72.0-139.0)	(70.0-137.0)	(67.0-133.0)	(65.0-130.0)		

 0.99 ± 0.09

(0.8-1.3)

1.01±0.08

(0.9-1.4)

		(0.7 1.1)	(0.7 1.0)	(0.0 1.0)	(0.0 1.1)
Depression	Aerobic	9.60±1.78	9.31±1.76°	8.84±1.77 ^{ab}	$7.72 \pm 1.58^{\text{abc}}$
		(6.0-12.0)	(6.0-12.0)	(6.0-12.0)	(5.0-11.0)
	Yoga	9.56±1.61	8.24±1.67°**	6.60±1.63 ^{ab***}	5.27±1.52 ^{abc***}
		(6.0-12.0)	(5.0-11.0)	(3.0-10.0)	(2.0-9.0)
Anxiety	Aerobic	13.94±3.52	13.63±3.01°	13.10±2.66 ^{ab}	$12.52 \pm 2.57^{\text{abc}}$
		(9.0-23.0)	(9.0-21.0)	(9.0-19.0)	(8.0-19.0)
	Yoga	14.39±3.74	13.18±3.47°	12.32±3.18 ^{ab}	11.60 ± 2.91^{abc}
		(9.0-23.0)	(7.0-21.0)	(7.0-19.0)	(6.0-20.0)
Numbers in parenth	esis indicate the range (min-max). BMI=Body mass in	dex; WC=Waist circumference;	HC=Hip circumference; WHR=	Waist to hip ratio

 $0.98 \pm 0.08^{\circ}$

(0.9-1.3)

0.97±0.07°

(0.9-1.3)

Numbers in parenthesis indicate the range (min-max). BMI=Body mass index; WC=Waist circumference; HC=Hip circumference; WHR=Waist to hip ratio Comparison between groups **P<0.01 or ***P<0.0001- Aerobic vs. Yoga Comparison within groups °P<0.05 or °P<0.01 or °P<0.001-as compared to day 0 °P<0.05 or °P<0.001 or °P<0.001- as compared to day 30 °P<0.05 or °P<0.001- as compared to day 90

Table	3:	Correlation	(n=272)	amona	variables
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Aerobic

Yoga

Variables	Weight	BMI	WC	HC	WHR	Depression	Anxiety
Weight	1.00						
BMI	0.98***	1.00					
WC	0.22***	0.21**	1.00				
HC	0.21**	0.21**	0.52***	1.00			
WHR	0.11 ^{ns}	0.11 ^{ns}	0.75***	-0.17**	1.00		
Depression	0.13*	0.12*	0.54***	0.54***	0.20**	1.00	
Anxiety	0.14*	0.16**	0.23***	0.26***	0.07 ^{ns}	0.23***	1.00

ns- P>0.05; *-P<0.05; **-P<0.05; ***-P<0.001

WHR

necessary for weight reduction; however, the psychological components due to obesity remain untreated.

This study was one of the first to give support to yoga as an effective tool *with no diet restriction* to improve anxiety and depression symptoms as well as obesity in obese subjects. The results showed differences in outcomes for the yoga and aerobic groups over a period of time.

Hence, this study established the improvement in psychological parameters with the potential to generate positive effect and general feeling of well being.

Similar work has also shown that those with depression could benefit from *Sudarshan Kriya* and related practice.^[21]

Earlier studies also reported similar findings.^[22-24] During depression, there is a decrease in neurotransmitters such as serotonin and norepinephrine. Besides, an increased level of cortisol has a role in causing depression by regulating the function of serotonin and norepinephrine.^[25] Yoga helps in decreasing the cortisol levels leading to a counter-regulatory effect to reduce the depressive symptoms.^[26]

0.98±0.08°

(0.9-1.3)

0.96±0.08^{ab}

(0.8-1.3)

 0.97 ± 0.08^{ab}

(0.8-1.2) 0.95±0.09^{ab}

(0.6 - 1.4)

There was decreased anxiety in the yoga group. Previous studies have also shown that practicing yoga for other conditions (cancer survivors, self-reported emotional distress) results in beneficial effects for depression and mood, as well as anxiety and a state of physical wellbeing is established.^[27] Further, the subjects who practiced *Yoga* frequently endorsed qualitative benefits after yoga sessions.

CONCLUSION

Incorporating yogic asana in the treatment protocol of patients suffering from anxiety and depression may prove beneficial in the long run.

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