

An Assessment of Adherence to Blood Pressure Regulations among Nigerian Elite Football Referees with Standard Characteristics

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ABSTRACT

Hardening and thickening of the arteries due to high blood pressure or other factors can lead to a heart attack, stroke or other complications such as aneurysm, heart failure, kidney problems, eye problems, metabolic syndrome, changes with memory or understanding, dementia among others. For any individual or referee who suffers from any of the above listed complications may fail to function well and this will in turn affects performance generally. It will be suicidal for a referee who is a critical stakeholder in the game of football to be unhealthy in this aspect. The main purpose of this study was to assess Nigeria Elite Football Referees' physiological performance requirement with Standard Characteristics. Physiological performance requirements compared were resting systolic and diastolic blood pressures. Two (2) research purposes and questions were tested at .05 level of significance. The subjects of the study consist of 40 active grade one, premier and FIFA referees from Nigeria who are currently officiating in all Nigeria Leagues, CAF and FIFA competitions. Data collected were analyzed using descriptive and one sample t-test statistics. The results obtained from the analysis of data revealed that, there was a significant difference between blood pressure (systolic and diastolic) of Nigerian elite football referees with the standard characteristics. Based on these it was recommended among others that, Nigerian Football Referees' committee should select referees who are healthy, the referees should be encouraged to continue checking and maintain their health status before, during and after the Football season. In conclusion, attention of the Nigeria Football Federation and Nigeria (Football) Referees' Association were drawn to those areas where improvements were needed.

Keywords: Blood Pressure, Elite Football Referees, Standard Characteristics.

INTRODUCTION

A referee is the arbiter who must have special knowledge and understanding of the rules and regulations (Laws of the Game) associated with football and is charged with the responsibilities of carrying out correct interpretation and implementation of these rules and ensuring that players and team officials abide by its regulations. The referee is the person who enforces the rules of participation in sports competition and administers sanctions (penalties) in case of rule violations. The referee is the overall controller of the game and he is helped by other officials on the field of play, these are two referee's assistants, the fourth official (Reserve Referee), Video Assistant Referee (VAR), Assistant Video Assistant Referee (AVAR). etc. Although there is no clear definition regarding the referee in the laws of the game, the International Board specify that the referee has full authority to enforce the laws of the game in connection with the match to which he has been appointed Federation International de Football Association, (FIFA, 2023).

Blood pressure is a measure of the force that the circulating blood exerts on the walls of the main arteries. The

pressure wave transmitted along the arteries with each heartbeat is easily felt as the pulse. The highest (systolic) pressure is created by the heart contracting and the lowest (diastolic) pressure is measured as the heart fills. Blood pressure is the force of blood against the walls of the arteries which the heart contracts. Everyone has blood pressure, while a certain amount of pressure is needed to keep the blood flowing, this pressure can increase if the blood meets resistance in the arteries. Blood flowing through the arteries at high pressure can damage artery walls and if this pressure is persistently high, this is called high blood pressure or hypertension. High blood pressure is a sign that the heart and blood vessels are being overwork (Crol Heart and Stroke Centre, 2014).

Chomitz, Slining, McGowan, Mitchell, Dawson & Hacker (2009) stated that potential relationships of an individual's health to cognitive functioning may simply be explained by both physiological and psychological mechanism. Toras (2005) added that, the nature and magnitude of relations of systolic and diastolic blood pressures (SBP and DBP) and vascular events which is linear down to the high normal range and cognitive performance is yet less clear.

Blood pressure is simply a measurement of the force applied to the walls of the arteries as the heart pumps blood through the body. The force and amount of blood pumped and the size and flexibility of the arteries determine the pressure. It also refers to the force exerted by circulating blood on the walls of blood vessels, and constitutes of the principal vital signs (<http://www.ijser.or>, 2014). Blood pressure as the force or pressure exerted by the blood the vessels while it can also be said that it is the amount of force that keeps the blood flowing through the arteries.

Hockey (2001) referred to blood pressure as the amount of force that the blood exerts against the artery walls generated as the heart contracts and maintained by the elasticity of the artery walls. It is measured in millimeters of mercury and increases as the heart contracts while at relaxation it decreases thus there are two blood pressures which drew their names from these two phases of cardiac cycle. That arising from the systolic (contracting) phase called the systolic blood pressure and it is the upper value while the observed during the diastolic (relaxation) phase is referred to as the diastolic blood pressure and is the lower of the two.

Taras (2005) observed that a normal "arterial systolic pressure" varies between 110 and 140 mm Hg while diastolic pressure is between 60 and 80 mm Hg. He added that a resting diastolic pressure, in excess of 90 mm Hg, is considered to be abnormal which is referred to as hypertension or high blood pressure. He further observed that, in healthy young men, a mean of 120 mm Hg. for systolic and 80 mm Hg. for diastolic pressure was normal. This value can be obtained both at rest or during exercise by either directly cannulating an artery (arterial catheter) or indirectly by aim cuff method with the help of a sphygmomanometer and a stethoscope at the upper arm at the same level as the heart. Although the results obtained by the arm cuff method are not very accurate compared with the direct method or the electronic manometer, it has become the standard method of blood pressure recording.

Jensen and Fisher (2009) explained that training has a definite effect on blood pressure and that trained and physically fit individuals have lower blood pressure than what is considered average. During exercise, however, the systolic pressure rises with work at about 10 mm Hg per minutes increases and may go up to 200 mm Hg while the diastolic usually stays about the same or decreases with work, as the vessels open in the active muscles. The authors warned that an increase in the diastolic valued would indicate maladjustment to exercise and that levels of 100 mm Hg. would be enough grounds for stopping an exercise test. This factors, therefore, makes the continuous monitoring of blood pressure a must during stress testing to be able to dictate subjects with heart problems.

From the various definition of blood pressure, two things are contributive to its value namely cardiac output and peripherals resistance. The authors concluded that physiological and motor performance skills such as cardiovascular endurance, muscular endurance, and muscular strength, resting heart rate, blood pressure, speed, agility and mental skills such as visual perception, attention, concentration, composure and decision-making are all required by referees at any level of the game, stressing that the ability of referee to cope with the pressures of officiating a match, a referee blood pressure must fall within systolic standard of 120 and diastolic standard of 80, as referees are required to keep up with the game, they are likely to suffer from physical fatigue and this will no doubt affect their physiological, motor and mental performance and hence decision making during the game. Young football referees appear to be more vulnerable to high blood pressure and heart changes. High blood pressure, or hypertension, affects about 30 percent of referees, which is associated with premature cardiovascular disease, including heart attack, stroke, arrhythmias and heart failure etc resulting to poor or inconsistent decision during especially high intensity match.

Jensen and Fisher (2009) further stated that, in exercises involving large muscle masses such as running, the total peripherals resistance is decreased therefore any increase in blood pressure may be due, entirely, to increase in cardiac output. Where small muscle masses are used, the total peripheral resistance may be increased, as in arm activities, and the rise in blood pressure may be greater. The author concluded that, this may be due to greater resistance offered by smaller vascular beds in the smaller muscles to systemic blood flow.

Owolabi (2016) associated the difference in the resting blood pressure and the exercise blood pressure to the response of the cardiovascular system in its attempt to adjust to increase muscle function. Aerobic type of training, over a reasonable period, has been found to decrease the blood pressure of coronary patients. Of great importance to clinicians and physiologists is the diastolic blood pressure values since it is a measure of the resistance of the blood vessels to the blood flow thus indicating the strain to which blood vessels walls are constantly be subjected to. This also reflects the condition of the peripheral vessels as noticed in its rise and fall with peripheral resistance. Therefore, since soccer is played over long period of time, sometimes stretching over the official time into extra time, soccer/football referees with low or normal blood pressure should be preferred to officiate the game of football which will in turn enhance their performance.

Theoretical Framework

The study was hinged within the theoretical background of Trait and Factor Theory by Pearson (1900). This theory was propounded by Frank Parsons in 1900. In the early 1900s, Pearson proposed the first career development theory which became known as the trait and factor theory. The theory focused on the match between, parson's concepts based on the individual's skills, achievements, interests, personality and values known as trait and, sharfs model which focused on the job requirements and conditions recognized as factor. Trait and factor theory means matching the individual's trait with requirements of a specific occupation. Subsequently in solving the person's career-search problems trait and factor theory may be important for referees, because every stage in refereeing requires certain abilities and this theory involved the two components. Therefore, referee's trait relates to the attitudes, abilities, interests, ambitions, resource and limitations while the factor has to do with referee's committee, providing the referees requirements for each level, conditions of success, advantages and disadvantages, in order for all referees to have an equal chance of promotion.

The relevance of this theory to the study is that, applying such a theory in Nigeria refereeing may be the beginning of a new era for the officials, which may be an attempt to put in place transparency and clear promotion criteria for all referees in Nigeria. This is because promotion of referees to elite categories in FIFA and Nigeria depend on the fitness level which is being exhibited in the field of play, when discharging their duties.

Purpose of the study

The purpose of this study was to find out how Nigeria elite football referees' systolic and diastolic blood pressure differ from the standard characteristics. The study was specifically designed to; Find out whether Nigeria elite football referees' blood pressures (Systolic and Diastolic) differ from the standard characteristics.

Research question

To what extent does systolic and diastolic blood pressures of elite football referees in Nigeria differ from the standard characteristics?

METHODOLOGY

The study adopted the quasi-experimental research design in which status of elite football referees in Nigeria were investigated. Thomas (2023) 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 authors concluded that, it also seen as the structure and strategy of investigation received, so as to obtain answers to research questions. The rationale for choosing this design was based on the assertion that the values in physiological fitness components of elite football referees were investigated to determine whether or not, these components of elite football referees in Nigeria differ from the standard characteristics.

The population of the study consists of forty (40) elite football referees in Nigeria comprising of twenty-one (21) FIFA referees and nineteen (19) referees from the premier league category. These referees are undergoing the same training at any given time in Nigeria. These subjects (referees) were certified by their Physical Training Instructor (PT) in Nigeria as elite football referees and having been traveling out for league matches or other competitions of similar importance.

The study was a census, it was in view of the fact that the total population of the elite football referees in Nigeria is small. Sambo (2005) argued that when 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. In this case, the totality of the population involved is discrete as opposed to the continuous (Ogundipe, Lucas and Sanni, 2006). The total sample size for this study is forty (40) elite football referees in Nigeria which is hundred percent (100%) of the population. This sample size was used

Testing Venues and Order of Testing

The National stadium gym was used as testing venue. The National stadium gym served as venue for the determination/measurement of the following variables; systolic and diastolic blood pressures, one day was used for data collection, also, considering the fact that some variables are better measured in certain times of the day, testing was done between the hours of 7am and 9am. Data collection process requested subjects to be at the testing

stations at least thirty (30) minutes before testing, to ensure that correct resting values were obtained for systolic and diastolic blood pressures. All tests were carried out by the investigators, who however, were assisted by test assistants who were trained on the testing procedures beforehand. Their main duties were recording of observations.

Blood pressure values was obtained using the stethoscope and KA 111 Aneroid Sphygmomanometer (KRIS-ALOY), with Batch No: KRIS 11-462G, calibrated from 20kg-300kg, manufactured by Medicare Instrument (WUXI) LTD, made in China. With the subject sited, the sphygmomanometer cuff was strapped around the upper left arm just above the cubital fossa. The earpieces of the stethoscope were positioned as described above and the diaphragm placed on a predetermined area over the brachial artery of the cuffed arm. The cuff of the sphygmomanometer was inflated to a pressure of about 180mm.Hg thus constructing the brachial artery. The knob of the inflator was gradually released thus reducing the constricting pressure on the artery until a point was reached where the pressure within the brachial artery equals the constructing pressure on the cuff. At this point, the first brachial pulse sound was heard which was taken as the systolic pressure. The deflation of the cuff continued until no more sound was heard. This level was taking as the diastolic pressure which corresponds with the muffling of the korotk off sound. The values was recorded in millimeters of mercury (mm.Hg) with the systolic value over the diastolic value.

According to American College of Cardiologist and American Heart Association (2017), normal blood pressure of an adult is 120/80 mm.Hg. Therefore, the observed blood pressure of Nigerian elite football referees (systolic over diastolic) is shown in table 1 below in relation to the suggested specification stated above.

RESULTS

To what extent does blood pressure (systolic and diastolic) of elite football referees in Nigeria differ from the standard characteristics. The data was analysed with the use of descriptive and One-Sample t-test statistics particularly with results of the research question presented in Table 1

Table 1: Data recording sheet for blood pressure characteristics of Nigerian Referee

S/N	Standard blood pressure	Actual referee systolic blood pressure	Actual referee diastolic blood pressure	Below standard blood pressure	Within standard blood pressure	Above standard blood pressure	Remarks
1	120/80	119	69	1/11			Below standard
2	120/80	110	68	10/12			Below standard
3	120/80	116	69	4/11			Below standard
4	120/80	110	70	6/10			Below standard
5	120/80	108	60	12/20			Below standard
6	120/80	112	67	8/13			Below standard
7	120/80	110	65	10/15			Below standard
8	120/80	118	68	2/12			Below standard
9	120/80	124	72	/8		4	Below diastolic standard by 8 but above systolic standard by 4
10	120/80	120	70	/10	Within Standard for systolic B/P		Below diastolic by 8 but Within Standard for systolic
11	120/80	120	80		Exact standard		Exact standard
12	120/80	124	72	/8		4	Below diastolic standard by 8 but above systolic standard by 4
13	120/80	120	70	/10	Within Standard for systolic B/P		Below diastolic standard by 10 but within systolic standard
14	120/80	100	60	10/20			Below standard
15	120/80	118	68	2/12			Below standard
16	120/80	114	70	6/10			Below standard
17	120/80	116	68	11/12			Below standard

18	120/80	119	70	1/10			Below standard
19	120/80	116	69	4/13			Below standard
20	120/80	108	60	12/20			Below standard
21	120/80	112	67	8/13			Below standard
22	120/80	120	80		Exact standard		Exact standard
23	120/80	126	74	/6		4	Below diastolic standard by 6 but above systolic standard by 4
24	120/80	112	60	8/20			Below standard
25	120/80	108	68	2/12			Below standard
26	120/80	110	60	10/20			Below standard
27	120/80	110	65	10/15			Below standard
28	120/80	115	70	5/10			Below standard
29	120/80	107	69	13/21			Below standard
30	120/80	116	65	4/15			Below standard
31	120/80	114	65	6/15			Below standard
32	120/80	122	80		Within Standard for diastolic B/P	8	Within diastolic Standard but above systolic by 8
33	120/80	120	80		Exact standard		Exact standard
34	120/80	110	70	10/10			Below standard
35	120/80	117	80	3	Within Standard for diastolic B/P		Within diastolic Standard but below systolic by 3
36	120/80	112	70	8/12			Below standard
37	120/80	116	68	4/12			Below standard
38	120/80	105	60	15/20			Below standard
39	120/80	125	85			5/5	Above standard
40	120/80	116	69	4/11			Below standard

The result in table 1 revealed that twenty-nine (29) Nigerian referees representing 72.5% falls below the established standard blood pressure characteristics of both systolic and diastolic blood pressure (120/80). These referees are found in serial number 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 31, 34, 36, 37, 38 and 40). Three (3) referees representing 7.5 % falls at the exact standard of both systolic and diastolic blood pressure. These referees are found in serial number 11, 22 and 33. While only one referee representing 2.5 %falls above standard of both systolic and diastolic blood pressure (Referee no 9). Nevertheless, one referee falls below diastolic standard by 8 but above systolic standard by 4 (Ref 9), one referee falls below diastolic by 8 but Within Standard for systolic (R10), one referee falls below diastolic standard by 8 but above systolic standard by 4 (R12), one referee falls below diastolic standard by 10 but Within systolic standard (R13), one referee falls below diastolic standard by 6 but above systolic standard by 4 (R23), one referee falls Within diastolic Standard but above systolic by 8 (R32) and one referee falls within diastolic standard but below systolic by 3 (35) respectively.

Further investigation on the data using the one sample t-test statistical analysis for the systolic and diastolic blood pressure of the Nigeria elite football referees revealed that the mean value for actual systolic blood pressure was 114.88 with the standard systolic blood pressure of 120 while the standard deviation was 19.000 with a t – value of 5.529 at p- level of .000 with 39 degrees of freedom as presented in table 2.

Table 2: One sample t-test analysis of systolic blood pressure characteristics of Nigeria elite football referees (N = 40)

	$\bar{X}$	SD	t-value	P-level
Actual Mean	114.88	18.000	-.5.529	.000
Population Mean	120			

* Significant at .05 level, $df = 39$

The result presented in Table 2 revealed that the calculated mean of systolic blood pressure was 114.88 while the population mean was 120 with a standard deviation of 19.0000 at .05 level of significance with 39 degree of freedom with the t- value of 5.529 at p- value of .000. Since the t- value is higher than critical value; it implies that this further investigation agreed with the descriptive result of the findings. This clearly implies that there is a

significant difference between standard systolic blood pressure and the referees' systolic blood pressure as observed in Nigeria. For the diastolic it was again found that the mean value was 69.25 with a standard deviation of 6.15, t- value was 11.061 with 39 degrees of freedom at p- level of .000 as presented in table 3.

Table 3: One sample t-test analysis of diastolic blood pressure characteristics of Nigeria elite football referees (N = 40)

	$\bar{X}$	SD	t-value	P-level
Actual Mean	69.25	6.15	11.061	.000
Population Mean	70.00			

* Significant at .05 level, $df = 39$

The result presented in Table 3 revealed that the calculated mean was 69.25 while the population mean was 80 with a standard deviation of 6.15 at .05 level of significance with 39 degree of freedom with the t- value of 11.061 at p- value of .000. Since the t- value is higher than critical value; it implies that this further probe agreed with the descriptive result of the findings. This implies clearly that there is a significant difference between standard diastolic blood pressure and the recruitment or practice of referees in Nigeria.

DISCUSSION OF RESULTS

The research hypothesis which sought to find out whether there is no significant difference between Nigeria elite football referees' resting systolic and diastolic blood pressure and the standard characteristics revealed that twenty-nine (29) Nigerian referees representing 72.5% fall below the stipulated standard blood pressure characteristics of both systolic and diastolic blood pressure (120/80). To support the above results, Jensen and Fisher (2009) explained that training has a definite effect on blood pressure and that trained and physically fit individuals have lower blood pressure than what is considered average. The authors further stated that, during exercise, however, the systolic pressure rises with work at about 10 mm Hg per minute's increases and may go up to 200 mm Hg while the diastolic usually stays about the same or decreases with work, as the vessels open in the active muscles. This factors, therefore, makes the continuous monitoring of blood pressure a must during stress testing to be able to dictate subjects with heart problems.

The result shows that, three (3) referees representing 7.5 % fall at the exact standard of both systolic and diastolic blood pressure. While only one referee representing 2.5% fall above standard of both systolic and diastolic blood pressure. one referee fall below diastolic standard by 8 but above systolic standard by 4 (ref 9), one referee fall below diastolic by 8 but within Standard for systolic (10), one referee fall below diastolic standard by 8 but above systolic standard by 4 (12), one referee fall below diastolic standard by 10 but within systolic standard (13), one referee fall below diastolic standard by 6 but above systolic standard by 4 (23), one referee fall within diastolic Standard but above systolic by 8 (32) and one referee falls within diastolic Standard but below systolic by 3 (35) respectively. The result is in line with Jensen and Fisher (2009) who stated that physiological and motor performance skills such as cardiovascular endurance, muscular endurance, and muscular strength, resting heart rate, blood pressure, speed, agility and mental skills such as visual perception, attention, concentration, composure and decision-making are all required by referees at any level of the game, stressing that the ability of referee to cope with the pressures of officiating a match, a referee blood pressure must fall within systolic standard of 120 and diastolic standard of 80, as referees are required to keep up with the game, they are likely to suffer from physical fatigue and this will no doubt affect their physiological and mental performance and hence decision making during the game.

Young football referees appear to be more vulnerable to high blood pressure and heart changes. High blood pressure, or hypertension, affects about 30% of referees, which is associated with premature cardiovascular disease, including heart attack, stroke, arrhythmias and heart failure etc resulting to poor or inconsistent decision making during high intensity match or what is considered as difficult game. There is need for Nigerian Football Federation to select referees who meet up with the standard requirements in order to be recognize by the international bodies.

CONCLUSION

Based on the findings of this study, the following conclusions were made:

Referees for this study were within the acceptable range as there was significant difference when descriptive statistic and one sample t-test statistics were applied while minor difference was observed. This means that referees in Nigeria required just the same amount of these variables for their fitness status in performance requirements.

Elite referees from Nigeria used in this study scored lower than the stipulated or established characteristics in resting systolic and diastolic blood pressure. This implies that elites' referees in Nigeria are within the acceptable range.

RECOMMENDATIONS

Based on the findings of the study the following recommendations are made:

1. Since physical and physiological profile reveals moderate aerobic cardiac adaptations to training and match officiating and match demands are relative to the standard of competition, the referees should increase their physiological parameters to be able to cope with the demands imposed by the players during match.
2. Nigeria (Football) Referees Association should encourage its members to continue checking and maintain their health status before, during and after the Football Season.
3. Nigeria Football Federation and Nigeria (Football) Referees Association should design training programmes that would detect, monitor and render an opportunity for referees to achieve their physical fitness status.

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