Effect of Physical Exercise and Yoga Practices on Flexibility Muscular Endurance and Blood Pressure among Working Women

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Abstract

The goal of this study was to see how physical activity and yoga practice affected flexibility, muscle endurance, and blood pressure (both systolic and diastolic). For this project, 45 middle-aged working women, between the ages of 35 and 40 were chosen. They were separated into three equal groups (n = 15), with group I participating in physical exercise, group II practicing yoga, and group III acting as a control that did not receive any extra instruction or physical activity. This research had a twelve-week training duration with six days of training each week. The subjects' flexibility, muscular endurance and blood pressure were measured before and after the training period. The sit and reach test was used to examine flexibility, the modified sit-up test was used to assess muscular endurance, and the sphygmomanometer was used to measure blood pressure. The analysis of covariance (ANCOVA) was performed to determine if there was a significant difference in chosen criteria variables between the experimental and control groups. The Scheffè *S* test was utilised as a pos-hoc test because there were three groups in this investigation. The study found that physical activity and yoga practise improved criteria factors such flexibility, muscular endurance, and a decrease in blood pressure (both systolic and diastolic). The study's findings also revealed that there was no statistically significant difference between the experimental groups, such as the physical activity and yoga practise groups except in flexibility.

Keywords: yoga practice, physical exercise, flexibility, muscular endurance, systolic and diastolic blood pressure.

INTRODUCTION

The degree of usefulness and metabolic efficiency of a living organism is defined as physical fitness. In humans, it is the total health of an individual, both body and spirit, that is a high priority, as well as the general importance of being free of sickness, damage, or agony (as "healthy" or "sound"). In 1946, the World Health Organization (WHO) defined wellbeing in a broader sense as "a state of total physical, mental, and social prosperity, rather than only the absence of sickness or ailment." Despite the fact that this definition has been the subject of discussion, particularly because of its lack of operational value and the problem caused by the use of the word "complete," it continues to be the most popular. Characterization frameworks, such as the WHO Family of International Classifications, which includes the International

Classification of Functioning (ICF) and the International Classification of Diseases (ISD), are commonly used to characterise and measure different aspects of wellbeing

Physical exercise, often known as holistic health, is any type of physical activity that improves or maintains one's health, well-being, and wellbeing[1]. Depression, physical endurance, mood, vanity, and academic performance have all been related to increased physical exercise[2]. Physical activity is regarded to be beneficial for a variety of reasons, including maintaining a healthy weight, creating and maintaining strong bones, muscles, and joints, improving physiological well-being, reducing surgical risks, and strengthening the immune system. According to several research, exercise can help people live longer and have a better quality of life[3].

Yoga focuses on mental, emotional, attitudinal, and behavioural aspects without addressing the previously mentioned bodily and physiological functions, whereas physical workouts consist of repeated physical movements aimed solely at improving bodily health and fitness by concentrating on muscular, cardiovascular, and respiratory functions[4,5].

Yug is derived from the root yug, which meaning 'to unite,' and it refers to both a path and a kingdom of unity in Sanskrit. Yoga's country is the result of syntropy: it is a kingdom devoid of time and space limits, a nation that defies counting number and power, and which is unconfirmable by any characteristic. This truth of pure Consciousness has been recognised by all philosophers, spiritualists or materialists, as the necessary axiom of life from which knowledge, will, love, and idea develop[6].

According to **Joshi** (1986)[7], all of our breaths are counted, and our life expectancy is determined by the number of times we will breathe in a given life; as a result of this fact, we should take less breaths in order to live longer; this notion was responsible for the origin of pranayama.

All motions are built on the basis of flexibility, which is defined as the range of motion around a joint. Picking up a tiny object, sitting, standing, and nailing a nail into the wall all require flexibility, but other characteristics such as strength are also important[8]. Blood pressure (BP) is a measurement of the force exerted by circulating blood on the vein dividers, and it is one of the most important indicators. BP swings between a maximum (systolic) and a minimum (diastolic) pressure with each pulse[9]. Muscular endurance is a phrase that refers to a combination of behaviour intensity and effort direction, or emotion. In negatives, physical endurance is defined by the direction of effort. It conveys unpleasant subjective experiences in this way[10].

METHODS

The effects of physical activity and yoga practise on flexibility, muscle endurance, and blood pressure are being investigated in this study (systolic and diastolic). Only middle-aged women between the ages of 35 and 40 who worked as school teachers in the Annamalainagar area of Tamilnadu State were chosen. Forty-five volunteers were chosen at random and divided into three groups of fifteen, with group I (n = 15) receiving physical exercise, group II (n = 15) receiving yoga practise, and group III (n = 15) receiving no treatment. For twelve weeks, the training programme was conducted six days a week (Monday to Saturday) during morning sessions only (6 am to 8 am). Flexibility was assessed by sit and reach test, muscular endurance was measured with the help of modified sit-up test and blood pressure was measured by using sphygmomanometer.

ANALYSIS OF DATA

The data on flexibility, muscular endurance, and blood pressure (systolic and diastolic) acquired before to and after the trial periods on the physical exercise group, yoga practise group, and control group were analysed and shown in the following table - I.

Table – I

Analysis of Covariance and 'F' ratio for Flexibility, Muscular endurance and Blood Pressure (systolic and diastolic) for Physical exercise Group, Yoga Practice Group and Control Group

Variable Name	Group Name / Test ± S.D	Physical Exercise Group	Yoga Practice Group	Control Group	'F' Ratio
Flexibility (in Inches)	**Pre-test Mean ± S.D**	4.25 ± 0.27	4.05 ± 0.29	4.04 ± 0.27	2.83
	Post-test Mean ± S.D.	4.54 ± 0.32	4.65 ± 0.25	4.02 ± 0.24	22.43*
	Adj. Post-test Mean	4.417	4.702	4.088	94.39*
Muscular endurance (in No./min)	**Pre-test Mean ± S.D**	9.00 ± 1.96	8.40 ± 1.77	8.13 ± 2.13	0.769
	Post-test Mean ± S.D.	11.40 ± 2.23	11.33 ± 1.60	8.13 ± 2.03	13.50*
	Adj. Post-test Mean	10.971	11.431	8.48	40.48*
Systolic Blood Pressure (in mmHg)	**Pre-test Mean ± S.D**	132.47 ± 3.68	134.20 ± 2.68	134.20 ± 2.40	1.70
	Post-test Mean ± S.D.	130.40 ± 3.58	131.60 ± 2.70	134.93 ± 2.72	9.05*
	Adj. Post-test Mean	131.531	131.081	134.496	42.56*
Diastolic Blood Pressure (in mmHg)	**Pre-test Mean ± S.D**	95.80 ± 2.04	94.20 ± 1.86	94.93 ± 2.40	2.15
	Post-test Mean ± S.D.	93.80 ± 2.11	91.53 ± 2.13	94.87 ± 2.20	9.42*
	Adj. Post-test Mean	93.026	92.265	94.906	41.03*

* Significant at .05 level of confidence. (The table value required for significant at .05 level with df 2 and 42 and 2 and 41 are 3.22 and 3.23 correspondingly).

The 'f' - ratio values of pre-test mean flexibility for the physical exercise group, yoga practise group, and control group were 2.83, which was not statistically significant. The 'f' - ratio of post- and adjusted post-test means was 22.43 and 94.39, respectively, which was higher than the required table value of 3.23 for significance with df 2 and 41 at the.05 level of confidence. The results of this study revealed a

substantial difference in flexibility between the physical activity group, yoga practise group, and control group.

Muscle endurance was 1.66 for the physical activity group, yoga practise group, and control group, which was not statistically significant. The post- and adjusted post-test mean 'f' ratios were 8.07 and 50.50, respectively, which were higher than the required table value of 3.23. The pre-test mean of systolic blood pressure for the physical activity, yoga practise, and control groups was 1.70, which was not significant. The superiority of the 'f' - ratio of post- and adjusted post-test means was 9.05 and 42.56. The pre-test mean of diastolic blood pressure for the physical activity, yoga practise, and control groups was 2.15, which was not significant. The post and adjusted post-test means' 'f' ratios were 9.42 and 41.03, respectively, which were higher than the required table value of 3.23 for significance. On chosen criteria factors, this study found a significant difference between the physical exercise group, yoga practise group, and control group.

The Scheff S test was used as a post-hoc test to assess whether of the adjusted post-test means had a significant difference. Table II displays the results of the follow-up test.

Table - II

Scheffẽ S Test for the Difference Between the Adjusted Post-Test Means of Flexibility, Muscular endurance and Blood Pressure (systolic and diastolic)

Adjusted Post-test Mean of Flexibility				
Physical Exercise Group	**Yoga Practice Group**	**Control Group**	**Mean Difference**	**CI**
4.417	4.702		0.285*	0.113
4.417		4.088	0.329*	0.113
	4.702	4.088	0.622*	0.133
Adjusted Post-test Mean of Muscular endurance				
10.971	11.431		0.46	0.895
10.971		8.48	2.491*	0.895
	11.431	8.48	2.951*	0.895
Adjusted Post-test Mean of Systolic Blood Pressure				
131.531	131.081		0.45	0.990
131.531		134.496	2.965*	0.990
	131.081	134.496	3.415*	0.990
Adjusted Post-test Mean of Diastolic Blood Pressure				
93.206	92.265		0.941	0.762
93.206		94.906	1.70*	0.762
	92.265	94.906	2.641*	0.762

* Significant at 0.05 level of confidence.

Results

After applying the analysis of covariance, the result of this study showed that there was a significant difference among physical exercise, yoga practice and control

groups on the changes in flexibility, muscular endurance and blood pressure after twelve weeks of training. The criterion variables such as, flexibility and muscular endurance was improved for both the physical exercise group and yoga practice group and systolic and diastolic blood pressure has significantly decreased after the physical exercise, yoga practice period. In flexibility, the yoga practice group have a significant improvement than the physical activity group. Basically the physical exercise and yoga practice has tremendously improves the physical fitness, physiological and psychological variables.

Conclusions

Both, physical exercise group and yoga practice group have significantly improved their flexibility when compared with the control group. The aerobic exercise programme has a significant role in flexibility improvement[11,12]. It was proved that yoga practice improves the flexibility due to performing various poses for prolong period involving various muscles and joints of human body[13,14]. Moreover, the result of the study shows that there was no significant difference was found between the experimental groups. Daily routine physical exercise or yoga practice may also improve the self-esteem or muscular endurance[15]. The physical exercise group and yoga practice group has significantly decreased the systolic and diastolic blood pressure when compared with the control group. A research produced that there was a significant reduction in systolic and diastolic blood pressure after physical exercise and yoga practices among middle aged working women[16]. Walking exercise also reduces the systolic and diastolic blood pressure because performing any continuous activity can increase the energy expenditure and improves the body working condition[17,18]. Some research studies found that there was a significant decrease in blood pressure, both in systolic and diastolic due to the yoga practice[19,20].

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Table - IIITRAINING SCHEDULE FOR PHYSICAL EXERCISE GROUP

List of Physical Exercise	Weeks	Duration	Duration in seconds	Recovery in between exercise in seconds	Set	Frequency	Duration of warming up
Neck rotation	1- 3 Weeks	20 min.	30 seconds	1 minute	2	Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Arms forward and backward rotation			30:30 seconds	1 minute			
Flexed Arm forward and backward rotation			30:30 seconds	1 minute			
Trunk twist			30 seconds	1 minute			
Sideward lunges			1 minute	1 minute			
Relaxation			2 minutes				
As in previous week	4 – 6 Weeks	40 min	20 minutes			Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Forward bending			30 seconds	1 minute	3		
Backward bending			30 seconds	1 minute			
Squat thrust			30 seconds	1 minute			
Sit ups			30 seconds	1 minute			
Relaxation			2 minutes				
As in previous week	7– 9 Weeks	60 min	40 minutes			Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Opposite toe touching			1 minute	1 minute	3		
Modified burpee			30 seconds	1 minute			
Heels raise			30 seconds	1 minute			
Relaxation			5 minutes				
As in previous week	10 – 12 Weeks	75 min	60 minutes			Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Push ups			20 seconds	1 minute	4		
Split jumps			10 seconds	1 minute			
Relaxation			5 minutes				

Table – IV: Training Schedule for Yoga practice group

Weeks	Name of the Asanas (Maintaining Duration in minutes : Recovery)
1 – 4	Suryanamaskar (18 Min : 5 Min), Adho Mukha Svanasana (1 : 1), Trikonasana (1 : 1), Badhakonasana (1 : 1) **- All 2 repetitions**, Shavasana (2 min) (1 min recovery) : Pranayama – Anuloma Viloma (5 min) : (1 min recovery) : Meditation – Omkar. (10 min)
5 – 8	Suryanamaskar (18 Min : 5 Min), Bhujangasana (1 : 1), Tadasana (1 : 1), Adhu Mukha Svanasana (1 : 1) Bhalasana (30 sec : 30 sec), Marjarasana (30 sec : 30 sec) **- All 2 repetitions**, Shavasana (10 min) : Pranayama – Bhastrika (5 min) (1 min recovery) : Meditation – Omkar. (10 min),
9 – 12	Suryanamaskar (18 Min : 5 Min), Bhujangasana (1 : 1), Trikonasana (1 : 1), Tadasana (1 : 1), Bhalasana (30 sec : 30 sec), Marjarasana (30 sec : 30 sec) **- All 2 repetitions**, Shavasana (10 min) : Pranayama – Nadi Sudhi (5 min) : Meditation – Omkar. (10 min).