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Effects of a Ten Week Training Programme on Repeated Short Sprints among Football Referees of Malaysia

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Abstract

The objective of this study was to investigate whether a ten week training programme would improve repeated short sprints of football referees in Malaysia. Sixty national football referees were randomly assigned into 3 groups (n=20) namely the control group, experimental one and experimental two. Experimental one followed a 10 week training programme (duration of training 4 days in a week, each session=90 minutes and time 5 pm) supervised by a physical education lecturer and his assistants. Experimental two reported for training at a different venue and trained on their own (duration, frequency and time as for experimental one). Pre-test and post-test results were used to determine whether there was an improvement. SPANOVA results rejected the null hypothesis [F (2, 57) =75.86 $p<0.05$]. Pillai's Trace indicated there was a significant difference between pre-test and post-test results and significant interaction effect. Tukey Pair Wise Comparison indicated best performance by experimental one and the control group the poorest. The results indicated that the training programme was acceptable.

Keywords: repeated short sprints, national football referees, ten week training programme.

1. Introduction

The headquarters of the international football governing body, the Federation Internationale de Football Association (FIFA) has its headquarters in Zurich. FIFA announced that 208 men's national football teams were affiliated to them and therefore considered football as the most popular game in the world (FIFA News, 2011). According to a survey published in 2006, over 230 million people from more than 200 countries regularly play football. It was also found that football has the highest global television audience in sport ("FIFA Big Count 2006"). Ingle, Sean Glendenning & Barry (2003) stated that, football is played at a professional level all over the world. They further reported that a large number of spectators regularly go to football stadiums to watch the game. While, FIFA (2003) announced that many more watch the game on television or on the internet. It is commendable that a large number of people also play football at an amateur level.

When the game is played, referees are an essential element to supervise matches. An official survey ("FIFA Big Count 2006") revealed that there were more than 840,000 registered referees and assistant referees worldwide. It was found that quality refereeing provides players with a chance to display a high level of skills and tactics. It ensures smooth flow of play and as a result brings about satisfaction and enjoyment to the fans. Thus, the attributes of quality refereeing ensures that it is a challenging, exciting and rewarding task. On the other hand, poor refereeing creates anxiety, frustration, anger and eventually some negative physical behaviour by players who perceived that they had been unfairly judged. When this happens, the referees feel frustrated, abused and unappreciated (Machin, 1990).

A good referee can be distinguished by his ability to judge incidents accurately, which is directly dependent upon his physical condition, experience, knowledge and application of the laws of the game (Eissmann, 1988). This observation was supported by Castillo (1990), who stressed that the physical condition of a referee would strongly affect the quality of refereeing. He further emphasized that referees should accelerate to be close to play. According to Ratanus (2012), acceleration can be defined as the rate at which a person or object changes velocity.

Asagba (2004) strongly felt that football referees must reach and maintain a high level of fitness. He further stated that in addition to aerobic ability, agility and speed were essential. There must therefore be an anaerobic energy supply from

time to time. A football referee is supposed to be within 10 to 15 metre range from the ball during play. Baumhakel et al. (2007) agreed that referees should have good physical condition.

A referee officiating a soccer match must observe the actions of players in an area that measures 8.250 [m.sup.2] (Castagna et al., 2007). Approximately every 4-6 seconds, the referee changes motion activity (D'Ottavio & Castagna, 2001; Krustrup & Bangsbo, 2001), equating to 1268 different activities during 90 minutes of a match. Of these, 588 are consequence of low-intensity activities (standing, walking, jogging) and 161 of high intensity (running and sprint) (Krustrup & Bangsbo, 2001). High-intensity efforts of 2 to 10 seconds occur more than 150 times at decisive moments in a soccer match (Faude et.al, 2012). The number of short sprints performed appeared to be the best measure that discriminates between levels of physical performance in soccer refereeing (Krustrup & Bangsbo, 2001; Mallo et al., 2009). However, like all measures of sporting performance short sprints efforts undertaken by referees during match-play may be subject to variation between successive matches. Indeed one of the key factors that have been reported to influence the number of short sprints performed by soccer referees is the overall match intensity, as determined by the amount of short sprint activity performed by the players. Weston et al., 2007).These studies indicate that supervising a soccer match is a highly intermittent exercise mode. In other words, soccer referees have significant aerobic energy expenditure throughout a match and episodes of considerable anaerobic energy turnover.

Football referees are often left on their own to develop their physical fitness efficiency. If they fail the FIFA Fitness Test, they are not allowed to officiate in a particular tournament. There has been no specific training programme designed to improve the fitness of football referees in Malaysia. Therefore, in order to ensure football referees can attain an optimal level of match fitness, emphasis within their fitness preparation programmes had to be firmly placed upon quality structured training sessions that provide an appropriate training stimulus to enable the attainment of such fitness. Hence, this study has been designed to investigate the effectiveness and acceptability of a ten week training programme to improve repeated short sprints. The objective of the study was to compare the performances of the three groups in repeated short sprints after ten weeks. The null hypothesis of the study stated that there will be no significant difference in the performance of the three groups in repeated short sprints after ten weeks.

2. Methodology

This investigation was an experimental research design which involved the measurement of repeated short sprints. The participants were assigned into three groups namely the control group, experimental group one and experimental group two. Twenty participants were assigned in each group. The participants were pre-tested on FIFA Fitness Test which measured 50 metre short sprints of six repetitions. Experimental group one and experimental group two were exposed to different experimental treatment respectively for ten weeks. Experimental group one followed a planned ten week programme while experimental group two trained using their own training programme. After ten weeks, the post-test was administered to the three groups. The researcher investigated whether there was a significant difference in the performance of repeated short sprints, whether there was a significance difference between pre-test and post-test scores, if there was a significant effect on the treatment for the three groups and to find out which group performed the best and to determine which of the training methods employed was better. The design of this study focused upon individual performances in the pre-test, providing training for ten weeks and to determine if referees improved their performance in repeated short sprints as a result of experimental treatments.

3. Results

The pre-test results in Table 1showed very little difference between the means and the standard deviations among the three groups: control group (M=3.05, SD = 0.69, N=20), experimental group one (M=3.25, SD=0.64, N=20), experimental group two (M=3.20, SD=0.62, N=20). The direction of effect showed the same statistical features for all of the participants in the three groups: total groups (M=3.17, SD=0.64, N=60).

Table 1. below provides descriptive statistics for the three groups in pre-test means, post-tests means (M), the standard deviation (SD) and number (N) of participants in each group.

Pre-Test	N	M	SD
Control Group	20	3.05	0.69
Experimental Group One	20	3.25	0.64
Experimental Group Two	20	3.20	0.62
Total	60	3.17	0.64
Post-Test	N	M	SD
Control Group	20	3.20	0.52
Experimental Group One	20	5.90	0.31
Experimental Group Two	20	3.70	0.66
Total	60	4.26	1.29

The descriptive statistical features for the three groups in post-test indicated: control group (M=3.20, SD=0.52, N=20), experimental group one (M=5.90, SD=0.31, N=20), experimental group 2 (M=3.70, SD=0.66, N=20), total groups (M=4.26, SD=1.29, N=60). The post-test results indicated that the mean of experimental group one improved from 3.25 to 5.90. Experimental group two mean improved from 3.20 to 3.70.

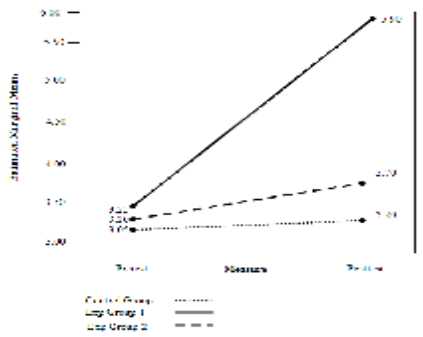

Figure 1. indicates the pre-test and post-test means for the three groups based on the number of repetitions in repeated short sprints

To determine whether there was a significant difference in the performance of the three groups in repeated short sprints after following a ten week training programme, a mixed between-within subject analysis known as split-plot ANOVA (SPANOVA) with a .05 significant level was set.

Table 2. SPANOVA Tests of Between Groups for Pre-Test and Post-Test

Pre-Test	Sum of Squares	df	Mean square	F	Sig
Between Groups	0.43	2	0.22	.517	.599
Within Groups	23.90	57	0.42		
Total	24.33	59			
Post-Test	Sum of Squares	df	Mean square	F	Sig
Between Groups	82.53	2	41.27	154.75	.000
Within Groups	15.20	57	1.84		
Total	97.73	59			

The pre-test results in Table 2 indicated that there was no significant difference among the three groups in repeated short sprints [F (2, 57) =.517, p>.05] before treatment was administered.

After undergoing a ten week training programme, the post-test results indicated that there was a significant difference among the three groups in the performance of repeated short sprints [F (2, 57) =154.75 p<0.05]. The mean value of experimental group one out performed the other two groups. The results showed experimental group one was the most effective group as compared to control group and experimental group two. Therefore, the null hypothesis which stated that there would be no significant difference in the performance of repeated short sprints among the three groups was rejected.

To further determine whether there was a significant difference between pre-test and post-test scores as a whole and to determine if there was a significant effect on the treatment for the three groups, multivariate tests using Pillai's Trace was administered.

Pillai's Trace [F (1, 57) = 205.88, p<0.05] indicated that there was a significant difference between pre-test and post-test scores as a whole. It showed that the programme had significant effect on repeated short sprints runs after treatment. There was also a significant interaction effect of the treatment for the three groups [F (2, 57) = 103.93, p<0.05].

Table 3. Multivariate Tests[a] Using Pillai's Trace

Effect	Value	F	Hypothesis df	Error df	Sig
Pillai's Trace	0.783	205.88[b]	1.000	57.000	.000
Wilk's Lambda	0.217	205.88[b]	1.000	57.000	.000
Hotelling's Trace	3.612	205.88[b]	1.000	57.000	.000
Roy's Largest Root	3.612	205.88[b]	1.000	57.000	.000
Measure* Group	Value	F	Hypothesis df	Error df	Sig
Pillai's Trace	0.785	103.99[b]	2.000	57.000	.000
Wilk's Lambda	0.215	103.99[b]	2.000	57.000	.000
Hotelling's Trace	3.612	103.99[b]	2.000	57.000	.000
Roy's Largest Root	3.612	103.99[b]	2.000	57.000	.000

a. Design: Intercept + group
Within Subjects Design: measure
b. Exact statistic

In order to investigate significant difference between groups, Tukey post hoc multiple comparison test analysis was conducted.

Table 4. shows Tukey Pair Wise Comparison on the means for the three groups in repeated short sprints.

(I) group	(J) group	Mean Difference (I-J)	Std error	Sig[b]
Control Group	Experimental Group 1	-1.450*	.349	.000
	Experimental Group 2	-0..325*	.349	.091
Experimental Group 1	Control Group	1.450*	.349	.000
	Experimental Group 2	1.125*	.349	.000
Experimental Group 2	Control Group	0.325*	.349	.091
	Experimental Group 1	-1.125	.349	.000

Based on estimated marginal means

* The mean difference is significant at the 0.05 level.

b. Adjustment for multiple comparisons: Least significant Difference (Equivalent to no adjustment

The results indicated that the mean difference between the experimental group one and the control group was 1.450*. When the means of experimental group one and experimental group two were compared, it indicated a mean difference of 1.125*. The results indicated that the mean difference of experimental group one when compared to the mean difference of experimental group two and control group was significant at .05.

The mean difference of the experimental group two and the control group indicated a value of 0.325*. The mean difference was just significant at an alpha of .05. when the performance of experimental group two in repeated short sprints was compared with the performance of control group.

The results indicated that there existed a significant difference in the performance of the three groups in repeated short sprints after ten weeks or training [F (2, 57) =154.75, p<0.05]. . Statistically significant differences were noted between experimental group one and experimental group two, experimental group one and control group and experimental group two and control group. The results of multiple comparisons among groups indicated that the performance of all the three groups in repeated high intensity intermittent runs differ from one another with experimental group one showing the best performance and the control group the poorest and the training method used by experimental group two was better.

4. Discussion

The post-test results of SPANOVA indicated that there was a significant difference among the three groups in repeated short sprints [F (2, 57) =154.75, p<.05] Therefore, the null hypothesis was rejected at an alpha of 0.05

Pillai's Trace [F (1, 57) = 205.88, p<.05] indicated the programme had significant effect after treatment. It also showed there was a significant interaction effect. [F (2, 57) = 103.93, p <.05].

Tukey Pair Wise Comparison results indicated that the performances of participants in experimental group one in short sprints were the best when compared with the other two groups. It also showed that the training method used experimental group one was better than the training methods used by experimental group two and control group.

Thus, from the findings of this study, it could be concluded that there were three general reasons for the improved performance in repeated short sprints of the football referees in Malaysia.

Firstly, training programme of this nature provided the football referees with an opportunity to train for four days in a week under the guidance of a trained physical education instructor. The instructor, playing a direct and ever-present role was recognized, as a result served as a strong motivating factor to the participants. Seguin et.al (2010)) reported that the exercise leaders appeared to be the single most important variable affecting training compliance and motivation. Secondly, during the present investigation there was an intense curiosity and interest regarding the training programme; from the first exposure to instructors and at the pre-test to the last exposure at the post-test. The interest was true to all the three groups. All groups responded to the pre-test and post-test with seemingly equal engrossment. Interest in the training method might have grown even more intense for football referees in experimental group one who followed training method one as the investigation progressed.

Finally, the football referees in Malaysia never had an opportunity to participate in a group training programme. This study which offered a setting to train in a group could have motivated them to train harder as they were eager to know the training effects. A study by Trost et al (2002) reported that adult exercisers preferred group programmes those in which one trained alone. It also indicated poorer training compliance in individual programmes. It was further reported that social reinforcement and companionship associated with a group programme apparently facilitated increased training programme.

5. Conclusion

The results obtained from the analysis of statistics indicated that there was a significant improvement in repeated short sprints for experimental group one after following the planned ten week training programme. The results also indicated that the training method used by experimental group one was better. Further, it indicated that the performance of group one was the best when compared to the performance of the other two groups. This planned ten week training programme is effective and acceptable to improve the performance of repeated short sprints of football referees. Therefore, it should be adopted as a formal training programme for football referees in Malaysia.

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