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An Evaluation of Body Composition of Elites Football Referees in Nigeria: A Descriptive Survey

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Abstract

The dwindling level of performance and non-appearance of Nigerian referees at regional, continental and international competitions has become a matter of great concern to major stakeholders and government of Nigeria. Many questions have been raised as to why Nigerian referees are not regularly invited or involved in major international competition in recent times. Could this be as a result of poor educational background? Is it that Nigerian referees can't measure up to the standard of physical fitness required of football referees as establish by FIFA? Could it be that Nigerian referees are not undergoing the right training programme that would enable them achieve required physical fitness status? All these questions are begging for answers because performance of football referees has a recommended range (standard characteristics or norms) as far as FIFA is concerned, and all referees must meet up with the standard in other to be recognized by the international body. However, to officiate a successful match, a referee is expected to possess basic good physical (age, height and body mass index) performance requirements attributes in addition to having good eye sight and sound state of health, in order to cope with the stress demanded in officiating. The purpose of this study therefore was to evaluate Elite Football Referees' body composition in Nigeria and compare with the standard characteristics or norms. Body composition compared were height and body mass index (BMI) of elite football referees in Nigeria. The subjects of the study consist of 40 active grades one, premier and FIFA referees from Nigeria who are currently officiating in all Nigeria Leagues, CAF and FIFA competitions. Data collected were analysed using descriptive statistic. The results obtained from the analysis of data revealed that, there were no significant differences between the standard characteristic or norms and the referees' height and body mass index (BMI). Based on the finding of the study, it was recommended among others that, Nigerian Referees' selection and promotion should be based on those that met the standard norms. In conclusion, attention of the Nigeria Football Federation and Nigeria (Football) Referees' Association were drawn to those areas where improvements were needed.

Keywords: Body composition, Elite Football referee, Body Mass Index (BMI), Federation de International Football Association (FIFA).

1. Introduction

A referee in the game of football (soccer) is one who is charged with the responsibility of officiating, implementing and enforcing the laws of the game in the field of play during play time. According to Abass, Moses, Alabi, Adedugbe, Fololas and Abayomi (2011); Ogabor (2015); Mascherini, Petri, Ermini, Pizzi, Ventura and Galanti (2020), football referees have the duty of enforcing the rules of the game as well as controlling the behaviour of players in accordance with the laws and spirit of the game during competitive football matches. Thus, how they perform their role is pivotal to the outcome of the game of football because a decision by a referee can have a profound effect on the game (Parpa & Michaelides, 2022). Every competitive football match must be officiated by a referee, two assistant referees and an assistant referee (fourth official) (Castagna, Abt & D'Ottavio, 2007). Despite being supported by the assistant referees, the fourth official (administrative referee) and the video assistant referee (VAR), refereeing tend to be a very herculean job that requires performing at a high physical, cognitive, physiological and psychological level (Parpa & Michaelides, 2022; Weston, Castagna, Impellizzeri, Bizzini, Williams, & Gregson, 2012) which can have a profound effect on the referee's performances as well as bio-physiological functioning (Ogabor, 2015). As such, referees are expected to maintain a high level of physical

fitness because of the nature of their involvement in the game which can be likened to the demands placed upon professional soccer players (midfielder), despite referees being about 15-20 years older than the players they officiate (Papanikolaou, Rousis, Athanasios, Konstantinos, Vasileios & Rousi, 2020; Castagna, Abt & D'Ottavio, 2007).

Referees, during the cause of officiating are expected to perform a large number of runs with robust speed, and quick changes of directions combined with intermittent walks, sprint and sudden stoppages (López-García, Lagunes-Carrasco, Carranza-García, Ródenas-Cuenca & Morales-Corral, 2021; Asagba, 2004). In fact, several literature have adduced that a referee covers an approximate distance between 9 to 14 km during a match, where approximately 4-18% of the total distance that is covered during the game, requires high intensity running (Papanikolaou, *et al*., 2020; Weston, *et al.,* 2012); reaching a cardiovascular resistance of 85-95% of maximal heart rate and a maximal oxygen uptake between 70-80 % (VO_2max) (Castagna, Abt & D'Ottavio, 2007; Castagna & D´Ottavio, 2001; Krustrup, & Bangsbo, 2001). Thus, the demands of their participation in a football match present a significant physical challenge whereby, referees are required to maintain an optimum level of physical fitness and healthy routine that can preserve morphology as well as sustain and improve performance according to physical needs (Weston, *et al.,* 2012; Mallo, Navarro, Aranda, & Helsen, 2009). Consequently, Abass (2005), adduced that having only an incredible aerobic ability alone is not enough to see a soccer referee through successfully in officiating a game because, according to Castagna, *et al.,* (2007), experience is a fundamental pre-requisite for successful refereeing due to the mature age usually shown by referees officiating at elite level. Therefore, to officiate a successful match, a referee is expected to possess good physical (age, weight, height and body mass index), physiological (heart rate, blood pressure, cardiovascular endurance and body composition) and motor (muscular endurance, running speed and agility) performance requirements attributes in addition to having good eye sight and sound state of health, in order to cope with the stress demanded in officiating.

Admittedly, regardless of the crucial role played by referees in competitive soccer games, seemingly little attention has been directed to studies related to the referees (Meckel, Balikin & Eliakim, 2020; Castagna, Abt & D'Ottavio, 2007) as most studies related to football science are often directed towards the physical performance profiles of soccer players. Due to the crucial role played by a referee during the cause of a competitive football match, it is important to monitor, understudy, analyse and evaluate the medical, morphological, and functional profiles of referees in order to develop various means of improving their performance and health through specific training, nutritional guidance, and the adoption of heathy habits and lifestyle (Moon, 2013; Da Silva, Fernandez, Paes, Fernandes, & Rech 2011; Castagna, Abt & D'Ottavio, 2007; Rontoyannis, Stalikas, Sarros, & Vlastaris, 1998). The dwindling level of performance and nonappearance of Nigeria referees at regional, continental and international competitions has become a matter of great concern to major stakeholders and government of Nigeria. Nigeria is considered to be a football loving nation and Nigerians have passion for the game. The Nigeria Football Federation (NFF) is an agency saddled with the responsibility of planning, organizing and executing all the football activities in the country. It also organizes various types of competition/championship such as the Football Association Cup, Nigeria Professional Football League (NPFL), Nigeria National League (NNL), Nation-Wide League (NWL), Nigeria Women Professional League (NWPL), Nigeria under-13 competition, Nigeria under-15 competition amongst others where clubs from different parts of the country participate. The championships are spread from the grassroots up to the national level. Many questions have been asked as to why Nigerian referees are not regularly invited or involved in major international competition in recent times. Is it that Nigerian referees can't measure up to the standard of physical fitness required of referees as establish by FIFA? Could it be that Nigerian referees are not undergoing the right training programme that would enable them achieve required physical fitness status? All these questions are begging for answers because performance of football referees has a recommended range (standard characteristics or norms) as far as FIFA is concerned and all referees must meet up with the standard in other to be recognized by the international body.

Despite the foregoing however, fairly recent studies have been conducted in different continents such as Europe (Weston and Colleauges, 2012 in England; Castagna and colleagues, 2001 and 2007 in Italy; Rontoyannis, Stalikas, & Vlastaris, 1998 in Greece; Krustrup & Bangsbo, 2001 in Denmark among others), the Americas (Da Silva and colleagues, 2011 in Brazil; López-García and colleagues, 2021 in Mexico among others) and Africa (Banda, 2015 in Zimbabwe; Ogabor, 2015 in Nigeria among others) to evaluate the anthropometric,

morphological, performance, physical fitness and training profiles of referees. In these studies, many factors were observed to affect the health and fitness level of football referees and by extension their performance. Some of these factors include physical training, genetic endowment, eating habit and body composition among others (Mascherini, *et al.*, 2020). Body composition is a term used to illustrate the different components in the human body, which when put together makes up the entirety of the person's body weight (Shah & Bilal, 2009). According to Dominic, Abolarin, Seidina, Atikumi and Ahmed (2019), it is a health-related component of physical fitness which includes the relative amount of fat and lean body tissue/fat free mass (water, body protein and bone minerals) in the human body. The total body fat is often categorized into essential (fat within and around major organs, the muscles and central nervous system) and storage fat (fats stored as adipose tissues).

Globally, and more specifically in the African context, there seem to be very little studies on the body composition of football referees (Banda, Grobbelaar & Terblanche, 2019). It is on the basis of this backdrop that this study derives its relevance in a bid to contribute to the available literature on the subject matter. Shah and Bilal (2009) averred that body composition data is an indispensable factor in the choice of various fitness, health and therapeutic programmes. The authors further adduced that through the assessment of body composition, a person's health can be more precisely evaluated and the effect of physical activity and nutritional programmes better directed and observed. Body composition is very crucial to the sport performance (López-García, *et al*., 2021; Čaušević, 2016; Carling & Orhant, 2010) and health of athletes (Casajús & Gonzalez-Aguero, 2015). An assertion exists that low fat percentage and an adequate body mass index (BMI) has a favourable relationship with lower times in a sprint test (Sporis, Jukic, Ostojic, & Milanovic, 2009; Wong, & Wong, 2009), which in turn positively affect strength and providing greater agility to the athlete (Grigoryan, 2011). Whereas, higher amounts of fat tissues in relation to muscle mass has a negative effect on performance (Moon, 2013; Wallace, Marfell-Jones, George & Reilly, 2009; Sutton, Scott, Wallace, & Reilly, 2009). Wilmore and Costill (2004) associated body weight with indices of performance such as agility, speed, balance and endurance. Overweight referees tend to expend more energy and find it more difficult to cover match distances (Banda, 2015). This finding was justified by Lilić, Joksimović, Chomani, D'angelo and Andelić (2022) who adduced that body composition is an important index of physical fitness and health of athletes because excess fat tissue acts as dead weight which consequently increases the energy required to lift the body repeatedly against gravity during movement and this tend to impede performance. Whereas, fat-free mass contributes to the production of power during high-intensity activities and provides greater absolute strength for resistance to high dynamic and static loads. They therefore advised on the need for sportsmen/athletes as well as officiators to focus on the values of their body composition in order to have better results in specific motor skills as well as maintain and improve their health (Lilić, *et al.*, 2022). Furthermore, a study by Casajus and Castagna (2007) submitted that there is no difference between younger and older referees with regards to fat mass. The study which is similar to Papanikolaou *et al*., (2020) concluded that on average, football referees have about 12% of body fat. Further studies however later pointed those referees older than 38 years had higher percentages of body fat than referees younger than 33 years of age (Casajus, Matute-Llorente, Herrero & González-Agüero, 2014). This finding is of great importance because football referees tend to reach their peak at around 40 years of age (Casajús & Gonzalez-Aguero, 2015), taking into consideration element of experience which is crucial for top-level football referees (Casajus, *et al.* 2014).

In the evaluation of body composition, a plethora of methods exists that can be used to estimate the relative fat and lean body tissues (Banda, Grobbelaar & Terblanche, 2019). These methods include the anthropometric measurements (for example, height, weight, skinfolds, girths, body density and bone breath), bioelectric impedance analysis (BIA) and dual-energy x-ray absorptiometry (DXA) among others. However, this study adopted the use of body mass index (an example of anthropometric measurement) which takes height and weight into consideration in order to ascertain the body composition of elite referees in Nigeria. The method was adopted because it is an inexpensive test that can be carried out outside the laboratory and are easy to collect, calculate and perform. Body mass index (BMI) also known as Quetelet Index is defined as the ratio of body weight in Kilogrammes (Kg) to the square of height in metres (m^2). Mackay (2010) expressed that it is a measure of relative body weight that takes height into account which can be correlated with body fat composition and can be used to indicate health risk. BMIs data are basically classified under the following category; below 18.5 kg/m^2, underweight; between 18.5 kg/m^2 to 24.9 kg/m^2, normal/healthy; between 25.0 kg/m^2 to 29.9 kg/m^2, overweight;

between 30 kg/m^2 and above obesity. This data can be used in a wide variety of contexts to assess how much an individual's body weight departs from what is normal or desirable for a person of his or her height (Aniodo, Dibia, & Anike, 2015). Excessive body weight is a risk factor for obesity and other associated cardiovascular, cardiorespiratory and cardiopulmonary diseases which has a propensity to affect performance.

2. Methodology

The study adopted nonequivalent group type of quasi-experimental research design in which status of elite football referees in Nigeria were investigated. Nachimias (2000) defined quasi-experimental research design as a logical model of proof that allows the researcher to draw inference concerning relationship among the variables under investigation. The author concluded that, it is also seen as the structure and strategy of investigation received, so as to obtain answers to research questions. According to Isangedighi, Joshua, Asim and Ekuri (2004), that quasi - experimental design is a research design carried out in the real life or natural settings where control is only minimal or absent. The researcher in this study does not have control of the variables as it relates to the work at hand.

The population of the study consists of 40 elite football referees in Nigeria comprising 21 FIFA referees and 19 referees from the premier league category. These referees undergo the same training at any given time in Nigeria. These subjects were certified by their Physical Training Instructor (PTI) in Nigeria, as elite football referees and have been traveling out for league matches or other competitions of similar importance. The study was a census, because the total population of the elite football referees in Nigeria is small. Sambo (2005), argued that when a study covers the whole population of interest and describes the situation in totality by giving complete information on the population, it is called status study or census. Therefore, the researchers involved all the subjects in the study. Thus, the 40 elite football referees in Nigeria (100%) of the population participated in the study. This size was used because, Cohen, Manion and Morrison (2011), suggested that a casual-comparative and experimental methodologies require a sample size of no fewer than 15 cases. This assertion provided justification for the use of the total sample size, hence, the result upon completion, can be generalized.

The Nigeria National stadium gymnasium was used as the testing venue. The gymnasium and the following equipment served for the determination/measurement of the following variables; height and weight for body mass index (BMI). The stipulated procedures, instruments and equipment as suggested by FIFA, were utilized. For height, the stadiometer portion of the Health-0-Meter model 8002, calibrated up to 195 cm was used to obtain subjects' height. The subjects, without shoes or cap, were asked to stand on the platform of the stadiometer with their heels, buttocks, upper back and rear of the head in contact with the upright of the stadiometer. The movable bar of the stadiometer was adjusted to the subject's vertex with the head held looking straight. From this position, the height was read from the upright and recorded to the nearest 1 centimeter. While for weight, the scale portion of the Health-0-Meter with weight range of 0 kg to 160kg, was used for this purpose. This time, apart from being bare-footed and with no cap, the subject mounted the platform with minimum amount of clothing (T-shirt and short) and facing the upright of the stadiometer. The weights on the two poise bars of the instrument were adjusted until the beam carrying the weights was freely suspended. The sum total of weights as indicated by two movable pieces, was recorded to the nearest kilograms. With the formula (weight/ height^2), the subjects body mass index (BMI) was obtained.

For the analysis of data, the descriptive statistic was used. The descriptive statistics were the frequencies, percentages, mean and standard deviation used to describe data collected used in the study.

3. Results

This study was designed to determine the extent to which the body mass index (BMI) of Nigeria elite football referees from 2015 to 2019 differ from the standard characteristics. The data was analyzed with the use of descriptive statistics as presented in Tables 1 and 2. The result in Table 1 revealed that none of the Nigeria elite football referees fall below the standard norms body mass index (BMI) of 2015. In a similar vein, 36 Nigeria elite football referees representing 90% fall within the standard characteristics body mass index (BMI) in 2015. These referees are observed in serial number 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40. The result also showed that only four (4) Nigerian elite football referees representing 10% fall above the standard characteristics of body mass index in 2015. These

referees are also observed in serial number 6, 11, 26, and 30. This result concluded that the Nigeria elite football referees maintained the standard body mass index (BMI) during the 2015 football season.

Table 1: Descriptive analysis of body max index (BMI) of Nigeria elite football referees in 2015

S/N	Standard body mass index	Actual referee height	Weight in 2015	BMI 2015 W/H^2	Remarks
1	18.5-24.9	1.69	68.0	23.81	Within standard
2	18.5-24.9	1.65	69.1	25.38	Above standard
3	18.5-24.9	1.70	68.0	23.53	Within standard
4	18.5-24.9	1.71	69.0	23.60	Within standard
5	18.5-24.9	1.74	71.0	23.45	Within standard
6	18.5-24.9	1.66	72.0	26.13	Above standard
7	18.5-24.9	1.68	70.0	24.80	Within standard
8	18.5-24.9	1.72	70.1	23.70	Within standard
9	18.5-24.9	1.71	72.1	24.66	Within standard
10	18.5-24.9	1.78	71.1	22.44	Within standard
11	18.5-24.9	1.64	70.0	26.03	Above standard
12	18.5-24.9	1.65	66.1	24.28	Within standard
13	18.5-24.9	1.66	55.0	19.96	Within standard
14	18.5-24.9	1.67	67.0	24.02	Within standard
15	18.5-24.9	1.68	68.1	23.61	Within standard
16	18.5-24.9	1.69	69.1	24.19	Within standard
17	18.5-24.9	1.70	70.1	24.26	Within standard
18	18.5-24.9	1.70	70.1	24.26	Within standard
19	18.5-24.9	1.70	71.1	24.60	Within standard
20	18.5-24.9	1.70	71.1	24.60	Within standard
21	18.5-24.9	1.73	72.0	24.06	Within standard
22	18.5-24.9	1.72	71.0	23.70	Within standard
23	18.5-24.9	1.69	66.0	23.11	Within standard
24	18.5-24.9	1.68	68.0	24.09	Within standard
25	18.5-24.9	1.73	64.0	21.38	Within standard
26	18.5-24.9	1.71	75.0	25.65	Above standard
27	18.5-24.9	1.72	71.0	23.99	Within standard
28	18.5-24.9	1.68	55.0	19.49	Within standard
29	18.5-24.9	1.68	56.0	19.84	Within standard
30	18.5-24.9	1.72	76.0	25.69	Above standard
31	18.5-24.9	1.77	68.0	21.71	Within standard
32	18.5-24.9	1.82	70.1	21.16	Within standard
33	18.5-24.9	1.73	68.0	22.70	Within standard
34	18.5-24.9	1.70	72.0	24.91	Within standard
35	18.5-24.9	1.71	70.0	23.94	Within standard
36	18.5-24.9	1.72	69.0	23.32	Within standard
37	18.5-24.9	1.79	64.0	19.97	Within standard
38	18.5-24.9	1.80	69.0	21.29	Within standard
39	18.5-24.9	1.78	68.0	21.46	Within standard

S/N	Standard body mass index	Actual referee height	Weight in 2015	BMI 2015 W/H^2	Remarks
40	18.5-24.9	1.75	70.0	22.86	Within standard

Table 2 presents information on the BMI of elite football referees to determine whether there was a change from what was recorded in 2015. The result revealed that none of the Nigeria elite football referees fall below the standard body mass index (BMI) in 2019. In a similar vein, 36 Nigeria elite football referees representing 90% fall within the standard body mass index (BMI) in 2019. These referees are observed in serial number 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40. While only four (4) Nigeria elite football referees representing 10% fall above the standard body mass index (BMI) in 2019. These referees are also observed in serial number 6, 11, 26, and 30. This result concluded that the Nigeria elite football referees maintained the standard body mass index (BMI) during the 2019 football season. Further observation revealed that the referees who fell above the initial body mass index (BMI) in 2015 did not work hard to maintain a standard body mass index (BMI) in 2019, the implication could be that they were not undergoing the right training programme or they were not given a target to work hard and maintain their body mass as a subsequent requirement for promotion to the next level or category.

Table 2: Descriptive analysis of BMI of Nigeria elite football referees in 2019

S/N	Standard body mass index	Actual referee height	Weight in 2019	BMI 2019 W/H^2	Remarks
1	18.5-24.9	1.69	68.0	23.81	Within standard
2	18.5-24.9	1.65	66.0	24.24	Within standard
3	18.5-24.9	1.70	66.0	22.84	Within standard
4	18.5-24.9	1.71	67.0	22.91	Within standard
5	18.5-24.9	1.74	70.1	23.15	Within standard
6	18.5-24.9	1.66	71.0	25.77	Above standard
7	18.5-24.9	1.68	69.0	24.45	Within standard
8	18.5-24.9	1.72	70.0	23.66	Within standard
9	18.5-24.9	1.71	73.0	24.96	Within standard
10	18.5-24.9	1.78	70.0	22.09	Within standard
11	18.5-24.9	1.64	70.0	26.03	Above standard
12	18.5-24.9	1.65	65.0	23.88	Within standard
13	18.5-24.9	1.66	54.0	19.60	Within standard
14	18.5-24.9	1.67	66.0	23.67	Within standard
15	18.5-24.9	1.68	67.0	23.74	Within standard
16	18.5-24.9	1.69	68.0	23.81	Within standard
17	18.5-24.9	1.70	69.0	23.88	Within standard
18	18.5-24.9	1.70	70.1	24.26	Within standard
19	18.5-24.9	1.70	70.1	24.26	Within standard
20	18.5-24.9	1.70	70.1	24.26	Within standard
21	18.5-24.9	1.73	70.0	23.39	Within standard
22	18.5-24.9	1.72	70.0	23.66	Within standard
23	18.5-24.9	1.69	66.0	23.11	Within standard
24	18.5-24.9	1.68	67.0	23.74	Within standard
25	18.5-24.9	1.73	65.0	21.72	Within standard
26	18.5-24.9	1.71	75.0	25.65	Above standard
27	18.5-24.9	1.72	72.0	24.34	Within standard

S/N	Standard body mass index	Actual referee height	Weight in 2019	BMI 2019 W/H^2	Remarks
28	18.5-24.9	1.68	54.0	19.13	Within standard
29	18.5-24.9	1.68	55.0	19.49	Within standard
30	18.5-24.9	1.72	76.0	25.69	Above standard
31	18.5-24.9	1.77	67.1	21.42	Within standard
32	18.5-24.9	1.82	69.1	20.86	Within standard
33	18.5-24.9	1.73	69.0	23.04	Within standard
34	18.5-24.9	1.70	71.0	24.57	Within standard
35	18.5-24.9	1.71	70.0	23.94	Within standard
36	18.5-24.9	1.72	67.0	2265	Within standard
37	18.5-24.9	1.79	64.0	19.97	Within standard
38	18.5-24.9	1.80	69.0	21.29	Within standard
39	18.5-24.9	1.78	66.0	21.55	Within standard
40	18.5-24.9	1.75	69.0	22.53	Within standard

A test of difference was performed using t-test analysis to determine whether the BMI of Nigeria elite football referees differ in 2019 from 2015. The results, presented in Table 3 reveals no difference observed between 2015 and 2019 body mass index (BMI) of nine (9) Nigerian elite football referees as they maintained their body mass from 2015-2019. This number represented 22% of the 40 referees. These referees are observed in serial number 1, 11, 18, 23, 26, 30, 35, 37, and 38. Nevertheless, the body mass index (BMI) of six (6) Nigeria elite football referees representing 15% increased mildly from 2015 to 2019 by their respective figures as seen in table 3. The increase in the body mass index (BMI) of the referees from 2015 and 2019 was witnessed on the serial number 9, 15, 25, 27, 33 and 39. Similarly, there was a decrease in the body mass index (BMI) of 25 Nigeria elite football referees representing 62.5% from 2015 to 2019 football seasons. The decrease in the body mass index (BMI) of the referees from 2015 and 2019 was observed on the serial number 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 16, 17, 19, 20, 21, 22, 24, 28, 29, 31, 32, 34, 36 and 40. This again revealed that the Nigeria elite football referees gain slot on body lose as they keep on maintaining their status as referees. Generally, it could be concluded that referee activities have a positive effect on their body mass as more referees decreased in their body mass from initial year 2015-2019 respectively.

Table 3: Descriptive analysis of the difference between body mass index (BMI) of Nigeria elite football referees in 2015 and 2019

S/N	Body mass index 2015	Body mass index 2019	Diff.	Remarks
1	23.81	23.81	Nil	No difference
2	25.38	24.24	1.14	Decrease
3	23.53	22.84	0.69	Decrease
4	23.60	22.91	0.69	Decrease
5	23.45	23.15	0.3	Decrease
6	26.13	25.77	0.36	Decrease
7	24.80	24.45	0.35	Decrease
8	23.70	23.66	0.04	Decrease
9	24.66	24.96	0.3	Increase
10	22.44	22.09	0.35	Decrease
11	26.03	26.03	Nil	No difference
12	24.28	23.88	0.4	Decrease
13	19.96	19.60	0.36	Decrease

S/N	Body mass index 2015	Body mass index 2019	Diff.	Remarks
14	24.02	23.67	0.35	Decrease
15	23.61	23.74	0.13	Increase
16	24.19	23.81	0.38	Decrease
17	24.26	23.88	0.38	Decrease
18	24.26	24.26	Nil	No difference
19	24.60	24.26	0.34	Decrease
20	24.60	24.26	0.34	Decrease
21	24.06	23.39	0.67	Decrease
22	23.70	23.66	0.04	Decrease
23	23.11	23.11	Nil	No difference
24	24.09	23.74	0.35	Decrease
25	21.38	21.72	0.34	Increase
26	25.65	25.65	Nil	No difference
27	23.99	24.34	0.35	Increase
28	19.49	19.13	0.36	Decrease
29	19.84	19.49	0.35	Decrease
30	25.69	25.69	Nil	No difference
31	21.71	21.42	0.29	Decrease
32	21.16	20.86	0.3	Decrease
33	22.70	23.04	0.34	Increase
34	24.91	24.57	0.34	Decrease
35	23.94	23.94	Nil	No difference
36	23.32	22.65	0.67	Decrease
37	19.97	19.97	Nil	No difference
38	21.29	21.29	Nil	No difference
39	21.46	21.55	0.09	Increase
40	22.86	22.53	0.33	Decrease

4. Discussion

The present study examined the body mass index (BMI) of Nigeria's elite football referees over a five-year period (2015-2019) to determine whether they maintained the stipulated standards. The findings of the study revealed that the majority of the referees (90%) fell within the stipulated range of BMI in 2015, and this was maintained during the 2019 football season. However, some referees who exceeded the BMI in 2015 did not work hard to maintain their BMI in 2019, indicating a possible lack of proper training programmes or targets to maintain their body mass. Furthermore, the study showed that 22% of the referees maintained their BMI from 2015 to 2019, 15% increased mildly, and 62.5% had a decrease in their BMI, suggesting that Nigeria's elite football referees tend to lose weight as they maintain their status as referees. The present study's findings are in agreement with previous research on the importance of body composition for effective performance of football referees (such as Banda, 2015; López-García et al., 2021; Moon, 2013; Wallace et al., 2009; Wong & Wong, 2009). Additionally, our findings align with Grigoryan's work, which identified body composition as a critical factor for optimal exercise performance, affecting strength, agility, and appearance (Grigoryan, 2011). Moreover, Lilić et al. (2022) reported that body weight can have either a positive or negative impact on sports participation, depending on the proportion of work done against gravity. In football officiating, it is preferable for referees to have a lower level of body fat or a normal BMI to enable them to move around the field quickly and efficiently (Lilić et al., 2022). Overweight referees or those with a high BMI may struggle to keep up with the pace of the game, which can lead to poor decisions making during football match.

The study's findings have significant implications for research, policy, and practice. From a research standpoint, the study highlights the need for more research to be conducted on the health and fitness of referees in sports, especially in developing countries where there may be limited resources for proper training and support. Further research can explore the factors that influence the maintenance of body mass index (BMI) by referees and strategies for developing effective training programmes to maintain their fitness levels. In terms of policy implications, the findings can inform the development of policies and guidelines for training programmes for referees to ensure that they maintain their body mass index (BMI) and overall fitness levels. The sport's governing bodies can use the study's results to assess the effectiveness of their current policies and interventions aimed at promoting the health and fitness of referees. The development of policies and interventions for maintaining the body mass index (BMI) of referees is essential because it can promote the health and safety of referees, improve the quality of officiating, and enhance the overall quality of the sports. From a practical standpoint, the study emphasizes the need for proper training programmes and targets for referees to maintain their BMI and overall fitness levels. Coaches, trainers, and referees can use the study's findings to develop individualized fitness plans that can help referees maintain their body mass index (BMI) and overall fitness levels. The development of individualized fitness plans can promote the physical well-being of referees and enhance their performance during matches. Therefore, this study adds to the existing literature on the significance of body composition for football referees' optimal performance and emphasizes the importance of maintaining a healthy weight and body mass index (BMI) for effective officiating.

5. Limitations and Suggestions for Further Research

There are several limitations to the study that need to be addressed. First, the study adopted a non-equivalent group type of quasi-experimental research design, which does not allow for complete control of the variables under investigation. This may have resulted in confounding factors that could have influenced the study's outcome. Future research should explore alternative research designs that provide greater control over the variables. Future research could investigate the impact of physical fitness on referee performance during matches. This could be done by tracking referees' movements during matches and examining whether there is a correlation between physical fitness and performance especially in Nigeria. Such research could help identify specific physical fitness components that are most important for referees to perform optimally. Future research could explore the impact of psychological factors on referee performance. Refereeing is a highly stressful and emotionally charged activity, and psychological factors may play a significant role in referees' performance. Future research could investigate the impact of factors such as stress, anxiety, and motivation on referee performance and physical fitness.

Second, the study's sample size was limited to 40 elite football referees in Nigeria. Although this represents the entire population, larger sample sizes could provide more robust results and increase the study's generalizability. Future research should aim to increase the sample size to improve the study's external validity. Third, the study relied on BMI as the sole measure of physical fitness. While BMI is widely used as an indicator of body composition, it may not be the most accurate measure of physical fitness. Future research should explore alternative measures of physical fitness, such as VO2 max or muscular endurance, to obtain a more comprehensive assessment of referees' physical fitness. Fourth, the current study identified the need for training programmes that detect, monitor, and help referees achieve their physical fitness status. Future research could examine the effectiveness of different types of training programmess on physical fitness outcomes.

6. Conclusion

This study examined the body mass index (BMI) of Nigeria's elite football referees over a five-year period, with the aim of determining whether they maintained the stipulated standards. The study found that the majority of referees maintained the stipulated standard body mass index (BMI), which is a positive finding for their fitness and overall health. However, the study also revealed that some referees did not maintain their body mass index (BMI), indicating a need for proper training programmes and targets to ensure that all referees can maintain their fitness levels. Furthermore, the study found that most referees tend to lose weight as they continue to officiate, which is a positive trend that may be attributed to the physical demands of the job. This study sheds light on the significance of maintaining optimal body mass index (BMI) for football referees to ensure efficient movement and quick decision-making during games. The findings suggest the need for proper training programmes and

targets to help referees maintain their body mass index (BMI) and overall fitness levels. These results contribute to the growing body of literature on the importance of body composition for optimal sports performance, particularly in football officiating. Future studies could explore the relationship between body mass index (BMI) and other factors, such as age and experience, to better understand how they influence referee performance. This study's findings highlight the need for sports organizations and governing bodies to develop and implement training programmes that focus on maintaining healthy body mass index (BMI) levels among referees. Such programmes could include regular health check-ups, dietary advice, and exercise programmes tailored to the specific needs of referees. By ensuring that referees are in good physical condition, sports organizations can improve the quality of officiating and promote fair play in football. Overall, this study underscores the importance of maintaining a healthy body mass index (BMI) for referees who are responsible for making critical decisions on the field. The study's findings can inform policy and practice, encouraging sports organizations to prioritize the physical well-being of referees to enhance the quality of football officiating.

7. Recommendations

Based on the study's conclusions, the following recommendations have been suggested to improve the performance of referees in Nigerian football:

1. The Nigeria Football Referees Association should encourage its members to prioritize physical training and maintain their fitness levels throughout the football season.
2. The Nigeria Football Federation and the Nigeria Football Referees Association should collaborate to develop training programmes that can identify, monitor and help referees achieve their optimal physical fitness levels.
3. Organizing courses, seminars, workshops, and conferences for referees, club officials, and supporters' clubs can help broaden their knowledge of the laws of the game, and thus, promote fair play.

By implementing these recommendations, the quality of officiating in Nigerian football can be improved, leading to better decisions on the field, and promoting a fairer and more enjoyable experience for all stakeholders involved.

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