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Dr. Arun SS Kumar

Assistant Professor,

Government College of Physical
Education, Calicut, Kerala, India

Effect of core stability training on health related physical fitness among state level netball women players

Dr. Arun SS Kumar

Abstract

The purpose of the study is to check the effectiveness of Core stability training on Health Related Physical Fitness variables among State level Netball women players before and after eight week programme. For that Thirty (No- 30) Netball women players, studying under University of Calicut, Kerala; within the age range of 18 to 24 years, selected as subjects. The subjects were assigned at random into two groups of fifteen each (2x15= 30 Nos). Group- I was performed as Core stability practices group and Group- II was treated as Control group. Control group under gone regular routine activity as based on their early practice schedule and the experimental group is practiced Core stability training for a period of eight weeks (2 months). The variables selected for this study were Cardio-respiratory Endurance, Muscular Endurance, Muscular Strength, Flexibility and Body Composition. For measuring these variables, Harvard-step test, One minute Sit-up test, Push-up test (Roger's physical fitness Battery), Sit and reach test and Skinfold measurement were used respectively. It was observed through the statistical technique ANOVA revealed that there was significant improvement in the selected health related physical fitness variables including Muscular Endurance, Muscular Strength and Flexibility and not much significance in Cardio-respiratory Endurance and Body-Composition.

Keywords: Core stability training, netball, health related physical fitness, cardio-respiratory endurance, muscular endurance, muscular strength

Introduction

The area of the body, which is commonly referred to as the core, is your mid section and it involves all your muscles in that area including the front, back and sides. The core includes the traverse abdominals, erector spine, oblique and your lower last. These muscles work as stabilizers for the entire body (Wikipedia). Kibler (2006) defined core stability as "the pre-programmed integration of local, single joint muscles and multi-joint muscle" Borghuis (2008) described core stability as "Core stability is related to the body's ability to control the trunk in response to internal and external forces. This integration of core musculature is used to both stiffen the spine to allow it to accept loads and produce gross movement of the entire core structure (Ajmer Singh *et al.*, 2003) ^[1].

Core stability refers to a person's ability to stabilize their core. Stability, in this context, should be considered as an ability to control the position and movement of the core. Thus, if a person has greater core stability, they have a greater level of control over the position and movement of this area of their body. The body's core is frequently involved in aiding other movements of the body, such as the limbs, and it is considered that by improving core stability a person's ability to perform these other movements may also be improved i.e. core stability training may help improve someone's running ability. The body's core region is sometimes referred to as the torso or the trunk, although there are some differences in the muscles identified as constituting them. Core stability is an important component maximizing efficient athletic function. Function is most often produced by the coordinated, sequenced activation of body segments that places the distal segment in the optimum position at the optimum velocity with the optimum timing to produce the desired athletic task, which means the performance of the athlete closely associated with speed, flexibility and agility (Akuthota V., Ferreriro A. and Moore T., 2008).

Correspondence

Dr. Arun SS Kumar

Assistant Professor,

Government College of Physical
Education, Calicut, Kerala, India

According to Bucher (1958) Physical fitness is the ability of an individual to live a full and balanced life. It involves physical, mental, emotional, social and spiritual factors and the capacity for their wholesome expression". Physical fitness is either health related or performance related.

Health Related Physical Fitness Components (H R P F)

Health related physical fitness refers to those components of fitness affected by habitual physical activity and related to health status. It defined as a state characterized by (A) an ability to perform and sustain daily activities and (B) demonstration of traits or capacities associated with a low risk of premature development of diseases and conditions related to movement.

- Cardio-respiratory Endurance
- Muscular Endurance
- Muscular Strength
- Flexibility
- Body Composition

The purpose of the study is to check the effectiveness of Core stability training on Health Related Physical Fitness variables among State level Netball women players before and after eight week programme. In the age group of 18 -24 years.

Hypothesis

1. The formulated hypothesis in the present study were, There will be significant improvement on Health related physical fitness variables (Cardio-respiratory Endurance, Muscular Endurance, Muscular Strength, flexibility and Body Composition) of State level Netball Women players due to the effect of Core stability training.
2. State level Netball Women players undergoing Core stability training will show significant differences in Health related physical fitness variables (Cardio-respiratory Endurance, Muscular Strength, Muscular Endurance, Body Composition and flexibility) compared to control group.

Delimitation of the Study

1. The study was delimited to the Core stability Training methods.
2. For the purpose of the study thirty (N-30) Netball women state level players studying under University of Calicut, Kerala was selected as the subjects.
3. The study was delimited to the age range of 18 to 24 years.
4. The subjects was divided randomly into two groups of fifteen each [n=15], Group-I is the experiment group they are undergoing Core stability training and group-II is treated as controlled group.
5. The duration of the training period was restricted to Eight weeks [2 months] and the number of sessions per week was confined to three.
6. The study was further delimited to the Health related Physical Fitness Variables such as Cardio-respiratory Endurance, Muscular Endurance, Muscular Strength, Flexibility, Body Composition

Limitation

1. The socio-economic status, health habit, diet and style of daily living on which the scholar have no control was considered as the limitation of this study.
2. The response of the subjects to Eight week core stability training has been recognized as limitation of the study

Experimental Design

Pre and post experimental design was used here for resolving the problem of the study. In this experiment including warming up, general exercises, Core stability training and warming down. First is preparatory training section (10 to 15 minutes) it is including warming up and general exercises. Second section is core stability training (20 to 25 minutes), and last section is warming down. Core stability training programme was prepared by the researcher with the help of experts. The programme included Russian twist, Plank, Seated scissor kick, Cross crunch, Plank step up, Plank walkouts, Bicycle crunch, Superman, Swimmer, Scissor kicks, Bent knee hip raise, Alternating heel touch, Spider crawl, Crunch, Bird dog, One leg push up.

Methodology

For the purpose of the study Thirty (No- 30) state level women Netball players, studying under University of Calicut, Kerala; within the age range of 18 to 24 years, selected as subjects. The subjects were assigned at random into two groups of fifteen each (2x15= 30 Nos). Group- I was performed as Core stability practices group and Group- II was treated as Control group. All the subjects were fully informed well in advance regarding the nature and purpose of the study. The procedures are employed in the collection of data and role of the subjects during the experimentation period are also explain by the investigator well before the experiment.

Control group under gone regular routine activity as based on their early practice schedule and the experimental group is practiced Core stability training for a period of eight weeks (2 months). The subjects had under gone the training 3 days in a week (Monday, Wednesday and Friday). Sixteen selected Core stability exercises including general fitness training are included in the Core stability training programme. The experimentation is same throughout the period, the only difference is intensity and volume of the exercise is increasing in every weeks. The variables selected for this study were Cardio-respiratory Endurance, Muscular Endurance, Muscular Strength, Flexibility and Body Composition. For measuring these variables, Harvard-step test, One minute Sit-up test, Push-up test (Roger's physical fitness Battery), Sit and reach test and Skinfold measurement were used respectively.

Result and Analysis of Data

Descriptive statistics and ANOVA is used here for finalizing the result, whether there is significant difference in experimental group and control group. In this entire statistical test the level of significance was fixed at 0.05 levels and it was carried out with the help of SPSS software.

Table 1: Analysis of Variance of Post Test on Health Related Physical Fitness Variables between Control Group and Experimental Group

Sl. No	Variables	Group	N	Mean	SD	F-value	P-value
1.	Cardio-respiratory Endurance	Control	15	68.79	6.56	1.87	0.127
		Experimental	15	72.88	4.73		
2.	Muscular Endurance	Control	15	26	5.69	11.45	*0.001
		Experimental	15	32	6.42		
3.	Muscular Strength	Control	15	13	6.44	19.56	*0.000
		Experimental	15	18	6.60		
4.	Flexibility	Control	15	19.88	2.09	46.93	*0.000
		Experimental	15	23.25	2.17		
5.	Body-Composition	Control	15	45.37	22.47	0.05	0.842
		Experimental	15	44.59	24.82		

Sl. No- 1 shows that the mean value of Cardio-respiratory Endurance among control group and experimental group are 68.79 and 72.88 with standard deviation of 6.56 and 4.73 respectively. The ‘F’ value calculated is 1.87 and P value is 0.127 ($P < 0.05$) meaning that the obtained P value is greater than the level of significance. So that the given hypothesis is rejected. That means statistically there is no significant difference between experimental group and control group on Cardio-respiratory Endurance after eight weeks Core stability training.

Sl. No- 2 shows that the mean value of Muscular Endurance among control group and experimental group are 26 and 32 with standard deviation of 5.69 and 6.42 respectively. The ‘F’ value calculated is 11.45 and P value is 0.001 ($P < 0.05$) meaning that the obtained P value is lesser than the level of significance. So that the given hypothesis is accepted. That means statistically there is significant difference between experimental group and control group on Muscular endurance after eight weeks Core stability training.

From the Sl. No- 3 post test score of Muscular Strength of both control group and Core stability training group were evaluated. The mean value of control group of 15 Netball women players is 13 with standard deviation of 6.44. Similarly the mean value of 15 Netball women samples of experimental group is 18 with standard deviation of 6.60. The ‘f’ value calculated is 19.56 and P value is 0.000 ($P < 0.05$)

meaning that the obtained P value is lesser than the level of significance. So that the given hypothesis is accepted. That means statistically there is significant difference between experimental group and control group on Muscular Strength and endurance after eight weeks Core stability training.

From the Sl. No- 4 post test score of Flexibility of both control group and Core stability training group were evaluated. The mean value of control group of 15 Netball women players is 19.88 with standard deviation of 2.10. Similarly the mean value of 15 Netball women samples of experimental group is 23.25 with standard deviation of 2.17. The ‘F’ value calculated is 46.93 and P value is 0.000 ($P < 0.05$) meaning that the obtained P value is lesser than the level of significance. So that the given hypothesis is accepted. That means statistically there is significant difference between experimental group and control group on Flexibility after eight weeks Core stability training.

Sl. No-5 shows that the mean value of Body Composition among control group and experimental group in post test are 45.37 and 44.59 with standard deviation of 22.47 and 24.82 respectively. The ‘F’ value calculated is 0.05 and P-value is 0.842 ($P < 0.05$) meaning that the obtained P value is greater than the level of significance. So that the given hypothesis is rejected. That means statistically there is no significant difference between experimental group and control group on Body Composition after eight weeks Core stability training.

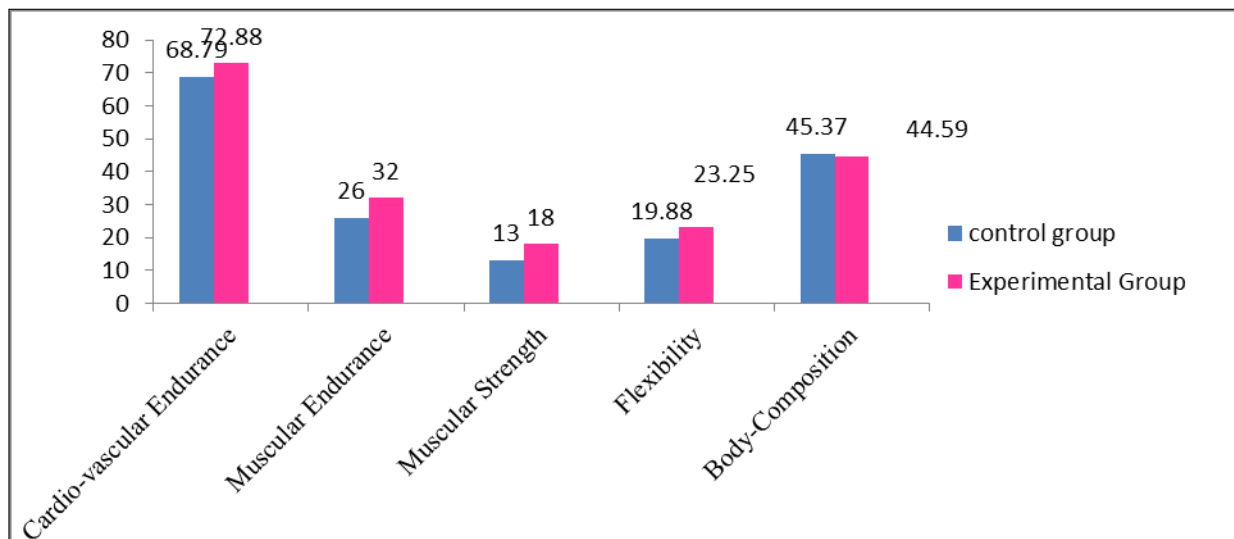


Fig 1: Graphical Representation of Post Test Mean Value on Health Related Physical Fitness Variables between Control Group and Experimental Group

Discussion

In earlier literature and studies are clearly mentioned that Core stability training could be improved the total physical fitness of a sports person. Similarly the selected training

package of CST programme had been drastically influence fitness of the state level women Netball payers by improving the core efficiency of limb movement and improving postural alignment through the strengthening of muscle group of the

lower back and abdomen. Good core stability will allow the women players to maximize their sporting performance and minimize injury.

This study revealed that after eight weeks CST programme had improved all selected variables of the study except Cardio-respiratory Endurance and Body Composition. That means, there is significant improvement in the variables such as Muscular Endurance, Muscular Strength and Flexibility between the pre-test and post-test of control and experimental group. In the other hand no any significance difference found in Cardio-respiratory Endurance and Body Composition of the experiment group and control group.

Conclusion

As based on the mean value of the obtained data of this study, it was concluded that eight weeks of Core stability training done by the state level Netball women players with in the age limit of 18 to 24 years was found to be effective in bringing about significant improvement in health related variables when compared to control group. It was observed through the statistical technique ANOVA revealed that there was significant improvement in the selected health related physical fitness variables including Muscular Endurance, Muscular Strength and Flexibility and not much significance in Cardio-respiratory Endurance and Body-Composition, which means the given experimental duration of eight weeks not sufficient for influencing the changes on Cardio-respiratory efficiency and body composition. The study is in strong consonance with the finding of Subramanian A. (2014) and Sobhy M. Aly (2016).

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