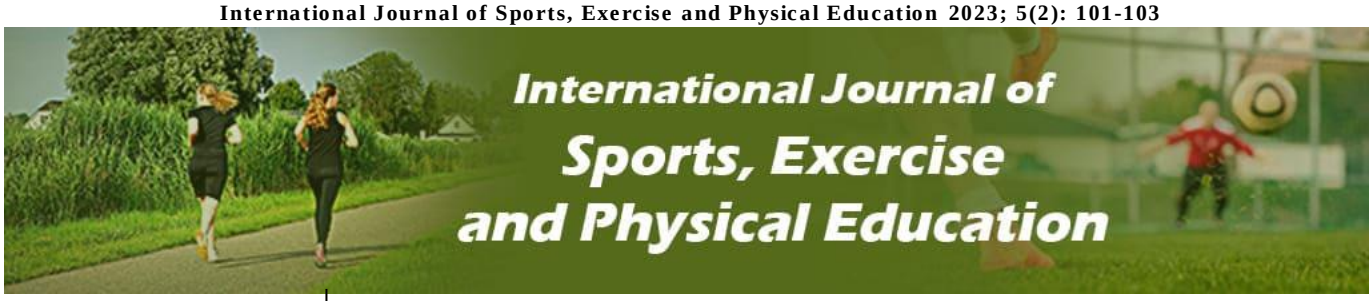

ISSN Print: 2664-7281
ISSN Online: 2664-729X
Impact Factor: RJIF 8
IJSEPE 2023; 5(2): 101-103
www.sportsjournals.net
Received: 07-06-2023
Accepted: 16-08-2023

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A comparative study on vital capacity and agility between resistance-trained individuals and CrossFit participants

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DOI: https://doi.org/10.33545/26647281.2023.v5.i2b.58

Abstract
The purpose of the study was to find out the comparative analysis of vital capacity and agility between resistance-trained individuals and CrossFit participants. The study has been conducted on 30 resistance-trained individuals and 30 cross-fit participants. The subjects were selected from Imphal, Manipur. The age of the subjects ranged between 20 and 30 years. The study was conducted on vital capacity and agility. The data was collected through a peak flow meter for vital capacity and a 30-meter shuttle run for agility. To find out significant differences among the groups, an independent 't'-test was used with the help of SPSS software. The level of significance chosen was 0.05. After the analysis, it was revealed that there was a significant difference in agility between the two groups. Whereas, no significant difference was found in vital capacity between resistance-trained individuals and cross-fit participants in Imphal, Manipur. Therefore, the study revealed that resistance-trained individuals performed greater on agility as compared to cross-fit participants.

Keywords: Vital capacity, agility, resistance-trained individuals and CrossFit participants

Introduction
Resistance training is a form of exercise intended to increase muscular strength and endurance. It involves exercising muscles using some form of resistance. This resistance could be weights, bands, or even your own bodyweight working against gravity. When doing resistance training, which is sometimes called strength training or weight training, you can focus on specific results, such as joint stability, muscular endurance, increased muscle size, strength, and power. Resistance training (RT) is a well-documented exercise modality to improve several physiological and psychological health parameters (Fiuza-Luces *et al*., 2013) [3]. RT has been demonstrated to decrease visceral fat, glycated hemoglobin, low-density lipoprotein, and triglycerides, increase glucose transporter type 4, and increase muscle and bone mass. Also, the benefits of RT include improved physical performance, movement control, functional independence, cognitive abilities, body composition, body image, and self-esteem (Westcott, 2012) [9]. CrossFit (CF) is a form of high-intensity functional training that combines resistance exercises, gymnastics, and traditional aerobic modalities (e.g., cycling, rowing, and running) into single workouts that vary by day to elicit general physical preparedness (Glassman, 2011; Feito *et al*., 2018) [4, 2]. This training form is enjoyed recreationally by participants of varying levels of fitness, training experience, age, and lifestyles (Thompson, 2017) [8] and also exists as its own sport.
CrossFit is one form of RE that is recognized as a high-intensity program that combines elements of mobility, technique, and strength (Smith *et al*., 2013) [7] and has seen increasing popularity in recent years. CrossFit workouts often incorporate Olympic lifts and elements of gymnastic exercises using handstands and rings. A large part of CrossFit workouts also consists of the "workout of the day" or "WOD," where workouts are performed for the best time or performed in the "as many rounds as possible" style and are completed in a group environment, with some workouts performed as a shared workload. The social nature of CrossFit, in addition to the annual 'CrossFit Games', which include national qualifying workouts and regional competitions, is what has led to CrossFit being described as the "Sport

of Fitness" (Hak *et al*., 2013) [5]. Competitors who complete all workouts and rank high enough will progress to the next stage of the competition. Regardless of which stage, it is expected that each workout will consist of a set of challenges that will require some combination of strength, power, endurance, and/or sport-specific skill (Glassman, 2011) [4].

Evidence of CF training being more advantageous towards developing a variety of fitness outcomes in comparison to alternative training strategies (e.g., resistance training, high-intensity interval training) is equivocal. There is only one well-controlled study that exists where a variety of physiological parameters were examined between CF-trained participants and those trained in more traditional exercise modalities (e.g., resistance training) (de Sousa *et al*., 2016) [1]. In that cross-sectional investigation, men with at least one year of CF training experience outperformed their resistance-trained (> 1 year) counterparts in a multi-stage shuttle run test and possessed a higher aerobic capacity; all other measures were statistically similar. While this study provides evidence in favor of CF training, there was no aerobic training requirement for the resistance-trained group, and the actual experience of the CF group was unclear beyond their having participated in the strategy for at least one year. It is possible that multiple physiological differences exist when experience is considered (Gerald *et al*., 2020) [10]. Therefore, taking views from the above studies conducted by known researchers, the present study focused on comparing the vital capacity and agility of resistance-trained individuals and cross-fit participants.

Objectives of the study

1. To find out the difference between Resistance Trained Individuals and CrossFit participants on vital capacity.
2. To compare the agility between Resistance Trained Individuals and CrossFit participants.

Materials and Methods

The study has been conducted on 30 resistance-trained individuals and 30 CrossFit participants. The subjects were selected from Imphal, Manipur. The age of the subjects ranged between 20 and 28 years. The study was conducted on vital capacity and agility. The data was collected through a peak flow meter for vital capacity and a 30-meter shuttle run for agility. To find out significant differences among the groups, an independent 't'-test was used with the help of SPSS software. The level of significance chosen was 0.05.

Findings

The comparison of vital capacity between Resistance Trained Individuals and CrossFit participants are depicted in table-1.

Table 1: Comparison of Scores on Vital Capacity (Peak Flow Metre) Between Resistance Trained Individuals and CrossFit participants

Variable	Group	N	Mean	SD	SEM	MD	SED	t-value
Vital Capacity	Resistance Trained Individuals	30	506.67	122.54	22.37267	8	36.89	0.217
	CrossFit	30	514.67	160.68	29.33647			

*Significance at.05 level

't'.05 (58) = 1.67

From the findings of the above table-1, the mean and standard deviation value with regard to Resistance Trained Individuals on the variable vital capacity (Peak flow rate) were 506.67 and 122.54 whereas CrossFit Participants were 514.67 and 160.68 respectively. After analysis of the data, the calculated 't' value was 0.217 at 0.05 level of significance, which was less than the tabulated value 1.67. So, it indicates that no significant differencewas found between Resistance Trained Individuals and CrossFit participants on vital capacity.

The graphical representation of mean comparison between Resistance Trained Individuals and CrossFit participants on vital capacity (peak flow rate) are depicted in fig. 1.

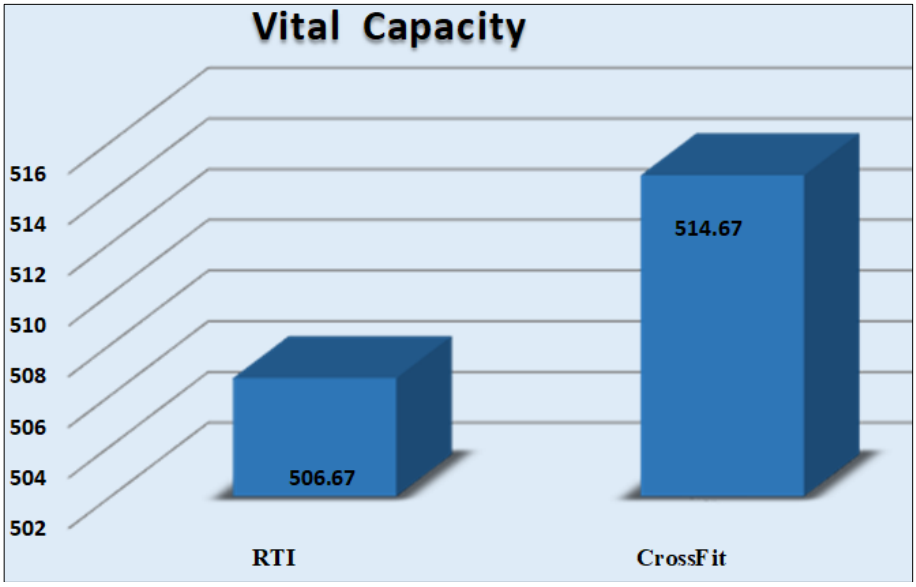

Fig 1: Mean Scores of Resistance Trained Individuals (RTI) and CrossFit participants on Peak Flow Rate for Vital Capacity

The comparison on agility between Resistance Trained Individuals and CrossFit participants are depicted in table-2.

Table 2: Comparison of Scores on Agility (Shuttle Run) Between Resistance Trained Individuals and CrossFit participants

Variable	Group	N	Mean	SD	SEM	MD	SED	t-value
Agility	Resistance trained individuals	30	11.20	1.16	0.21	0.81	0.31	2.60*
	CrossFit	30	12.01	1.26	0.23			

*Significance at.05 level
't'.05 (58) = 1.67

From the findings of the above table-2, the mean and standard deviation value with regard to Resistance Trained Individuals on the variable agility were 11.20 and 1.16 whereas CrossFit Participants were 12.01 and 1.26 respectively. After analysis of the data, the calculated 't'-value was 2.60 at 0.05 level of significance, which was greater than the tabulated value 1.67. So, it indicates that significant difference was found between Resistance Trained Individuals and CrossFit participants. The graphical representation of mean comparison between Resistance Trained Individuals and CrossFit participants on agility (Shuttle run) are depicted in fig. 2.

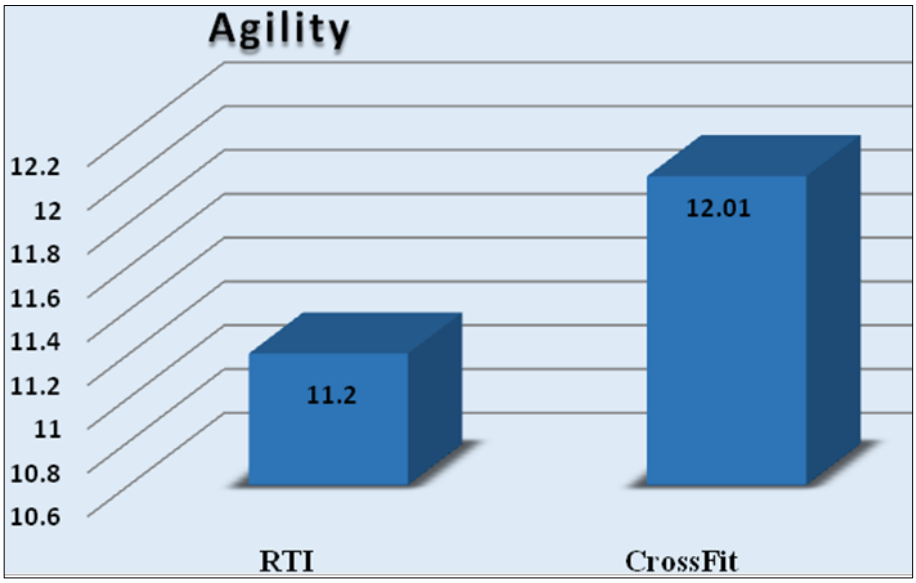

Fig 2: Mean Scores of Resistance Trained Individuals (RTI) and CrossFit participants on Shuttle run for Agility

Conclusion

1. No significant difference was found in vital capacity (peak flow rate) between resistance-trained individuals and cross-fit participants.
2. A significant difference was found in agility (shuttle run) between resistance-trained individuals and CrossFit participants. Resistance-trained individuals had performed significantly better on agility as compared to CrossFit participants.

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