

## Effect of Selected Yogic Practice and Bench Step Aerobics on Improving Flexibility of Female Subjects, Wollega University, Ethiopia

Mr. Edosa Jabesa<sup>1</sup> and Mr. GetuMosisa<sup>2</sup>

<sup>1</sup>Lecturer, Department of sport studies, College of natural science, Wollega University, nekemte 395, Ethiopia

<sup>2</sup>Lecturer, Department of Health, ,Wollega University, nekemte 395, Ethiopia

### Abstract

The study was designed to investigate the comparative effect of yoga & bench step aerobics exercise on improving the flexibility of female subjects. To achieve the purpose this study the subjects were selected from Wollega University community service female participants. Sixty (60) subjects were divided into three equal groups on random basis (Groups I, II, and III) consisting of 20 subjects in each group. Two out of the three groups were given experimental treatments i.e. Yogic practice (Group- I), Bench step aerobics (Group- II) while the remaining one group (Group- III) was designated as control group. The study was formulated as a Completely Randomized Group Design, consisting of a pre-test and post-test. The data was collected from the three group's pretest and posttest statistically analyzed by using descriptive and analysis of covariance (ANCOVA). The LSD post hoc test was applied to determine which of the paired mean have significant differences. The 0.05 level of confidence was fixed to test the significance. The experimental group namely, selected yogic practice groups (YPG) and bench step aerobics training (BSAEG) had significantly improved the flexibility of the lower and back muscle of the subjects after the 10 weeks of training in contrast to control group.

**Keywords:** Asana Yoga, Pranayama Yoga, Flexibility, Bench Step Aerobics.

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### I. Introduction

Training is a system of process in which athletes improve their fitness to meet the demands of their sport. Training is a long term process that is progressive and meets individual athletes at their level of fitness and conditioning. Training uses both general and event specific exercises to develop an athlete for their sport (Dr.P.Satyanarayana1, et al., 2013)<sup>[5]</sup>.

The word yoga means "union" in Sanskrit, the language of ancient India where yoga originated. Hatha yoga is an ancient practice that was developed to promote physical health as well as an awareness of one's true nature. It consists of a series of postures, called asanas, and various breathing exercises, called pranayama, which encourage balance between the physical, mental/emotional, and spiritual aspects of a human being. Asana and pranayama are one of the eight "limbs" of yoga, the majority of which are more concerned with mental and spiritual well-being than physical activity. There are so many famous known **asanas** like, Viparitadandasana, Adhomukhavikasana, Adhomukhasvanasana, Chaturangadandasana, Padmasana, Matyasana, Kurmasana, Sukhasana, Vajrasana, Natarajasana, Hanumanasana, Garbhasana, Sirshasana, Dhanurasana, Siddhasana, Anjaneyasana, Bhujangasana, Anantasana, Among these asanas, Viparitadandasana, Adhomukhavikasana, Adhomukhasvanasana, Chaturangadandasana and forms of **pranayama** like NadiShodhana, Ujjayi, Bhastrika are useful for our studies. We have selected, mukhasvanasana, Sukhasana, adhomukhasvanasana and all the above three pranayama forms in our study (Dr.P.Satyanarayana1, et al., 2013)<sup>[5]</sup>.

Yoga is traditionally believed to have beneficial effects on physical and emotional health (Gilbert C.; 1999)<sup>[6]</sup>. The overall performance is known to be improved by practicing yoga techniques (Upadhyay et al; 2008)<sup>[14]</sup> and their effects on physical functions were reported (Hadi 2007)<sup>[7]</sup>. Yoga practices can also be used as psycho-physiological stimuli to increase the secretion of melatonin which, in turn, might be responsible for perceived well-being (Harinath et al; 2004)<sup>[8]</sup>. Yoga may be as effective as or better than exercise at improving a variety of health-related outcome measures (A. Ross and Thomas; 2010)<sup>[1]</sup>.

Aerobic refers to a variety of exercise that stimulates heart and lung activity for a time period sufficiently long to produce beneficial change in the body. Aerobics or endurance exercises are those in which large muscle groups are used in rhythmic repetitive fashion for prolonged periods of time. By doing aerobics,

the whole body is used and major muscle groups including legs, trunk and arm get involved (P. Sivaraman, 2014)<sup>[12]</sup>.

During the recent years, many people, especially woman turned to rhythmic activities such as aerobics. Such sports bring less fatigue, thank to music; they also improve memory since they require tight coordination between rhythm and movement. (Dastgerdi, 2008)<sup>[4]</sup> In such rhythmic sports in general and aerobics in particular, it is possible to either increase or decrease the exercise intensity level and output through changing bench height, music rhythm, and kinetic chain exercises (Kramer et al, 2001)<sup>[11]</sup>. Aerobics has a positive effect on all body organs, contributes to striking caloric balance and controlling body weight, and improves muscles, joints, and bones structure as well. It also decreases the risk of cancer and blood pressure and leads to better cardiorespiratory functions (Salimi, 2010)<sup>[14]</sup>. Therefore, athletes have more oxygen uptake, which guarantees more efficient breathing (Vilmor, 2006)<sup>[16]</sup>. The fact is also supported by the recent researches. Koutedakis et al (2007)<sup>[10]</sup> confirmed that 3 months of aerobic and stretching exercise has a great effect on students' physical fitness and performance. The findings of the study revealed that slow and fast-paced classical music has a significant effect on participants' resistance against fatigue, final workload, and also their heart rate in fatigue state; however no significant difference was seen between the effects of the two types of music (Akbarpour et al., 2005)<sup>[2]</sup>. Mohebi et al (2005)<sup>[12]</sup> considered step aerobic exercises as an effective way to increase cardiovascular endurance and decrease body fat in non-athletic women; they also believe that such activities lead to a good body composition and balance. There is lack of scientific studies or no such experimental research conducted on Wollega University community service female participants. All this things urged the researchers to conduct the study on the effects selected yoga practice and bench step aerobics training on flexibility of Wollega University community service female participants.

### **1.1 Objective of the study**

- 1 To investigate the influence of selected yogic practices and bench step aerobics on the flexibility of lower and back muscle of female subjects.
- 2 To compare the effects of the training programs between the experimental and control groups on flexibility of lower and back muscle of female subjects.

## **II. Materials and Methods**

### **2.1 Sample and sampling techniques**

To achieve the purpose of the study sixty (60) untrained subjects from eighty (80) female total population who are not in any of the yoga and step aerobics and also free from deformities and ailments was selected from Wollega University community service female participants by using random sampling method and their ages ranged from 13-17 years old.

They were randomly assigned into three groups, namely, yoga training group (YG) (n=20), bench step aerobics training group (BSAEG) (n=20) and control group (CONTG) (n=20). Group I was participated in YT, group II participated BSAET, and the control group was not given any treatment.

### **1.2 Design of the study**

The study was formulated as a **Completely Randomized Group Design**, consisting of a pre-test and post-test.

### **2.2 Selection of variables**

After the author gone through both critical as well as allied literature related to the problem, the following independent and dependent variable were selected.

#### **1. Independent variables**

- A. Selected yogic practice (15 asana and 3 pranayama practice)
- B. Bench step aerobics training

#### **2. Dependent variables**

- A. Flexibility (lower and back muscle)

### **2.3. Administration of Tests**

Sit and reach test was conducted to measure the subject's flexibility of back and lower (hamstring) muscle. To insure the reliability of the data, test-retest method was used.

### **2.4. Training protocol**

A ten weeks selected yogic practice and bench step aerobics programme for three days in a week approximately for one hour were conducted. The training programme was administered in the afternoon session of the day. The

control group was continued their regular programme as usual. The subjects underwent their training program under continuous and strict supervision of the researcher.

**2.5 Statistical techniques**

The data was collected from the three groups pretest and posttest on the flexibility statistically examined for significant improvement by using SPSS version 20 software package, descriptive and analysis of covariance (ANCOVA). The LSD post-hoc test was applied to determine the significant differences between the adjusted posttest means. In all cases the criterion for statistical significance was set at 0.05 level of confidence (P<0.05).

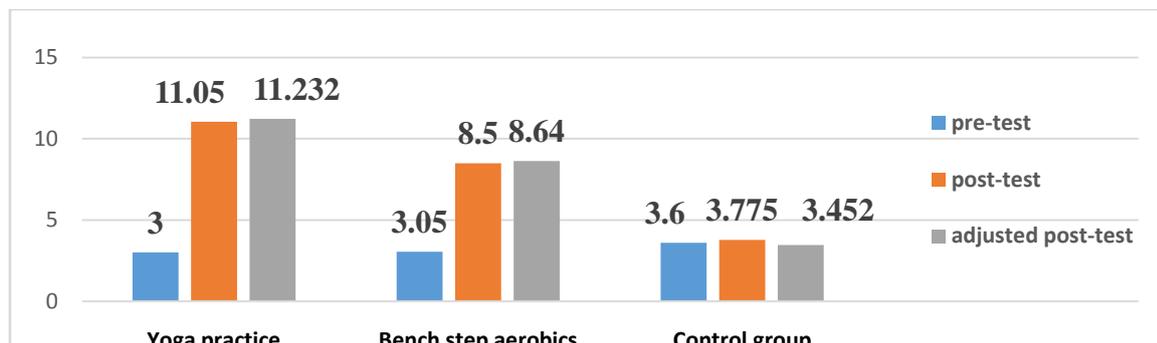
**III. Analysis of Results**

This study have been assessed the back and lower body flexibility of female subjects before and after the exercise training intervention. Flexibility of the subjects were measured by using appropriate tools. The study discussed according to the factual data obtained.

**Table 1:** Analysis of Covariance for the Pretest, Post Test and Adjusted Post Test Mean of the Experimental and Control Groups on Flexibility (Score In Centimeter)

Tests Groups	Mean & Standard Deviation								Sig
	Yoga practice	Bench step aerobics	Control group	Sum of Variance	Sum Square of	D.f	Mean Sum of Square	F-ratio	
Pre	3.0000	3.0500	3.6000	A	4.433	2	2.217	.227	.798
				W	556.750	57	9.768		
	3.45269	3.13679	2.74629	Total	561.183	59			
Post	11.0500	8.5000	3.7750	A	68.765	2	272.513	32.484	.000
				W	1342.459	60	8.389		
	2.68475	3.01749	2.97567	Total	1411.224	62			
Adjusted Post test	11.232	8.640	3.452	A	623.082	2	311.541	207.612	0.000
				W	84.033	56	1.501		

The pretest, posttest and adjusted post-test mean values of yogic practice, bench step aerobics and control group on flexibility are graphically presented in figure 1.



**Fig 1:** Comparison of Flexibility Among, Yogic Practice, Step Aerobics and Control Group in Pre, Post and Adjusted Post Test Means.

Table 1 and Figure 1, clearly shows that the F-ratio test applied to the pre-test means was .227 which was lesser than the required table value of 3.16 for significant at 0.05 level of confidence with the degrees of freedom 2 and 57. This provides that, no significant differences was exist among the training and control groups at initial stage on the lower back muscle.

However, the 'F' ratio value in post test phase (32.484), and adjusted post-test phase (207.612) are found to be significant for being greater than the required table value of 3.16 and 3.16 to be significant at 0.05 level of confidence with 2, 57 and 2, 56 degree of freedom respectively.

As in analysis of co-variance the significant difference on flexibility in post-test and adjusted post-test means among yogic practice, step aerobics training groups and one control group was found.

To find out which of the paired means had a significant difference, the LSD post-hoc test is applied and the results are presented in table 4.

**Table 2:** The LSD Post Hoc Test for the Differences between the Adjusted Post-Test Paired Means among Experimental and Control Groups on Flexibility (Score In Centimeter)

Yoga practice	Bench step aerobics	Control group	Mean Differences	Confidence Interval Value
11.232	8.640		2.592*	0.000
11.232		3.452	7.780*	0.000
	8.640	3.452	5.188*	0.000

\* Significant at 0.05 level of confidence

From Table 2, (post-hoc test) it was also observed that there were significant differences between each training groups and control group on flexibility in which the mean value of training groups (yoga practice 11.232, step aerobics group 8.640) were found to be greater than that of control group (3.452) mean values. It is concluded that there was a significant difference on flexibility among the two experimental and control groups. However, selected yogic practice group was to be found better in improving the flexibility than bench step aerobics group and bench step aerobics groups improved better than control group.

#### IV. Discussion of findings

The result of the present study reveals that the experimental group namely, selected yogic practice (YPG) and bench step aerobics training (BSAEG) had significantly improved the flexibility of lower and back muscle of the subjects after the 10 weeks of training in contrast to control group.

Yogic practice (Asana technique) and Stretching exercise before, during and after the aerobics training plays a vital role in keeping muscles and joints strong and pliable so they are less susceptible to injury and enabling your muscles to work most effectively. The reason behind this is may be increased muscle/tendon group with a greater range of motion passively, increased the maximal length, length extensibility and passive resistive forces of the calf, thigh and back muscles. Adaptations of other ankle and leg structures also may have contributed. There is also increased elasticity of muscle and connective tissues, increased resting length of muscle and connective tissues, muscle spindles adapt to the increased length, reducing the stimulus to the stretch reflex, increased RoM at a joint before the stretch reflex is initiated due to asana practice and stretching exercise (Alter, (1996).

The current findings are in compliance with a research conducted by **K. Bharathapriya and R. Gopinath, (2011)** studied the effect of yogic practice on flexibility among school boys. The experimental group underwent selected asanas and pranayama for five days per week for twelve weeks. Control group did not undergo any training programme rather than their routine work. Flexibility was measured by using sit and reach box. Finding of flexibility shows significant improvement due to the twelve weeks yogic practice when compared to the control group.

**Nagaraj, Subramaniam and Jayasivarajan, (2011)** studied effect of stretching exercises and aerobic exercises on flexibility of school boys. The three experimental groups were subjected to the training programme for 10 weeks for three days per week. Control group did not undergo any training programme rather than their routine work. The pre-test and post-test were compared with using Analysis of Covariance. The result shows that combined exercises (stretching and aerobics exercises) were significantly better than stretching exercises, aerobics exercises in flexibility.

#### V. Conclusion

Besides, the analysis of the data indicated that yogic practice showed better results in improving flexibility of lower and back muscle of the female subjects than bench step aerobics training undertaken in this study.

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