Effective Study of 4 Weeks Two High Intensity Training Programmes on Selected Motor Fitness Variables of Football Players: A Pilot Study

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Abstract: *The objective of the study was to find out the effective of 4 weeks two high intensity training programmes on selected motor fitness variables of football players. For thepurpose of the study 30 male club level football players, aged between 18-23 years from Barasat Jagriti Sangha, Barasat, North 24 Parganas, WB on November 1-29, 2017 were randomly selected as the subject. The subjects were randomly divided into three groups (10 in each group) namely HIIT (High Intensity Interval Training Group), SET(Speed Endurance Training Group) and CG (Control Group) . Speed, Agility, leg explosive strength, Repeated Sprint Ability and VO2max were selected as the variables for the study. Standard tests were used to measure the selected variables. Pre test data were collected before the treatment was given. Experimental groups were given treatment for 3days a week for the duration of 4 weeks after which the post test data were collected. The data was computed by Descriptive statistics and ANCOVA were used to analyze the data. The result of the pilot study showed that the high intensity training both high intensity interval training(HIIT) and speed endurance training (SET) did not significantly improve the selected motor fitness variables namely speed(F=0.064) and agility(F=0.831).*

Key Words: *HIIT training, SET training, Speed, Agility, Football players.*

1. INTRODUCTION:

Football is generally a free-flowing game, with play stopping only when the ball has left the field of play, or when play is stopped by the referee. After a stoppage, play recommences with a specified restart. Broadly, these include three main categories: strikers or forwards, whose main task is to score goals; Defender who specialize in preventing their opponents from scoring; and midfielders who dispossess the opposition and keep possession of the ball in order to pass it to the forwards; players in these positions are referred to as outfield players, in order to discern them from the goalkeeper. These positions are further differentiated by which side of the field the player spends most time. While players may spend most of the game in a specific position, there are few restrictions on player movement, and players can switch positions at any time.(www.storiespreschool.com/soccer_gameplay.html). Thus the players of varied positions may be different in the physical and psychological characteristics. Having this concept, the present study was carried out to study the physical and motor characteristics among the positions of defensive, midfield and offensive football players. One of the factor that football is so popular worldwide is that players may not require to have an unusual ability within any of these performance areas, but possess a practical level within all areas. However, there are trends towards more organized training and selection influencing the anthropometric profiles of players who compete at the top level. As with other activities, football is not a science, but science may help to improve performance. Efforts to improve soccer performance often focus on technique and tactics at the expense of physical fitness. During a 90-minute game, elite-level players run about 10km at an average intensity close to the anaerobic threshold (80–90% of maximal heart rate). Within this endurance context, numerous explosive bursts of activity are required, including jumping, kicking, tackling, turning, sprinting, changing pace, and sustaining forceful contractions to maintain balance and control of the ball against defensive pressure. The best teams continue to increase their physical capacities, whilst the less well ranked have similar values as reported 30 years ago. Whether this is a result of fewer assessments and training resources, selling the best players, and/or knowledge of how to perform effective exercise training regimens in less well ranked teams, is not known. As there do exist teams from lower divisions with as high aerobic capacity as professional teams, the latter factor probably plays an important role. (Stolen T.et al 2005). Physical fitness has been shown to have a key role in success during a football match. Over a 90-minute match, elite youth (ages 13–18) soccer players engaging in intermittent activity will often cover distances greater than six kilometres, placing an importance on the aerobic

metabolic pathway. Improvements in aerobic power have been shown to affect the number of sprints, involvements with the ball, and distance covered during a football match. The same study demonstrated that players' heart rate during a soccer match can reach values approximating 80–90% of an age-predicted heart rate max, further highlighting the demands placed on the anaerobic metabolic pathway on top of aerobic fitness. At the same time, observations of specific player movements throughout a match suggest that high-intensity activity is an important factor for performance and success in professional soccer. Studies in young players indicate that soccer specific tasks such as passing accuracy and involvement with the ball decline after short bouts of high-intensity exercise. Others have also demonstrated the detrimental effects of the game on sprint performance. These findings suggest that training programs should place emphasis on repeated bouts of high intensity work, with and without the ball. Indeed, most teams focus on both aerobic and anaerobic conditioning during pre-season workouts (Howard N and Stavrianeas S. 2017). In recent years, High-intensity interval training (HIIT) and speed endurance training (SET) has been proposed as the preferred methods of exercise when time is limited. In football (soccer) both aerobic and anaerobic metabolism are very important. Football is a long duration game, so the aerobic capacity is essential. On the other hand, anaerobic power plays a very vital role in the time of short running with and without ball, kicking, heading and throwing. At present there is a very few research study on high intensity interval training (HIIT) and speed endurance training (SET) on the development of football performance in India and even in the world. Therefore the present researcher decided to do the research on HIIT and SET training of the football players.

2. AIM OF THE STUDY:
The aim of the study was to find out the Effective Study of 4 Weeks Two High Intensity Training Programmes on Selected Motor Fitness Variables of Football Players.

3. METHODS

Selection of the Subject: For thepurpose of the study 30 male club level football players, aged between 18-23 years from Barasat Jagriti Sangha, Barasat, North 24 Parganas, WB on November 1-29, 2017 were randomly selected as the subject. The subjects were randomly divided into three groups (10 in each group) namely HIIT (High Intensity Interval Training Group), SET(Speed Endurance Training Group) and CG (Control Group) . Speed, Agility, leg explosive strength, Repeated Sprint Ability and VO2max were selected as the variables for the study. Standard tests were used to measure the selected variables. Pre test data were collected before the treatment was given. Experimental groups were given treatment for 3days a week for the duration of 4 weeks after which the post test data were collected. The data was computed by Descriptive statistics and ANCOVA were used to analyze the data.

Variables-Test and Criterion Measure: Speed and Agility were selected as the variables for the study. It was tested by field test Speed was measured by 50 meter dash Test and was recorded in $1/100^{th}$ of a second. Agility was measured by 4X10 meter Shuttle Run Test and was recorded in $1/100^{th}$ of a second.

Design of the Study: Pre test- post test randomized group design was used for the study. Pre test data was collected from both the groups (experimental and control group) before administering the experiment to the experimental group. Then the high intensity interval training (HIIT) programme and speed endurance training (SET) programme was applied to the experimental group in three alternate days per week for 4 weeks. The control group was not given any treatment during these 4 weeks. Immediately after completion of the experiment the post test data were collected from both the experimental and control group.

Statistical Analyses: For determining the effect of the HIIT training and SET training, descriptive statistics and ANCOVA were used to analysis the data.

4. RESULTS:
The result of the pilot study showed that the high intensity training both high intensity interval training(HIIT) and speed endurance training (SET) did not significantly improve the selected motor fitness variables namely speed(F=0.064) and agility(F=0.831). The insignificant result may be due to the short duration (4weeks) of treatment to the experimental groups.

Table-1: Descriptive Statistics of Speed among the selected three Groups					
HIIT		**SET**		**CG**	
Pre Test	**Post Test**	**Pre Test**	**Post Test**	**Pre Test**	**Post Test**
Sum 75.96	75.95	75.15	75.03	74.52	74.68
Mean 7.60	7.60	7.52	7.50	7.45	7.47

StdDev	**0.30**	**0.30**	**0.31**	**0.32**	**0.27**	**0.38**
Std Err	0.10	0.09	0.10	0.10	0.08	0.12
Minimum	**7.07**	**7.08**	**7.03**	**7.01**	**7.03**	**7.01**
Maximum	**7.96**	**7.95**	**7.93**	**7.93**	**8.01**	**8.22**

Table-1 describes the mean (M), standard deviation (SD), Maximum value (Max.) and Minimum Value (Min.) scores of subjects in Speed. In the pre test phase, the mean of HIIT group, SET group and AC group were 7.60mt, 7.50mt and 7.45mt respectively. The post test mean of HIIT group, SET group and AC group were 7.60mt, 7.50mt and 7.47mt respectively. The standard deviation for pre-test phase of HIIT group, SET group and AC group were 0.30, 0.31 and 0.27 respectively. The post test standard deviation for HIIT group, SET group and AC group were 0.30, 0.32 and 0.38. The Maximum value for HIIT group in pre test phase was 7.96mt. Whereas the Minimum value was 7.07mt. For the SET group the Maximum value in pre test was 7.93mt where as the Minimum value was 7.03mt. The Maximum value for AC group in pre test phase was 8.01mt where as the Minimum value was 7.03mt. In the post test phase for HIIT group the Maximum value was 7.95mt and the Minimum value was 7.08mt, for SET group the Maximum value was 7.93mt and the Minimum value was 7.01mt, and for the AC group the Maximum value was 8.22mt and the Minimum value was 7.01mt.

Table-2: ANCOVA for Distinct Groups on Speed for Pre-Test and Post-Test Data				
Source of Variation	**df**	**Sum of Squares**	**Mean Square**	**F-value**
Treatment Group	2	0.004	0.002	
Error	26	0.718	0.028	**0.064**
Total	28	0.721		
Table value of F (2,26) = 3.37 *. Significant at the .05 level				

Table-2 reveals that there was no significant improvement of speed (F=0.064) among the HIIT group, SET group and AC group. The obtained F value 0.064 was found to be lesser than that of tabulated F value 3.37 at 0.05 level of significance with 2, 26 degree of freedom.
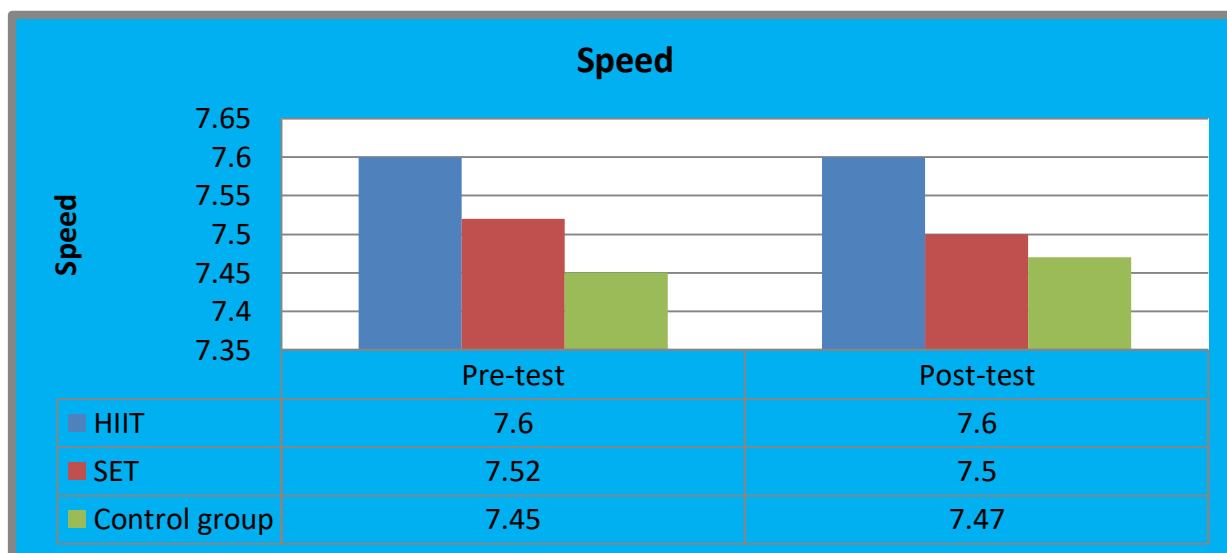

Speed

	Pre-test	Post-test
HIIT	7.6	7.6
SET	7.52	7.5
Control group	7.45	7.47

Figure- 1: Graphical Representation of Pre-Test & Post-Test Mean for Distinct Treatment Groups on Speed.

Figure-1 describes the pre-test and post-test mean for HIIT, SET and AC group. Here the pre-test and post-test mean of HIIT, SET and AC group were 7.6meter and 7.52meter, 7.45meter and 7.6meter & 7.5meter and 7.47meter respectively.

Table-3: Descriptive Statistics of Agility among the selected three Groups					
HIIT		**SET**		**CG**	
Pre Test	**Post Test**	**Pre Test**	**Post Test**	**Pre Test**	**Post Test**

Sum	107.26	107.06	106.38	106.26	106.73	106.20
Mean	**10.73**	**10.71**	**10.64**	**10.63**	**10.67**	**10.62**
StdDev	**0.34**	**0.35**	**0.31**	**0.29**	**0.18**	**0.18**
Std Err	0.11	0.11	0.10	0.09	0.06	0.06
Minimum	**10.03**	**10.02**	**10.13**	**10.14**	**10.22**	**10.21**
Maximum	**11.41**	**11.45**	**10.99**	**10.90**	**10.85**	**10.82**

Table-3 describes the mean (M), standard deviation (SD), Maximum value (Max.) and Minimum Value (Min.) scores of subjects in Speed. In the pre test phase, the mean of HIIT group, SET group and AC group were 10.73mt, 10.64mt and 10.67mt respectively. The post test mean of HIIT group, SET group and AC group were 10.71mt, 10.63mt and 10.62mt respectively.The standard deviation for pre-test phase of HIIT group, SET group and AC group were 0.34, 0.31 and 0.18 respectively. The post test standard deviation for HIIT group, SET group and AC group were 0.35, 0.29 and 0.18. The Maximum value for HIIT group in pre test phase was 11.41mt. Whereas the Minimum value was 10.03mt. For the SET group the Maximum value in pre test was 10.99mt where as the Minimum value was 10.13mt. The Maximum value for AC group in pre test phase was 10.85mt where as the Minimum value was 10.22mt. In the post test phase for HIIT group the Maximum value was 11.45mt and the Minimum value was 10.02mt, for SET group the Maximum value was 10.90mt and the Minimum value was 10.14mt, and for the AC group the Maximum value was 10.82mt and the Minimum value was 10.21mt.

Table-4: ANCOVA for Distinct Groups on Agility for Pre-Test and Post-Test Data				
Source of Variation	**df**	**Sum of Squares**	**Mean Square**	**F-value**
Treatment Group	2	0.009	0.005	
Error	26	0.147	0.006	**0.831**
Total	28	0.157		
Table value of F (2,26) = 3.37 *. Significant at the .05 level				

Table-4 reveals that there was no significant improvement of speed (F=0.831) among the HIIT group, SET group and AC group. The obtained F value 0.831 was found to be lesser than that of tabulated F value 3.37 at 0.05 level of significance with 2, 26 degree of freedom.
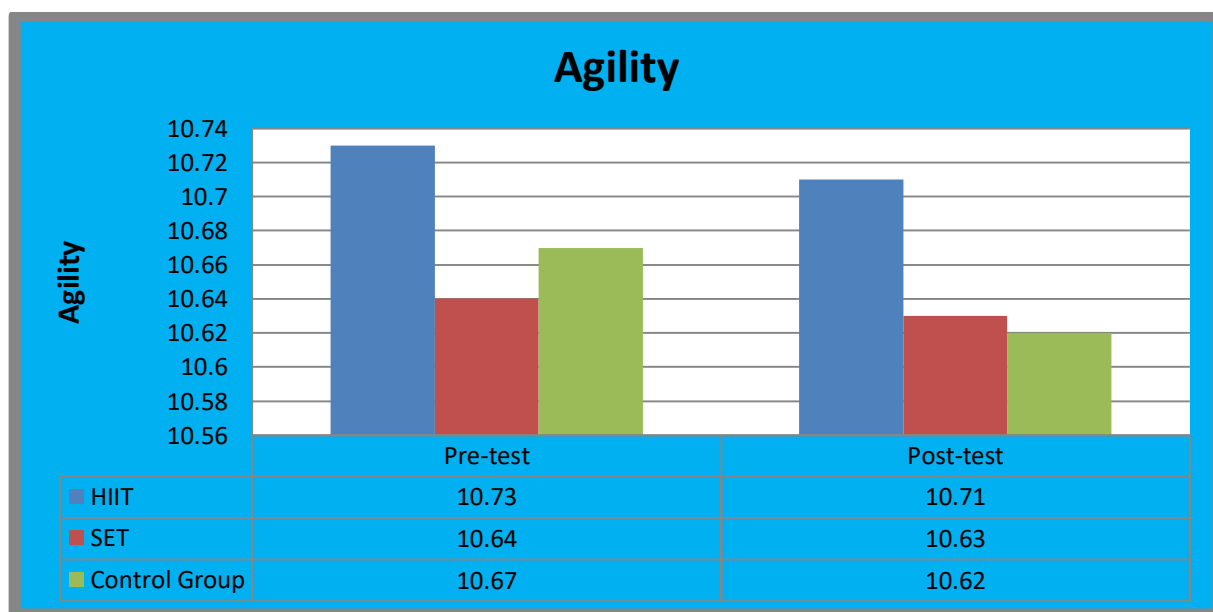

Figure- 2: Graphical Representation of Pre-Test & Post-Test Mean for Distinct Treatment Groups on Agility.

Figure-2 describes the pre-test and post-test mean for HIIT, SET and AC group. Here the pre-test and post-test mean of HIIT, SET and AC group were 10.33meter and 10.64meter, 10.67meter and 10.71meter & 10.63meter and 10.62meter respectively.

5. DISCUSSION:

The result of the study revealed that the four weeks High Intensity Interval Training (HIIT) and Speed Endurance Training (SET) significantly not improved the speed and agility. The result may be due to the effect of high intensity interval training programmes both HIIT and SET training programmes for 45-60 minutes per unit for three alternate days for four weeks. The result of the study is supported by the study of the decrement of the speed, agility, leg explosive strength, RSA and VO2max was supported by the study, In case of speed ,agility, leg explosive strength RSA and VO2max no significant effect ($F=0.064$), ($F=0.831$), ($F=1.163$), ($F=2.756$), ($F=1.041$) was observed among the HIIT group, SET group and Active Control group.

6. CONCLUSION:

On the basis of the result it is concluded that the high intensity interval training (HIIT) and speed endurance training (SET) programmes did not significantly improve the selected motor fitness variables namely Speed($F=0.064$) and Agility($F=0.831$). The insignificant result may be due to the short duration (4weeks) of treatment to the experimental groups of the football players.

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