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**Original Research Article**

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## **Prevalence of Undiagnosed Elevated Blood Pressure in Okparabe Community in Southern Nigeria**

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### **Abstract**

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**Purpose:** To assess the incidence of undiagnosed hypertension and body mass index (BMI) profile of the inhabitants of Okparabe community in Ughelli South of Delta State, Nigeria.

**Methods:** In a prospective study involving stratified random sampling, weights, heights and blood pressures (BP) of 500 subjects (aged, 39.20 ± 12.05 years) from different compounds in Okparabe community of Delta State, Nigeria were evaluated. Their BMI values were calculated.

**Results:** Males constituted 51.8 % of the sample studied. Prevalence of undiagnosed hypertension was 29.8 % with

several of the subjects (54.2 %) presenting with BP in the pre-hypertensive range. Some of the subjects were either overweight (31.2 %) or obese (11.8 %). The average systolic/diastolic BP and BMI values were 127.89±14.81/86.54±36.15 mmHg and 24.63 ± 6.09 kgm<sup>-2</sup> respectively.

**Conclusion:** High prevalence of undiagnosed hypertension exist in Okparabe community Many of the inhabitants also have elevated BMI values that require necessary attention.

**Keywords:** Body mass index (BMI); hypertension; Niger Delta; obesity, Okparabe community.

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**Indexing:** Index Copernicus, African Index Medicus

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### **Introduction**

Hypertension remains an important public health challenge in both the developing and developed countries. It is a leading cause of cardiovascular morbidity and mortality. Due to a general lack of symptoms most people are not aware they have high blood pressure until major complications arise. Sustained elevated blood pressure is a major risk factor for heart attack, stroke and other cardiovascular diseases. A rather high prevalence of undiagnosed hypertension has been reported in a market population in South-Western Nigeria [1]. Worldwide prevalence of hypertension stands at about one billion individuals [2]. The prevalence of hypertension has been shown to increase with increasing age, such that 50% of populations older than 60 years of age have hypertension. Despite the progress in prevention, management and control, a significant amount of individuals with hypertension are unaware of their conditions, and among those with diagnosed hypertension, treatment is frequently inadequate [3]. Also, in paediatric population, hypertension and pre-hypertension have been shown to be frequently undiagnosed [4].

In Nigeria, the prevalence of hypertension in rural and urban communities varies between 12.0% and 32.8% in different studies [5-7] with urban centers having the higher prevalence. The prevalence of hypertension is higher in men than women in Nigeria [8, 9].

The association between body mass index (BMI) and blood pressure has constantly been observed with the question as to whether there is a linear relationship between the two. Foulds and associates [10] established that there is a greater relative risk for hypertension amongst individuals with increased BMI. Other studies revealed that the prevalence of hypertension is generally higher in overweight persons in the United States, Africa and other parts of Asia [10-12].

There is paucity of information on the incidence of undiagnosed hypertension as well as profile of BMI among the dwellers of Delta State in the Niger Delta region, South-south Nigeria. For this reason, this study sought to assess the incidence of undiagnosed elevated BP along with the BMI profile among the inhabitants of Okparabe town in Ughelli, south of Delta State, Nigeria.

## Methods

### Setting

The study was conducted in Okparabe community (comprising about 7056 inhabitants) which is one of the six major clans located in Ughelli South local government area of Delta State, Niger Delta area, South-south Nigeria. The local government is one of the highest crude oil producing areas in the State and home to one of the largest Gas Plants in Africa. It is mainly populated by the Urhobos with an estimated population of 150,000 people whose occupations are mainly farming and fishing [13].

### Study design

Following ethical approval (Ref: USLG.844/T/7), a prospective study involving door to door BP (mmHg), weight (kilogram, kg) and height (meter, m) measurements (between January to March, 2013) was carried out among 500 individuals in Okparabe community using stratified random sampling. The sample size (inclusive of overage) was arrived at with the aid of the sample size calculator [14]. Individuals were included based on their age ( $\geq 25$  years), residency in the community, and not having been diagnosed of hypertension or on antihypertensive drugs. Pregnant women were however, excluded from the study. Subjects' BPs were measured using standard procedure [15] with a validated electronic BP monitor for an arm circumference of range, 22-32 cm (OMRON M2 Intelli sense, OMRON Healthcare Co., Ltd. Kyoto, Japan. Made in Vietnam) following explanation as to what the exercise entailed and their subsequent agreement to participate in the study.

The weight was measured in kilogram (kg) using Hamson bathroom weighing scale and the height in meter with the aid of a long calibrated wooden rod while the subject stood (without shoes on) on flat surface platform. Main outcomes measures were the BP and Body Mass Index (BMI, i.e. weight (kg) per square height ( $m^2$ )). The BP and BMI values were categorized as earlier reported [15,16].

**Table 2:** Body mass index (BMI) and blood pressure (BP) profile of the subjects

BMI ( $kgm^{-2}$ )	Normal BP N (%)	Pre- hypertension N (%)	Stage I hypertension N (%)	Stage II hypertension N (%)	Total N (%)
Underweight (<18.5)	6 (1.2)	34 (6.8)	3 (0.6)	0 (0.0)	43 (8.6)
Normal weight (18.5-24.99)	45 (9.0)	130 (26.0)	48 (9.6)	19 (3.8)	242 (48.4)
Overweight(25.0-29.99)	19 (3.8)	81 (16.2)	43 (8.6)	13 (2.6)	156 (31.2)
Obese class I (30.0-34.99)	10 (2.0)	22 (4.4)	8 (1.6)	6 (1.2)	46 (9.2)
Obese class II (35.0-39.99)	0 (0.0)	2 (0.4)	4 (0.8)	2 (0.4)	8 (1.6)
Obese class III ( $\geq 40$ )	0 (0.0)	2 (0.4)	1 (0.2)	2 (0.4)	5 (1.0)
Total	80 (16.0)	271 (54.2)	107 (21.4)	42 (8.4)	500(100.0)

Normal BP, < 120/80 mmHg; Pre-hypertension, 120-139/80-89 mmHg; Stage I hypertension, 140-159/90-99 mmHg; Stage II hypertension,  $\geq 160/100$  mmHg.

### Data analysis

Data analysis was done with the aid of the Statistical Package for Social Sciences (SPSS) 20.0 for windows and their presentation was by descriptive statistics. Means of continuous variables such as systolic blood pressure (SBP), diastolic blood pressure (DBP) and BMI in males and females were compared using Student t-test while proportional variables were compared using Chi square. A 2-tailed p-value of 0.05 was considered significant.

## Results

The subjects' response rate for this study was 100 % out of which 259 (51.8 %) were males. Most (85.6 %) of the participants were mainly adults while elderly (age, 50 - 64 years) and very olds (age,  $\geq 65$ ) constituted 7.2 % each in the study group. The average age of the group was  $39.20 \pm 12.05$  (Table 1).

**Table 1:** Subjects' demographics (n = 500)

Variable	N (%)
Gender	
Male	259 (51.8)
Female	241 (48.2)
Age (years)	
(25 - 49)	428 (85.6)
(50 - 64)	36 (7.2)
( $\geq 65$ )	36 (7.2)
Average age (Mean $\pm$ SD)	$39.20 \pm 12.05$

*N, number of subjects*

Considerable numbers of the subjects were in the stage I (21.4 %) and stage II (8.4 %) hypertensive range. Another 271 (54.2 %) were in the pre-hypertensive range. In addition, several of the participants were either overweight (31.2 %) or obese (11.8 %) with the rest being of normal weight (48.4 %) and underweight (8.6 %) respectively. However, the BP values and the BMI values were significantly associated ( $P = 0.0015$ ) and the prevalence of undiagnosed hypertension was estimated to be 29.8 %.

Average overall SBP and DBP values were  $127.89 \pm 14.81$  and  $86.54 \pm 36.15$  mmHg, while that of BMI was  $24.63 \pm 6.09$   $kgm^{-2}$  and there were no statistical

differences between respective values for males and females in the cohort ( $p > 0.05$ ).

## Discussion

This study revealed a high prevalence (29.8 %) of undiagnosed elevated blood pressure in the community studied. This finding is consistent with findings elsewhere [17, 18] and have been noted to be parts of the reasons for proliferations of hypertension management guidelines worldwide [15,19]. In addition, many of the subjects studied were either overweight or obese. Therefore, there is the need to have them monitor their weight closely considering the established linear relationship between high BMIs and elevated BP coupled with the associated increased risk of cardiovascular mortality [11].

Similitude of above described elevated BP and high BMI values have been noted elsewhere to constitute public health issues [15, 20] given that the concerned subjects are not aware of their conditions and are not presently on any form of therapy. Hence, they are predisposed to complications associated with uncontrolled hypertension and obesity. However, all the subjects encountered in this study were given appropriate health talks to maintaining healthy lifestyle. Those with elevated BP and BMI values in excess of normal ranges were urged to seek appropriate attention at the nearest clinic in the community. The foregoing is an eye opener to the fact that pharmacists have roles to play in the opportunistic screening for high blood pressure in any given community because of their proximity and free access to the locals. Community pharmacists can take up this challenge as a form of community service to the residents of places where their premises are located. This is of utmost importance because BP measurements are taken outside the clinic setting, thus ruling out the white-coat effect. Consequently, concerned individuals are protected from unnecessary exposure to drugs with the attendant side effects.

Limitation of this study includes non-reassessment of BP readings of the subjects investigated granted that hypertension is not usually confirmed with a single set of readings. There is often the need for a revisit at a later date in order to ensure a well informed judgment.

## Conclusion

The prevalence of undiagnosed hypertension in Okparabe community of Delta state, Niger Delta area, South-south Nigeria is 29.8 %. Also, 43.0 % of the cohort have high BMI values. These findings are of public health importance and they demand special attention in order to maintain a healthy community.

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## Competing Interests

No competing interest exists among authors.

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## References

1. Fatiu A, Abubakr S, Muzamil H, Aderoju G, Funmilayo O, Bola O, Adewale A. Undiagnosed Hypertension and Proteinuria in a Market Population in Ile-Ife, Nigeria. *Arab J Nephrol transplant* 2011;4(3):141-146.
2. Burt VL, Colter JA, Higgins M. Trends in the prevalence, awareness, treatment, and control of hypertension in the adult US population. Data from the health examination surveys, 1960 to 1991. *Hypertens* 1995;26:60-9.
3. Kearney PM, Whelton M, Reynolds K, Whelton PK, He J. Worldwide prevalence of hypertension: a systematic review. *J Hypertens* 2004;22(1):11-19.
4. Hansen ML, Gunn PW, Kaelber DC. Underdiagnosis of hypertension in children and adolescents. *JAMA* 2007;298(8):874-879.
5. Cooper R, Rotimi C, Ataman S, McGee D, Osotmehin B, Kadir S et al. The prevalence of hypertension in seven populations of West African origin. *Am J Public Health* 1997;87(2), 160-168.
6. Oladapo OO, Salako L, Sodiq O, Shoyinka K, Adedapo K, Falase AO. A prevalence of cardiometabolic risk factors among a rural Yoruba south-western Nigerian population: a population-based survey: cardiovascular topics. *Cardiovasc J Afr* 2010;21(1), 26-31.
7. Erhun WO, Olayiwola G, Agbani EO Omotoso NS. Prevalence of Hypertension in a University Community in South West Nigeria. *Afr J Biomed Res* 2005;8(1), 15-19.
8. Ekwunife OI, Udeogaranya PO, Nwatu IL. Prevalence, awareness, treatment and control of hypertension in a Nigerian population. *Health* 2010;2:731-755.
9. Ogah OS, Okpechi I, Chukwuonye II, Akinyemi JO, Onwubere BJ, Falase AO et al. Blood pressure, prevalence of hypertension and hypertension related complications in Nigerian Africans: A review. *World J Cardiol* 2012;4(12), 327-40.
10. Foulds HJA, Bredin SSD, Warburton DER. Greater prevalence of select chronic conditions among Aboriginal and South Asian participants from an ethnically diverse convenience sample of British Columbians. *Appl Physiol Nutr Metabolism* 2012;37(6):1212-1221.
11. Tesfaye F, Nawi NG, Van Minh H, Byass P, Berhane Y, Bonita R, Wall S. Association between body mass index and blood pressure across three populations in Africa and Asia. *J Hum Hypertens* 2007;21(1):28-37.
12. Brown CD, Higgins M, Donato KA, Rohde FC, Garrison R, Obarzanek E et al. Body mass index and the prevalence of hypertension and dyslipidemia. *Obes res* 2000;8(9), 605-619.
13. Ughelli south local government. Delta state: The finger of God. Available at <http://www.deltastate.com.ng/Local-Government/ughelli-south.html> (Accessed on June 10, 2014).
14. Creative Research Systems. Your complete survey software solution since 1982. Research Aids. Available at

- <http://www.surveysystem.com/sscalc.htm> (Accessed on January 05, 2013).
15. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 Report. *JAMA* 2003;289(19):2560-2571.
  16. World Health Organization. Global Database on Body Mass Index: an interactive surveillance tool for monitoring nutrition transition. *WHO*, 2006.
  17. Centers for Disease Control and Prevention (CDC). Vital signs: prevalence, treatment, and control of hypertension-United States, 1999-2002 and 2005-2008. *MMWR Morb Mortal Wkly Rep* 2011;60(4):103-8.
  18. Adedoyin RA, Mbada CE, Balogun MO, Martins T, Adebayo RA, Akintomide A et al. A prevalence and pattern of hypertension in a semiurban community in Nigeria. *Eur J Cardiovasc Prev Rehabil* 2008;15(6):687-7.
  19. Flack JM, Sica DA, Bakris G, Brown AL, Ferdinand KC, Grimm Jr RH et al. Management of High Blood Pressure in Blacks: An Update of the International Society on Hypertension in Blacks Consensus Statement. *Hypertens* 2010; 56:780-800.
  20. Hurt RT, Kulisek C, Buchanan LA, McClave SA. The Obesity Epidemic: Challenges, Health Initiatives, and Implications for Gastroenterologists. *Gastroenterol Hepatol (NY)* 2010; 6(12): 780-792.