Nutritional Status and Prevalence of Hypertension among Teachers in Yewa North Local Government, Ogun State, Nigeria

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Abstract:

Introduction: The global incidence of hypertension has been steadily increasing, raising significant public health concerns. Various factors, including inadequate nutrition, have been linked to the development of hypertension. **Objective:** The purpose of the study was to evaluate the prevalence of hypertension and the nutritional status of teachers in Yewa North Local Government, Ogun State, Nigeria. Materials and Methods: A sample size of 390 participants, aged 18 to 59, who lived in the Yewa North Local Government Area were chosen using a cross-sectional and descriptive methodology. A systematic questionnaire, anthropometric measures, and blood pressure readings were used to gather data. **Results:** With 42.8% of the teachers being classed as overweight and 24.4% as obese, the results demonstrated a high prevalence of overweight and obesity among the teachers. Compared to female teachers, overweight was more common among male teachers. Less than half of the participantshad normal systolic blood pressure, indicating a high prevalence of abnormal blood pressure. Significant percentages of the subjects had elevated (pre-hypertension), stage I, and stage II hypertension. Compared to female teachers, male teachers were more likely to have stage I hypertension. **Conclusion and Implication:** These results imply that the anomalous nutritional condition of a considerable proportion of teachers in Yewa North Local Government may put them at risk of hypertension.

Introduction:

Globally, the incidence of hypertension has been rising leading toserious concerns for public health (Ayogu et al., 2021). The development of hypertension has been linked to a number of factors, including inadequate nutritional status (Carey et al., 2018). Hypertension or high blood pressure which is a global health concern is defined by abnormally high blood pressure in the arteries. It poses a significant risk for cardiovascular illnesses as well as other grave health issues (Singh et al., 2017). The World Health Organization (WHO) estimates that one billion people globally suffer from hypertension, which significantly causes morbidity and death (WHO, 2023). In order to improve health outcomes and to put into practice effective preventative strategies, it is imperative to comprehend the factors that contribute to the development of hypertension. An estimated one in three people in Nigeria suffer from hypertension, making it a prevalent condition in the country (Davies et al., 2022; Augustine et al., 2020). Genetic predisposition, sedentary lifestyle, obesity, and poor food choices are among of the variables that lead to the development of hypertension (Ayogu et al., 2021).

One of the important factors in the emergence and treatment of chronic illnesses, such as hypertension, is nutritional status. A higher risk of hypertension has been associated with poor dietary practices, such as consuming excessive amounts of saturated fats, less fruits and vegetables, and high sodium intake (Mills et al., 2020). The impact of a healthy diet on one's overall health and wellbeing cannot be overstated. Given its significant influence on immune function, illness susceptibility, physical and mental development, and immunity, nutritional status has been extensively researched as a crucial predictor of health in a variety of demographic groups (Khan et al., 2023). The nutritional status of Nigerian adults has become increasingly challenging in recent years due to rapid urbanization, changing eating habits, and altered lifestyles. These developments call for a better understanding of the nutritional status of many demographic groups, including teachers, as they are frequently accompanied by an increase in non-communicable diseases such obesity, high blood pressure, diabetes, and cardiovascular diseases (Zhang et al., 2023). Teachers are among the many professional groups that have an impact on how society develops, and they play a critical role in molding the next generation. Teachers are the foundation of educational systems, shaping children's minds and making a major contribution to the advancement of society (Uchechi et al., 2021).

Nevertheless, their hard job frequently entails lengthy workdays, high stress levels, and little time for self-care, which may have an effect on their personal diet and health decisions (Agyapong et al., 2022). Teachers may be particularly vulnerable to poor nutrition and unhealthy eating habits because of their hectic schedules and frequently restricted access to wholesome meal options. Teachers may also have sedentary lifestyles and frequently deal with high amounts of stress, which increases their risk of hypertension. Blood pressure has been demonstrated to be physiologically affected by stress, and inactivity is linked to a number of health hazards, including hypertension (Tsubono et al., 2023).

Despite the potential risks, little is known about the prevalence of hypertension and the nutritional status of teachers. This study aims to fill this research gap by conducting a comprehensive investigation into the nutritional status and prevalence of hypertension among the teachers.

Materials and Methods:

In Yewa North Local Government, Ogun State, Nigeria, a cross-sectional and descriptive study was conducted to evaluate the nutritional status and prevalence of hypertension among teachers. A total of 422 individuals, aged 18 to 59, residing in the Yewa North Local Government Area were selected for the study. The sample size was determined using an appropriate formula for cross-sectional studies, considering a 5% margin of error and a 95% confidence level, based on the estimated population of teachers in the area.

Sample Size Determination
The minimum sample size was calculated using the statistical formula:

$$n = \frac{Z^2 (p)(q)}{d^2}$$

Where Z is the Z score value at 95% confidence interval (CI) = 1.96
n = Minimum sample size
Z = 1.96
d = (0.05)
p = 50%
q = 1-p (=0.5)

$$n = \frac{1.96^2 (0.5)(0.5)}{(0.05)^2}$$

n = 384.24

Ten percent (10.0 %) of the minimum sample size calculated using the above formula was introduced

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to compensate for non-response.
Thus, 10.0% of 382.24 = 38.2
384.24+38.2 = 422 Approximately

Data collection

A structured questionnaire was administered to collect relevant demographic and socioeconomic data, including age, sex, marital status, educational level, household income, and number of dependents. Anthropometric measurements, including weight, height, visceral fat, were collected following standardized procedures. The Body Mass Index (BMI) was calculated as weight (kg) divided by height (m²) and categorized as underweight, normal weight, overweight, and obese, using established cutoff values. The blood pressure was measured using an automated sphygmomanometer. Three consecutive blood pressure measurements were taken after participants have been seated and rested for at least 5 minutes. The average of the three measurements was recorded as the participant's blood pressure.

Ethical Considerations

Prior to starting data collection, ethical approval was obtained from the Ogun State Hospital, Ijaye Abeokuta Research Ethics Committee (Ref. no: SHA/RES/VOL/XII/162). Informed consent was acquired from all participants, and the study always ensured the privacy of their personal data.

Data Analysis

Descriptive statistics, such as the means, standard deviations, frequencies, and percentages was used to summarize the data collected, including anthropometric measurements and demographic variables. The prevalence of undernutrition and overweight/obesity among teachers was determined based on the BMI cutoff values. The Fisher exact test was used to assess the association between nutritional status and demographic variables.

Results:

Table 1 provides information on the socio-economic and demographic characteristics of the participants. It can be observed that most of the participants had secondary (14.4%) or tertiary (85.6%) education. In terms of monthly income, the highest percentage (39.7%) fell in the range of 61,000-90,999, followed by 31,000-60,999 (24.9%). Most of the participants had access to electricity (78.7%) for lighting, had brick housing type (62.3%), and used water closet toilets (80.0%). Additionally, most participants used borehole water as their source of drinking water at home (61.5%). The primary source of cooking fuel for most participants was gas (77.9%).

Table 1: Socio-economic and Demographic Characteristics of the participants

Variable	Frequency	Percentage
Age (years) Mean= 40.6±9.4 years		
<29	65	16.7
30-39	102	26.2
40-49	154	39.5
50 and above	69	17.7
Ethnicity		
Hausa	23	5.9
Yoruba	316	81.0
Ibo	42	10.8
Others (Urhobo, Esan, Ijaw)	9	2.3
State of Origin		
Ekiti	5	1.3
Lagos	5	1.3
Ondo	27	6.9
Ogun	230	59.0
Osun	32	8.2
Oyo	33	8.5
Others (Anambra, Benue, etc.)	58	14.9
Religion		
Christianity	276	70.8
Islam	103	26.4

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Traditional	5	1.3
Others	6	1.5
Family type		
Monogamous	290	74.4
Polygamous	100	25.6
Family size		
≤3	41	10.5
4-5	228	58.5
6-7	101	25.9
Others (>7)	20	5.1
Education		
Informal	0	0.0
Primary	0	0.0
Secondary	56	14.4
Tertiary	334	85.6
Estimated Monthly Income		
≤30,000	58	14.9
31,000-60,999	97	24.9
61,000-90,999	155	39.7
91,000-120,999	55	14.1
≥121,000	25	6.4
Energy for lightning?		
Electricity	307	78.7
Generator	53	13.6
Solar	15	3.8
Lantern/candle/wick	8	2.1
Others	7	1.8
Housing Type		
Mud	7	1.8
Brick	243	62.3
Concrete	138	35.4
Others	2	0.5
Toilet Type		
Latrine	71	18.2
Water Closet	312	80.0
Bush	4	1.0
Others	3	0.8
Source of drinking water at home		
Well	33	8.5
Stream	11	2.8
Tap	94	24.1
Borehole	240	61.5
Sachet	12	3.1
Total	390	100.0

The nutritional status expressed as Body Mass Index (BMI) is presented in Table 2. It was noted that 30.5% of the participants had a normal BMI, 24.4% were obese while the majority of them were overweight (42.8%). Gender differences were also observed in the study in which most males (51.6%) were overweight compared to females (36.8%). On the other hand, more females (32%) were found to be obese compared to males (13.1%). Overall, the majority of the participants (69.5%) had abnormal nutritional status, including underweight, overweight, and obesity. The association between the nutritional status (BMI) of the male and female participants was found to be statistically significant ($p<0.05$). Furthermore, the study examined visceral fat among the participants and found that the majority (60.5%) had normal visceral fat, while 36.9% had high visceral fat and 2.6%

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ad very high visceral fat. More females (65.4%) than males (53.5%) had normal visceral fat, while more males (44.0%) than females (32.0%) had high visceral fat.

Table 2: Association between Body Mass Index and Gender of the participants

Body Mass Index	Male N (%)	Female N (%)	Total	X²	p-Value
Underweight (<18.5)	6 (3.8)	3 (1.3)	9 (2.3)	24.165[a]	0.000
Normal weight (18.5-24.9)	50 (31.4)	69 (29.9)	119 (30.5)		
Overweight (25.0-29.9)	82 (51.6)	85 (36.8)	167 (42.8)		
Obesity Class I (30.0-34.9)	19 (11.9)	50 (21.6)	69 (17.7)		
Obesity Class II (35.0-39.9)	1 (0.6)	11 (4.8)	12 (3.1)		
Obesity Class III (≥40.0)	1 (0.6)	13 (5.6)	14 (3.6)		
Total	159 (100.0)	231 (100.0)	390 (100.0)		

Table 3: Systolic Blood of the participants

Systolic Blood Pressure	Male N (%)	Female N (%)	Total (N%)	Exact	p-Value
Normal (<120.00)	53 (33.3)	97 (42.0)	150 (38.5)	9.748[a]	0.054
Elevated (120.00-129.99)	30 (18.9)	40 (17.3)	70 (17.9)		
Stage I (130.00-139.99)	35 (22.0)	31 (13.4)	66 (16.9)		
Stage II (≥140.00)	41 (25.8)	63 (27.3)	104 (26.7)		
Total	159 (100.0)	231 (100.0)	390 (100.0)		
Diastolic Blood Pressure					
Normal (<80.00)	65 (40.9)	119 (51.5)	184 (47.2)	4.868[a]	0.181
Stage I (80.00-89.99)	55 (34.6)	72 (31.2)	127 (32.6)		
Stage II (≥90.00)	39 (24.5)	40 (17.3)	79 (20.3)		
Total	159 (100.0)	231 (100.0)	390 (100.0)		

The blood pressure of the participants is presented in Table 3. Less than half (38.5%) of the participants had normal systolic blood pressure while 17.9%, 16.9% and 26.7% had elevated (pre-hypertension), stage I and II hypertension respectively. A higher percentage of females (42.0%) compared to males (33.3%) had normal systolic blood pressure. Conversely, more males had elevated (18.9%) and stage I hypertension (22.0%) compared to females (17.3% and 13.4 %, respectively). Additionally, a slightly higher percentage of females (27.3%) than males (25.8%) participants had stage II hypertension.

Less than half (47.2%) of the participants had normal diastolic blood pressure while 32.6% and 20.3% had stage I and II hypertension respectively. It was noted that more females (51.5%) than males (40.9%) participants had normal diastolic blood pressure. On the contrary, more males (34.6%, 24.5%) than females (31.2%, 17.3%) participants had stage I and II hypertension respectively. Based on Table 4, the study revealed a statistically significant relationship between nutritional status and blood pressure.

Table 4: Association between Blood Pressure and Nutritional Status of the participants

	Body Mass Index (Nutritional Status)					X²	p-Value
	Under-weight N (%)	Normal N (%)	Over-weight N (%)	Obese N (%)	Total (N%)		
Systolic Blood Pressure							
Normal (<120.00)	6 (66.7)	67 (56.3)	50 (29.9)	16 (16.8)	139 (35.6)	47.927[a]	0.000
Pre-hypertension (120.00-139.99)	3 (33.3)	32 (26.9)	72 (43.1)	40 (42.1)	147 (37.7)		

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Stage I (140.00-159.99)	0 (0.0)	14 (11.8)	36 (21.6)	31 (32.6)	81 (20.8)		
Stage II (≥160.00)	0 (0.0)	6 (5.0)	9 (5.4)	8 (8.4)	23 (5.9)		
Total	9 (100.0)	119 (100.0)	167 (100.0)	95 (100.0)	390 (100.0)		
Diastolic Blood Pressure							
Normal (<80.00)	6 (66.7)	66 (55.5)	81 (48.5)	29 (30.5)	182 (46.7)	18.089[a]	0.034
Pre-hypertension (80.00-89.99)	3 (33.3)	30 (25.2)	52 (31.1)	44 (46.3)	129 (33.1)		
Stage I (90.00-99.99)	0 (0.0)	13 (10.9)	18 (10.8)	11 (11.6)	42 (10.8)		
Stage II (≥100.00)	0 (0.0)	10 (8.4)	16 (9.6)	11 (11.6)	37 (9.5)		
Total	9 (100.0)	119 (100.0)	167 (100.0)	95 (100.0)	390 (100.0)		

Discussion:

In Yewa North Local Government, Ogun State, Nigeria, teachers' nutritional status and the prevalence of hypertension were evaluated in this cross-sectional and descriptive study. In a research paper titled "Overweight/obesity in teachers: prevalence and associated factors," Rochas et al. (2015) discovered that teachers had a higher prevalence of overweight and obesity compared to the national average for individuals in the same age range. This is in line with the results of our study, which showed that 24.4% of participants were obese and 42.8% of participants were overweight. Similar findings were observed in three other studies (Saulo et al., 2015; Pizadeh et al., 2023; Monteiro et al., 2003), all indicating significant rates of overweight and obesity among teachers. Additionally, our study found a noteworthy gender disparity, with a higher percentage of overweight male teachers compared to female teachers. This is consistent with our data, which showed that 36.8% of females and 51.6% of males were overweight. However, other studies (Fadupin et al., 2014; Ckukwuonye et al.,2022; Emmanuel et al., 2020) reported lower prevalence rates of overweight and obesity among teachers compared to our study. . The authors attributed this discrepancy to factors such as the teachers' socioeconomic background, years of teaching experience, and educational attainment. There are many potential explanations for the discrepancies in results between our study and previous studies, including the socioeconomic and demographic makeup of the study group, cultural influences on eating customs, and accessibility to medical facilities. Overall, our study findings indicate that a substantial proportion of teachers are overweight or obese, and that inadequate nutritional status is highly prevalent. Given the teachers' critical role in shaping students' education and future, it is essential to prioritize their health and well-being. Teachers should be encouraged to adopt healthy lifestyle practices, such as eating nutritious meals and engaging in regular exercise.

To enhance the overall well-being of teachers in Yewa North Local Government, Ogun State, Nigeria, interventions aimed at improving the socioeconomic and environmental aspects, such as access to healthy food and healthcare facilities, should be given top priority. The sedentary nature of teaching may contribute to the high rates of overweight and obesity among educators as they often have limited opportunities for physical activity and spend long hours seated. Furthermore, teaching is a profession that frequently experiences stress and heavy workload, both of which can lead to poor eating habits and weight gain (Schultz, 2020; Delfino et al., 2020). Previous research has similarly reported the gender disparities observed in our study, with more males being overweight and more females being obese (Alwan, 2010; Pizadeh et al., 2023). These differences may be attributed to variations in hormone levels and body composition between males and females.

This study also evaluated individual blood pressure levels. Less than half of the participants had normal systolic blood pressure. The findings revealed that 17.9%, 16.9%, and 26.7% of the subjects had elevated (pre-hypertensive), stage I, and stage II hypertension, respectively. There was gender-specific variations in the prevalence of hypertension. More women than men had normal systolic blood pressure, while more men than women had elevated and stage I hypertension. These results are consistent with recent research (Davies et al., 2022; Pizadeh et al., 2023) showing a higher prevalence of hypertension in men. The prevalence of stage II hypertension did not differ significantly between males and females.

Overall, our findings highlighted a high percentage of teachers who may be at risk of hypertension due to their inadequate nutritional state. This is consistent

with a study by Ibrahim et al. (2013) which identified BMI as the most significant modifiable risk factor and found that pre-hypertension and hypertension were highly prevalent among teachers in Jeddah. These results are significant because they emphasize the necessity of programmes and interventions aimed at promoting the health and well-being of teachers (Hascher et al., 2021). Hypertension among teacher can be prevented and managed by promoting good lifestyle choices, including nutritional education, and regular physical activity. The underlying causes of the significant frequency of inadequate nutritional status and hypertension among teachers require more investigation. This can help in developing targeted interventions and strategies to improve teachers' overall health and well-being. It is important to note that limitations might have affected the generalizability of the study's conclusions. The samples consisted of teachers from a specific area or school system, which may not accurately represent all teachers in the country.

Conclusion:

This study provides important new insights into the prevalence of hypertension and the nutritional health of teachers. The results emphasize the need for programmes and interventions aimed at promoting the health and wellness of teachers, particularly in terms of blood pressure management and nutritional status.

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