

IMPACTS OF INTERVAL TRAINING PROGRAMME ON LEG POWER, AGILITY AND SPEED AMONG SOCCER PLAYERS OF UNIVERSITY OF IBADAN

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Abstract

To achieve a high level of performance in soccer, commitment to regular training is essential. It is important that Frequency, Intensity, Time, Types principle (FITT) be adopted when planning a training programme. In this study, it is important to examine the impacts of interval training programme (ITP) among soccer players leg power, agility and, speed performance. The study entails pretest, posttest, and control. Thirty soccer players of University of Ibadan participated in the study. Both groups went through the pre-training as well as the post training evaluation. Instruments used were stadiometer, weighing scale, stop watches and, cones. The experimental group was exposed to ITP while the control group was engaged with ball work. Descriptive statistics and Analysis of Covariance were employed. ITP had no significance on leg power ($F_{(1,27)} = .233$; $P < .05$; $\eta^2 = .009$). Treatment of ITP had significance on the agility of soccer players ($F_{(1,27)} = 152.81$; $P < .05$; $\eta^2 = .850$) with experimental group having a higher score than the control group. There was significance on soccer players speed performance ($F_{(1,27)} = 44.28$; $P < .05$; $\eta^2 = .621$) with higher score in the experimental than control group. Therefore, interval training programme should be adopted as a training modality to improve agility and soccer among soccer players.

Keywords: Interval training programme, Soccer players, Leg Power, Agility, Speed.

Introduction

The place of training in skills acquisition, high dexterity and successful performance in conceptual and practical activities cannot be underestimated. Indeed, prior experience has been said to play a major role in determining an individual performance of a skill (Ogunleye, 2009). Ball games such as soccer, a skill-based activity, require good genetics, high level of motivation and a commitment to regular training to achieve a high level of performance. Lack of adequate preparation, practice and deliberate skill development has been proved to deter performance and success (Ogunleye & Bamidele, 2010). Therefore, the efforts and amount of training required to excel in sports performance are greater than the amount required for good health and wellness (Babalola & Ojo, 2015). It is important that Frequency, Intensity, Time, Types principle (FITT) be adopted when planning a training programme. In order to prevent worn out, the frequency of the exercise can be reduced when the exercise intensity is high. Intensity of exercise refers to how vigorous an exercise must be to contribute to the development of fitness level. When people do not understand this concept they exercise at a

level that is too high or too low (Hockey, 1996). During exercise, heart rate increases in proportion to the energy required for the performance of the task. As the task increases in intensity, there will be a corresponding increase in heart rate.

In interval training (ITP), there is a series of bouts of exercise alongside relief periods. Babalola and Ojo (2015) established that coaches choose it as a result of its effectiveness in cardiovascular fitness and its capacity to build the speed capacities of athletes. ITP, however, helps to improve the aerobic capacity of exercisers' so as to endure training at varying intensities. For ITP to achieve significant improvement, it is necessary to ensure accurate exercise intensity and rest intervals. This prevents accumulation of fatigue and its products as well as accommodating exercisers to endure more intensive workouts without unnecessary fatigue. In order for a trainer to design the very best ITP and to achieve a better result, there is the need to know the energy system that supplied a given activity (Ojo, 2020). Typically, interval training is suited to dynamic activities such as running, cycling, rowing and swimming. A training session would include warm-up, stretching, training and further stretching as cool down. At the onset of training, it is important to prevent severe muscular soreness by starting from simple to complex. The first few weeks of training are critical. Fox and Matthew (1997), therefore, stated that the first few weeks are to establish a positive attitude and desire towards the ITP.

To build speed and endurance, a well programmed IT workout could be helpful. ITP has been shown to be beneficial. Evidence shows that it has been beneficial for people with health conditions like chronic obstructive pulmonary disease (COPD) and metabolic syndrome (Kortianou, et al., 2010). More so, a well-designed ITP could be used to manage the effect of low back pains (Abass & Ojo, 2016). Interval training leads to many physiological changes including an increase in cardiovascular efficiency as well as increased tolerance to the build-up of lactic acid. It adheres to the principle of adaptation and with improved performance, greater speed, and endurance (Trey, 2009). Not much has, however, been found in literature concerning the efficacy of ITP on soccer players especially in Nigeria.

Motor performance fitness emphasizes the development of qualities that enhance the performance of physical activities such as sport. To Wuest and Bucher (1999), motor performance fitness (MPF) is concerned with performing sport-related skills more efficiently and with better living. It is also specific to the sporting activities in which an individual engages. Depending on the specific motor activity, different degrees of MPF components such as power, speed and agility are needed (Blair, 1993). For soccer players, the degree needed is different from that required by a basketball player, though both individuals need these qualities to perform at an optimal level. Engaging in exercise training either in or outside the gymnasium is vital for the stimulation of growth of muscle cells (Ogunleye& Ojo, 2019) which is important for the players. To this end, ITP for soccer players should be built around exercises such as rope jumping, agility drills, speed drills and bench blasts.

Soccer, like most serious group activities, is a discontinuous game and one of the most well-known games on the planet. The game comprises of two equivalent times of 45 minutes, with a time frame minutes between them. There are eleven players from each group on the field who can be separated into four sub-groups: strikers, midfielders, defensive players and

goalkeepers. During the game, players are required to perform exercises, for example, running (forward and in reverse), kicking, turning, coordinating and shooting. Physical molding is significant for everybody on the field. Along these lines, adequate preparation is critical to improving the wellness of the players, keep them from getting drained effectively and improve the abilities and strategies for the game (Oladipo & Moses, 2004).

Execution in discontinuous games has been related with speed, power, agility, strength and the capacity to rehash short eruptions of high force during a match, instead of the capacity to keep up a consistent submaximal work rate (Mosey, 2009). Before the individual aptitudes controlled by football players can be utilized, it is important to join fundamental characteristics, for example, speed, quality, nimbleness, perseverance and force (Ojo & Oladipo, 2019). Understanding the physical and mental requirements of the game will permit a more logical way to deal with preparing football players than any other time in recent memory. The goalkeeper and striker (wing and striker) must build up the adenosine triphosphate-phosphocreatine framework (ATP-PC) and lactic corrosive framework (Moses, Adedugbe & Abass, 2015). Fox and Matthew (1997) saw that when the wings, the inside and the middle forward work in nearly the whole field, it is important to build up the anaerobic and high-impact vitality framework.

Interval training has been accounted for in speed improvement. Speed is the capacity to move rapidly over the field or move upper and lower limbs rapidly to get or play. The activities are normally set with time spans that are followed up until the expiration of the period. For instance, 45 seconds of all out push-ups followed by 15 seconds of rest can be rehashed. Ojo and Oladipo (2018) reported that anaerobic alactic pathway supplies the energy for absolute speed and it is required as an athlete approaches top speed while running at maximum speed of about 90%. This speed segment of anaerobic digestion goes on for roughly eight seconds and ought to be prepared when no muscle weariness is manifest (as a rule following 24 to 36 hours of rest). It is on these bases that the study assessed the effects of exercise intensity of interval training programme on leg power, agility and speed among soccer players of University of Ibadan.

Hypotheses

Three hypotheses were tested.

H₀1: There is no significant treatment effect on leg power of the soccer players.

H₀2: Treatment does not have significant effect on agility of soccer players.

H₀3: Treatment does not have significant effect on speed performance of the soccer players

Research Design and Methods

The pretest-posttest quasi-experimental research design was used for the study. Thirty soccer players participated in the study. The players were assigned to groups of experimental with fifteen soccer players and control with fifteen soccer players. Both groups went through the pretraining as well as the posttraining evaluation. The purposive sampling technique was used for this study. All male soccer players of University of Ibadan were selected for this study. The participants were students of University of Ibadan who volunteered to be trained for Nigeria University Games. Standardised research instruments used are:

1. Weighing Scale: Hana scale (RA 9012).

2. Stop watches: Joerex digital timer, NO.4528-2 was used to time the participants.
3. Cones: Pro disc cones.

Procedure for the Study

The participants were classified into groups. Also, they were made to sign a consent form. Each participant engaged in a familiarization trial where they learned the training techniques and demonstrated the usage of the equipment for the interval training. The following data were collected prior the training:

Pretest and Initial Measurements:

- i. Gender
- ii. Age in years
- iii. Height was measured with stadiometer.
- iv. Weight was measured using Hana Portable weighing scale on the participants in kilogrammes.
- v. Leg power was measured with vertical jump test.

Equipment: Chalk and calibrated wall in cm, tape measure and wipes.

Procedure

- a. Warm up which included jogging, jumping and stretching. The participant stood against the wall in a sideways manner with stable feet on the ground and the body close to the wall.
- b. Participant fingertips were marked with chalk as they reaches upwards to make a mark along the wall as high as possible without the flat foot leaving the floor.
- c. At testing, the participants stepped backwards with the rare foot firmly grounded. In a crouched position with the arms outstretched behind the body. The participant brought both feet together and jumped as high as possible leaving a chalk mark on the wall.
- d. The best of three efforts were recorded in metres.
- vi. Agility

Test: Illinois agility test

Equipment: Non-slippery surface, cones, stopwatch and measuring tape.

Procedure: The length and width of the course is 10 meters and 5 meters respectively. Four cones were used to mark the three points; beginning, ending and two turning points. Also, four cones were placed in 3.3metres apart at the centre. Each cone in the centre was spaced 3.3 meters apart. Participants lied and stretched their heads forward at the start line with their hands by their shoulders. The starter started the stopwatch at 'Go' while the participants got up as quickly as possible and ran around the course in the direction indicated, without knocking the cones over, to the finishing line, at which the timing is stopped.

Scoring: Time spent was recorded in seconds.

- vii. Speed

Test: 50m test

Purpose: To assess total body movement (speed) within a short period of time.

Equipment: Running area of about 75meters in length marked with a starting line and finish line 50 meters from the starting line, starting blocks and stopwatch.

Procedure: The performer took a crouched position at the starting line, at 'Go' (start stopwatch) while the participants ran the 50m as fast as possible to the finishing line.

Scoring: The best time was recorded in seconds.

Treatment Administration: The soccer players who were assigned to the experimental group participated in an eight weeks interval training programme of three times per week while the control group participants partook in a ball work session. The exercises that were used for the interval training programme were: bench blast, sit ups, squat jumps, tuck jumps, lateral hops, zigzag hops, push ups, squat thrust, kneeling chest pass, 100metre, 200 metres, 400 metres and 800 metres.

Weeks 1-8

Intensity: 60%-85%MHR

Day 1: Warm up for 10 minutes

- Set 1: 10x5 at 0:10(0:30)
- Set 2: 10x5 at 0:20(1:00)
- Set 3: 1x800 at easy
- Cool down

Day 2: Warm up for 10 minutes

- Set 1: 10x15 at 0:20(1:00)
- Set 2: 10x15 at 0:20(0:30)
- Set 3: 2x200 at 0:25(1:3)
- Cool down for 10 minutes

Day 3: Warm up for 10 minutes

- Set 1: 8x10 at 0:15 (0:45)
- Set 2: 10x5 at 0:10(0:30)
- Set 3: 2x400 at 0:25(1:3)
- Cool down for 10 minutes

3.4.3 Posttest: The leg power, agility and speed test were measured succeeding the completion of eight weeks of interval training. These were done for both the experimental and control groups.

Method of Data Analysis

Descriptive statistics such as frequency count, mean, standard deviation were employed for data analysis with the Analysis of Covariance tests carried out at .05 level of significance with inferences in the light of Akinsola and Ogunleye (2004) and Ogunleye (2008) specifications.

Results

Hypothesis 1: There is no significant treatment effect on leg power of the soccer players. Table 1 is on the Summary of ANCOVA.

Table 1: ANCOVA of Treatment on Leg Power of the Soccer Players

Source	SS	df	MS	F	Sig.	η^2
Corrected Model	3433.208	2	1716.604	25.784	.000	.656
Intercept	5.836	1	5.836	.088	.769	.003
Leg power	1963.208	1	1963.208	29.488	.000	.522
ITP	136.252	1	136.252	2.047	.164 ^{n.s}	.070
Error	1797.592	27	66.577			
Total	347418.000	30				
Corrected Total	5230.800	29				

The result in table 1 shows no significant effect of treatment on leg power (LP) of soccer players in the experimental and control group ($F_{(1,27)} = 2.047$; $P > .05$; $\eta^2 = .070$). The partial eta square of .070 indicated that the effect of the treatment was small on LP.

Table 2: Experimental and Control Groups' Leg Power

Group	$\bar{x}$	Std. Error	Lower scores	Upper Scores
ITP	1.092E2	2.268	104.593	113.898
Control	1.044E2	2.268	99.702	109.007

From the results in Table 2, it can be concluded that the soccer players exposed to Interval Training Programme (ITP) obtained higher leg power score ($\bar{x}=1.09$) than the control group ($\bar{x}=1.04$). In line with this, the ITP improved players' leg power in the experimental group.

Hypothesis 2: Treatment does not have significant effect on agility of the soccer players.

Table 3: ANCOVA of Treatment on Agility of the Soccer Players

Source	SS	df	MS	F	Sig.	η^2
Corrected Model	204.913	2	102.456	93.019	.000	.873
Intercept	2.789	1	2.789	2.532	.123	.086
Pretest	10.347	1	10.347	9.394	.005	.258
Treatment	168.311	1	168.311	152.807	.000*	.850
Error	29.739	27	1.101			
Total	6752.680	30				
Corrected Total	234.652	29				

Table 3 shows a significant effect of treatment on the agility of soccer players ($F_{(1,27)} = 152.81$; $p < .05$; $\eta^2 = .850$) in the experimental and control group. Hence, the null hypothesis is rejected. The partial eta square of .850 indicated that the effect of the treatment was large on agility.

Table 3: Descriptive Statistics of Experimental and Control Group of Agility Scores

Groups	$\bar{x}$	Std. Error	Lowest scores	Upper scores
ITP	12.318	.274	11.756	12.881
Control	17.162	.274	16.599	17.724

Table 3 indicates that experimental group have lower agility scores ($\bar{x}$ =12.32) when compared with the higher score of ($\bar{x}$ =17.16) obtained by the control group. This implies that the time spent by the experimental group during the Illinois agility test decreases as a result of the effect of ITP.

Hypothesis 3: Treatment does not have significant effect on speed performance of the soccer players.

Table 4: ANCOVA of Treatment on Speed of the Soccer Players

Source	SS	df	MS	F	Sig.	η^2
Corrected Model	23.247	2	11.623	156.391	.000	.921
Intercept	.057	1	.057	.760	.391	.027
Speed	13.951	1	13.951	187.702	.000	.874
Treatment	3.291	1	3.291	44.278	.000*	.621
Error	2.007	27	.074			
Total	1657.710	30				
Corrected Total	25.254	29				

*significant @ $p < .05$

Based on the results on Table 4, it can be concluded that the effect of ITP on the speed performance of the soccer players is significant $F_{(1,27)} = 44.28$; $P < .05$; $\eta^2 = .621$). In accordance to result, the hypothesis was rejected. The partial eta squared of .621 indicated that the effect of the treatment was large on agility.

Table 4: Descriptive Statistics of Experimental and Control Group of Speed

Groups	$\bar{x}$	Std. Error	Lowest	Highest
Experimental	7.030	.072	6.882	7.178
Control	7.723	.072	7.575	7.871

Table 3 indicates that experimental group have lower agility scores ($\bar{x}$ =7.03) when compared with the higher score of ($\bar{x}$ =7.72) obtained by the control group. This implies that the time spent by the experimental group during the speed test decreases which was an improvement as a result of the effect of ITP

Discussion

The finding that the soccer players who participated in interval training programme had their leg powers improved minimally compared to the experimental group. This is in alignment

with the study by Hurst, Weston and Weston (2019) which reported leg power improvements in the foremost and non-dominant leg of older adults.

The study proved the potent treatment of interval training on agility performance of soccer players with the ITP group improving significantly. In tandem with this finding, Mosey (2009) reported improved mean results from the test to retest of agility among 14-16 years of male soccer players. Ojo (2020), also ascertained that with interval training, athletes agility and endurance improves by combining short bursts of strenuous exercise with rest or less intense exercise which is important in soccer training.

Another major finding from the result of this study is that the speed performance of the soccer players improved most especially the experimental group. Fajrin, Kusnanik and Wijono (2018) earlier reported that there was significant increment in speed performance of athletes. They further stated that such increase was as a result of the features of neuromuscular which improve and affect the increase in muscle strength and performance.

Recommendations

Based on the findings of this study, it is therefore recommended that:

- A similar study should be conducted on female soccer players.
- The frequency of the training should be increased for improved performance.
- More so, coaches should always train their athletes based on the sport specific skills.

Conclusion

Based on the fact that interval training programme can improve the physical performance variables of ball games players, this study established that eight weeks of interval training programme had significant effects on agility and speed performance of soccer players. The study had revealed that interval training programme had impact on the leg power, agility and speed test of the players.

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