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The influence of socio-economic status on casual blood pressures of the adult Nigerians
Rufus A. Adedoyin, Chidozie E. Mbada, Omotesho O. Awofolu and Olubunmi M. Oyebami

Department of Medical Rehabilitation, Obafemi Awolowo University, Ile-Ife, Nigeria.

Background: Studies into social inequalities in health tend to focus more on parental socio-economic status (SES) as it affects the children. We aimed to test the hypothesis that socio-economic inequalities would not affect the casual blood pressure among Nigerian adults.

Methods and results: Resting blood pressure (BP) and pulse rate of 1067 sedentary adults were measured. Rate pressure product and pulse pressure were later calculated. Second, a structured questionnaire, which objectively assessed the SES of the subjects, was administered. Subsequently, a self-rating SES ladder was employed to classify the subjects into different socio-economic groups. This was used as a check for the structured questionnaire. A Pearson product correlation coefficient comparing the two outcome measures revealed a high correlation ($r = 0.951$, $P < 0.01$). Socio-economic status was found to have an inverse significant ($P < 0.05$) effect on systolic pressure, heart rate and pulse pressure. The 95th centile blood pressure obtained was 154/91 mmHg.

Conclusion: Low SES is associated with development of hypertension among the Nigerian adults.

Keywords: socio-economic status, blood pressure, hypertension

Introduction
Hypertension is one of the major causes of death in both developed and developing nations [1,2]. Reports from the USA and West Indies confirmed that Blacks have a higher incidence of hypertension than their White counterparts [3–6]. Factors such as genetic, dietary as well as physical activity and body fatness are known to play a major role in the development of hypertension [6]. Many investigators have also reported the influence of socio-economic status (SES) as the reason behind the high incidence of hypertension among the Blacks [7,8]. Balogun and associates [9] investigated the effect of parental SES on casual blood pressure in Nigerian school pupils. They found no significant correlation between the resting blood pressure, heart rate, estimated myocardial oxygen consumption, stroke volume, and the economic status of the parents. They concluded that hypertension in Nigerian children may not be attributed to socio-economic influence alone, but genetic and environmental factors might also contribute. Another group found that the Nigerian children have a consistently higher systolic blood pressure and diastolic pressure than American children [10]. They postulated that the difference might be due to environmental factors rather genetic factors.

Poulton et al. [11] found that children that grew up in low SES families tended to have poorer cardiovascular health compared with those from high SES backgrounds in New Zealand. They concluded that protection of children against the effects of SES adversity could reduce the burden of the disease experienced by adults. In the developing nations, where the economy is poor, it is expected that the incidence of hypertension will be high.

That socio-economic factors are related to the development of hypertension among adult Nigerians is yet to be investigated. The aim of this study therefore was to investigate the influence of socio-economic status of adult Nigerians on casual blood pressure.

Methods
Subjects
The subjects for this study were recruited from the ancient city of Ile-Ife, Nigeria. A total of 552 males and 515 females whose age ranged between 30 and 60 years voluntarily participated in the study.
Procedures

The procedure for the study was explained to the subjects prior to measurement. Subjects’ height and weight were measured and their ages recorded. After about 10 min of sitting, blood pressure was taken with the use of a digital blood pressure measuring monitor (Kit Omron model HEM-712C, China). The rate pressure product was calculated by multiplying systolic blood pressure (SBP) and heart rate (HR).

A questionnaire was used to aid classification of subjects into three different socio-economic groups [9,14]. The questionnaire sought information on the highest educational attainment of the subjects and the properties they owned. Scores were assigned for each item based on their educational and social strata in Nigerian society. They were categorized as either lower class (< 9); middle (10–18); or upper (19–27).

Because, most Nigerians are usually reluctant about disclosing their properties, we used alongside the questionnaire, a subjective, self-rating socio-economic status ladder. This was adopted from the MacArthur research network on social economic status. The pictorial ladder has nine rungs—each rung was later multiplied by 3 to make a score minimum of 3 and maximum of 27.

Analysis

The Pearson moment correlation coefficient was used to determine the relationship between the total SES scores and the physical characteristics of the subjects.

One-way analysis of variance was used to determine if there was any significant difference between the dependent variables and the subjects in the three socio-economic groups. Least square difference (LSD) post hoc analysis was used to probe the specific differences found in the F ratio of the analysis of variance. The confidence level was set at $P < 0.05$. The tests were performed using SPSS 10.0 version software (SPSS Inc., Chicago, Illinois, USA) on a personal computer.

Results

The average systolic and diastolic blood pressures of the subjects were 123.40 ± 15.5 and 76.90 ± 9.9 mmHg, respectively. The mean resting HR was 70.14 ± 7.9 beats per minute. The rate pressure product (RPP) and pulse pressure (PP) recorded 9034.4 ± 5484.21 mmHg beats per minute and 46.30 ± 12.03 mmHg, respectively. High concurrent-criterion validity between the structured questionnaire and the modified socio-economic ladder was obtained ($r = –0.951; P < 0.01$).

The result of the Pearson moment correlation showed a significant inverse relationship between socio-economic status and systolic blood pressure ($r = –0.131, P < 0.01$). An inverse correlation was also obtained between socio-economic status and weight ($r = –0.113, P < 0.01$) and body mass index (BMI) ($r = –0.172, P < 0.01$).

Subjects in the middle and upper classes were found to be significantly heavier, having higher systolic blood pressure and pulse pressure than the subjects in the lower class. However, no significant difference was found in diastolic blood pressure and rate pressure products of the subjects in the three classes (Table 1).
Discussion

We found significant differences in the SBP, HR and pulse pressure of Nigerian adults from the different socio-economic strata. This finding is at variance with the findings of Balogun et al. [9] and Simpson et al. [2]. These two studies focused on the influence of parental socio-economic status on children. Our finding is however consistent with studies from multiracial populations conducted on children [12,15]. Specifically, inverse correlations were obtained in the systolic blood pressure, weight, BMI of the subjects in the lower socio-economic class. Studies have focused on the influence of parental socio-economic status on children. Our finding is however consistent with studies from multiracial populations conducted on children [12,15]. Specifically, inverse correlations were obtained in the systolic blood pressure, weight, BMI of the subjects in the lower socio-economic class. Studies have shown that poverty and affluence are one of the causes of hypertension in the low and high stratum, respectively [13,16].

The food culture among the low socio-economic class may be responsible for the high incidence of hypertension in this group. In most of the developing world, body or size is believed to be a sign of good living among the poor. Thus, more economic strata. This finding is at variance with the findings of Balogun.

**References**