



Effect of Suryanamaskar Practices Compared with Physical Exercises on Selected Biochemical Parameters of College Women

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Abstract

To attain healthy population, college campuses serve as crucial settings to overcome perceived barriers to healthy diet and exercise habits, and implement effective interventions. The aim of this study was to find out the effect of suryanamaskar practices and physical exercises on selected biochemical parameters of college women. 60 college women studying in Arul Anandar College in Madurai District were selected randomly and divided into three groups consisting of 20 in each. Group I underwent physical exercises (PEG), group II underwent suryanamaskar practices (SNG) and group III was kept as control group. The physical exercises (PEG) group was provided with different types of physical exercises, consisting of walking, jogging, floor aerobic exercises and step aerobic exercises for 12 weeks and suryanamaskar practices (SNG) group underwent, slow, medium and fast variations of suryanamaskar. Venous blood samples (10 ml) were collected from the forearm vein after overnight fasting both prior to and immediately after the experimental treatments from all the three groups' subjects. From the blood samples biochemical variables, fasting blood sugar and total cholesterol were obtained. The results of this study proved that both the experimental protocols significantly contributed for fasting blood sugar and total cholesterol of the college women. Even though it was found that suryanamaskar practices (SNG) group was found to be better than physical exercises (PEG), the difference between the experimental groups was not significant at 0.05 level. It was concluded that the findings of this study can be used by future researchers as status reporting on selected biochemical parameters among college women and the beneficial effects of physical exercise and suryanamsakar for the all round development of their health.

Keywords: Physical Exercise, Surya Namaskar, Fasting Blood Sugar, Total Cholesterol.

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Introduction

The adage of healthy body, healthy mind is especially relevant to college students. Getting good grades, focusing in class and balancing a busy schedule may be easier if they maintain a healthy lifestyle. By making small changes in the diet and activity level, they can reap big benefits in their overall health. Most college students may not achieve the nutrition and exercise guidelines designed to reduce the risk of chronic disease, typically consuming diets high in fat, sodium, and sugar and low in fruits and vegetables which resulted in imbalance in their biochemical parameters. Therefore, to attain healthy population, college campuses serve as crucial settings to overcome perceived barriers to healthy diet and exercise habits, and implement effective interventions. Ideally, if college students make positive changes in exercise and dietary habits, these changes could persist into adult years. The health benefits of exercise are well documented. Working out on a regular basis is not just a great way to stay in shape, it also

enables the body to produce natural chemicals called endorphins that help feel happier, and may also make it easier to focus on the studies. However, making the commitment to go to the gym on a regular basis can be a struggle. Fitness scientists, physical educationists, administrators are giving more concentration to evolve suitable solutions and make the students, especially the college women students to undergo regular physical exercises and asanas as they are simple in nature. To high light the advantages of physical exercises and Suryanamaskar on their biochemical parameters this study was undertaken. Asanas have evolved over the centuries so as to exercise every muscle, nerve and gland in the body. Asanas balance the respiratory, circulatory, nervous, hormonal, digestive excretory and reproductive systems perfectly. The equilibrium in the body then bring mental peace and enhances intellectual clarity (Iyengar, 2001). Asana are one of the major tools of Yoga. Asana brings steadiness, health and lightness of limb. A steady and pleasant posture produces mental equilibrium and prevents fickleness of mind. Asanas are not merely gymnastic exercises, they are postures. The limbs of the body provide the necessary weights and counter-weights. By practicing them one develops agility,

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balance, endurance, co-ordination and great vitality. It secures a fine physical structure, which is strong and flexible without being muscle-bound and helps to keep the body free from diseases. Asanas reduce fatigue and soothe the nerves, boosts metabolism, lymphatic circulation, hormonal secretion, and bring about chemical balance in the body (Iyengar, 2001). There are three stages to each asana, viz. coming into the pose, holding it, and coming out of the pose and those steps should be performed as one continuous movement upto the final position (Rabinovitch et al., 1983).

Surya Namaskara or Sun Salutation is a common sequence of Hatha yoga asanas. This sequence of movements and poses can be practised on varying levels of awareness, ranging from that of physical exercise in various styles, to a complete sadhan, which incorporates asana, pranayama, mantra and chakra meditation. The physical base of the practice links together twelve asanas in a dynamically performed series. These asanas are ordered so that they alternately stretch the spine backwards and forwards (Iyengar, 2001). When performed in the usual way, each asana is moved into with alternate inhalation and exhalation (except for the sixth asana where the breath is held in external suspension). A full round of Surya namaskara is considered to be two sets of the twelve poses with a change in the second set to moving the opposite leg first through the series. Proponents of the use of Surya namaskara as part of the modern yoga tradition prefer to perform it at sunrise, which the orthodox consider to be the most 'spiritually favourable' time of the day. Surya Namaskar provides all of the key health benefits of yoga in a very succinct package. It is a holistic exercise that provides physical health benefits, but also mental or emotional as well as spiritual benefits. The obvious advantage of Surya Namaskar is the workout it provides for the muscles, but it also benefits joints, ligaments and the skeletal system by improving posture, flexibility and balance. In addition to these physical benefits, Surya Namaskar practice stimulates and conditions virtually every system in the body. It is good for the heart and stimulates the cardiovascular system. It oxygenates the blood and helps strengthen the heart. Surya Namaskar is good for the digestive system and the nervous system. It stimulates the lymphatic system and supports respiratory system health, as well (Rabinovitch et al., 1983).

Physical exercises improves intake of oxygen. Oxygen is transported to muscles primarily by haemoglobin (Suhr, Porten, and Hertrich, et al. (2009) . During aerobic exercise, the demand for oxygen increases at the working muscle; so an optimum level of hemoglobin is required to perform at the highest level with high intensity. Urea and uric acid accumulation is most frequently used as a measure of protein catabolism and degradation of adenonucleotides (Heitkamp, Wegler and Brehme, et al (2008) . Lipids have important beneficial biological functions. These include usage of triglycerides for energy production, fat storage in adipose tissues, and usage of cholesterol as a component in phospholipids of cellular membranes or in the synthesis

of steroid hormones (Kelley and Kelley, 2009). Elevated plasma cholesterol concentrations have been implicated in the development of coronary artery disease (CAD) (Halverstadt, Phares and Wilund, et al. (2007). Regular monitoring of these biochemical variables of college women can provide valuable information about their health, metabolic and cardiovascular status. In this study, the investigator selected two biochemical variables, namely, blood cholesterol and blood sugar (fasting) to find out the effect of physical exercises on them.

Kim, (2014) investigated the effects of yogic exercises on life stress and blood glucose levels in nursing students on twenty-seven undergraduate nursing students and gave yogic exercises intervention was undertaken for 60 minutes one day a week for 12 weeks. It consisted of physical exercise (surya namaskara) combined with relaxation and meditation (shavasana and yoga nidra). It was found yogic exercise group measurements were significantly decreased in both life stress and postprandial blood glucose levels compared with the control group. McDermott, et al. (2014) found significant reductions in systolic and diastolic blood pressure, total cholesterol among diabetes due to yogic practices while there were no significant differences in fasting blood glucose. Thus, the theoretical foundations laid proved that there were number of studies to find out the effect of yogic practices on biochemical variables, blood sugar and blood cholesterol and there were contradictory findings whether suryanamaskar can be practiced for improving selected biochemical variables among college women. Hence this study was undertaken to find out whether physical exercises or suryanamsakar could significantly contribute for beneficially altering fasting blood sugar and blood cholesterol.

Methodology

For the purpose of the study 60 college women studying in Arul Anandar College in Madurai District were selected randomly. They were divided into three groups consisting of 20 in each. Group I underwent physical exercises (PEG), group II underwent suryanamaskar practices (SNG) and group III was kept as control group. The physical exercises (PEG) group was provided with different types of physical exercises, consisting of walking, jogging, floor aerobic exercises and step aerobic exercises for 12 weeks and suryanamaskar practices (SNG) group underwent, slow, medium and fast variations of suryanamaskar. The base level biochemical variables selected, namely, fasting blood sugar and blood cholesterol were measured prior to experimental treatments. After experimental treatments to physical exercises (PEG) and suryanamaskar practices (SNG) groups for 12 weeks, post test scores were collected. Venous blood samples (10 ml) were collected from the forearm vein after overnight fasting. Samples were centrifuged to separate serum at 3000 g for 15 min, and serum samples were stored at -80°C until blood biochemistry analysis. The obtained data were subjected to statistical analysis using

ANCOVA to test the significance. In all cases 0.05 level was fixed to test the hypothesis.

determine whether the training programmes produced significant changes in Fasting Blood Sugar and Total Cholesterol among Physical Exercises Group, Suryanamaskar Group and control group. The analysis is presented in the following tables.

Analysis of Data

Analysis of covariance was applied to

Results

Table I. Influence on Fasting Blood Sugar due to Physical Exercises and Suryanamaskar

	PEG	SNG	CG	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	76.55	77.30	78.35	Between	32.7	2	16.35	1.88
				Within	495.7	57	8.69	
Post Test Mean	70.70	72.75	77.90	Between	550.43	2	275.22	28.64*
				Within	547.75	57	9.61	
Adjusted Post Test Mean	71.42	72.83	77.09	Between	327.18	2	163.59	48.82*
				Within	187.64	56	3.35	
Mean Diff	5.85	4.55	0.45					

PEG: Physical Exercise Group; SNG: Suryanamaskar Group; CG: Control Group
 Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.
 *Significant

Table II. Multiple Comparisons of Adjusted Means on Fasting Blood Sugar

PEG	SNG	CG	Mean Difference	Reqd. C.I
71.42	72.84	-	1.41	1.47
71.42	-	77.09	5.67*	1.47
	72.84	77.09	4.26*	1.47

* Significant at 0.05 level.

Table III. Influence on Total Cholesterol due to Physical Exercises and Suryanamaskar

	PEG	SNG	CG	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	173.45	168.2	171.25	Between	278.03	2	139.02	1.25
				Within	6333.9	57	111.12	
Post Test Mean	166.80	161.80	170.9	Between	830.8	2	415.4	3.53*
				Within	6710.2	57	117.72	
Adjusted Post Test Mean	164.54	164.32	170.64	Between	514.94	2	257.47	9.79*
				Within	1471.92	56	26.28	
Mean Diff	6.65	6.4	0.35					

PEG: Physical Exercise Group; SNG: Suryanamaskar Group; CG: Control Group
 Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.
 *Significant

Table IV. Multiple Comparisons of Adjusted Means on Total Cholesterol

PEG	SNG	CG	Mean Difference	Reqd. C.I
164.54	164.32	-	0.23	4.12
164.54	-	170.64	6.10*	4.12
	164.32	170.64	6.33*	4.12

* Significant at 0.05 level.

Discussions on Results

Physical Exercise is considered an acceptable method for improving and maintaining health related fitness. A growing body of evidence supports the belief that yoga benefits physical and mental health. (Ross and, Thomas, 2010) With the recent rise in awareness and the increased understanding of the importance of physical activity in promoting overall health, greater emphasis has been placed on improving physical fitness to enhance quality of life. Surya Namaskar, a component of Hatha Yoga, has been practiced by Indians for hundreds of years and is often used in place of a typical fitness program. It consists of a series of postures (asanas) that are repeated 12 times per round. (Bhavesh, Surendra Mody, 2011). The results of this study proved that both the experimental protocols, namely, physical exercises and suryanamaskar practices significantly contributed for beneficially altering biochemical variables, total cholesterol and fasting blood sugar of the college women. Even though it was found that suryanamaskar practices (SNG) group was found to be better than physical exercises (PEG) on blood sugar, the difference between the experimental groups was not significant at 0.05 level (Table 2). The results presented in Table 3 proved that there was significant effect on biochemical variable, total cholesterol too among the college women as the obtained F value was greater than the required F value to be significant at 0.05 level. The multiple paired adjusted mean comparisons presented in Table 4 proved that both the experimental groups were able to significantly reduce total cholesterol of the college women. The mean differences between the treatment groups showed that suryanamaskar practices (SNG) was better than physical exercises (PEG). However, this difference was also not significant at 0.05 level. The findings of this study are in agreement with the findings of Kim, (2014) who found yogic exercise (consisting of suryanamaskar) group significantly decreased blood glucose levels compared with the control group and McDermott, et al. (2014) findings that significant reductions in total cholesterol.

Conclusions

It was concluded that the findings of this study can be used by future researchers as status reporting on selected biochemical parameters among college women and the beneficial effects of physical exercise and suryanamsakar for the all round development of their health.

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