

Research Article

Lack of blood pressure difference by race in professional American football players



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Abstract

Previous findings suggest that professional American football players have higher blood pressures (BP) and a higher prevalence of pre-hypertension and hypertension than the general population. We sought to determine whether race is associated with differences in BP and prevalence of pre-hypertension and hypertension among a large sample of professional football players. BP was measured at 2009 team mini-camps for 1484 black ($n = 1007$) and white ($n = 477$) players from 27 National Football League (NFL) teams. Players were categorized into three position groups based on body mass index (BMI). There was no racial difference in mean systolic or diastolic BP in any of the three position groups. There were no racial differences in prevalence of hypertension (99 [9.8%] black players vs. 39 [8.2%] white players; $P = .353$) or pre-hypertension (557 [55.3%] black players vs. 264 [55.3%] white players; $P = 1.0$). Contrary to findings in the general population, BP and prevalence of pre-hypertension/hypertension did not vary with race in a large population of active NFL players. *J Am Soc Hypertens* 2015;9(5):370–374. © 2015 American Society of Hypertension. All rights reserved.

Keywords: BMI; hypertension; NFL; pre-hypertension.

Background

In the United States, studies have consistently demonstrated that blacks have higher mean blood pressure (BP) and rates of hypertension than do whites.^{1–3} Documented differences are attributed to multiple factors.^{4,5,6} Surprisingly, no difference in BP by race was found in a recent study of active National Football League (NFL) players.⁷

Players of both races did have elevated BP and higher rates of pre-hypertension and hypertension compared with an age- and race-equivalent population sample from the Coronary Artery Risk Development in Young Adults (CARDIA) study,⁷ a population-based observational study of 5115 participants aged 18 to 30 years. That study also noted that these large, extremely active athletes did not have other cardiovascular risk factors, such as lipid abnormalities and glucose intolerance, which are normally associated with large size.

BP level in the previous report was based on a single BP measurement, whereas standard methodology requires use of at least two measurements.⁸ The previous study also used a convenience sample of 12 of the 32 NFL teams. The current investigation further explored differences in BP and prevalence of hypertension by race using a

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standard BP measurement protocol in a larger NFL study group.

Methods

Institutional Review Board approval was obtained through the MedStar Health Research Institute (Hyattsville, MD).

In this cross-sectional study, BP was measured at the mandatory annual physical examination for active NFL players during off-season team mini-camps between April and August 2009. The annual physical examination is performed on a day dedicated to these evaluations, while practice or workout activities are prohibited. As required by the NFL/NFL Players Association Collective Bargaining Agreement,⁹ all NFL players must undergo a preseason physical examination. These examinations are performed in the spring/summer by the team medical staffs with BP as one of the required elements.

Players from all 32 NFL teams were invited to participate in the study. Measurements were obtained on the entire pre-season roster of players from 27 of 32 teams (1519 total players). None of the players requested that their data be excluded from the research study. Scheduling conflicts occurred for five teams whose annual pre-participation physicals overlapped with another team, thus preventing study personnel and equipment from being present at two events at the same time. There were no inherent differences between teams that participated and those that did not.

The examinations were performed by the medical staff of each NFL team. The research team reviewed the BP protocol⁷ with each team medical doctor and athletic trainer before the examinations. One or more of the investigators were present at some of the teams' physical examinations to assist in data collection.

After informing the player of the purpose of the BP study, the staff obtained a mid-bicep arm circumference measurement using a measuring tape and the appropriately sized arm cuff was selected based on manufacturer instructions. Medical personnel had players sit quietly with feet flat on the floor for 5 minutes prior to the BP measurements. During this rest period, players were asked questions regarding race, age, height, weight, position, and medications. Height and medication use were self-reported by the participant and recorded by study staff. Weight was measured on the day of the physical examination. Medical staff asked players to identify their race and recorded it as white, black, or other. Three consecutive BP measurements were obtained using a Welch Allyn automated cuff (Welch Allyn Spot Vital Signs BP monitor, Welch Allyn Inc., Skaneateles Falls, NY).⁸ Results were recorded on data sheets, which were collected by the investigators and delivered to MedStar Health Research Institute for data input and analysis.

BP Determination

BP for each player was determined by discarding the first measurement and averaging the second and third measurements. Data on hypertension and pre-hypertension were collected for comparison with findings of the previous study on a smaller group of players.⁷ Players were asked about their use of antihypertensive medications at the time of BP measurement.

Data Analysis

Hypertension was defined as systolic BP ≥ 140 mm Hg or diastolic BP ≥ 90 mm Hg, or current use of antihypertensive medication. Normal BP was defined as systolic BP < 120 mm Hg and diastolic BP < 80 mm Hg. All other combinations of systolic and diastolic BPs were classified as pre-hypertension.

Players were categorized into three groups based on BMI in recognition of the substantial differences in size observed in different position groups in the NFL and college football¹⁰ and on the known effect of size on BP.¹¹ The three groups were as follows: Group 1, interior defensive and offensive linemen; Group 2, defensive ends, linebackers, running backs, and tight ends; and Group 3, defensive backs, kickers/punters, quarterbacks, and wide receivers.

Multivariable analysis was used to estimate mean differences in systolic and diastolic BP, comparing black with white players. Linear regression models for systolic and diastolic BP included age and BMI as independent variables, without assuming linearity in the effects of these covariates, modeling those using restricted cubic splines.

All analyses were performed by a biostatistician using R: A Language and Environment for Statistical Computing, version 2.15.2 (R Foundation for Statistical Computing, Vienna, Austria). $P \leq .05$ was considered statistically significant.

Results

In the study group, median (25th–75th percentile) anthropometric data were age 26 (24–28) years; height, 74 (72–76) inches; weight, 240 (208–291) pounds; and BMI, 31 (28–35) kg/m². The linemen (Group 1) were the largest, followed by Group 2 and then Group 3 (Table 1). A significant difference in height, weight, and BMI was found among the groups (Table 1).

No difference in BP based on race was observed in any position grouping of the active players. (Table 2, Figure 1) In black ($n = 1007$) versus white ($n = 477$) players, there were no differences in the prevalence of hypertension (99 players [9.8%] vs. 39 players [8.2%], respectively; $P = .353$) or pre-hypertension (557 players [55.3%] vs. 264 players [55.3%], respectively; $P = 1.0$).

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