

**ASSESSMENT OF PERFORMANCE RELATED PHYSICAL
FITNESS OF FOOTBALL PLAYERS BASED ON THEIR
PLAYING POSITION: IN
THE CASE OF SOUTH WESTERN ZONE OF ETHIOPIAN
NATIONAL LEAGUE FOOTBALL CLUBS**

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ABSTRACT

The purpose of this investigation is to assess performance related physical fitness of national league football players regarding to their playing position. National league football clubs competition is one of the most widely organized popular football contests across the country next to Ethiopian premier league match, which is governed by Ethiopian football federation. 7(seven) national league club players and coaches from south western regional division of the league was the population of the study. To conduct this research 3(three) clubs was selected purposively from 7(seven) clubs based on their date of establishment and previous achievement. Based on their playing position, 9 goal keepers, 24 defensives, 24 mid fielders and 18 forwards total of 75 players and 3(three) coaches was directly involved in the study.

The main instrument of data collection was 30 meter sprint test, vertical jump power test, Illinois agility test and structured interview. Collected fitness test scores through predetermined fitness tests and structured interview was analyzed using descriptive statistics such as mean, median, standard deviation and analysis of variance was

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carried out to identify the significance mean difference. The result of the study revealed that, there was statistically significance mean difference between playing position in sprint speed test, vertical jump test and Illinois agility test, $p < 0.05$. Goal keepers appeared low scorer in speed and agility test.

Lack of motivation and absence of measuring instruments was the main problems that hinder fitness assessment in national league football clubs. Coaches should consider positional role of players and demands during training programs.

Key words: football, playing position, physical fitness, national league, performance efficiency.

1 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Soccer is one of the most widely played and complex sports in the world, where players need technical, tactical, and physical skills to succeed. Without good physical fitness, players are rarely able to play the game with good technique, (Chapman *et al*, 2007). Soccer is characterized by a continuous course of activities with intermittent intensity in the game and a very low success ratio (the number of achieved goals) according to possession of the ball. For achieving top results in this sport, it is necessary that players have an exceptionally high level of technical and tactical skills as well as significant physical fitness, (Sevensson & Drust, 2005).

Fitness in soccer specific context refers to a range of individual characteristics that is a composite of many attributes and competences. Such competence by definition includes, physical, physiological, and psychomotor factors, (Reilly & Williams, 2003). Physically superior players felt less fatigued during the game played with the same intensity and, therefore, those players experience less decrement in technical performance, (Jukic, *et al*, 2011).

Players in competitive soccer require high levels of power, speed, and agility to

perform explosive movements such as heading, shooting, sprinting, and dribbling,(Stolen, *et al.*,2005).

Shots on goal are a particularly important feature because the final result of a match depends directly of their effectiveness. Soccer positions can be broadly categorized into four: Forwards, Midfielders, Defenders, and Goalie/Goalkeeper, (Botelho, 2012). The work rates and work intensities rate differs among the forwards, defenders and midfielders, (Coopoo & McNaughton, 2012).

The total distance covered in a soccer match ranges 9-13 km, with a decrease of 5-10% in the 2nd half. Players spend 60-70% of the total match duration low-intensity activities (walking, jogging, slow running). Mean recovery time between very high-intensity activity (Sprint and High-intensity running) is 72 seconds, but this result differs greatly for different position players, Wide and central midfielders cover a greater total distance.(Molino's, 2013).

Central defenders undertake less high intensity running than all other positions. Performance in soccer is multi-faceted and so in order to assess each aspect the testing protocol should include a variety of methods for evaluating a player's ability. Soccer is a sport predominated by the aerobic energy system highlighted by players covering 10-12 km during a 90 minute match.

However short bursts of high intensity work including multiple sprints, rapid changes in direction and headers are interspersed throughout the game. Therefore, aerobic fitness as well as speed and power are key components for any comprehensive soccer testing protocol (Rienzi, et al, 2005).

A research in to the analysis of movement in football has shown that players typically complete 1179 changes in activity across a 90 minutes match. More recently this has increased with studies reporting 1431 active patterns per match (Rienzi, *et al*, 2005). This increase is due to the greater magnitude of speed and physical requirement in the modern game.

The purpose of this study is to assess performance related fitness such as speed, power and agility of south western zone (A) Ethiopian national league football players through valid predetermined field testes.

1.2 Statement of the problem

The various codes of football played around the world have much in common in terms of their physical demand and correspondingly the importance of fitness testing (Pyne.*et al*, 2014).

Competition naturally provides the best test for an athlete, but it is difficult to isolate the various components with the sport and get objective measure of performance (Di salvo, *et al*, 2006). The path to any performance goal is never usually a straight line but a series of peaks and troughs (Davies, 2005).

Testing the physical and physiological abilities of soccer players is important for a variety of reasons including: identifying the strengths and limitations of players, monitoring athletes during critical windows of development. Fitness testing is used as a way of comparing an athlete's results to previous performances or to normative standards established in the sport. Fitness testing can thus be used to modify future training as appropriate. (Jones. *et al*, 2008).

Ethiopia is one of the few nations in Africa to establish modern sport system. This was known for the reputable achievement in Africa by its huge contribution for the inception and development of continental sport organization particularly CAF founded in 1957 by collective effort of Ethiopia, Egypt and Sudan (Amdie, 2006). The performance of east African football teams in the continental competition has been low in comparison to other regions in Africa (Rintaugu, 2012). This statement includes our country Ethiopia in critical background of our football player's limited performance to compute against other nations. But there is no clear evidence to what extent and a degree to which the performance of players has been limited from certain standard. Various study has been conducted on the assessment of physical performance of football players, but very few

studies were conducted on the basis of playing position especially in Africa. As stated by Clark, (2007), positional roles are less well distinguished on the basis of physical fitness in Africa.

According to Korkusuz & Ergen, (2007), high level of soccer requires a great amount of endurance speed, power and agility. To this end the researcher attempted fill the gap shown on other study through administering objective measure of selected performance related fitness such as speed, power and agility of national league players based on four (4) basic playing position of football such as goal keeper, defensive, midfielder, and striker or forwards through predetermined fitness tests.

Therefore this research intends to answer the following basic question in the course of the study.

1. How national league football coaches assess their players' actual performance?
2. Is their significance difference between players performance related fitness according to their playing position?
3. Does performance related physical fitness of national league players go in line with international test standards?
4. Which performance related fitness of players becomes common problematic area for national league football clubs?
5. What are the possible solutions suggested to enhance players' performance related physical fitness?

2. Research design and method

2.1. Study Design

The researcher gathers data from different site and different point of view. Therefore cross-sectional study design was be best closely related to the current study. The research method which also best suited for the investigation was quantitative and qualitative research methods.

2.2. Study Area and Period

South western part of Ethiopia consists of different zones and localities such as: Jimma zone, bench Maji zone, Sheka zone, Elu Abba Bora zone, Kaffa zone, and parts of Gambella region.

From those zones and regions, national leagues clubs namely, Jimma Abba Buna, Mizan Amman, Kaffa Coffee, Jimma City, Mettu city, Nekemt City, and Gambella City were assigned in south western (A) division of the league..

2.3. Population of the Study

The study population of this particular research 7(seven)south western (A) division of Ethiopian national league football clubs such as, Jimma Abba Buna, MizanAman, Kaffa Coffee, Jimma City, Mettu City, Nekemt City, and Gambella City. Each club have an average number of 25 players and one main plus one assistance coach. From those all 25 players from and coaches from those clubs totally 175 players and 14 coaches was the population of the study.

2.4. Participants

Players those are currently involving in the main team of national league football clubs such as, Jimma Abba Buna football club, Kaffa coffee football club, and Jimma city football club and also the main coach of the clubs was the subjects of this study.

2.6. Sample Size

The selection of players was based on playing position and no assistance coaches was included in the study, therefore all players from three selected national league football clubs selected by considering their health condition and status of injury. To realize the objective of the study, purposive sampling method was employed based on criteria such as previous achievements of the clubs. Thus, from seven (7) clubs those participated in 2006EC competition season, these selected 3 clubs were completed the league respectively from the list rank. Therefore from those three clubs total of 75 players was selected according to their positional involvement to this end,

9, goal keepers, 24 defensives, 24 mid fielders, and 18 forwards were the sample group of

the study including 3 main coaches from selected clubs were the sample of the study.

2.7. Instruments of data collection

The main instruments of data collection in due investigation of the study was valid predetermined fitness tests and structured interview, the test score sheet was prepared to record test score during administering the tests considering playing position. Demographic data such as age, height and playing experience was recorded on single sheet prepared for collect those data.

Additionally the researcher looked other published literatures as well as web sites in the area of the investigation.

2.7.1. The valid predetermined fitness tests

2.7.1.1. 30-Meter sprint test

Speed test can be performed over varying distance, depending on the factor being tested and the relevance to the sport. This test is used to measure acceleration and speed off the mark. A longer distance isn't relevant to soccer where players rarely run flat out for more than 20-30meters/yards. The test, however, despite the definition of terms, is still valid and specific to soccer (Turner ,2011)

2.7.1.2. Illinois Agility Test

This test measures your ability to change direction quickly. You will need 8 cones, a stopwatch and a training partner to record the time. Rapid activity occurs in the crucial seconds of the game and can make the difference between scoring and conceding a goal. Thus, the ability to produce fast-paced variable actions can impact soccer performance, and therefore, a soccer player's agility must be assessed(Davies, 2005).

2.7.1.3. Vertical jump

This is a good test for soccer because it measures jumping power relevant for heading ability. It's also useful for goalkeepers

2.7.2. Interview

Supplementary information from national league football club coaches was collected through structured interview regarding to the presence of special fitness coaches and continuous fitness testing throughout the season in the clubs.

2.8. Data Collection procedure

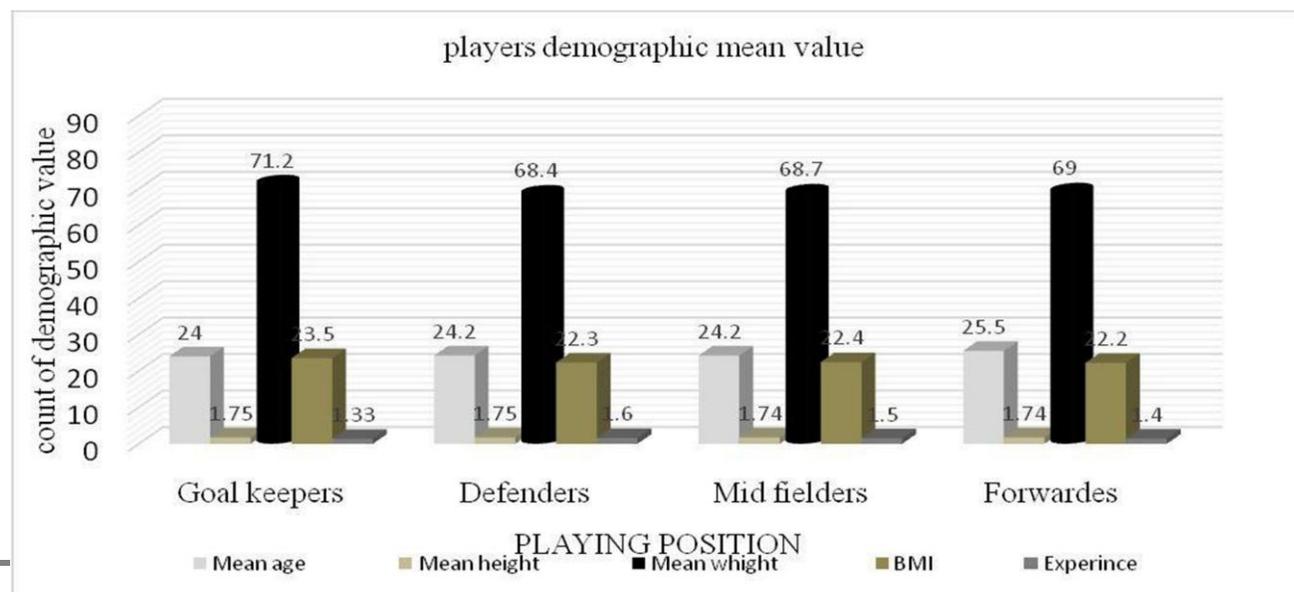
Data collection procedure was preceded through the following steps. After taking ethical approval from Jimma University the researcher was progressed to the target area of the study. So that here it also persuade stakeholders, coaches, and players of each clubs through detail and brief description of the objective of the study. These made strong agreement and to enhance their cooperativeness. Then after the researcher was directly skipped to select sample participant considering injury and other health problem, therefore, by selecting test groups, the test was administered in four (4) categories regarding to playing position of the participant on similar field and similar measurement of testes.

3. Results and major findings

3.1 Demographic characteristics of players

The data gathered from players for this investigation, in addition to testing the performance of players through field tests demographic and anthropometric variables such as age, weight, height and BMI was included and the result of each variable was analyzed.

Figure 1 Demographic and anthropometric Characteristics of players



According to the above graph 1, goal keepers' defensives and mid fielders were appeared approximately under similar age group while forwards were older than other position. Regarding to their height, goal keepers and defensives have similar mean height and taller than other on the other hand mid fielders and forward players were similar in their mean height value. Furthermore goal keepers were appeared heavier than the rest position with mean weight (M= 71.2kg) and forwards were found to be comparatively lighter than other positions with mean weight (M=69kg). So these indicates that there was considerable difference between playing position.

Regarding to players anthropometric variable the minor mean variation was found between playing position, in this regard goal keepers found to be fattest of the position with (M = 23.5), while forwards appeared lower in their BMI having mean BMI (M = 22.2).. In order to determine the significance difference between the above mean score, one way analysis of variance (ANOVA) was employed and the result had been analyzed below.

Table 1 comparison of players' demographic and anthropometric characteristics

Playing position			Demographic variables				
N	M	SD	F(3,71)	Sig			
Goal keepers		9	Age	24.0	2.6	3.7	NS
Height	1.75	.035	.64	NS			
Weight	71.2	4.8	.52	NS			
BMI	23.5	1.76	.64	NS			
Defenders		24	Age	24.2	1.74	3.7	.032
Height	1.75	.08	.64	NS			
Weight	68.4	5.9	.52	NS			

BMI	22.3	1.84	.64	NS				
Mid fielders			24	Age	24.2	1.47	3.7	.032
Height	1.74	.06	.64	NS				
Weight	68.7	4.1	.52	NS				
BMI	22.4	1.32	.64	NS				
Forwards	18	Age	25.7	1.5	3.7	.016		
Height	1.74	.07	.64	NS				
Weight	69	5.8	.52	NS				
BMI	22.2	2.2	.64	NS				

The above table 1 illustrated the mean difference of players based on their playing position regarding their demographic characteristics, therefore the researcher need to ensure the above mean difference was significant or not, cause of this one way analysis of variance (ANOVA) was used to identify significant mean difference of players demographic and anthropometric variables based on their playing position. Therefore one way analysis of variance (ANOVA) indicated that there was mean difference between players age regarding to their playing position, thus forwards (M= 25.7,SD=1.5), mid fielders (M= 24. 2, SD= 1.47), defences (M= 24.2, SD= 1.74), and goal keepers (M= 24.0, SD= 2.6), $F(3,71) = 3.7, P < .05$.

The other section of analysis supported by ANOVA was anthropometric variables (height, weight and BMI) variation of players based on their playing position. Thus, as indicated on the

table 2, there was a mean difference between players height according to their position amongst, goal keepers (M = 1.75, SD = 0.035), defenders (M= 1.75, SD= 0.008), mid fielders (M= 1.74, SD = 0.06) and forwards (M= 1.74, SD = 0.07), $F(3,71)= 0.64, P > 0.05$.

The last anthropometric variable which was included in this particular study was player's body mass index (BMI). BMI is a number calculated from player's weight and height. According the output taken from one way analysis of variance it had shown that, there was mean difference between players regarding playing position, among goal keepers (M= 23.5, SD = 1.76), defences (M = 22.3, SD = 1.84), mid fielders (M = 22.4, SD = 1.32) and forwards (M = 22.2, SD = 2.2). $F(3,71) = 0.64, P > 0.05$.

Generally as we have seen from the above analysis, only player's age was found to be significantly difference from the demographic characteristics of players regarding their playing position, in contrast the other variables shown to be similar for all playing position. This indicates excluding age, there was no significance difference between players regarding to height, weight and BMI across playing position.

3.2. Comparison of fitness and playing position

The table 2 below illustrates the comparisons of mean differences in fitness variables across playing position. One way analysis of variance (ANOVA) indicated that there was a mean difference between playing in Illinois agility test score, to this Forwards was found to be better with mean score (M = 16.8, SD=.18) than mid fielders score (M = 16.9, SD .38), as well as defence (M = 17.1, SD =0.5), than goal keepers (M = 17.7, SD = .52), $F(3,71),= 11.70, P < .05$.

Table 2 Comparisons of fitness variables across playing position**ANOVA**

Sum of Squares	Df	Mean Square	F	Sig.		
power score of	Between Groups	19.652	3	6.551	2.981	.037
players Groups	Within	156.028	71	2.198		
Total		175.680	74			
agility score of	Between Groups	5.820	3	1.940	11.706	.000
players Groups	Within	11.767	71	.166		
Total		17.587	74			
speed score of	Between Groups	.254	3	.085	4.154	.009
players Groups	Within	1.448	71	.020		
Total			1.702			

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*p <.05.

Regarding to vertical jump as it is indicated on table 2, power test one way analysis of variance (ANOVA) showed that, there was mean difference between players of south western zone, national league football clubs in vertical jump test score, so that forwards mean score (M = 53.5 SD =1.24) than Goal keepers score (M = 53.0, SD 1.87), as well as defence (M = 52.6, SD =1.63), than mid fielders (M = 52.2, SD =1.39), $F(3,71) = 2.98, P < .05$.

The third performance related physical fitness which was assessed by field test was speed; the score obtained through 30m sprint test was based on playing position. Therefore one way analysis of variance (ANOVA) indicated that there was mean difference between playing position in 30m sprint test, in this regard forwards were better than other position with mean score (M= 4.27, SD= 0.12), defensives were better than mid fielders and goal keepers with mean score(M= 4.35, SD= 0.18) and mid fielders have better mean score (M= 4.38, SD = 0.38)than goal keepers mean score(M= 4.46, SD= 0.10) $F(3,71) = 4.15 P > 0.05$

Table 10 comparison of players' fitness mean score with international norms of each test mean score..

Test variables	Test norms						
	Super	Excellent	Good	Average	Fair	Poor	Very poor
1 Vertical jump leg power test (cm)	64.8-69.9	61.0-63.5	57.2-59.7	53.3-55.9	48.5-52.9	44.6-48.3	39.4-44.5
2 Illinois agility test (second)	15.3-16.1	16.3-16.7	16.8-17.3	17.5-17.9	18.1-18.6	18.7-19.1	19.3-20.1
3 30meter sprint test (second).	< 4.0	4.2- 4.0	4.5- 4.3	4.6- 4.4	> 4.6	_	_

Source: Davis B, et al(2000), Physical education senior syllabus,(2010)

The above table shown that, sport specific test standards are categorized by the international norms which was used to compare an athlete's performance based on those standard scores. Therefore, the present study attempted to compare test score obtained from field test assessment such as 30m sprint speed test, Illinois agility test and vertical jump leg power test with the international test standards on the above table.

As we have seen on the above table the result of players fitness score obtained from 3 fitness tests based on their playing position was compared with international norms of each test results.

Therefore the mean score obtained from 30m sprint test of goal keepers was (M=4.46 sec), defenders (M= 4.35 sec), mid fielders (M=4.38 sec) and strikers (M= 4.27). Therefore the current test score of players as compared with the above standardized score distribution the score of goal keepers found to be below average, defenders and mid fielders appeared under average score of the standards and only forward players was found to be above average score of the standards.

This implies that players were not sufficiently trained to compete reach their pick performance in maximal speed.

The players Illinois agility test score is the second performance related fitness variable which was compared with the test standard on the above table. In this regard Illinois agility test mean score obtained from current assessment of players shown that, goal keepers (M= 17.7 sec), defenders (M= 17.1 sec). Mid fielders (M= 16.9 sec) and strikers (M=16.8 sec). as it was clearly indicated that the mean score of players shown except goal keepers all position appeared at good standard of the normative data, but goal keepers found on the average standard of the test. From these one can understand that except goal keepers other positions shown little improvement than 30m sprint speed test.

The last performance related physical fitness compared with the international test standard was vertical jump test. Similarly to the above test score, vertical jump test score was also obtained from national league football players through field test. Therefore the obtained test mean score from those individual performers shown that, goal keepers (M = 53.0 cm), defender,(M= 52.6 cm), midfielders (M= 52.2 cm), forwards (M= 53.5 cm). As we have seen from these mean distribution forwards and goal keepers were better in vertical jump test and they fall in average distribution under the test standard, next to these mid fielders and defensive fall under fair but not god or bad category. These implies, especially defensives and mid fielders appears below average.

In addition to the above comparisons of test score of player with the standard, by considering the mean score obtained from different tests, prevailing performance limitation of players according to playing position was identified. In these regard, goal keepers mean score for Illinois agility test was lowest score (M=17.7sec) and similarly the low scorero of 30m sprint test was goal keepers with mean score (M=4.46 sec) to these end agility and speed to be found prevailing limitation for goal keepers. This indicated that, goal keepers need extra demand to improve both variables in training season.

3 Qualitative analysis of data

Determining actual players' performance

When the coaches were asked to answer the interview question regarding to how they determine the actual observable performance of player in the team, coaches who participated in this study explained that, the main tool in which football coaches used to determine the actual performance of players was, considering individual players contribution during competition and pre training effectiveness.

Major factors inhibit fitness assessment

The participants offered the major challenges that inhibit them, not to administer continuous assessment of fitness throughout the season with simple sport specific field test were, listed as follow;

Lack of coaches' motivation

Low level of understanding about practical field test assessment

Absence of measuring instruments

Conclusion

The result of this study demonstrated that there is no sport specific field assessment trend under south western division of Ethiopian national league football clubs. And also there was no statistically significant difference between south western division of national league players regarding to their height, weight and BMI. But, regarding to age, there was statistically significance difference found between playing position. Forward players were better than mid fielders in lower body power output. Comparing to international standard, Forward players were better than other position players in agility, power and speed test. Goal keepers power and speed score found to be below the average standard of the test, this indicates goal keepers' speed and power performance was not in line with the test standard. Agility and speed were prevailing performance limitations of goal keepers.

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