



BHARATHIAR NATIONAL JOURNAL OF  
PHYSICAL EDUCATION AND EXERCISE SCIENCES  
**BNJPEES**

**DOUBLE – BLIND REFERRED JOURNAL**



## **From the Editors' Desk**

Whilst we are striving hard to manage the new normal post Covid pandemic, there is a great realisation on health fitness and wellness. The department of Physical Education, Bharathiar university with societal responsibility publishes this 11<sup>th</sup> volume of 'The Bharathiar National Journal of Physical Education and Sports Sciences'. In spite of the pandemic break the editorial team had put in tremendous efforts to bring out this volume of research works and articles.

**The Bharathiar National Journal of Physical Education and Exercise Science (BNJPEES)** is an open access quarterly journal, double blind refereed journal with ISSN – 0976-3678 which publishes original articles, commentary, editorials, review articles and case reports covering recent innovative high quality researches on sports published by the Department of Physical Education, Bharathiar University Coimbatore since June 2010. The purpose of this journal is to enrich the field of physical education and sport with literary base dynamic latest research and articles. The field of sport and physical education with its dynamic nature needs a literary back up to keep the masses informed of the latest changes that are happening across this field. Since the Sports Climate is experiencing a wide range of change and is very much essential that we stretch ourselves to meet the key challenges on sports and games. Since the inception of the new editorial team from 2019, the journal has been upgraded online to increase the vicinity across the globe and provide a wider citation opportunity scaling up research heights. The journal has been indexed with google scholar, world cat, core and road.

We appreciate the research scholars for stepping forward to get their works published in our university journal. After thorough plagiarism check using Ithenticate and Turnitin, the articles are subjected to a double blind referee system for review. Based on the reviewers report the articles are accepted. Being We are also working hard towards quality control of the articles in par with the international standards.

From the editorial desk we submit to you that BNJPEES, with immense pleasure is working for the development of research in the field of Physical education and sports sciences which is the need of the hour. We encourage the authors to submit evidence based realtime research results which would benefit the society.



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Editor



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## **Publisher's Desk**

**The Bharathiar National Journal of Physical Education and Exercise Science**

**BNJPEES -A Double Blind Refreed University Journal**

**Vol:XI; Issues1-4; 2020**

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<b>@copy rights</b>	Department of Physical Education Bharathiar University, Coimbatore-641046, Tamilnadu, India
<b>ISSN</b>	<b>0976-3678</b>
<b>Published by</b>	Department of Physical Education Bharathiar University, Coimbatore-641046, Tamilnadu, India

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## Impact of Yogic Practices on selected Physical and Physiological variables among Inter Collegiate Level Men Kabaddi Players

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### Abstract

The purpose of the study was to find out the effect of yogic practices on selected physical and physiological variables among inter collegiate level men kabaddi players. For this study 30 inter collegiate level men kabaddi players were selected from CMS College of Arts and Commerce, Coimbatore, Sri Ramalinga Sowdanbigai college of Arts and Commerce, Coimbatore. The selected subjects were divided into two groups namely Experimental Group - I yogic practices, Group - II control group. Each group consists of 15 subjects. The age of the subjects ranged from 18-25 years. The Experimental Group-I underwent six weeks of yogic practices on weekly three days. The control group did not undergo any training other than the regular work. Data were collected from each subjects before and after the six weeks of training. The collected data were analyzed statistically by using depended 't' test. It was found that there was significant improvements due to the yogic practices on selected physical and physiological variables among inter collegiate level men kabaddi players.

**Keywords:** collegiate level, kabaddi, men, yogic practices.

### INTRODUCTION

Yogasanas is the simple actions of keeping the internal and external parts of the body to maintain the good health. The body and the mind are closely interrelated. Both should be fully taken care of. Thousands of years ago, the people of ancient Greece believed in the principle 'A sound mind in a sound body'. The whole system of their education was based on this principle.

A competitor wants sufficient energy to play well. Chanting – 'Kabaddi' several times in a

particular breath for lengthy stretches throughout the game can further reduce their power levels resulting in fatigue. This may impact the act of a competitor. The yogic practices that increase the lung capability enhance the power levels too. It includes Yogic inhalation (deep breathing), Nadishodhana yogic(alternating nostril breathing), Bhramari (humming bee breathing) and Ujjayi yogic(Ocean breathing) every day.

## **YOGA AND SPORTS**

Yoga postures are the physical positions that coordinate breathe with movement and wit holding the position to stretch and strengthen different parts of the body. Asana practices is the ideal complement to other forms of exercise, especially running , cycling and strength training, as the postures systematically work all the major muscle groups, Including the back, neck, and shoulders, deep abdominal, hip and buttocks muscles and even ankles, feet, wrists and hands.

By the very nature, asanas affect major and minor muscle groups and organs as they simultaneously import strength, increase flexibility and bring nourishment to internal organs. Although most poses are not aerobic in nature they do in fact send oxygen to the cells in the body by way of conscious deep breathing and sustained stretching and contraction of different of different muscle groups.

## **METHODOLOGY**

The study was to find out the effect of yogic practices on selected physical and physiological variables among inter collegiate level men kabaddi players. To achieve the purpose of the study, thirty inter collegiate level men kabaddi players were randomly selected from CMS College of Arts and Commerce, Coimbatore, Sri Ramalinga

Sowdanbigai college of Arts and Commerce, Coimbatore, whose age ranged between 18 to 25 years. The subjects were divided into two groups of fifteen in each. Experimental Group I was given yogic practices and Group II was acted as Control Group. The experimental group underwent six weeks of yogic practices and weekly three days for a period of six weeks. The control group did not undergo any training other than the regular work. Data were collected from each subject before and after the six weeks of training.

## **SELECTION OF VARIABLES AND TEST ITEMS**

The test items were designed for this study after a thorough investigation on literature reviews consultation with experts of this field of study, physical education personals and medical experts as well. The criterion variables are presented in Table-I

## **STATISTICAL TECHNIQUES**

The collected data were analyzed statistically by using dependent't' test

## **TRAINING PROGRAMME**

The procedure adopted in the training programme for the present study is described in the following aspects. During the training period, the experimental group yogic practiced for six weeks. These groups practiced for duration of 90 minutes. They



started with a warming-up for a period of 10 minutes. During the warming up the participants was trained to perform suryanamaskar in a slow manner so that each of the 12 poses was held for duration of 5 seconds.

0.60 for flexibility, breath holding time and resting heart rate respectively. The obtained 't' ratios on flexibility, breath holding time and resting heart rate were found to be less than the required table value of 2.14 at 0.05 level of significance.

**Table – I Criterion Measurements**

S. No	Variables	Test items	Unit of measurements
1.	Flexibility	Sit and Reach Test	In Centimeters
2.	Breath Holding Time	Nose Clip	In Seconds
3	Resting Heart Rate	Heart Rate Monitor (Manual)	In Beats/Min

They performed suryanamaskar five times and for the period of 40 minutes asanas practices and pranayama practices. At the end of the class the participants performed relaxation asana such as savasana and matsyasana for a period of 5 minutes.

### **ANALYSIS AND INTREPRETATION OF DATA**

An examination of that the Yogic Practices Group (YPG) obtained 't' ratio were 5.24, 12.64 and 8.50 for flexibility, breath holding time and resting heart rate respectively. The obtained 't' ratios on flexibility, breath holding time and resting heart rate were found to be greater than the required table value of 2.14 at 0.05 level of significance. It was found to be statistically significant. An examination of that the Control group obtained 't' ratio were 1.43, 0.56 and

### **DISCUSSION ON FINDINGS**

The purpose of the present study investigation was to determine the effect of yogic practices on selected physical and physiological variables among inter collegiate level men kabaddi players.

#### **Flexibility**

To obtained 't' ratios for pre and post test mean difference in the selected physical variables are: 5.24 (Flexibility) The obtained 't' ratios were tested at 0.05 level of significance. From the result it was inferred that the pre to post tests were statistically significant. Sunil rayat (2015) to conduct the study was effect of yoga (asana & pranayama) on selected physical & physiological variables of physical education students. Finally result of the study was to

yoga (asana & pranayama) showed significantly improved in flexibility.

Table - II						
YOGIC PRACTICE TRAINING PROGRAM						
week	Asanas	Rep	Set	Holding time (In Seconds)	Each asana (In Seconds)	Rest in between asana (In Seconds)
6 Weeks	Mediation	5 minutes				
	Stretching	10 minutes				
	Suryanamaskar	5	1	5		30
	Asanas	60 minutes				
	Talāsana	4	2	7	15	30
	Padahastāsana	4	2	7	15	30
	pirayasana	4	2	7	15	30
	Ardhakatichakrasana	4	2	7	15	30
	virabdrāsana	4	2	7	15	30
	Ardhamatseyentrasana	4	2	7	15	30
	Paschimottāsana	4	2	7	15	30
	Navukasana	4	2	7	15	30
	Sarvangāsana	4	2	7	15	30
	Halāsana	4	2	7	15	30
	Bhujangāsana	4	2	7	15	30
	Salabāsana	4	2	7	15	30
	Relaxation	5 minutes				
	Pranayama	10 minutes				
	Nadi-suddhi pranayama	6-8	2	-	-	30
	Nadi- sodhana pranayama	6-8	2	4	-	30
Sitali pranayama	6-8	2	-	-	30	
Sittkari pranayama	6-8	2	-	-	30	



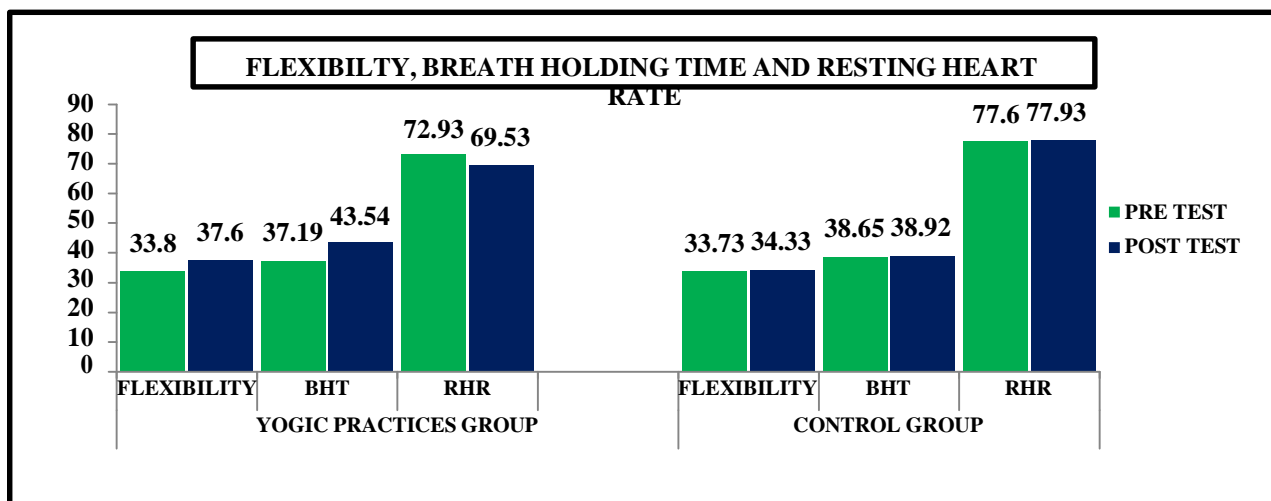
Table III

Computation of 't' Ratio between pre and post test mean values on Selected Physical and Physiological Variables Of Yogic Practices Group And Control Group

Groups	Variables	Pre Test	Post Test	Mean	SEM	't'-
Yogic Practices Group (YPG)	Flexibility	33.80	37.60	3.80	0.72	5.24*
	Breath Holding Time	37.19	43.54	6.34	0.50	12.64*
	Resting Heart	72.93	69.53	3.40	0.40	8.50*
Control Group	Flexibility	33.73	34.33	0.60	0.44	1.34
	Breath Holding Time	38.65	38.92	0.27	0.47	0.56
	Resting Heart	77.60	77.93	0.33	0.54	0.60

Figure - I

Graphical Representation Showing the Pre-Test and Post-Test Mean Values of Experimental Group and Control Group On Flexibility Breath Holding Time and Resting Heart Rate



### Breath holding time

To obtained 't' ratios for pre and post test mean difference in the selected physiological variables are: 12.64 (Breath Holding Time) The obtained 't' ratios were tested at 0.05 level of significance. From the result it was inferred that the pre to post tests were statistically significant. Senthil (2017) to conduct the study was to find out the effects of plyometric training with yogic practices on selected physical and physiological variables among schools boys. Finally the analyzed the data was indicates that plyometric training with yogic practices was significantly increase physiological variables are (Breath Holding Time, Resting Heart Rate) finally result of the study was to yoga (asana & pranayama) showed significantly improved in breath holding time.

### Resting Heart Rate

To obtained 't' ratios for pre and post test mean difference in the selected physiological variables are: 8.50 (Resting Heart Rate). Rahul Kumar Prasad et al., (2015) to conduct the study were to find out the effect of pranayama practice on selected physiological parameters. The selected variables as physiological parameters for the current study such as resting pulse rate, maximum breath holding capacity, and blood pressure (systolic and diastolic). The result of the present study was powerfully reveals that pranayama practices of eight weeks have

significant effect on selected physiological parameters of kabaddi players.

### CONCLUSION

1. It was concluded that the yogic practices group (YPG) has produced significant improvement from pre to post test on flexibility among inter collegiate level men kabaddi players.
- 2.
3. It was concluded that the yogic practices Group (YPG) has produced significant improvement from pre to post test on breath holding time among inter collegiate level kabaddi players.
4. It was concluded that the yogic practices Group (YPG) has produced significant improvement from pre to post test on resting heart rate among inter collegiate level kabaddi players.

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**Journal of Recent Research and Applied Studies.** ISSN: 2349 -4891

- 3 **Youvaraj & Dr. K. Vaithianathan (2015)** Effects of Asanas and Yogic Practice on Flexibility of Badminton Players. **International Journal of Recent Research and Applied Studies.** ISSN: 2349 –4891
- 4 **Premnath (2016)** Effect of Yogasana and Yogicon Selected Psychological and Physical Fitness Variables among School Boys. **International Journal of Recent Research and Applied Studies.** ISSN: 2349 –4891
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## Effects of Multimode Exercise Intervention on Selected Psychological Variable among Women Breast Cancer Survivors

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### Abstract

The purpose of this study was to find the effects of multimode exercise intervention on selected psychological variables among women breast cancer survivors. To achieve the purpose, forty women breast cancer survivors were randomly selected as subjects. They were divided into two equal groups namely experimental group and control group. Experimental group underwent aerobic exercise, massage and yoga training (AMYT) and control group was not given any specific programme. They assessed before and after the training periods of twelve weeks. The following criterion variables were chosen namely stress and depression. The 't' ratio statistical tool was used to analyze the study. The study revealed that the selected psychological symptoms were significantly improved due to the influence of the multimode exercise practices. The exercise should be structured programme for cancer survivors.

**Keywords:** Breast Cancer, AMYT, 't' ratio

### INTRODUCTION

Cancer is a leading cause of death worldwide. Among the leading causes of cancer deaths in women, breast cancer remains a medical and social challenge, as well as a major public health problem. There is a trend of increasing breast cancer incidence almost everywhere, partly due to increases in risk factors such as decreased childbearing and breast-feeding, increased exogenous hormone exposure and detrimental dietary and lifestyle changes, such as obesity and reduced physical activity. This being a lifestyle disease, it could be remedied through a change in man's

lifestyle through yoga and other physical exercises.

Medical treatment focuses on beating cancer, but women whose lives are affected by breast cancer have to find how to live with it and what works best for them. During primary treatment of breast cancer, a broad range of treatment-related adverse effects occur which compromise physical health, mental health, social health, and subsequently impact quality of life. Often breast cancer is associated with serious emotional issues such as stress, anxiety, depression, and negative perception of self-

images. A recent meta-analysis concluded that exercise interventions should be multidimensional, including both exercise and behavioral interventions. Aerobic exercise may help to prevent the weight gain typically associated with this form of treatment. It involves raising the heart rate so the lungs and heart work harder to pump blood through the body and also experienced improved body image, increased shoulder flexibility and elevated cardiovascular health **(Betsy, 2008)**. Massage therapy is the fastest growing form of complementary and alternative medicine sought and recommended for breast cancer patients. Over 80% of all female breast cancer patients report using complementary and alternative medicine for managing breast cancer and symptoms of its treatment **(Boon et al., 2007)**. Yoga intervention for cancer patients shown positive effects on a variety of outcomes, including sleep quality, mood, stress, cancer-related distress, cancer-related symptoms, and overall quality of life, as well as functional and physiological measures **(Julienne, 2005)**.

### **Stress of women after breast cancer**

Anything that poses a challenge or a threat to our well-being is a stress. When the stresses undermine both our mental and physical health they are bad. A persistently negative response to challenges will eventually have a negative effect on your health and happiness. Breast cancer survivors and other cancer survivors, too have long known that one of the side effects of chemotherapy seems to be a

mental cloudiness that interferes with the ability to think clearly, remember details, and pay attention. There is even a nickname called chemo brain. But chemo is not the only thing that can cause problems with thinking and memory for people with cancer stress also plays a role in cognitive problems in breast cancer patients. In the brain, cortisol interferes with the function of neurotransmitters, the chemicals that brain cells use to communicate with each other. Excessive stress hormone levels can make it difficult to think or retrieve long-term memories. As a result of advances in screening procedures and in treatment, women diagnosed with breast cancer are living longer than ever before. This has allowed us to turn our attention to the goal of improving quality of life following cancer diagnosis and treatment. In addition to other consequences of treatment that are known to affect quality of life for example, fatigue, body image issues, lymphedema. Cognitive deficits also negatively influence quality of life among persons with a history of breast cancer. To help them minimize the occurrence of these difficulties, and to determine possible interventions, more information on potential causes is needed **(Stephanie, 2012)**.

Exercise has been proven to have a beneficial effect on a person's mental and physical state. Exercise is an extremely effective stress buster.

## **Depression of women after breast cancer**

Depression is a mental state or chronic mental disorder characterized by feelings of sadness, loneliness, despair, low self-esteem, and self-reproach; accompanying signs include psychomotor retardation or less frequently agitation, withdrawal from social contact, and vegetative states such as loss of appetite and insomnia. Depression is a co-morbid disabling syndrome that affects approximately 15% to 25% of cancer patients (**Henriksson et al., 1995**). Depression is believed to affect men and women with cancer equally, and gender-related differences in prevalence and severity have not been adequately evaluated (**Miaskowski, 2004**). Breast cancer patients undergoing chemotherapy experienced high level of depressive and anxiety symptoms. However different coping strategies were adopted to cope with their illness, chemotherapy treatment, practical and family problems, emotional and physical symptoms (**Saniah and Zainal, 2010**).

Multimodal means different modes or different types of exercise. That is two or more modes of operation. The term is used to refer to myriad functions and conditions in which two or more different methods, processes or forms of delivery are used. Aerobic activities strengthen the heart and lungs, making them more efficient and durable, improving quality and quantity of life. Exercise not only extends our life, but also gives us more energy to live it to the fullest.

Massage therapy is the fastest growing form of complementary and alternative medicine sought and recommended for breast cancer patients. Health benefits of massage include anxiety, infant growth, diabetes, immunity, cancer, proper sleep, heart problems, pain, nervous problems, skin, blood circulation, urinary system and digestive system. Yoga interventions for cancer patients shown positive effects on a variety of outcomes, including sleep quality, mood, stress, cancer-related distress, cancer related symptoms, and overall quality of life, as well as functional and physiological measures. Yoga, which is designed to be a calming exercise, strengthens and tones the body without raising the heart rate.

A structured group exercises programme during adjuvant treatment is a safe, well tolerated and effective way of providing physical, physiological and psychological health benefits to people during treatment and also appropriately powered analyses of some variables of exercise create interest and favoured relatively economical for people after breast cancer. Exercise interventions may be effective in managing some of these effects such as fatigue, weight gain, pain, emotional distress, nausea/ vomiting and premature menopause. Multidimensional exercises intervention undertaken by breast cancer patients undergoing chemotherapy can lead to reduction in psychological symptoms.



## Methodology

The purpose of the study was to find out the effects of multimode exercise intervention on selected psychological symptoms among women breast cancer survivors.

To carry out the purpose of the study, Eighty women Mastectomies (who have undergone surgical removal of the breast) were randomly selected at Breast club from G. Kuppuswamy Naidu Memorial Hospital, Coimbatore, Tamilnadu, India. Their age ranged between thirty five to forty five years. They were divided into two equal groups namely experimental group and control group. Experimental group underwent multimode exercise intervention of aerobic exercise, massage, and yoga training (MEIAMYT) for six days per week for twelve weeks and control group was not given any specific programme. Stress and Depression were selected as criterion variables. These variables were assessed before and immediately after the training period. The collected data were statistically analyzing for significant difference between two groups. The 't' ratio statistical tool was used to analyze the study and obtained results were tested with 0.05 level of significance.

## Results and Discussion

The table shows that the obtained 't' – ratio values of pre test and post test mean values of stress and depression of experimental group and control group among women breast cancer survivors. The obtained 't' – ratios were 4.84 for Stress, 14.23 for Depression of

experimental group and 1.92 for stress, 1.94 for depression of control group.

The obtained 't' – ratios on selected psychological symptoms were greater than the critical value of 2.09 it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 19 for experimental group. Hence it was observed that the mean gains and losses statistically significant resulting that twelve weeks practice of multimode exercise interventions of aerobic exercise, massage, and yoga training showed positive sign as having the significant improvement in Stress (6.41%;  $p < 0.05$ ), Depression (24.13%;  $p < 0.05$ ) of experimental group and the obtained 't' – ratios on selected treatment- related symptoms were lesser than the critical value of 2.09 it was found to be statistically insignificant at 0.05 level of confidence for degrees of freedom 1 and 19 for control group. It was observed that the mean gains and losses statistically insignificant resulting that control group showed negative sign as having the insignificant improvement in Stress (4.34%;  $p < 0.05$ ), Depression (2.15%;  $p < 0.05$ ) from the base line. A multimode exercise intervention of aerobic exercise, massage, and yoga training programme has produced a significant improvement on selected psychological symptoms namely stress and depression.

Groups name	S. No	Variables	Pre test SD	Post test SD	Diff	SE	't' – ratio
Experimental group	1	Stress( <i>numeric</i> )	27.30 2.1	25.55 2.91	1.75	0.36	4.84*
	2	pression ( <i>numeric</i> )	23.20 1.90	17.60 1.39	5.6	0.39	14.23*
Control group	1	Stress ( <i>numeric</i> )	27.60 2.50	28.80 3.38	1.20	0.62	1.92
	2	pression ( <i>numeric</i> )	23.25 1.99	22.75 1.94	0.5	0.25	1.94
*Significant at 0.05 level of confidence							

The control group programme has not produced a significant improvement on stress and depression among the women breast cancer survivors. Therefore it is concluded that after attending multimode exercise training programme there is a significant reduction in their stress level and depression level. It was observed that multimode exercises interventions of aerobic exercise, massage, and yoga training group (MEIAMYTG) produced significant development effect on psychological symptoms variables used in the study whereas in the case of control group it was found to be insignificant. In testing the significance of mean difference on pre-test between the two groups namely multimode exercises interventions of aerobic exercise, massage, and yoga training group (MEIAMYTG) and control group (CG) the result indicates that the mean differences on selected psychological symptoms namely stress, and depression used in the study before the respective treatment was insignificant. Thus, this analyses confirms that

the random assignment of subjects into two groups were successful.

In testing the significance of mean difference on post-test between the two groups namely multimode exercises interventions of aerobic exercise, massage, and yoga training group (MEIAMYTG) and control group (CG), the result indicates that the mean differences on criterion variables used in the study at the end of the treatment was found to be statistically significant. Thus it was found that there was a significant mean difference between the two groups in the variables used in the study

### Conclusion

In the present study the effects of multimode exercises interventions of aerobic exercise, massage and yoga training (MEIAMYT) has produced significant improvement on the criterion variables among women breast cancer survivors. Thus the logical combination of this method of trainings will be useful to women breast

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cancer survivors in developing their physical health and mental health.

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## **EFFECT OF YOGASANA AND PRANAYAMA PRACTICES ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES AMONG PHYSICAL EDUCATION STUDENTS**

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### **Abstract**

The study was to find out the effect of yogasana and pranayama practices on the selected physical and physiological variables among physical education students. For this purpose thirty students were selected from department of physical education, Barathiar University Coimbatore. The age group of the subjects ranged from 18 to 25 years and were selected by random sampling method. They were divided into 2 groups namely Group -A Experimental group and Group B control group, each group consisting of 15 subjects. The experimental group underwent yogasana and pranayama practice for a period of eight weeks and were tested before and after the training. Standardized tests were used to test the selected variables. The data were analyzed statistically by using dependent 'f test in order to find out the significant differences between the pre test and post test scores. After eight weeks of yogasana and pranayama practice the experimental group showed significant improvement on the selected physical and physiological variables namely Flexibility and Resting pulse rate respectively.

**Keywords:** Flexibility, Resting Pulse Rate, Yogasana and Pranayama.

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### **INTRODUCTION**

Yoga is the name given to age-old practices that help to create a sense of union among all aspects of the human beings; in body, mind and spirit. The word yoga has its roots in the Sanskrit word "YUJ" which means to merge, to join or to unite or to be whole or communion. It aims to unite or to be with the eternal truth which is a state of unalloyed bliss arising from the unquiet of the dualities. The study of yoga as a discipline sharpens the

powers of discernment and leads towards the understanding of the true nature of the soul which can never be fully comprehended by the senses or the intellect. Yoga is also interpreted as the union of the microcosmic individual self with the macrocosmic supreme self (paramathman).

### **YOGASANA**

Yogasanas are not meant only to develop muscles and the body but also

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mainly to regulate the proper activities of all internal organs and glands that affect the nervous system which, in turn, controls the over well-being of muscles to a greater degree than we actually suppose (Indira Devi, 1969).

## **PRANAYAMA**

Pranayama means controlled breathing. It is the very basis and the foundation of yogic principles. Loosely translated from Sanskrit, Pranayama is described as the breath control. The term when broken up reveals the word, 'Prana' which means the very breath of life or crucial life energy; while 'ayama' stands for the power to direct or determine.

While performing Pranayama, an individual breathes deeply. The breath of air boosts the upper respiratory system and fills the lungs with clean air. When the clean air is retained in the lungs, it helps to raise the body temperature and to increase the assimilation of oxygen. During the process of exhaling the diaphragm returns to the normal position and the exhaled air that contains harmful impurities is thrown out of the body as the inter-costal muscles contract

## **RELATIONSHIP BETWEEN YOGASANA AND PRANAYAMA**

Yoga literally means to unite the individual spirit (Jeebamathma) with the

universal spirit (paramathma) the emphasis here is on 'self realization'. Yoga practice is directed towards developing peace and well being in the practitioner. All the elements of yoga exist to purify the body, the mind and the soul, these elements are referred to as Ashtanga yoga. Patanjali, the father of yoga, created eight Sadhanas, known as Ashtangayoga namely yama, niyama, Assana, Pranayams, Prathara, Dharana, Dayana and Samadhi. So the asanas and the pranayama are merely three or four steps of Ashtanga yoga but are definitely integral to yoga.

## **MATERIALS AND METHODS**

For the purpose of this study thirty subjects were selected from department of physical education, Barathiar University Coimbatore. They belonged to the age group of 18 to 25 years and were selected by adopting the randomized sampling method. For carrying out the research the subjects were divided into two groups of fifteen in each group. The experimental group underwent yogasanas and pranayama practices for a period of eight weeks while the other group acted as the control group. The tests used to assess the selected physical and physiological variables are given below in table-1.

**TABLE-1**  
SELECTED VARIABLES TESTS AND UNIT OF MEASUREMENTS

S.NO	PHYSICAL AND PHYSIOLOGICAL VARIABLES	TESTS	UNIT OF MEASUREMENTS
1	Flexibility	Sit and Reach test	Centimeter
2	Resting Pulse Rate	Manual Method	Beats Per minute

### EXPERIMENTAL DESIGN

An experimental design is the blue print of the procedure used for testing the hypotheses and for reaching valid conclusions about the relationship between the independent variables and the dependent variables. For this study, the experimental randomized group design was employed, to find out the effects of yogasana and pranayama practices on the variables namely flexibility and resting pulse rate.

### TRAINING PROGRAMME

The Asana and pranayama practices were given to the experimental group for eight weeks between 5.30 am to 6.30 am every day morning. For 5 days, in a week namely on Mondays, Tuesdays, Wednesdays, Thursdays and Fridays for eight weeks. For the prescribed yogasana and pranayama practice, the investigator followed the principle of progression of load. The experimental load was fixed according to the capacity of each subject. After every two weeks the load was increased by increasing the number of repetitions.

The following training program was given

to the subjects for eight weeks and the same is presented in table II.

### STATISTICAL ANALYSIS

The investigators collected the data on the selected physical and physiological variables and were analyzed statistically using the dependent t-test for 0.05 level of significance.

### RESULTS AND DISCUSSION

In the present study the two groups namely the control and the experimental groups were compared with regard to the difference in Flexibility and Resting Pulse Rate in relation to their pre and post- test scores. The results, thus obtained and interpreted are presented in table III.

The primary objective of the paired 't' ratio is to point out the differences between the pre-test and post-test of the experimental group and the control group on, flexibility and resting pulse rate of the physical education students. The 't' ratio between the pre and post test on flexibility is presented in table-IV.



**TABLE II**  
NAMES OF ASANANS AND PRANAYAMA PRACTICE

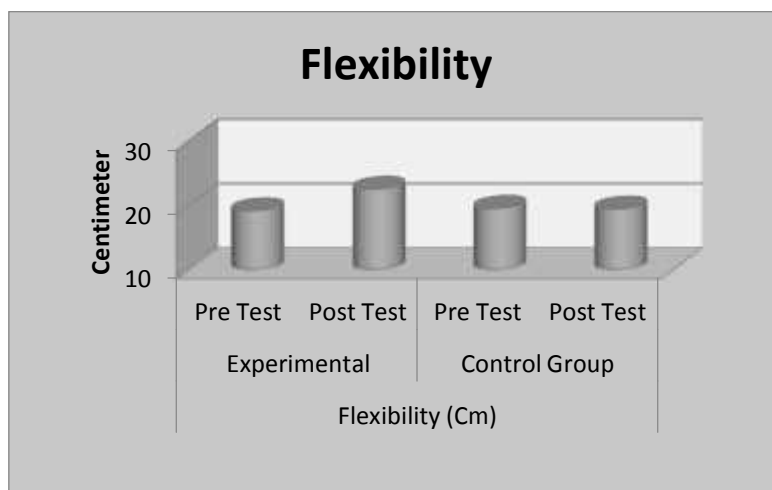
Period	Asana Pranayama Practices	Duration
Monday Tuesday Wednesday Thursday Friday	Padamasana Vajrasana Paschimotasana Matsyasana Salabhasana Bhujangasana Utthanpadasana Chakrasana Dhanurasana Sarvangasana Halasana Trikonasana Pranayama Kabalapathi Basthirika Bhramari	5.30 Am to6.30 Am

**TABLE-III**  
DESCRIPTIVE ANALYSIS OF PRE AND POSTTEST MEANS OF  
EXPERIMENTAL AND CONTROL GROUPS ON SELECTED PHYSICAL  
AND PHYSIOLOGICAL VARIABLES

S. No	Variables	Pre Test Mean	Post Test Mean
1	Flexibility	Exp :19.20	Exp : 22.56
		Con : 19.58	Con: 19.48
2	Resting Pulse Rate	Exp : 74.89	Exp : 69.48
		Con : 72.20	Con: 71.18

**TABLE-IV** COMPUTATION OF 't' TEST ON FLEXIBILITY OF EXPERIMENTAL AND CONTROL GROUPS

Variable	Group	Test	Mean	S.D	D.M	DM	't'
Flexibility (Cm)	Experimental	Pre Test	19.20	0.97	3.03	0.41	7.34*
		Post Test	22.56	1.55			
	Control Group	Pre Test	19.58	0.98	0.10	0.07237	
		Post Test	19.48	0.80			

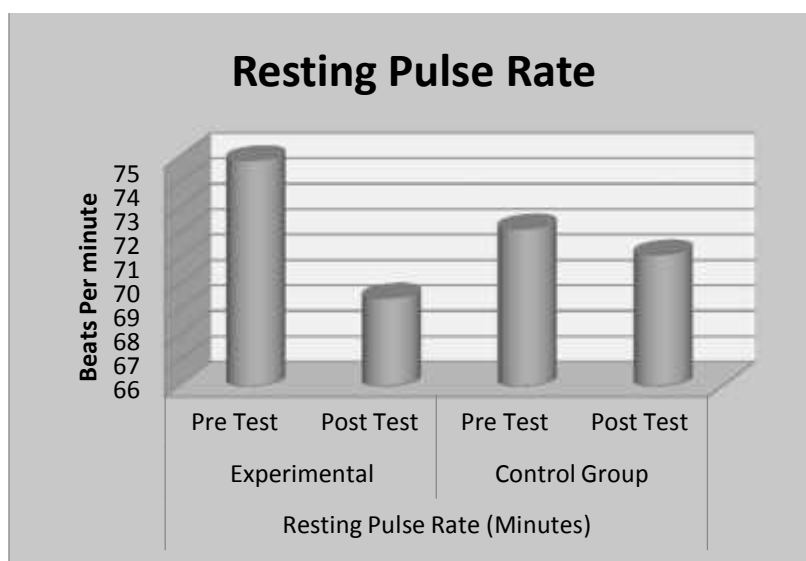


**FIGURE-1** MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS OF PRE AND POSTTESTS ON FLEXIBILITY OF PHYSICAL EDUCATION STUDENTS

**TABLE-V**  
COMPUTATION OF 't' TEST ON RESTING PULSE RATE OF EXPERIMENTAL AND CONTROL GROUPS

Variable	Group	Test	Mean	S.D	D.M	DM	't'
Resting Pulse Rate (Minutes)	Experimental	Pre Test	74.89	2.59	4.34	0.90	4.82*
		Post Test	69.48	1.68			
	Control Group	Pre Test	72.20	2.32	0.28	0.20	
		Post Test	71.18	2.34			

\*Significance Level was fixed at 0.05 with df 14Table value 2.14



**FIGURE-2** MEAN VALUES OF EXPERIMENTAL AND CONTROL GROUPS OF PRE AND POST TESTS ON RESTING PULSE RATE OF PHYSICAL EDUCATION STUDENTS

Table-IV indicates experimental and control groups with regard to the flexibility on the mean and standard deviation of physical education students. The experimental group pre and post test mean values are 19.20 and 22.56 and the standard deviation values are 0.97 and 1.55 and the obtained 't' value is 7.34 which is greater than the table value of 2.14 with df 14. Control group mean values are 19.58 and 19.48 and standard deviations are 0.98 and 0.80. The results of the study of 't' value is 0.148 which is less than the table value 2.14. The results of the study indicate that there is a significant improvement on flexibility of the experimental group due to yogasana and pranayama practices. The mean difference of pre and post test on flexibility are presented in figure -1

Table-V indicates that the resting pulse rate of the experimental and control groups, their mean and standard deviations of subjects. The experimental group's pre and post test mean values are 74.89 and 69.48 and standard deviation values are 2.59 and 1.68 and obtained 't' value is 4.82 which is greater than the table value of 2.14 with df 14. Control group mean values are 72.20 and 71.18 and standard deviation values are 2.32 and 2.34. The 't' value is 1.40 which is lesser than the table value of 2.14. The result of the study indicate that the experimental group made significant improvements on resting pulse rate due to yogaasana and pranayama practices imparted to the subjects. The mean

difference of pre and post test on resting pulse rate are presented in figure – 2.

The study reveals that the eight weeks of training given to the experimental group had a positive effect on the development of their physical and physiological variables. It was further observed that there is a significant improvement of the variables after this practice. Hence this improvement can be attributed to the systematic training given to the subjects.

## **DISCUSSION**

### **FLEXIBILITY**

The results of this investigation show that the obtained 't' ratio for the pre and post-tests is 7.39 and the obtained 't' ratio is found to be greater than the required table value of 2.14 at 0.05 level of confidence. This reveals that there is a significant improvement in flexibility of the subjects of the experimental group.

### **RESTING PULSE RATE**

The results of this investigation show that the obtained 't' ratio of the experimental group for the pre and post tests is 4.82 and the obtained 't' ratio is found to be greater than the required table value of 2.14 at 0.05 level of confidence. This indicates that there is a significant reduction in resting pulse rate.

## **CONCLUSIONS**

Within the limitations of the present study, the following conclusions are drawn.

- There is a significant improvement in flexibility of the subjects who underwent eight weeks of yogasana with pranayama practices.
- There is a significant reduction in resting pulse rate of subjects who underwent eight weeks practice of the yogaasanas with pranayama.
- The control group did not show any significant changes in the selected physical and physiological variables.

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## Effect of yogic practices on selected physiological and psychological variables among College Men

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### Abstract

*Yoga is a way of life. It is predominantly concerned with maintaining a state of equanimity at all costs. All yoga schools of thought emphasize the importance of the mind remaining calm, because as the saying goes, only when the water is still can you see through it. This study was designed to effect of yogic practices on selected physiological and psychological variables among college men. To achieve the purpose of the study 30 college men were selected from Dr.N.G.P Arts and Science College, Coimbatore. Their age ranged between 18 and 23 years and they were divided into two equal groups consists of 15 each. Group I underwent the yogic practices and Group II acted as control group. The training was given to the experimental group for 3 days per week for the period of 12 weeks. The control group was not given any sort of training except their routine work. The data were collected from the subjects and it was statistically analyzed with dependent 't' test to find out significant improvement if any at 0.05 level of confidence. The results speculated that the resting heart rate and self confidence of school college men improved significantly due to the influence of yogic practices with the limitations.*

**Keywords:** *Yogic practices, resting heart rate and self confidence*

### Introduction

Aerobic exercise is the exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy generating process. They are several kinds of aerobic exercise which are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise, involving large muscle groups, and a cooling down period at the end. Aerobics is a form of physical exercise that combines rhythmic aerobic exercise with stretching and strength training routines with the goal of improving all elements of fitness (flexibility, muscular strength and cardio – vascular fitness). It is usually performed to music and may be practiced in a group setting led by an instructor, although it can be done solo and without musical accompaniment. With the goal of preventing

illness and promoting physical fitness, practitioners perform various routines comprising a number of different dance like exercises. Formal aerobics classes are divided into different levels of intensity and complexity. Aerobics classes may allow participants to select their level of participation according to their fitness level. Many gyms offer a wide variety of aerobic classes for participants. Each class is designed for a certain level of experience and taught by a certified instructor with a specialty area related to their particular class (Mohan, 2002).

Basketball players should possess the basic qualities of physical fitness like speed, speed endurance, agility, explosive power, flexibility and coordination. Only with the basic qualities they can improve their performance level during the game. With this quality and the player's anthropometric variables like height, arm length

and leg length also play a vital role in deciding the efficiency of the Basketball player.

## Methodology

Yoga is a way of life. It is predominantly concerned with maintaining a state of equanimity at all costs. All yoga schools of thought emphasize the importance of the mind remaining calm, because as the saying goes, only when the water is still can you see through it. This study was designed to effect of yogic practices on selected physiological and psychological variables among college men. To achieve the purpose of the study 30 college men were selected from Dr.N.G.P Arts and Science College, Coimbatore. Their age ranged between 18 and 23 years and they were divided into two equal groups consists of 15 each. Group I underwent the yogic practices and Group II acted as control group. The training was given to the experimental group for 3 days per week for the period of 12 weeks. The control group was not given any sort of training except their routine work. The data were collected from the subjects and it was statistically analyzed with dependent 't' test to find out significant improvement if any at 0.05 level of confidence.

## Training Programme

During the training period of the experimental groups underwent their respective training programme in addition to their daily regular activities as per the schedule. Experimental group underwent yogic practices on three alternate days per week (Monday, Wednesday and Friday 7.00 am to 8.00 am) for twelve weeks. The experimental training Programme was designed based on the resources collected from books, periodicals, e-materials and discussions with the experts. The duration of experimental training were planned for 60 minutes. All the subjects involved in this study were carefully monitored throughout the training programme, none of the reported with tear and muscle soreness.

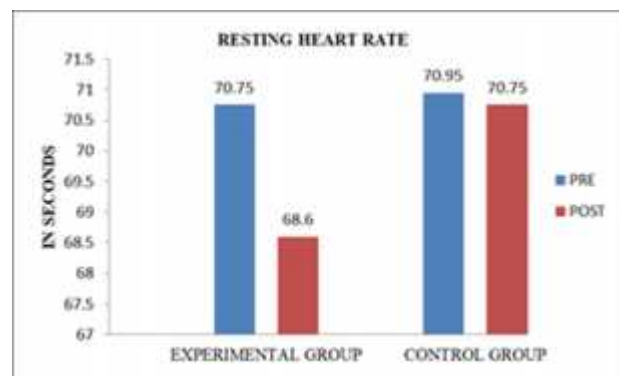
Table I shows that the pre test mean values of experimental group and control group 70.75, 20.45 and 70.95, 19.65 respectively and the post test mean values are 68.60, 26.85 and 70.75, 22.50 respectively. The obtained dependent t-test between the pre and post test means on agility and cardio respiratory endurance of experimental group and control group are 5.78, 11.25 and 0.45, 1.31 respectively.

**TABLE – I** Analysis of 't' ratio for resting heart rate and self confidence

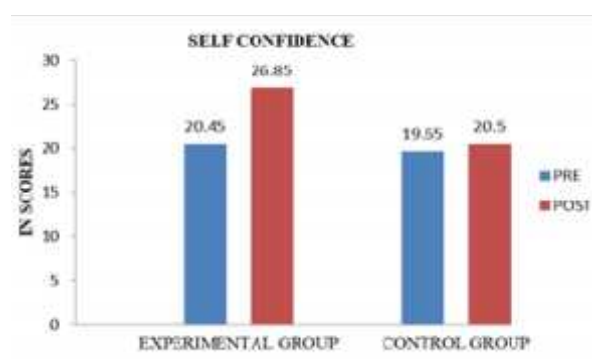
Variables	Group	Test	Mean	SD	DM	t-ratio
RESTING HEART RATE	Experimental Group	Pre test	70.75	1.66	0.37	5.78*
		Post test	68.60			
	Control Group	Pre test	70.95	1.96	0.43	0.45
		Post test	70.75			
SELF CONFIDENCE	Experimental Group	Pre test	20.45	2.54	0.56	11.25*
		Post test	26.85			
	Control Group	Pre test	19.65	2.88	0.64	1.31
		Post test	20.50			

(Significance at 0.05 level of confidence for df of 14 is 2.14)





**Figure –I** Bar diagram of experimental and control group on resting heart rate.



**Figure-II** Bar diagram of experimental and control group on self confidence.

The table value required for significant difference with degrees of freedom 14 at 0.05 level of confidence is 2.14. The obtained 't' test value of experimental group was greater than the table value. The results clearly indicated that the resting heart rate and self confidence of the experimental group improved due to the yogic practices of college men.

### Discussions on Findinas

This study confirms that yogic practices alone produce improvement in physiological and psychological variables namely resting heart rate and self confidence. Supported the mean, the experimental group was found in better increasing on resting heart rate and self confidence when compared to the control group. This study supports the findings of Prasanth et al., (2017), Balaji et al., (2012), Benavides et al., (2009) Kousari et al., (2009) and padmadevi (2007).

### Conclusion

Results of the present study, it was concluded that physiological and psychological variables, are observed significantly favoured the experimental group (yogic practices group) as compared to control group.

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### **Funding**

This study was not funded by any grant

### **Acknowledgements**

The authors would like to thank every participant for his effort and time.

### **Conflict of interest**

None of the authors have any conflicts of interest to declare.

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A. Thanasingh and N. Lingaraj, Effect of yogic practices on selected physiological and psychological variables among College Men, Bharathiar National Journal of Physical Education and Exercise Sciences 11(1) (2020) 21-24.



## A six week pilates mat exercises protocol on self efficacy and self esteem of school level basketball girls

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### Abstract

**Aim and Scope:** Pilates, a body-mind exercise method, has experienced increasing popularity in recent years, especially among young women. But there is not enough evidence whether this exercise method contributes to the physical or/and psychological condition of individuals. The aim of this study was to investigate the effectiveness of an original six-week Pilates mat exercise protocol on school level basketball players.

**Methods:** Thirty basketball players aged between 14 and 17 were randomly assigned to Pilates Exercise Group (n=15), and Control Group (n=15). Pilates Exercise Group performed a six-week pilates mat exercise protocol whereas Control Group did not participate in any regular physical activity for six weeks. Self efficacy and Self esteem of the subjects were assessed at the baseline and after six weeks.

**Results:** Self efficacy and Self esteem increased in the pilates mat exercise Group after six weeks.

**Conclusion:** The current pilates mat exercise protocol contribute to the psychological well-being of young basketball players in terms of self efficacy and self esteem.

**Keywords:** Pilates, Self Efficacy, Self Esteem, Basketball.

### Introduction

The World Health Organization defines health as “A state of complete, physical, mental, and social well-being, not merely the absence of disease or infirmity” [1]. The modern era and lifestyle, unfortunately, worsen well-being of the individuals and cause inactive lifestyle contrary to human biomechanics. In today’s society, especially young population suffers from the consequences of inactivity [2]. Worsening of body composition and fitness levels due to an inactive lifestyle may impair the physical and psychological health of the young population [3].

Pilates supposed that the balance between body and mind is an important factor in achieving health, and happiness. Pilates also holds that contrology stimulates the mind and decreases mental strain [4]. Pilates training minimizes unnecessary muscle recruitment by maintaining a neutral spine position and core

stabilization. Pilates exercises improve general body flexibility and health by improving strength, posture, and the coordination of movements. Some researchers have also reported that the holistic approach of Pilates based training may offer physical and psychological improvements for human health [5].

In developing this method, Pilates (founder of Pilates exercises) combines both eastern and the western concepts [6] by including mental focus and specific breathing of yoga with the ancient Greek and Roman exercise systems. Pilates provides complete coordination of body, mind and spirit. Pilates is based on six principles which enable to increase attention, motivation and enhance cognitive functions while minimizing stress on the body [7].

Pilates training method is based on 6 principles that are Centering (i.e., focussing on tightening the power house), Concentration, (i.e., mental focus and attention while performing exercise), Control (i.e., postural management while performing the exercise), Precision (i.e., accuracy of exercise techniques), Flow (i.e., smooth transition of movement within the exercise sequence), Breathing in coordination with the exercise [8]. Pilates improves posture, balance, increase core strength, peripheral mobility, which may be helpful for improving athletic performance [9].

The main purpose of pilates is to organise the mind, body, and breathe to build up sleek and strong abdominal muscles and a strong and agile back. It improves flexibility, tonicity, strengthens core muscle groups, enhances body awareness, prevents injury, develops posture and balance, and comfort of movement through daily life. Pilates gives equal importance to strengthening-body conditioning and the mind [10].

Self-efficacy is a person's belief in his or her ability to succeed in a particular situation. It is described that these beliefs as determinants of how people think, behave, and feel [11]. Among other psychological skills, self-efficacy is considered a significant element of mental training. Having strong self-efficacy cognitions are important for sport performance and emotional well-being. One way that Martin's [12] research effort expanded the knowledge base on self-efficacy in sport was by examining training self-efficacy or athlete's confidence to overcome common training barriers. Most sport psychology researchers have typically focused on performance self-efficacy.

Self-esteem is a term used in psychology to reflect a person's overall evaluation or appraisal of his or her own worth. Self-esteem encompasses beliefs (for example, "I am competent", "I am worthy") and emotions such as triumph, despair, pride and shame: some would distinguish how 'the self-concept is what we think about the self; self-esteem, the positive or negative evaluation of the self, is how a person

feel about it' [13]. Everyone believed that self confidence helps players to reach higher level. Self confidence allows the players to thrive in their environment. Self confidence gives athletes the belief that they can overcome any obstacle and that they can achieve their goals.

Basketball is a team sport characterized by the execution of series of skills in multiple situations occurring across the game. The success of an athlete is influenced by several factors. In general, the factors that have been considered to influence the success of an athlete are physical, technical, tactical and psychological skills. In accordance to the statement about that the success of an athlete is influenced by the psychological factors For basketball athletes, every playing position has different characteristics. In relation to the different characteristics of the playing position, the aspects of psychological skills that might have been identified are namely motivation, self-confidence, self-efficacy and self esteem.

The Pilates method has seen increasing popularity in last decades particularly among young women in order to avoid the physical and psychological consequences of sedentary lifestyle [14]. Evidence-based studies in this field remain limited in the context of this population. Previous studies promised certain contributions to improve psychological parameters but could not offer any clear exercise program for individuals and their outcomes were contradictory. We aimed to create a standardized protocol to improve the self efficacy and self esteem of young basketball players with this study.

## 1.1 Hypothesis

We will assume that if we use pilates mat exercise protocol, we will get superior results in self efficacy and self esteem. The hypothesis argued in this paper is that basketball players can significantly increase the self efficacy and self esteem by practicing pilates mat exercise over a consecutive six weeks period. Therefore, the objective of this research was to investigate the changes in the parameters produced during six

weeks pilates mat exercise protocol in thirty school level team basketball girls.

## 2. Materials and Methods

### 2.1 Participants

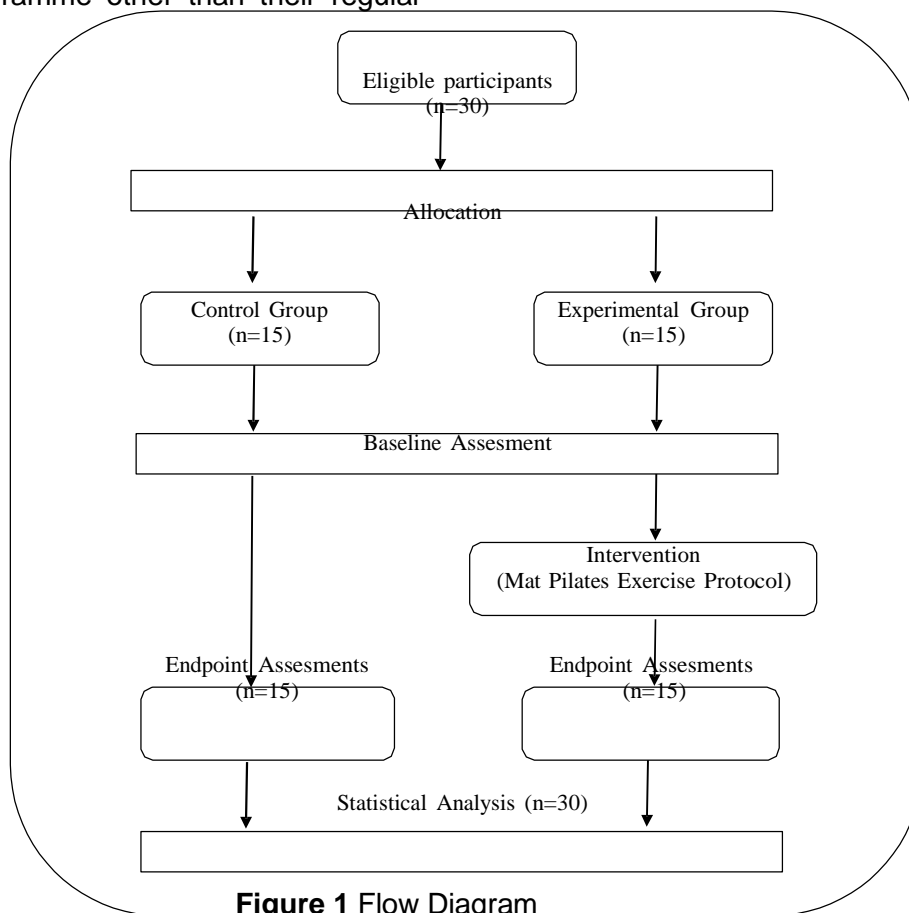
In order to address the hypothesis presented herein, we selected thirty school level basketball players from Thiyagi N.G.R memorial higher Secondary school, Coimbatore, Tamilnadu. Their age ranged between 14 and 17 years. Both the subjects and their parents were informed about this research and written consent was obtained from them. In accordance with the experimental research in the field of physical education and sports, we chose a small size target group. The selected subjects were divided into two equal groups consisting of fifteen each. No attempt was made to equate the groups. Experimental group I (n = 15) underwent mat pilates exercise protocol for a period of six weeks and group II (n = 15) acted as control group (CG), the subjects in control group were not engaged in any training programme other than their regular work.

### 2.2 Research Design

The evaluated parameters were self efficacy (**General Self-Efficacy Scale (GSE)** [15]) and self esteem (**Rosenberg Self-Esteem Scale** [16]). The parameters were measured at baseline and after six weeks, the effects of the training were examined. Before the tests, the subjects underwent 5 minutes of low intensity aerobic run and 10 minutes of dynamic and static stretching of upper and lower extremity muscles for general warm-up.

This prospective, single-blind, randomized-controlled study involved pre and post-measurement tests. Assessments were conducted at the baseline and after six weeks period. The dependent variables including self efficacy and self esteem were assessed in all subjects.

The self efficacy of the subjects was assessed by General Self efficacy Scale (GSE). This scale is a self-report measure of self-efficacy.



General self efficacy scale (GSE) developed by Schwarzer & Jerusalem in 1995. The self efficacy scale is usually self-administered, as part of a more comprehensive questionnaire. The 10 items are mixed at random with the aim in mind to predict coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events. Responses are made on a 4-point scale. Sum up the responses to all 10 items to yield the final composite score with a range from 10 to 40. (1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true). The subjects were asked to circle one from these four responses to each question. General self efficacy scale (GSE) score was obtained by summing all 10 items. The high score indicated that the subject had more self efficacy.

The self esteem of the subjects was assessed by Rosenberg self – esteem in 1965. The Rosenberg self – esteem scale consists of 10 statements dealing with general feelings about themselves. The subjects were asked to circle SA if they strongly agree. If they agree with the statement, circle A. If they disagree, circle D. If they strongly disagree, circle SD.

The points for the above responses are 3, 2, 1 and 0 respectively. In this self – esteem scale, items 2, 5, 6, 8 and 9 are negatively stated. The scores of this negatively stated item are obtained by reversing the scores e.g. SA =0, A = 1, D = 2 and SD = 3. Sum the scores for the 10 items. The high score indicated that the subject had high self esteem.

### 2.3 Training Protocol

In each training session the training was imparted for a period 60 minutes. The pilates mat exercise protocol, which included 5 minutes warming up and 5 minutes relaxation procedure after training programme for three days per week for a period of six weeks. The Pilates exercise group followed an original six-week Pilates mat exercise protocol created by the researchers of this study. According to previous studies, 6 to 8 weeks of Pilates training has positive effects on physical and psychological health [17]. We preferred the 6-week protocol to demonstrate effectiveness as soon as possible in this study. Exercises were performed as group training and supervised by a physical therapist, taking into account the potential benefits of group interaction on motivation and coordination.

Phase I (I & II week)	Phase II (III & IV week)	Phase III (V & VI week)	Frequency
Pelvic curl Chest lift Leg circles Single leg stretch Hundreds Crunches Rolling like a ball Cat stretch	Pelvic curl Chest lift Leg circles Single leg stretch Hundreds Crunches Rolling like a ball Cat stretch Corkscrew Double-leg stretch Criss-cross Single-leg kick Double-leg kick Front support Back support	Pelvic curl Chest lift Leg circles Single leg stretch Hundreds Crunches Rolling like a ball Cat stretch Hamstring pull Hip circles prep Leg pull front Leg pull back Kneeling side kick Side bend Twist Teaser prep	3 days / week



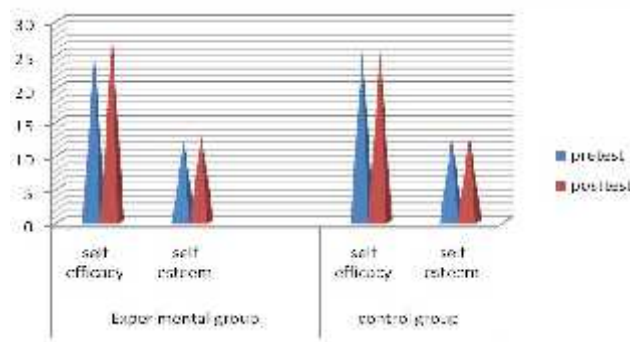
Current protocol comprised of progressive three phases. Phase-1 contained simple movements such as hundreds, crunches, rolling and some simple training series for back and hip during the first two weeks. All Phase-1 exercises were part of the program of the following phases. At the beginning of the third week, a few more complicated exercises were added to the program. Phase-3, which was performed during last two weeks period of the protocol, was composed of the most complicated and difficult exercises in addition to the previous ones. Individual limitations were respected while training and exercises were modified according to the subjects' abilities. The researcher demonstrated each activity using verbal and visual instructions to facilitate the correct position and movement. All exercises were coordinated in the group. There was a 10 seconds rest interval between each exercise.

**2.4 Statistical Analysis**

The collected data were analyzed using SPSS 16.0 for Windows. Level of 5% was used to determine significant differences. Normality tests indicated that quantities data were not normally distributed. The 't' test was find out the individual effect from base line to post-test if any.

**3. Results**

Table.1 indicates the obtained 't' values on variables for the experimental group were 7.72 (Self efficacy) and 6.59 (Self esteem). Since these values were higher than the required table value of 2.14, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom1 and 19. And the obtained 't' ratio between pre and post-test of control group 1.07 (Self efficacy) and 1.90 (Self esteem) were lesser than the required table value of 2.14, found to be not statistically significant.



**Figure 2** Bar diagram showing pre and post test means of mat pilates training group and control group on self efficacy and self esteem

**4. Discussion**

This study investigated the effectiveness of an original Pilates mat exercise protocol on self efficacy and self esteem among young females.

Table 1. Computation of 't' ratio on self efficacy and self esteem of basketball players					
Variables	Pre – test mean	Pre – test S. D (±)	Post – test mean	Post – test S. D (±)	't' ratio
<b>EXPERIMENTAL GROUP</b>					
Self efficacy	24.93	2.21	27.63	1.97	7.72*
Self esteem	11.93	1.68	12.93	1.87	6.59*
<b>CONTROL GROUP</b>					
Self efficacy	25.40	1.92	25.27	1.93	1.07
Self esteem	12.50	1.22	12.83	1.46	1.90

Our findings revealed that the six weeks Pilates mat exercise Protocol contribute to

improve self efficacy and self esteem of young basketball girls.

In a case report, Miller and Mesa [18] declared that "Pilates can help in the present moment releasing anxiety, and stress but depending on the severity of anxiety it can add to the levels once the client leaves, and goes back into the world." This emphasizes the importance of consistency for the effectiveness of the exercise. Simple, practical, feasible and entertaining programs may help individuals to incorporate exercise into their lifestyle and provide permanence of the positive effects. Heretofore, many opinions have been developed about the effective mechanisms of Pilates exercises on the emotional health.

According to the present study, it is possible to report that the pilates mat exercise protocol has positive effects on the psychological parameters of young basketball players. But as a limitation, it is not possible to reveal the mechanisms of effects through this study. We could only guess, and comment on possible effect mechanisms.

#### 4.1 Limitations

The limitation of the study is small sample size and limited age group because of which results cannot be generalized. Also, male basketball were not included in the study, so any gender specific differences in the results and associated factors could not be studied.

#### 4.2 Future Recommendations

Study can be done on a larger sample size and long term effects of pilates can be studied. Long term effects on mood state, anxiety, aggression, and quality of life can be studied. Effect of pilates on sports performance and incidence of injuries can be studied. Effect of pilates on other physical fitness variables like speed, reaction, endurance, flexibility and cardiopulmonary fitness can also be studied.

#### 5. Conclusions

Within the limitations and on the basis of the findings, it was very clear that six-week (3

days per week) pilates mat exercise protocol contributes to the psychological well-being of young basketball players in terms of self efficacy and self esteem.

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### **Funding**

This study was not funded by any grant

### **Acknowledgements**

The authors would like to thank every participant for his effort and time.

### **Conflict of interest**

None of the authors have any conflicts of interest to declare.

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### **How to Cite this Article**

E. Balaji and R. Karthika Banu, A six week pilates mat exercises protocol on self efficacy and self esteem of school level basketball girls, *Bharathiar National Journal of Physical Education and Exercise Sciences* 11(1) (2020) 25-31.



## Impact of ladder and drop jump training on speed for handball players

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### Abstract

The purpose of the study was the impact of ladder and drop Jump training on speed for handball Players. To achieve the purpose of the study, thirty six male inter-collegiate level handball players studying in various arts and science colleges affiliated to Madurai Kamaraj University, from Virudhunagar district, Tamilnadu, India were selected as subjects. The handball players who represented inter collegiate level competitions are only selected as subjects. Their age of the subjects were ranged from 18 years to 23 years. The selected subjects were randomly assigned into three equal groups of 12 subjects each. Group-I underwent ladder training, Group-II underwent drop jump training and group-III underwent combined ladder and drop jump training. In order to nullify the initial mean differences the data collected from the three groups prior to and post experimentation on selected dependent variables were statistically analyzed to find out In the significant difference if any, by applying the analysis of covariance (ANCOVA). The pretest means of the selected dependent variables was used as a covariate. Since three groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted posttest means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance. Due to the Impact of ladder training, drop jump training and combined training the speed performance of the Handball players was significantly improved. It is also concluded that combined training and drop jump training are significantly better than ladder training whereas, no significant differences existed between drop jump training and combined training groups in improving speed. The result of the study produced 2.16% percentage of changes in speed due to ladder training, 5.46% of changes due to drop jump training and 5.83% of changes in combined training group.

**Keywords:** Handball, Ladder, Drop jump

### Introduction

Handball players requires various technical skills (e.g. shooting, passing and throwing) and physical characteristics (e.g. jumping ability, power, speed and agility) at different level of competition. Plyometric exercises are specialized, high intensity training techniques used to develop athletic power (strength & speed). Plyometric training involves high-intensity, explosive muscular contractions that invoke the stretch reflex (stretching the muscle before it contracts so that it contracts with greater force). The most common plyometric exercises include hops, jumps and bounding movements. One popular plyometric exercise is jumping off a box and rebounding off the floor and onto another, higher box. These exercises typically increase

speed and strength and build power. Plyometric training is a type of exercise designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in sports. Plyometric is used to increase the speed or force of muscular contractions, providing explosiveness for a variety of sport-specific activities. Plyometric has been shown across the literature to be beneficial to a variety of athletes. Benefits range from injury prevention, power development and improvement in sprint performance. plyometric drills usually involve stopping, starting and changing directions in an explosive manner (Gabbett, 2000). Although in those sports, performance requires good aerobic capacity for recovery after high-intensity activity, many authors agree that it is anaerobic capacity that determines

success (Chaouachi et al., 2009; Duncan et al., 2006; Gabbett, 2000; Ostojic et al., 2006; Stolen et al., 2005). The capacity to improve performance in athletes and recreationally trained individuals is the primary goal of sport performance professionals and Plyometric exercises is ranked among the most frequently used methods for the development of the above mentioned profiles in team sport games. Several research studies have confirmed that Plyometric exercises can enhance muscle strength and power (Markovic et al., 2007), speed (Diallo et al., 2001; Impellizzeri et al. 2008; Michailidis et al., 2013). Therefore, the purpose of this systematic review was to describe impact of ladder and drop jump training on speed for handball players.

## Methodology

To achieve the purpose of the study, thirty six male inter-collegiate level handball players studying in various arts and science Colleges affiliated to Madurai Kamaraj University, from Virudhunagar District, Tamilnadu, India were selected as subjects. The Handball players who represented inter collegiate level competitions are only selected as subjects. Their age of the subjects were ranged from 18 years to 24 years. The selected subjects were randomly assigned into three equal groups of 12 subjects each. Group-I underwent ladder training, Group-II underwent drop jump training and group-III underwent combined ladder and drop jump training.

## Combined Ladder and Drop Jump Training Programme

In order to nullify the initial mean differences the data collected from the three groups prior to and post experimentation on selected dependent variables were statistically analyzed to find out In the significant difference if any, by applying the analysis of covariance (ANCOVA).

was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance.

## Analysis of the Data and Results of the Study

Descriptive Analysis of the Pre and Post Test Data and 'T' Ratio on Speed of Experimental Groups

Table shows that the mean, standard deviation and mean difference values of the pre and post test data collected from the experimental groups on speed. Further, the collected data was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post data. The obtained 't' values of ladder training, drop jump training and combined training groups are 7.58, 6.72 and 11.57 respectively which are greater than the required table value of 2.20 for significance at 0.05 level for 11 degrees of freedom. It revealed that significant differences exist between the pre and post test means of experimental groups on speed. The result of the study also produced 2.16% percentage of changes in speed due to ladder training, 5.46% of changes due to drop jump training and 5.83% of changes in combined training group.

The pre and post test data collected from the three experimental groups on speed is statistically analyzed by using analysis of covariance and the results are presented in table.

Table shows that the adjusted post-test means on speed of ladder training, drop jump training and combined training groups are 7.71, 7.46 and 7.42 respectively. The obtained 'F' value of 13.48 on speed is greater than the required table value of 3.29 for the degrees of freedom 2 and 32 at 0.05 level of confidence.

Criterion Measure			
Test	Variables	Test/Equipment used	Measuring unit
Speed	50 meters run	Stop watch	Seconds



Ladder Drills Training Schedule					
Phase	Exercises	Intensity (complexity of drills)	Sets	Rest between sets (minutes)	Speed of drills
I & III	Jump cuts, Walk through, One foot runs, Two foot runs, Miss a square run, Lateral Run, Bunny hops, Hopscotch, Backward hopscotch, Lateral bunny hops,	Low	3	2	Fast
		Low	3	2	Fast
		Low	3	2	Fast
IV & VII	Hopscotch, High knee up runs, Backward runs Single leg runs, Lateral runs, Carioca, Icky Shuffles, X-Country Skier (1 step), X-Country Skier (2 step), Straddle hops,	Moderate	3	2	Fast
		Moderate	3	2	Fast
		Moderate	3	2	Fast
VIII & IX	Straddle Hops, Backwards Straddle hops. Icky Shuffle, Bunny hops Double step icky shuffle, Single Square Buzzsaw, Swivel Skips, Dead leg skips, Hopscotch, X-Country Skier (2 step).	Moderate	3	2	Fast
		Moderate	3	2	Fast
		Moderate	3	2	Fast
XI & XII	Backward Icky Shuffles, Chimney Jumps, Lateral Separation Run, Crazy climber, Lateral Chimney runs, 180° Straddle Hops, Partner Races, Sensory Commands, Audible Commands, Crooked Ladder drills	High	3	2	Fast
		High	3	2	Fast
		High	3	2	Fast

Drop Jump Training Schedule					
Week	Station	Intensity	Duration in each station	Recovery	Number of sets
I	Single Leg Drop Jump (40 cm),	40%	70 sec.	30sec	3
II	Single Leg Drop Jump (40 cm),	40%	70 sec.	30sec	3
III	Double Leg Drop Jump (60 cm),	40%	70 sec.	30sec	3
IV	Single Leg Drop Jump (60 cm),	40%	70 sec.	30sec	3
V	Single Leg Drop Jump (60 cm),	40%	70 sec.	30sec	3
VI	Double Leg Drop Jump (20 cm),	50 %	90 sec	30sec	3
VII	Double Leg Drop Jump (20 cm),	50 %	90 sec	30sec	3
VIII	Single Leg Drop Jump (20 cm),	50 %	90 sec	30sec	3
IX	Single Leg Drop Jump (20 cm) and Double Leg Drop Jump (40 cm)	50 %	90 sec	30sec	3
X		50 %	90 sec	30sec	3
XI		60%	120 sec.	30 sec.	3
XII		60%	120 sec.	30 sec.	3

Hence, it is concluded that significant differences exist between the adjusted post test means of ladder training, drop jump training and combined training groups on speed.

Since, the obtained 'F' value in the adjusted post test means is found to be significant, the Scheffe's test is applied as post hoc test to find out the paired mean difference, and it is presented in table

As shown in table the Scheffe's post hoc analysis proved that significant mean differences existed between ladder and drop jump training groups, ladder training and combined training groups on speed. Since, the mean differences 0.25 and 0.29 are higher than the confident interval value of 0.16 at 0.05 level of confidence. However, no significant differences existed between drop jump and combined training groups.

Combined Ladder and Drop Jump Training Programme						
Phase	Exercises	Training	Intensity (complexity of drills)	Sets	Rest between sets (minutes)	Speed of Drills/ Volume
I & II	Bunny hops, Hopscotch, Backward hopscotch, Lateral bunny hops, Jump cuts, Walk through, One foot runs, Two foot runs, Miss a square run, Lateral Run	Ladder Drills Training	Low	3	2	Fast
			Low	3	2	Fast
			Low	3	2	Fast
III & IV	Double Leg (20 cm), Single Leg (20 cm), Single Leg (20 cm), Double Leg (40 cm), Single Leg (40 cm), Single Leg (40 cm), Double Leg (60 cm), Single Leg (60 cm), Single Leg (60 cm), Double Leg (20 cm)	Drop Jump Training	40%	3	2	54min.
			40%	3	2	54min.
			40%	3	2	54min.
V & VI	Carioca, Icky Shuffles, X-Country Skier (1 step), X-Country Skier (2 step), Straddle hops, Hopscotch, High knee up runs, Backward runs, Single leg runs, Lateral runs	Ladder Drills Training	Moderate	3	2	Fast
			Moderate	3	2	Fast
			Moderate	3	2	Fast
VII & VIII	Double Leg (20 cm), Single Leg (20 cm), Single Leg (20 cm), Double Leg (40 cm), Single Leg (40 cm), Single Leg (40 cm), Double Leg (60 cm), Single Leg (60 cm), Single Leg (60 cm), Double Leg (20 cm)	Drop Jump Training	50%	3	2	69min.
			50%	3	2	69min.
			50%	3	2	69min.
IX & X	Lateral Chimney runs, 180° Straddle Hops, Partner Races, Sensory Commands, Audible Commands, Crooked Ladder drills, Backward Icky Shuffles Chimney Jumps, Lateral Separation Run, Crazy climber	Ladder Drills Training	High	3	2	Fast
			High	3	2	Fast
			High	3	2	Fast
XI & XII	Double Leg (20 cm), Single Leg (20 cm), Single Leg (20 cm), Double Leg (40 cm), Single Leg (40 cm), Single Leg (40 cm), Double Leg (60 cm), Single Leg (60 cm), Single Leg (60 cm), Double Leg (20 cm)	Drop Jump Training	60%	3	2	77min.
			60%	3	2	77min.
			60%	3	2	77min.

Group	Test	Mean	Standard Deviation	Mean Differences	't' ratio	Percentage of Changes
Ladder Training Group (LTG)	Pre test	7.88	0.26	0.17	7.58*	2.16%
	Post test	7.71	0.31			
Drop Jump Training Group (DJTG)	Pre test	7.87	0.22	0.43	6.72*	5.46%
	Post test	7.44	0.36			
Combined Training Group (CTG)	Pre test	7.89	0.23	0.46	11.57*	5.83%
	Post test	7.43	0.29			

Table t-ratio at 0.05 level of confidence for 11 (df) =2.20



Table: Analysis of Covariance on Speed of Experimental Groups

Variable	Adjusted Posttest Means of			S o V	Sum of Squares	Df	Mean squares	'F' ratio
	Ladder Training Group	Drop Jump Training Group	Combined Training Group					
Speed	7.71	7.46	7.42	B	0.611	2	0.305	13.48*
				W	0.725	32	0.023	

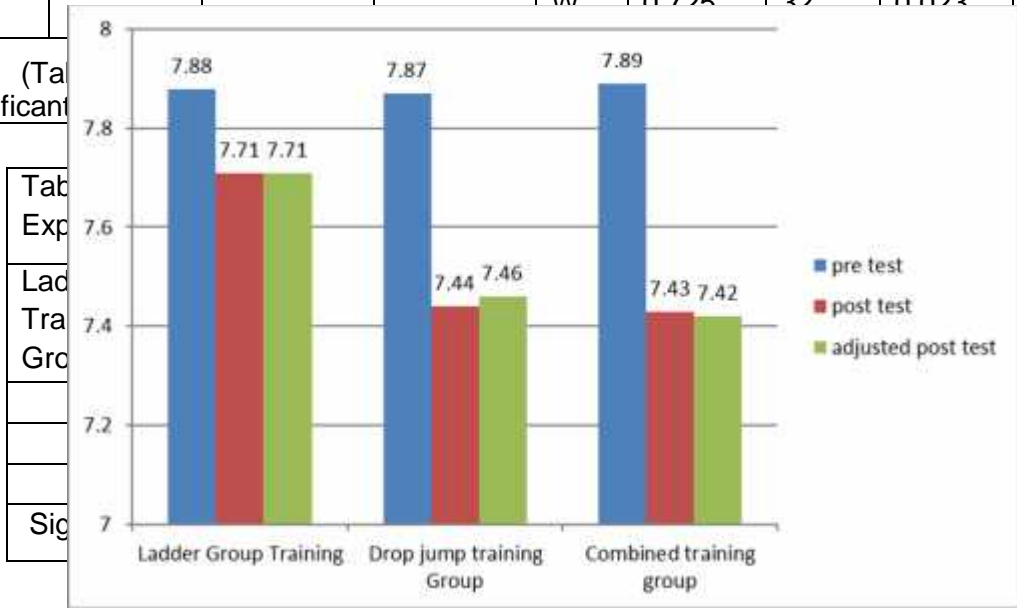


Figure-1

Since, the mean difference 0.04 is lesser than the confident interval value of 0.16 at 0.05 level of confidence.

Hence, it is concluded that due to the Impact of ladder training, drop jump training and combined training the speed performance of the

Handball players was significantly improved. It is also concluded that combined training and drop jump training are significantly better than ladder training whereas, no significant differences existed between drop jump training and combined training groups in improving speed.

The pre, post and adjusted post test mean values of ladder training, drop jump training and combined training groups on speed is graphically represented in figure-1. The percentage of changes on speed of ladder training, drop jump training and combined training groups is graphically represented in Diagram Showing the Mean Values on Speed of Experimental Groups.

## Discussion of Findings

The after the effects of the examination demonstrate that the experimental gather which experienced drop jump training and combined training gather had appeared note worthy advancement on Speed compared to Ladder gather.

## Conclusion

Based on the result obtained from the statistical analysis of the data the following conclusions have been derived. Due to the impact of ladder training, drop jump training and combined training the speed performance of the handball players was significantly improved. It is also concluded that combined training and drop jump training are significantly better than ladder training whereas, no significant differences existed between drop jump training and combined training groups in improving speed. The result of the study produced 2.16% percentage of changes in speed due to ladder training, 5.46% of changes due to drop jump training and 5.83% of changes in combined training group.

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## Funding

This study was not funded by any grant

## Acknowledgements

The authors would like to thank every participant for his effort and time.

## Conflict of interest

None of the authors have any conflicts of interest to declare.

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### How to Cite this Article

S. Arunsankar, J. Paul Jeeva Singh, A. Murugan, Impact of ladder and drop jump training on speed for handball players, Bharathiar National Journal of Physical Education and Exercise Sciences 11(1) (2020) 32-37.



## Impact of aerobic exercise on physical fitness variables among school level kabaddi players

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### Abstract

Aerobic exercises include brisk walking, jogging, swimming, cross country, skiing, hopping, and skipping. By doing aerobics, the whole body is used and major muscle groups including legs, trunk and arms get involved. In aerobic exercise the heart rate increases substantially, but never reaches its maximum level. This study was designed to impact of aerobic exercise on physical fitness variables among school level kabaddi players. To achieve the purpose of the study 30 school boys were selected from TMHNU Nadar Sarasaswathi Public School, Theni. Their age ranged between 15 and 17 years and they were divided into two equal groups consists of 15 each. Group I underwent the aerobic exercise and Group II acted as control group. The training was given to the experimental group for 3 days per week for the period of 12 weeks. The control group was not given any sort of training except their routine work. The data were collected from the subjects and it was statistically analyzed with dependent 't' test to find out significant improvement if any at 0.05 level of confidence. The results speculated that the grip strength and leg strength of school level kabaddi players improved significantly due to the impact of aerobic exercise with the limitations.

**Keywords:** Aerobic exercise, grip strength and leg strength.

### Introduction

Aerobic exercise is the exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy generating process. They are several kinds of aerobic exercise which are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise, involving large muscle groups, and a cooling down period at the end. Aerobics is a form of physical exercise that combines rhythmic aerobic exercise with stretching and strength training routines with the goal of improving all elements of fitness (flexibility, muscular strength and cardio – vascular fitness). It is usually performed to music and may be practiced in a group setting led by an instructor, although it can be done solo and without musical accompaniment. With the goal of preventing

illness and promoting physical fitness, practitioners perform various routines comprising a number of different dance like exercises. Formal aerobics classes are divided into different levels of intensity and complexity. Aerobics classes may allow participants to select their level of participation according to their fitness level. Many gyms offer a wide variety of aerobic classes for participants. Each class is designed for a certain level of experience and taught by a certified instructor with a specialty area related to their particular class (Cooper, 1985).

### Methodology

The purpose of the study was to find out the impact of aerobic exercise on physical fitness variables among school level kabaddi players. To achieve the purpose of the study 30 school boys were selected from *TMHNU Nadar Sarasaswathi Public School, Theni*. Their age ranged between 15 and 17 years and they were divided into two

equal groups consists of 15 each. Group I underwent the aerobic exercise and Group II acted as control group. The training was given to the experimental group for 3 days per week for the period of 16 weeks. The control group was not given any sort of training except their routine work. The data were collected from the subjects and it was statistically analyzed with dependent 't' test to find out significant improvement if any at 0.05 level of confidence.

### Training Programme

During the training period of the experimental groups underwent their respective training programme in addition to their daily regular activities as per the schedule. Experimental group underwent yogic practices on three alternate days per week (Monday, Wednesday and Friday 7.00 am to 8.00 am) for twelve weeks. The experimental training Programme was designed based on the resources collected from books, periodicals, e-materials and discussions with the experts. The duration of experimental training were planned for 60 minutes.

All the subjects involved in this study were carefully monitored throughout the training programme, none of the reported with tear and muscle soreness.

Table II shows that the pre test mean values of experimental group and control group 46.00, 34.75 and 45.70, 35.01 respectively and the post test mean values are 51.30, 40.21 and 46.45, 36.18 respectively. The obtained dependent t-test between the pre and post test means on agility and cardio respiratory endurance of experimental group and control group are 8.91, 28.73 and 1.29, 0.79 respectively. The table value required for significant difference with degrees of freedom 14 at 0.05 level of confidence is 2.14. The obtained 't' test value of experimental group was greater than the table value. The results clearly indicated that the resting heart rate grip strength and leg strength of the experimental group improved due to the aerobic exercise of school level kabaddi players.

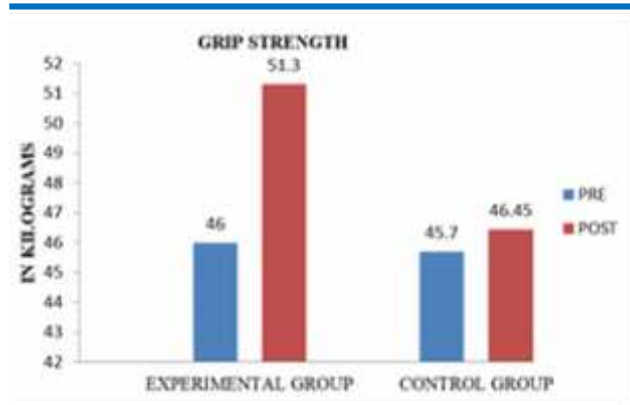
**TABLE – I Test Selection**

S.NO	Variables	Test	Unit of measures
1.	Grip Strength	Hand Grip Dynamometer	Kilograms
2.	Leg Strength	Sargent Vertical Jump Test	Centimetres

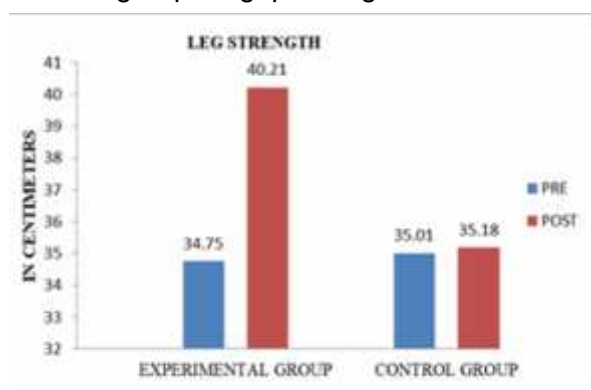
**TABLE II Analysis of 't' ratio for grip strength and leg strength**

Variables	Group	Test	Mean	SD	DM	t-ratio
<b>GRIP STRENGTH</b>	Experimental Group	Pre test	46.00	2.65	0.59	8.91*
		Post test	51.30			
	Control Group	Pre test	45.70	2.59	0.57	1.29
		Post test	46.45			
<b>LEG STRENGTH</b>	Experimental Group	Pre test	34.75	0.85	0.19	28.73*
		Post test	40.21			
	Control Group	Pre test	35.01	0.95	0.21	0.79
		Post test	35.18			

(Significance at 0.05 level of confidence for df of 14 is 2.14)



**Figure –I** Bar diagram of experimental and control group on grip strength



**Figure –I** Bar diagram of experimental and control group on leg strength

## Discussions on Findings

This study showed that aerobic exercise group produce improvement in physical fitness variables namely grip strength and leg strength. Supported the mean, the experimental group was found in better increasing on grip strength and leg strength when compared to the control group. This study supports the findings of Guo Siqiang (2018), Anek et al., (2015), Aranga et al., (2011), Mahendran, (2009) and Gore et al., (2003).

## Conclusion

Results of the present study, it was concluded that the aerobic exercises group significantly improved the selected physical fitness variables when compared to control group.

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## Funding

This study was not funded by any grant

## Acknowledgements

The authors would like to thank every participant for his effort and time.

## Conflict of interest

None of the authors have any conflicts of interest to declare.

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## How to Cite this Article

P. Rajangam and A. Thangamurugan, Impact of aerobic exercise on physical fitness variables among school level kabaddi players, *Bharathiar National Journal of Physical Education and Exercise Sciences* 11(1) (2020) 38-40.





## **Effect of regimen of physical training with obstacle course training on selected physical fitness components on sedentary female students**

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### **Abstract**

The purpose of the study was to find out the effect of regimen of physical training with obstacle course training on selected physical fitness components on sedentary female students. To achieve the purpose of the study, fifty sedentary female students were selected randomly from Bharathiar University, Coimbatore. The subjects aged from 20 to 25 years. The selected subjects were divided into two equal groups namely experimental and control groups of 25 subjects each. The training period was limited to twelve weeks and for six days per week. The regimen of physical training with obstacle course training was selected as independent variables and speed, strength, agility, explosive power, and cardio respiratory endurance were selected as dependent variables and it was measured by 50 meters dash, 1RM test, Shuttle run(6X10), standing broad jump and 12 min run /walk test. All the subjects were tested two days before and immediately after the experimental period on the selected dependent variables. The obtained data from the experimental group and control group before and after the experimental period were statistically analyzed with dependent 't'-test to find out significant improvements. The level of significance was fixed at 0.05 level confidence for all the cases. Significant improvement was found on speed, strength, agility, explosive power, and cardio respiratory endurance of experimental group due to the effect of regimen of physical training with obstacle course training when compared to the control group.

**Keywords:** Speed, Strength, Agility, Explosive Power, and Cardio Respiratory Endurance.

### **Introduction**

Physical fitness is a systematic process of extending over a long period. For best results the system of training has to be based and conducted on scientific facts and lines where it is not possible to do that, the training has to be based on the results of successful practice which has withstood the test of time sport.

The physical fitness on condition is the namely, speed, strength, agility, explosive power, flexibility, cardio respiratory endurance and coordinate abilities. These all motor abilities and their complex forms are the basic requirement for human motor actions. Therefore, the sports performance in all sports depends to a great extent on these abilities. The improvement and maintenance of physical fitness of condition is perhaps the most important aim of physical training.

### **Obstacle Course Training**

An obstacle course is a series of challenging physical obstacles an individual or team must navigate usually while being timed. Obstacles courses can include running, climbing, jumping, crawling and balancing elements with the aim of testing endurance. Sometimes a course involves mental tests; and there are different types of obstacle courses.

Obstacle courses as well as rifle drills, log drills, and aquatic exercises. These are not designed to develop specific components of physical fitness. Commanders should use them to add variety to their physical fitness programs and to help players develop motor fitness including speed, agility, coordination, and related skills and abilities. Many of these activities also give players

the chance to plan strategy, make split-second decisions, learn teamwork, and demonstrate leadership.

Physical performance and success in combat may depend on a player's ability to perform skills like those required on the obstacle course. For this reason, and because they help develop and test basic motor skills, obstacle courses are valuable for physical training. There are two types of obstacle courses: conditioning and confidence. The conditioning course has low obstacles that must be negotiated quickly. Running the course can be a test of the player's basic motor skills and physical condition. After players receive instruction and practice the skills, they run the course against time. A confidence course has higher, more difficult obstacles than a conditioning course. It gives players confidence in their mental and physical abilities and cultivates their spirit of daring. Players are encouraged, but not forced, to go through it. Unlike conditioning courses, confidence courses are not run against time.

## Methodology

For the purpose of this study, altogether fifty sedentary female students were chosen on random basis from Bharathiar University, Coimbatore. Their age group ranges from 20 to 25 years. They were divided into two groups of 25. The Experimental group I would undergo regimen of physical training with obstacle course training. The second group Control group II. Pre – test and post –test would be conducted. Treatment would be given for twelve weeks. It would be found out finally the effect of regimen of physical training with obstacle course training on the sedentary female students in scientific methods.

## Training Programme

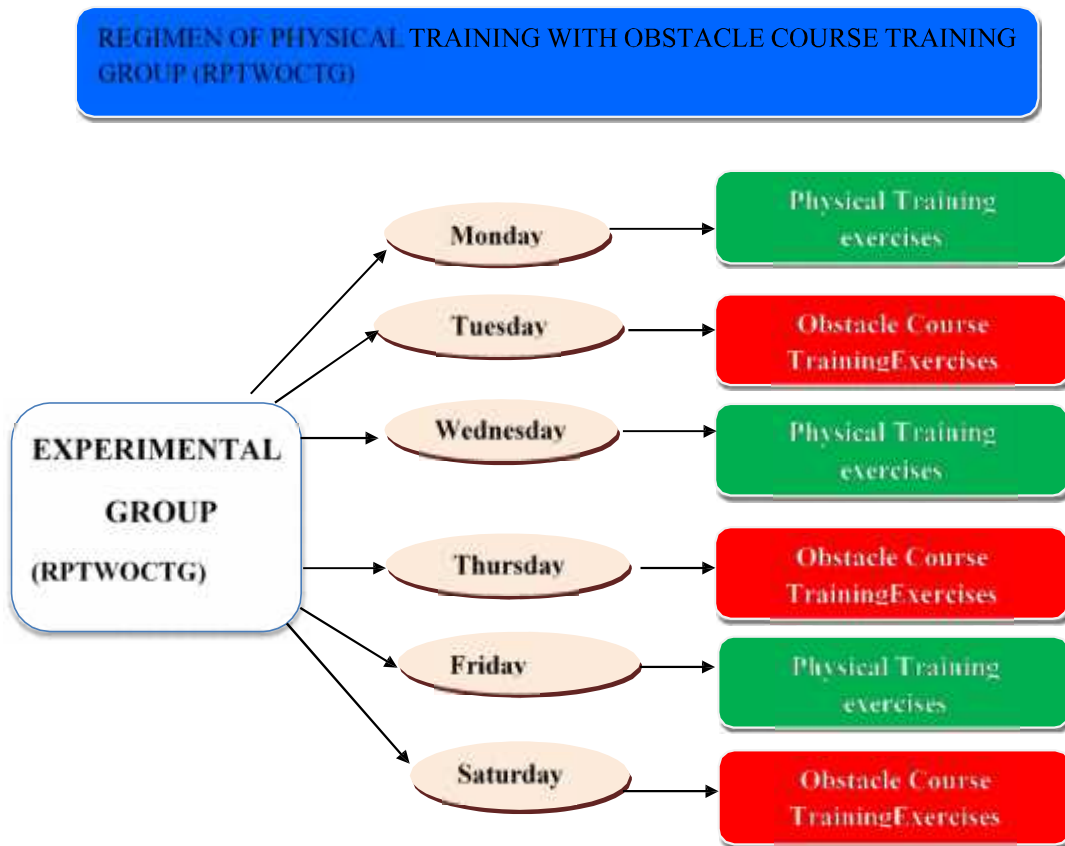
The following schedule of training was given for the regimen of physical training with obstacle course training group.

The selected tests were measured by following units for testing:		
Criterion Variables	Test Items	Unit Measurements
Speed	50 meters dash	Seconds
Strength	1RM test	Kg
Agility	Shuttle run(6X10)	Seconds
Explosive power	standing broad jump	Centi Meters
Cardio-respiratory endurance	12 min run /walk test	Meters

Group	Design of the Training
Experimental Group I	regimen of physical training with obstacle course training
Control Group II	Did not do any Specific Training
Training Duration	60 Minutes
Training Session	6 Days a week
Total Length of Training	Twelve weeks



**EXPERIMENTAL TREATMENT ADOPTED FOR EXPERIMENTAL GROUP**



**Table- I Progression of load for experimental group (RPTWOCTG)**

Weeks	Physical Training (Monday, Wednesday, Friday)	Duration(5+15+30+10 = 60 min)	Load
I to IV	<b>Warming up</b> 1000M Walking / Jogging Physical Training exercises Mountain climber Burpees Push ups Lunges Squat <b>Warming down</b>	<b>5 minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	4 to 8rep x 2 sets
V to VIII	<b>Warming up</b> 2000 M Walking /Jogging Physical Training exercises Mountain climber Burpees Push ups Lunges Squat <b>Warming down</b>	<b>5 minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	8 to 12rep x 3 sets

IX to XII	<b>Warming up</b> 3000 M Walking /Jogging <b>Physical Training exercises</b> Mountain climber Burpees Push ups Lunges Squat <b>Warming down</b>	<b>5minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	12 to15 rep x 4 sets
Weeks	Obstacle Course Training (Tuesday, Thursday, Saturday)	Duration(5+15+30+10 = 60 min)	Load
I to IV	<b>Warming up</b> 1000M Walking / Jogging <b>Obstacle Course TrainingExercises</b> Low beam walk Net climbing Wall jump Deep crunches <b>Warming down</b>	<b>5 minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	4 to 8rep x 2 sets
V to VIII	<b>Warming up</b> 2000 M Walking /Jogging <b>Obstacle Course TrainingExercises</b> Low beam walk Net climbing Wall jump Deep crunches <b>Warming down</b>	<b>5 minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	8 to12rep x 3 sets
IX to XII	<b>Warming up</b> 3000 M Walking /Jogging <b>Obstacle Course TrainingExercises</b> Low beam walk Net climbing Wall jump Deep crunches <b>Warming down</b>	<b>5minutes</b> 15 minutes <b>30 minutes</b>  <b>10 minutes</b>	12 to15 rep x 4 sets

### Experimental Design

The experimental group was given regimen of physical training with obstacle course training exercises after taking an initial test. After the initial test selected physical training with obstacle course training exercises were given for twelve weeks in all days except Sunday. The time of practice was from 6.00A.M to 7.00 A.M.

The control group were not participating in any of the special training programme. However they were allowed to participate in their regular education classes in the college as per their curriculum.

## Statistical Technique

The achieved data since the experimental group and control group previously and subsequently the experimental data were statistically evaluated with dependent t-test to discover obtainable significant development. The level of significance was secure at 0.05 level of confidence for all the cases.

## Results and Discussions

The effect of independent variables on each criterion variables was considered by dependent 't' – test on the data achieved for speed, strength, agility, explosive power, and cardio respiratory endurance. The pretest and post- test means of experimental group and control group have been analyzed and existing in Table II & III.

**TABLE – II** Mean and dependant 't' – test for the pre and post tests on speed, strength, agility, explosive power, and cardio respiratory endurance of experimental group

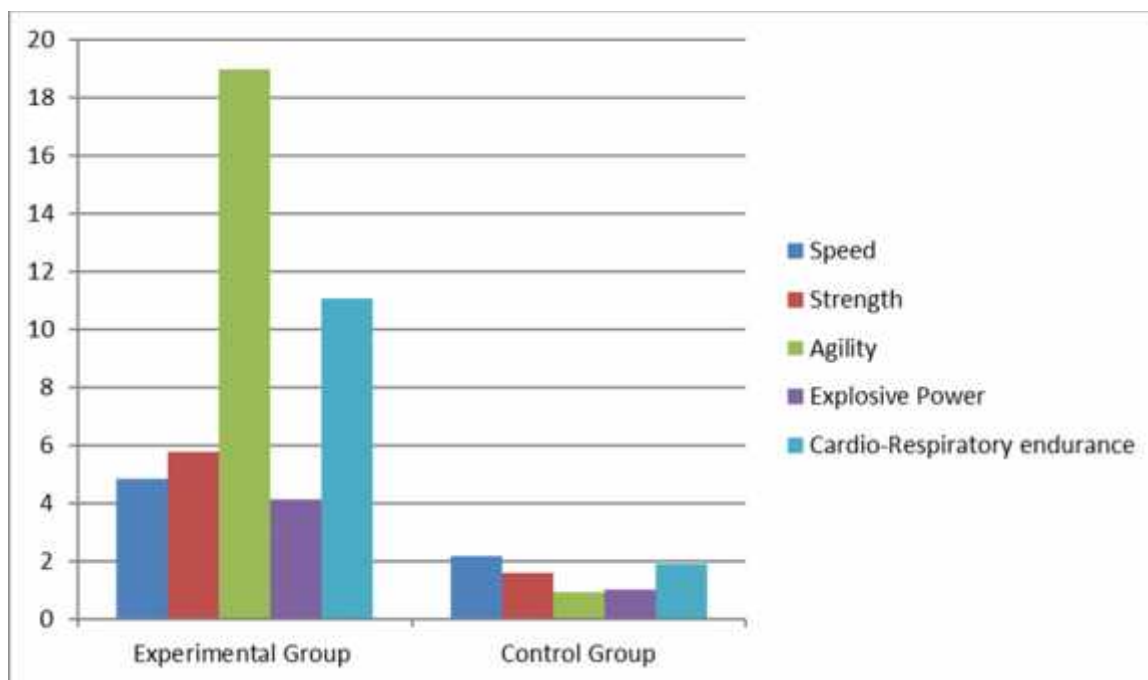
S.No	Variables	Pre test Mean± SD	Post test Mean± SD	Diff	SE	't' – ratio
1	Speed	08.20 ± 2.16	07.76 ±1.88	0.44	0.61	4.86*
2	Strength	29.14 ± 2.28	30.12 ±2.32	0.98	0.13	5.76*
3	Agility	8.07±1.04	7.12±1.12	.95	.05	19.0*
4	Explosive power	1.49 ± 0.46	1.57 ± 0.99	0.08	1.94	4.11*
5	Cardio respiratory endurance (meters)	844.46±28.50	1077.33±53.68	232.87	11.99	11.07*

\*Significance at 0.05 level of confidence

**TABLE – III** Mean and dependant 't' – test for the pre and post tests on speed, strength, agility, explosive power, and cardio respiratory endurance of control group

S.No	Variables	Pre test Mean±SD	Post test Mean± SD	Diff	SE	't' – ratio
1.	Speed	08.26 ± 2.16	08.24 ± 1.88	0.02	0.61	1.16
2.	Strength	29.14 ± 2.28	29.20 ± 2.32	0.06	0.13	1.59
3.	Agilit	8.90±1.114	8.73±1.107	.17	.18	.920
4.	Explosive power	1.48 ± 0.46	1.50 ± 0.99	0.02	1.94	1.01
5.	Cardio respiratory endurance (meters)	728.86 ±45.55	890.26 ± 8.26	161.40	20.09	1.92

\*Significance at 0.05 level of confidence



**FIGURE I**

The table II and III, shows that, the obtained 't'-ratio between the pre and post-test means of experimental group were 4.86, 5.76, 19.0, 4.11, 11.07 and control group were 1.16, 1.59, .920, 1.01, 1.92 respectively. The table values required for significant difference with df 24 at 0.05 level of confidence. Since the obtained 't' – ratio value of experimental and control group on speed, strength, agility, explosive power, and cardio respiratory endurance were greater than the table value 2.063, it was concluded that the regimen of physical training followed by obstacle course training had significantly improved speed, strength, agility, explosive power, and cardio respiratory endurance of experimental group.

The pre and post- test mean value of experimental and control group on speed, strength, agility, explosive power, and cardio respiratory endurance were graphically represented in the figure 1.

### Discussion on Findings

The finding of the study reveals that the regimen physical fitness followed by obstacle course training group cause significant improvement in their physical fitness components. In the view of control group there was no significant improvement in their physical variables.

The findings of the study Thompson CJ, Cobb KM, Blackwell J (2007), Buel Getchell (1976) in their study, they stated that regimen physical fitness with obstacle course training exercise developed physical fitness variables.

### Conclusions

It was concluded that improvement of speed, strength, agility, explosive power, and cardio respiratory endurance was found significantly on experimental group due to the effect of regimen physical fitness followed by obstacle course training when compared to the control group.

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**Funding**

This study was not funded by any grant

**Acknowledgements**

The authors would like to thank every participant for his effort and time.

**Conflict of interest**

None of the authors have any conflicts of interest to declare.

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**How to Cite this Article**

P. Anbalagan G.Meenatchi and Vineesh T.J, Effect of regimen of physical training with obstacle course training on selected physical fitness components on sedentary female students, Bharathiar National Journal of Physical Education and Exercise Sciences 11(1) (2020) 38-44.