



EFFECT OF YOGA PRACTICE ON PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS IN HEALTHY STUDENTS

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Abstract

To assess the effect of 45 minute yogic kriya (Surya Namaskar and Kapalbhati) for 30 days on various physiological and biochemical parameters. 20 students pursuing B.P.Ed course at Panskura Banamali College, West Bengal, between the age group 19 and 23 years volunteered to participate in the study. They were divided into two Groups A and B. Group A students including 10 students in each group were subjected to 30 days yoga kriya for 60 minutes for 5 days in a week. A student's t-test was used for comparing the means of pre- and post-yoga results of various parameters. No significant difference was found in systolic blood pressure, pulse, body mass index, haemoglobin except for fasting blood sugar and diastolic blood pressure ($p < 0.001$) among the yoga subject while comparing with baseline values and control.

Keywords: Yoga, Biochemical alterations, Physiological alterations, Surya Namaskar and Kapal Bhati.

Introduction

Recently, scientists have explored its consistent beneficial effects on various biochemical, physiological, and psychological parameters, among the healthy and diseased human beings. Madanmohan et al. have reported the effect of yoga practice in prevention and management of diabetic

mellitus. He found a significant decrease in the fasting and post-prandial glucose level. Total cholesterol (TC), triglyceride (TG), and very low-density lipoprotein (LDL) were significantly decreased while high-density lipoprotein (HDL) was remarkably raised. Furthermore, all the lipid ratios were desirably raised. In another group of non-insulin dependent diabetes mellitus patients, also significant reduction was observed in the frequency of hyper glycaemic index. According to Chaya et al., long-term yoga practice is shown to be associated with increased insulin sensitivity and attenuation of a negative relationship between body weight or waist circumference and insulin sensitivity. A study was conducted by Yadav and Bal to find out the effect of yoga Asanas on selected haematological variables of female college students. Haematological parameters included erythrocytes, haematocrit, haemoglobin (Hb), platelets, erythrocyte sedimentation rate (ESR), etc. The experimental group showed lowering in albumin level and raised Hb level and ESR. The results of the study have revealed significant differences between control and experimental groups in relation to Hb but in the case of platelets insignificant difference was found between control and experimental groups. Though, few specific yoga Kriyas were reported to have no effect on the haematological parameters or haematological parameters. Study done by



Balgave some unusual results. An intervening attempt was done by him to determine the short term effects of Kapalbhathi pranayama on haematological parameters of university level girls. No significant differences were found in Hb. Hence it can be said that there is not enough data to say how effective yoga is in the management of haematological problems. Therefore, the role of yoga for assessing various biochemical haematological changes remains unclear. We, therefore, intend to have our study in this direction to assess the level of various physiological and biochemical parameters.

Methods

Participants 20 B.P.Ed students from Panskura Banamali College, West Bengal, between the age group 19-23 were taken into study. All subjects volunteering for participation in the study had given their written consent. The study protocol was approved by the college ethical committee. Subjects having any pathological condition and those who were on any pharmacological treatment from 3 months prior to the study were excluded from the study. Only healthy volunteers with daily regular lifestyle and were involved in sport regularly, were chosen to be part of the study.

Yoga program

Attendance was maintained to confirm the presence of experimental subjects, participating in 60 minutes yoga session, for 5 days in a week for 30 days. The yoga activity was conducted inside the college gymnasium. The procedure began with Surya Namaskar (sun salutation) with a session of 12 asanas (fixed postures) for 30 minutes, followed by 20 minutes Pranayam (breathing exercise including AnulomeVilome, Surya Bandana,

Sheetali, and Bhramari). The session used to end with 10 minutes meditation.

Blood sampling

A sample collection was done initially at the baseline level and then after 30 days of completion of yoga training from both the groups that is Training Group (A) and Control Group (B) participants. Fasting blood sample was taken from the forearm vein of all participants in the identical basal and fasting conditions. The samples were analysed from the Biotechnology laboratory of the college for Hb and fasting glucose level. Systolic blood pressure (SBP) and diastolic blood pressure (DBP), height and body weight were also measured at initial baseline level and then after 30 days of yoga. Hb was analysed by spectrophotometric method. While glucose estimation was measured by using glucose oxidase-peroxidase method.

All variables (SBP, DBP, pulse, fasting blood sugar, Hb and body mass index [BMI]) were expressed in mean, standard deviation and standard error of mean. The paired Student's t-test was applied in yoga performing Group A as well as control (not yoga performing) Group B. $p < 0.05$ was considered statistically significant. IBM Statistical Package for Social Sciences version 16 was applied for statistical analysis.

Results

No significant changes were observed in various parameters such as SBP, pulse, Hb and BMI, between control and experimental groups, except for fasting blood glucose, and DBP which were found to be significantly decreased among experimental group post-yoga session. However, Hb in yoga group showed slightly lower value post-yoga ($p=0.064$) while comparing to control group with their pre- and post-yoga values. However,



this change is insignificant. Results are given in Table 1.

TABLE 1
BASELINE PARAMETERS IN BOTH GROUPS

Group		Mean	SD	SEM	p value
SBP					
06					
Yoga Group					
	Pre	11.14	11.43	3.65	0.324
	Post	107.83	12.57	3.96	
Control					
	Pre	115.60	13.73	3.12	0.764
	Post	114.52	6.51	1.04	
DBP					
Yoga Group					
	Pre	70.91	6.65	2.14	0.016
	Post	66.94	8.37	2.68	
Control					
	Pre	73.54	8.45	1.96	0.548
	Post	71.83	7.59	1.66	
Pulse					
Yoga Group					
	Pre	85.78	6.76	2.14	0.576
	Post	83.82	12.16	3.38	
Control					
	Pre	89.73	11.89	2.67	0.716
	Post	90.95	11.06	2.47	
Fasting Blood Sugar					
Yoga Group					
	Pre	2.01	6.35	2.03	<0.001
	Post	98.41	4.58	1.44	
Control					
	Pre	100.23	9.16	2.05	0.623
	Post	99.15	7.78	1.73	
Hb					
Yoga Group					
	Pre	9.92	1.05	0.36	0.064
	Post	9.07	1.01	0.32	
Control					
	Pre	9.65	1.71	0.38	0.765
	Post	9.80	1.83	0.40	
BMI					
Yoga Group					
	Pre	19.33	1.66	0.52	0.950
	Post	0.47	1.50	0.47	
Control					
	Pre	0.791	3.11	0.69	0.791
	Post	21.35	2.89	0.64	

Discussion

Results of the study clearly indicate that fasting blood and DBP was significantly decreased ($p < 0.001$ and 0.017 respectively) in the post-yoga experimental group. While there was no change observed in the control group in their baseline values and after 30 days. Rest of the parameters including SBP was remaining unaffected in both Group A and B. Principal Finding of this trial was the decline in the level of blood glucose in post yoga

experimental subjects when compared with the baseline value and control group. Notable fact emerged from the study is that regular yoga practice does generate a noticeable increase in hypoglycaemic effect. Various researchers working in the area have also reported that short term yoga practice in patients with Type 2 diabetes bring about a marked drop in the glucose level. However, the mechanism behind this to bring about these modifications is still not well understood. The glycaemic drop after regular yoga practice might also add a new alternative therapeutic focus in those clinical situations where a hike of this blood parameter is present. Lowered level of DBP was observed in the experimental group. However, no significant change was seen in SBP.

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