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Effect of four weeks yogic practice on selected anthropometric and psychological variables among sedentary college women

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Abstract
Yogic practices have become increasingly popular at present, as a method of coping with health problems, stress and as a means of exercise and fitness training. The purpose of the present study was to find out the effect of yogic practice on selected physiological health parameters on sedentary college women. For this purpose, a total of 15 college women students in (mean age 25.4 years) were agreed to take part as subject. Body weight, three skin fold body fat and psychological stress were considered as criterion in this study. All parameters were measured by the standard tools and procedures. Four weeks training was provided to the subjects and selection of yoga and training schedule was fixed by the consultation with the experts on Yoga. Descriptive and inferential statistics were used to analyze the data and 0.05 level of significance was considered. Results revealed that no significant difference on selected parameters between pre-test and post-test value (P>0.05). It was concluded that the four weeks yogic practice did not have significant effects on body weight, skin fold fats and psychological stress among sedentary college women students.

Keywords: Yogic practice, body weight, skin folds fats, psychological stress, sedentary women college students

Introduction
Yoga is an ancient Indian practice, which utilize mental and physical exercise to attain Samadhi, or the union of the individual self with the infinite. The Hatha yoga has become increasingly popular in western countries as a method of coping with stress and as a means of exercise and fitness training (Schell *et al*., 1994) [20]. Hatha yoga was developed to promote physical health. It consist of a series of postures, called *Asanas*, and various breathing exercise called *Pranayama*, which encourage balance between the physical, mental, emotional and spiritual aspect of human being. Like other form of yoga, hatha yoga is purported to quite the mind and focus the concentration; however, all the yoga traditions, the importance of physical fitness is emphasized most in hatha yoga (Worthington, 1982) [23].

Yoga is a popular activity at present for athletes, children and seniors. Yoga can be modified to suit all levels of people for developing fitness. The efficiency of yoga on health and physical and cardio-respiratory fitness have been well proved (Madanmohan, 2011; Huang, Chien and Chung, 2013) [8, 9, 11]. Yoga has been proven to lower blood pressure, heart rate, respiratory rate (Raub, 2002) [17] and increase strength and flexibility (Halder *et al*., 2015) [6]. Yoga calms our minds help to reduce stress. Yoga is traditionally believed to have beneficial effects on physical and emotional health (Gilbert, 1999) [4]. The yoga practice might be interacting with varies somatic and neuro endocrine mechanism bringing about therapeutic effects. The overall performance is known to be improved by practicing yoga techniques and their effects on physical functions were reported by (Upadhyay *et al*., 2008). Study reported that Yoga practice can also be used as psycho-physiological stimuli to increase the secretion of melatonin which in turn, might be responsible for perceived well-being and happiness (Harinath *et al*., 2004) [7]. Yoga may be effective as or better than exercise at improving a variety of health related outcome measures (Ross and Thomas, 2010) [19]. In this background the present study was designed to find out the effect of yogic practice on selected anthropometrical and psychological stress on sedentary college women students.

Material and Methods

The subjects

A total of 15 sedentary women students were agreed to take part in this work as subjects. All of them were regular students of a Govt. Teachers; Training College and the age of the student was in between 22 to 30 years (Mean = 25.4 yrs).

Design of the study

Single group design was adopted for this study. The group was given four weeks of Yoga Practice. The group was tested before the treatment (pre-test) and again they were tested after four weeks of Yoga Practice (post-test). Difference between pre-test and post-test mean were analyzed statistically by t-test to find out the effect of yoga treatment.

Criterion measure

Following physiological criterion were measures in this study:

1. Body weight
2. Skin fold body fats-Triceps Skin Fold (TSF), Abdominal Skin fold (ASF) and Supra-illiac skin fold (ISF)
3. Psychological stress

Instruments and tools used

Following instruments and tools were used in this study to collect the data

1. Body weights have measure by standard weighing machine.
2. Skin fold body fat were measured by the Skin Fold Caliper.
3. Psychological stress was measured by SCAT questionnaire.

Training schedule

Yoga practice was scheduled as three days per week basis for a period of twelve weeks continuously. But letter it was ended after four weeks due to the serious pandemic situation. The exercise set was repeated two times for each asana in during four weeks. Duration of the exercise programmed was 40 minute per day in during the training period. The detail of schedule has presented in Table-1. Yoga training schedule was prepared with the help of the experts in the field.

Table 1: Training schedule during training period

Particular of training	Training schedule	Yoga selected
Total duration	12 weeks	Om Chanting
Frequency	Monday, Wednesday & Friday	Surya Namaskara
Repeating	2 times	Padmasana, Bazrasana
Duration	40 Minutes	Yogomudrasana
Time	7.00-7.40 PM	Poschimattasana
		Usthasana
		Ardhakurmasana
		Bhujangasana
		Salvason
		Brikhasana
		Anulom-Belom Pranayam
		Shabhasana
		End Prayer

Statistical procedure used

To conduct the present study single group design was adopted. Therefore descriptive and inferential statistics were used for analyzed the data. Mean and standard deviation were used as descriptive statistics. The significance of difference between the pre-test score and post-test score was computed by using t-test. Only 0.05 level of significance was considered in this study. All statistical calculations have done by the standard statistical software (Excel 2010).

Result and Findings

The mean and standard deviation regarding anthropometric parameters body weight (BW) and three skin fold fat - triceps skin fold (TSF), abdominal skin fold (ASF) and supra-illiac skin fold (ISF) have been presented in Table No-2. The findings in mean difference between pre and post-test of body weight (t = 0.03) was not significant statistically *(p>0.05)*. Table-2 also revealed that the post-test mean value for TSF, ASF and ISF (17.27mm, 19.03mm and 14.87mm respectively) were lower than the pre-test mean values of TSF, ASF and ISF (20.57mm, 22.07mm and 16.27mm respectively) but the computed t-value for all these parameters between pre and post-test value have found insignificant statistically *(p>0.05)*. The findings on mean values for pre and post-test for body weight and for TSF, ASF and ISF have presented graphically in Figure-1 and Figure-2 respectively.

Table 2: Presentation of analyzed data and result for physiological parameters

Parameters	Pre-test		Post-test		t-value*
	Mean	SD	Mean	SD	
BW	54.53 Kg	10.51	54.52 Kg	9.91	0.03
TSF	20.57 mm	5.70	17.27 mm	3.15	1.96
ASF	22.07 mm	5.87	19.07 mm	3.83	1.66
ISF	16.27 mm	5.65	14.87 mm	2.99	0.85
Stress	24.8	11.11	25.20	10.52	0.101

*To be significant at 0.05 level the t-value should be 2.06 at df = 28

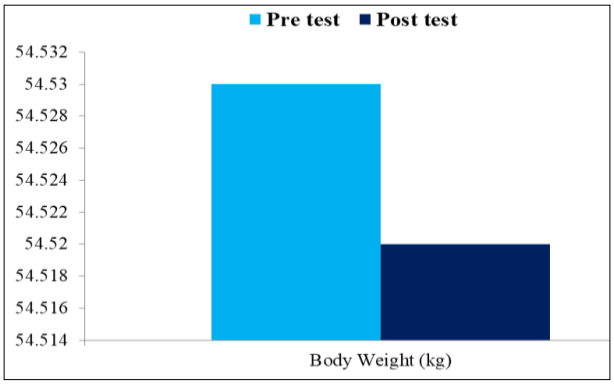

Fig 1: Graphical comparison of mean values for body weight

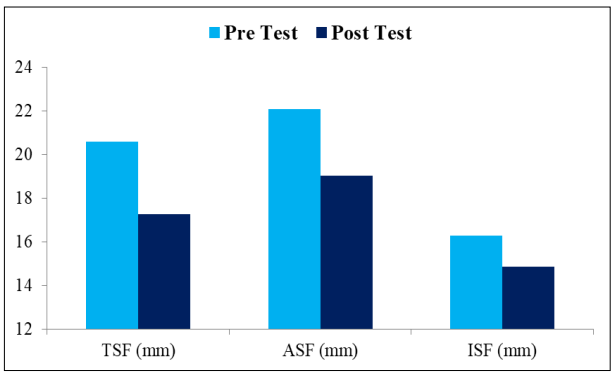

Fig 2: Graphical comparison of mean values for TSF, ASF and ISF

The mean and standard deviation regarding psychological stress also have been presented in Table No-2. The table have shown that the mean difference between pre and post-test of psychological stress (t = 0.101) was not significant statistically *(p>0.05)*. The pre and post-test mean values of

the psychological stress have presented graphically in Figure-3.

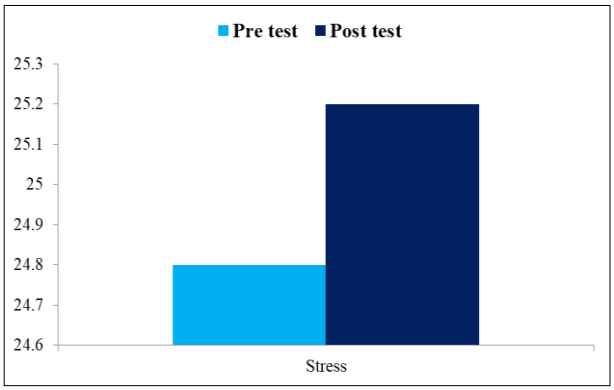

Fig 3: Graphical comparison of mean values for stress

Discussion on findings

Present study was designed to find out the effect of yoga practice on body weight and sub-contentious body fat – TSF, ASF and ISF. Table-2 revealed that body weight of the subject was not significantly changed (t = 0.03; p>0.05). Table-2 also unveiled that all the three skin fold values were decreased after four weeks of yoga practice. But the t-value computed for these three skin fold measurements indicated that these differences in mean value between pre and post-test were not statistically significant. The t-value for TSF, ASF and ISF were t = 1.96, t = 1.66 and t = 0.85 respectively were below the required table value (t = 2.06) to be significant at 0.05 level. Few study on this area reported positive effects of yogic practice on body weight and body fat thickness. Madhavi *et al.*, (1985) [12] found that there was a significant reduction in body weight and fat fold thickness and an increase in lean body mass in normal healthy female volunteers practicing yoga for three months. Gharote *et al.*, (1997) [3] found that with yoga, there was a decrease in fat fold thickness in obese people and similar result was evident in the case of school children (Bera, Rajapurkar, & Ganguly, 1990) [1]. Khare and Kawathekar (2002) [10] found that with yoga and controlled diet there was a significant reduction in fat fold thickness and increase in lean body mass. Venkata Reddy *et al*. (2004) [18] also reported significant reduction of body weight and body fold thickness among obese women following a three months yogic practice. However, other study conducted in this area have found no significant effect or negligible contribution of Yogic practice to reduce body fat and decrease body weight (Mondal, Kaibarta and Sil, 2016; Dhara and Sil, 2016) [2, 16]. The findings of the present study on body weight and skin fold fats were similar with these studies conducted earlier in West Bengal.

Present study was also designed to find out the effect of yoga practice on psychological stress among sedentary college women. The post mean value for this parameter was found slightly higher in this study than the pre mean value however, the t-value (t = 0.101) indicated that difference was not significant statistically *(p*>0.05*)*. Several study opined that Yoga practice is helpful to reduce the psychological stress (Gorden and McGrowder, 2013; Sharma, 2014; Pascoe and Bauer, 2015) [5, 15, 21]. Hung *et al*. (2013) reported long term practices of Hatha Yoga provides clear and significant health benefits, including reduction of perceived stress significantly. However Rachiwong *et al*. (2015) [16] reported Hatha Yoga has beneficial effect on physical fitness variables including flexibility but not on stress level in injured workers. The higher mean value of the stress among the subjects in post training period was might be due to the increased in socio-psychological stress due to the spread of pandemic COVID-19 in Kolkata as well as in India. The post-test was conducted just before the announcement of lock down situation in West Bengal. The situation of spreading of COVID-19 in India and closing of the college and regular study for long period might be the cause of higher mental stress of the subject noticed in this study.

Conclusions

On the basis of above findings and discussion the following conclusions were drawn in this study:

1. Four weeks yogic practice did not have any significance effect on body weight and sub-coetaneous body fat among sedentary college women.
2. Four weeks yogic practice did not have significance effect on psychological stress among sedentary college women.

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