

Impact of Cross Fit Training on Selected Physical and Body Composition Variables Among College Women Volleyball Players

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Abstract: The purpose of present study was to find out the impact of crossfit training on selected physical and body composition variables among college women volleyball players. To achieve the purpose of the present study, thirty (N= 30) college women volleyball players from Fatima and Lady Doak College, Madurai, Tamilnadu, India were selected as subjects at random and their ages ranged from 17 to 22 years. The subjects were randomly divided into two equal groups Group-I cross fit training and Group-II Control group, each group consisting of 15 subjects with a pre-test, mid-test, and post-test, the experiment is configured as a true random group design. Each participant completed a pre-test on specific variables. These pre-test results were used to create the subject's pre-test scores. Group I received cross-fit training, while Group II, the control group, received no training. For eight weeks, five days a week, the experimental group received the particular training packages created by the study's investigator. Each session lasted 60 minutes. Following the four-week experimental treatment, each of the thirty participants underwent a mid-test on the factors they had chosen variables. The dependent variables selected for this study were agility and percentage of body fat. The agility was measured by shuttle run in seconds and percentage of body fat was tested by skin fold caliber in percentage and also after experimental for the period of 8 weeks the final test scores formed as post-test scores of the subjects. Analysis of covariance (ANCOVA) and Scheffe's Post- hoc test were applied to find out the significance of the mean difference among two groups. Finally, the result of the study also revealed that there was a significant improvement of agility and percentage of body fat for the cross fit training group was better than the control group.

Keywords: Cross fit Training, Agility, Percentage of Body Fat and Volleyball Players

Cross fit training

Cross training refers to working out in several ways so as to enhance overall performance and it meant to be used for substituting other training methods not replacing your primary workout. Cross training focuses on alternating different kinds of training adding the factors of changing the exercises frequently, the alternate workouts keep the body fresh and ready for doing more workouts. Player can prevent injuries through by providing in cross training in which the major muscles gets an opportunity to rest and reset. For instance, runners frequently use of the calf and hamstring muscles get injuries normally because of overtraining. However, when you perform an alternate exercise, the primary muscles are given time to rebuild and heal and the supporting muscles become stronger. After it happens you should go for an effective cardio vascular workout for strengthening the lungs and heart. Cross training also encourages the exercises like yoga and martial arts for enhancing overall flexibility. The sports persons had improved performances thin their stability and balance with the use of cross training workouts.

Cross Fit training is an alternative modality to high-intensity functional training. Due to its constantly varied functional movements performed at relatively high intensity through metabolic conditioning, gymnastics, and



weightlifting, this modality has been increasing in its popularity across the world. The basic tasks are consisted of little to no resting periods during the activity in order to complete a task as fast as possible (for time) or achieve the greatest number of repetitions in a certain period of time. The high intensity of Cross Fit workouts improves muscular endurance and strength, fitness level, as well as body composition. The huge number of participants and increasing competition and professional athletes of Cross Fit allowed us to characterize it as a training program and sport of fitness. (Meenatchi & Anbalagan, 2022).

It has been shown to create both a broad, overall and inclusive fitness (Turna et al., 2019). In this way, the combined style of cross-fit has been named as a workout of the day which is called both a physical training philosophy and a competitive sports type, called exercise of the day. These wods start and end in a period of 10-50 minutes (Glassman, 2009). After a good warm-up in these training sessions, one of the power or strength programs is applied, and during these applications, high-intensity exercises, rapid repetitions and an aerobic load are performed between the sets with little or no rest period (Sprey et al., 2016).

The aim of most athletes is to become strong, shows good performance in a competition without causing any injury. It is very tough to reach all these goals by exercising in a single training component. Cross training means training in two or more sports or exercise activities which can improve fitness and prevent injury. To achieve good performances in a competition Cross training must be added in their training. Cross training is generally be an effective training procedure to build an all-around development of an athlete which also protects the causes of injury with increasing of fitness level and reducing the mental stress associated without a lack of training. Cross-training tricks gets off easy by doing two different exercises with moderate exertion instead of doing one exercise with increased exertion in both the muscles and brain into believing the body needs to for the sports in the future. Cross training not only brings about positive changes in physical fitness and it reduces the chance of occurring injuries to the sportsman which provides the athlete to the new motivation. Because of doing combination of exercise in their training the players are exposes to release of boredom to the muscles keeps away by getting stale, gives pleasure to the mind and will sharpen the reflexes.

Volleyball is characterized by a very high reach out of male and female volleyball players above the set and highball velocity on jump service and spiking. Many authors consider motor abilities, agility and explosive strength as the major characteristics for successful volleyball performance. A great deal of strength endurance, agile, good explosive and skill are necessary to play volleyball effectively in competitive of national and international level performance. As a consequence the player must work on a wide-ranging program designs to improve his strength, muscular endurance, cardio vascular efficiency, flexibility and agility. To be successful, teams must be able to control play at the net both offensively and defensively.

Methods And Materials

The purpose of present study was to find out the impact of crossfit training on selected physical and body composition variables among college women volleyball players. To achieve the purpose of the present study, thirty (N= 30) college women volleyball players from Fatima and Lady Doak College, Madurai, Tamilnadu, India were selected as subjects at random and their ages ranged from 17 to 22 years. The subjects were randomly divided into two equal groups Group-I cross fit training and Group-II Control group, each group consisting of 15 subjects with a pre-test, mid-test, and post-test, the experiment is configured as a true random group design. Each participant completed a pre-test on specific variables. These pre-test results were used to create the subject's pre-test scores. Group I received cross-fit training, while Group II, the control group, received no training. For eight weeks, five days a week, the experimental group received the particular training packages created by the study's investigator. Each session lasted 60 minutes. Following the four-week experimental treatment, each of the thirty participants underwent a mid-test on the factors they had chosen variables. The dependent variables selected for this study were agility and percentage of body fat. The agility was measured by shuttle run in seconds and percentage of body fat was tested by skin fold caliber in percentage and also after experimental for the period of

8 weeks the final test scores formed as post-test scores of the subjects.

Statistical Technique

The following statistical techniques were employed to find out the effect of cross fit training on selected physical and body composition variables among college women volleyball players. Analysis of covariance (ANCOVA) was employed to find out the significant differences if any, among the groups for each variable separately. The Scheffe's test was applied as post-hoc test whenever the 'F' ratio of the adjusted post-test means was found to be significant at 0.05 level of confidence.

Experimental Programme:

8-week Cross Fit Training Program

Frequency: 5 days per week

Intensity: Moderate to vigorous

Duration: 40-50 minutes

Warm-up and cool down: 5-10 minutes each

This schedule might include upper body and conditioning on Monday and Saturday, lower body and conditioning on Tuesday and Saturday, deadlift and conditioning on Wednesday, active rest and recovery on Thursday, upper body and aerobic bodybuilding on Friday, and rest on Sunday. Strength program: This schedule might include back squat and leg accessory work on Monday, overhead press and shoulder/biceps accessory work on Tuesday, deadlift/Oly lift and back and hamstring accessory work on Thursday, and bench press and triceps/chest accessory work on Friday were completed before and after the 8 week Cross Fit exercise program.

Results Of Agility

The analysis of covariance on agility of the pre-test, mid-test and post-test scores of cross fit training and control group have been analyzed and presented in the table-1.

Table-I Analysis Of Covariance On Agility Of Pre-Test, Mid-Test And Post-Test Scores Of Cross Fit And Control Groups

Test	Cross Fit Training Group	Control Group	SOV	Sum of Squares	Df	Mean Square	'F' Ratio
Pre- Test Mean	11.56	11.65	Between Within	2.02 25.89	2 28	1.01 0.92	1.09
Mid-Test	10.50	10.87	Between Within	11.89 24.67	2 28	5.95 0.88	6.76

Post-Test Mean	9.98	11.67	Between Within	15.45 28.50	2 28	7.73 1.01	7.65*
Adjusted Post-Test Mean	9.96	11.90	Between Within	18.80 30.26	2 27	9.40 1.12	8.39*

Significant at 0.05 level of confidence

The table value required for significance at 0.05 level of confidence with 2 and 28 were 2.50 respectively.

Table-1, point out that the pre-test mean of cross fit training and control group were 11.56 and 11.65 respectively. The attained F-ratio for the pre-test was 1.09 and the table F-ratio was 2.50. As a result, the pre-test mean F-ratio for degrees of freedom 2 and 28 was negligible at the 0.05 level of confidence. This showed that there was no substantial difference between the experimental and control groups, indicating that the method of group of randomization of the groups was ideal while conveying the subjects to groups.

The mid-test mean of the cross fit training and control groups were 10.50 and 10.87 respectively. The attained F-ratio for the post-test was 6.76 and the table F-ratio was 2.50. As a result, the mid-test means F-ratio for degrees of freedom 2 and 28 was important at the 0.05 level of confidence. This suggested that there was a substantial difference between the mid-test mean of the emphasis.

The post-test mean of the cross fit training and control groups were 9.98 and 11.67 respectively. The attained F-ratio for the post-test was 7.65 and the table F-ratio was 2.50. As a result, the post-test mean F-ratio for degrees of freedom 2 and 28 was important at the 0.05 level of confidence. This suggested that there was a substantial difference between the post-test mean of the emphasis.

The adjusted post-test mean of the cross fit training and control groups were 9.96 and 11.90 respectively. The attained F-ratio for the adjusted post-test means was 8.39 and the table F-ratio was 2.50. As a result, the modified post-test mean F-ratio for degrees of freedom 2 and 27 was meaningful at the 0.05 level of confidence. As a result of the experimental trainings on the means, it was determined that there was a significant difference between them agility.

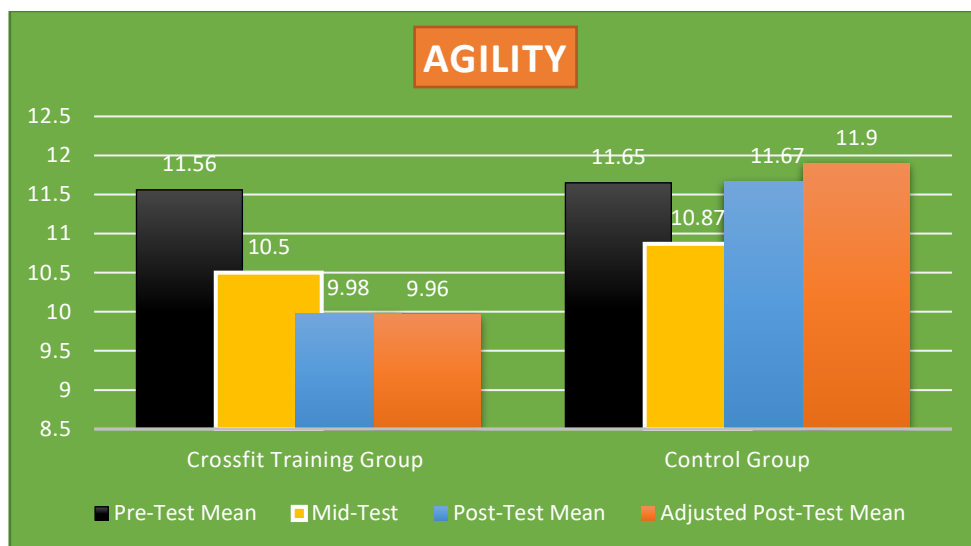
Table-II Scheffe's Test For The Difference Between The Adjusted Post-Test Paired Mean Of Agility

Cross Fit Training Group	Control Group	Mean Difference	confidenceInterval
9.96	11.90	1.94*	1.20

*Significant at 0.05 level of confidence

From the above table-II shows that the adjusted mean difference values between cross fit training group and control group are 1.94 respectively on agility, which are greater than the confidence interval value 1.20 at 0.05 level of confidence. The results of the study showed that there was significant difference between the adjusted mean values of cross fit training group and control group. So the present study clearly indicates the cross fit training group is better than the control group.

The pre-test, mid-test, post-test and adjusted post-test mean values of cross fit training group and control group on agility are graphically represented in the figure -1.



Percentage Of Body Fat

The analysis of covariance on percentage of body fat of the pre-test, mid-test and post-test scores of cross fit training and control group have been analyzed and presented in the table-III

Table-III Analysis Of Covariance On Percentage Of Body Fat Of Pre-Test Mid-Test And Post-Test Scores Of Cross Fit Training And Control Groups

Test	Cross Fit Training Group	Control Group	SOV	Sum of Squares	Df	Mean Square	'F' Ratio
Pre- Test Mean	19.75	20.60	Between Within	12.86 178.32	2 28	6.43 6.37	1.01
Mid-Test	17.68	20.54	Between Within	124.80 168.98	2 28	62.40 6.04	10.33
Post-Test Mean	15.70	20.65	Between Within	162.38 198.25	2 28	81.19 7.08	11.47*
Adjusted Post-Test Mean	15.49	20.70	Between Within	60.60 48.70	2 27	30.30 1.80	16.83*

Significant at 0.05 level of confidence

The table value required for significance at 0.05 level of confidence with 2 and 28 were 2.50 respectively.

Results Of Percentage Of Body Fat

Table-III, point out that the pre-test mean on percentage of body fat of cross fit training and control group were 19.75 and 20.60 respectively. The attained F-ratio for the pre-test was 1.01 and the table F-ratio was 2.50. As a result, the pre-test mean F-ratio for degrees of freedom 2 and 28 was negligible at the 0.05 level of confidence. This showed that there was no substantial difference between the experimental and control groups, indicating that the method of group of randomization of the groups was ideal while conveying the subjects to groups.

The mid-test mean on percentage of body fat of the cross fit training and control groups were 17.68 and 20.54 respectively. The attained F-ratio for the mid-test was 10.33 and the table F-ratio was 2.50. As a result, the mid-test means F-ratio for degrees of freedom 2 and 28 was important at the 0.05 level of confidence. This suggested that there was a substantial difference between the post-test mean of the emphasis.

The post-test mean on percentage of body fat of the cross fit training and control groups were 15.70 and 20.65 respectively. The attained F-ratio for the post-test was 11.47 and the table F-ratio was 2.50. As a result, the post-test mean F-ratio for degrees of freedom 2 and 28 was important at the 0.05 level of confidence. This suggested that there was a substantial difference between the post-test mean of the emphasis.

The adjusted post-test mean on percentage of body fat of the cross fit training and control groups were 15.49 and 20.70 respectively. The attained F-ratio for the adjusted post-test means was 16.83 and the table F-ratio was 2.50. As a result, the modified post-test mean F-ratio for degrees of freedom 2 and 27 was meaningful at the 0.05 level of confidence. As a result of the experimental trainings on the means, it was determined that there was a significant difference between them percentage of body fat.

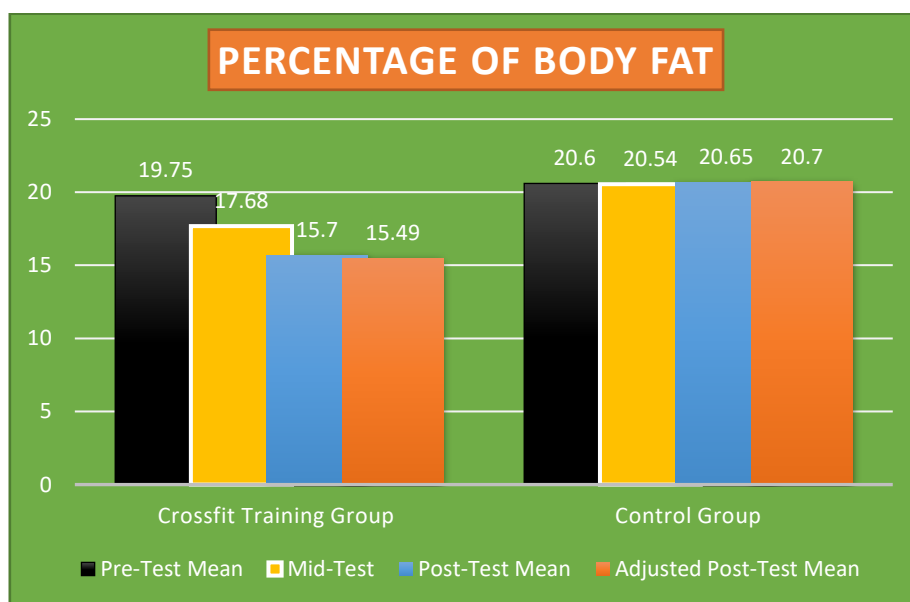
Table-IV Scheffe's Test For The Difference Between The Adjusted Post-Test Paired Mean Of Percentage Of Body Fat

Cross Fit Training Group	Control Group	Mean Difference	Confidence Interval
15.49	20.70	5.21*	3.10

*Significant at 0.05 level of confidence

From the above table-IV shows that the adjusted post-test mean difference values between cross fit training group and control group are 5.21 respectively on percentage of body fat, which are greater than the confidence interval value 3.10 at 0.05 level of confidence. The results of the study showed that there was significant difference between the adjusted mean values of cross fit training group and control group. So the present study clearly indicates the cross fit training group was better than the control group.

The pre-test, mid-test, post-test and adjusted post-test mean values of cross fit training group and control group on percentage of body fat are graphically represented in the figure -2.



Discussion

The purpose of the study was to investigate the effect of cross fit training on selected physical and body composition variables among college women volleyball players. It was observed from the pre-test results, that there were no significant differences between experimental group and control group while the mid-test, post-test results of experimental group and control had been analyzed statistically and revealed that, there was a significant mean difference in favour of experimental group. Although there are many studies about cross-fit, there are limited studies existing related to cross-fit.

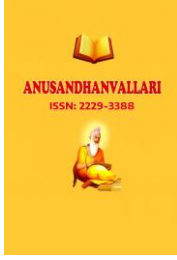
According to Baynaz et al. It was determined that the strength exercises performed with their own body weight for 6 weeks with cross-fit training had a positive effect on the body weight values of the sedentary (Baynaz et al., 2017). According to Paoli et al., in a study with three different groups performing endurance training, high intensity circular training and low intensity circular training, found that the group that performed high intensity circular training had a higher decrease in body weight than the other training groups (Paoli et al., 2010). Carol et al., investigated the effect of jogging and walking exercise on performance with 60 women and men aged 24-48. They practiced the participants for 8 weeks. They found that there was a significant reduction in the body weight of the participating women and men. In this study, when the pre and post values of the participants were compared. a significant decrease was found (Carol et al., 2002). Gomez et al., stated that there was a significant increase in total lean mass with 10-week resistance training (Gomez et al., 2015). Mertens et al. Applied a 2-month running program with 8 sedentary female and 8 male subjects with an average age of 54.9 years (Mertens et al., 2015).

Conclusion

Based on the reviews and results the following conclusions were drawn within limitations of the present study. The result of the study also revealed that there was a significant improvement of agility and percentage of body fat for the cross fit training group was better than the control group.

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