

Original Research Article

RISK FACTORS AND ANTHROPOMETRIC VARIABLES OF YOUNG PEOPLE WITH ESSENTIAL HYPERTENSION IN UYO, AKWA IBOM STATE.

Abstract

Hypertension, a chronic medical condition is commonly seen in young people in my environment. Certain risk factors are associated with the development of this condition. They include having a positive family history of hypertension, being overweight /obese, excessive alcohol intake, cigarette smoking, high salt intake and others. This study was conducted to find out which of these factors have effect on hypertension on young people.

Method: One hundred and fifty one young people diagnosed with essential hypertension over a one year period January to December 2013 were recruited from patients attending the general outpatient clinic of the University of Uyo teaching hospital. Their age, sex, tribe, occupation and marital status were assessed. Risk factors like cigarette smoking, significant alcohol intake, adding salt to meals before eating, family history of hypertension and history of diabetes mellitus, weight, height, body mass index, hip circumference, waist circumference and blood pressure were assessed.

Result: A total of 151 respondents (n=151) were recruited into the study.48 respondents had stage 1 hypertension while 103 had stage 2 hypertension. More women had hypertension n=84(55.6%). Respondents with secondary level of education had more stage 1 hypertension while those respondents with tertiary education had more stage 2 hypertension. Married respondents had more of stage 2 hypertension n=56(54.4%) than stage 1 hypertension n=22(45.6%). Family history of hypertension was present in n=79(52.3%) respondents. Stage 2 hypertension was associated with having a positive family history of hypertension p=0.001. Adding extra salt to serve meals was associated with stage 1 hypertension p=0.006. Other risk factors were not significantly associated with any stage of hypertension.

Conclusion: Positive family history of hypertension and adding extra salt to serve meals were strong risk factors for hypertension in young persons in this study. So young people with positive family history of hypertension should begin early screening for detection of hypertension and reduce or refrain from adding extra salt to serve meals to reduce risk of developing hypertension.

Keyword: *young people, hypertension, risk factors*

Introduction

Hypertension or high blood pressure is a chronic medical condition in which the systemic arterial blood pressure is elevated.[1] Hypertension is taken as blood pressure reading greater than or

35 equals to 140mmHg Systolic and greater than or equals to 90mmHg Diastolic. [2] A systolic
36 blood pressure of <120mmHg is considered ideal with each 10mmHg increase in blood pressure
37 being accompanied by a 10% greater risk of cardiovascular event and mortality.[3] About one
38 billion people in the world have Hypertension [4] of which young people between the ages of
39 18 and 44 years constitute 6% (national health and nutrition evaluation studies 2009-2011).[5]
40 Hypertension occurs among young people in Nigeria with reported prevalence of 3.3% in South
41 East region [6], 4.3% in Northern region [7] and 30% in South West region.[8]

42 Certain risk factors are known to predispose people to development of essential Hypertension.
43 These factors include non modifiable factors like age (45 years and above)[9], sex (males more
44 than females until age 65years) [9], race (black race) [10] and positive family history [11.12].
45 Modifiable factors include overweight, obesity, cigarette smoking, excessive alcohol intake,
46 excessive salt intake and others.

47 Overweight (25.0kg/m^2 - 29.9kg/m^2 and obesity ($\text{BMI} >30\text{kg/m}^2$) are known to predispose to
48 Hypertension. A study on Africans reported that 6-29% of Hypertension was attributed to
49 overweight and 1-16% was attributed to obesity. [13] Also, obesity may increase the risk of
50 hypertension five fold compared to normal weight. [14] Cigarette contains nicotine which is
51 known to cause release of catecholamine that increase blood pressure and heart rate [15].
52 Excessive alcohol intake (more than 14 units per week for women and more than 21 units per
53 week for men) causes an increase in blood pressure [16]; this it does by stimulating the
54 sympathetic nervous system and increasing adrenocorticoid hormone in circulation [17].
55 Excessive salt intake more than 6g per day [18] is a known risk factor for hypertension through
56 its effect on expansion of the extracellular fluid volume, induction of cardiac myoblast and
57 smooth muscle hypertrophy, activation of NF-Kappa B in proximal tubular cells of the kidney
58 leading to inflammation and changes in the Renin Angiotensin System as well as induction of
59 oxidative stress.[19] Other factors that predispose to hypertension are sedentary lifestyle,
60 exposure to chronic stress, diabetes mellitus and dyslipidaemia.

61 Since there is scarcity of study in Uyo, Akwa Ibom State, Nigeria on risk factors for essential
62 hypertension in young people so this study was undertaken to determine the risk factors and
63 anthropometric variables of young people diagnosed with essential hypertension with the aim of
64 filling the knowledge gap and bringing out which risk factors have the strongest effect on young
65 persons who develop essential hypertension.

66

67 MATERIALS AND METHODS

68 The study was a cross-sectional descriptive study of young people aged 18-44 years (DSMIV
69 classification of young people) with essential Hypertension attending the General Outpatient
70 Clinic of the University of Uyo Teaching Hospital.

71 A semi-structured questionnaire was administered to consenting young people diagnosed with
72 essential Hypertension. The instrument sought information on age, sex, tribe, occupation and
73 marital status. The questionnaire also sought information on risk factors like history of cigarette
74 smoking(current smokers-those that were currently smoking and non smokers- those that never
75 smoked or used to smoke but stopped smoking at least five years ago, significant alcohol
76 intake,(men who took more than 21 units of alcohol per week, women who took more than 14
77 units of alcohol per week , a unit of alcohol was 10 ml of ethanol or 8g of alcohol in various
78 forms beer, spirits and wine), adding salt to meals on table before eating (self report by
79 respondents), exposure to excessive stress on the job, in the family and finance (self report by
80 respondents). Other risk factors assessed were family history of Hypertension (mainly first
81 degree relatives), personal history of diabetes mellitus and family history of diabetes mellitus.

82 Anthropometric measures - Weight, Height and Body Mass Index, Waist circumference, Hip
83 circumference and Waist Hip ratio were done for each patient. The weight was done using a
84 bathroom scale standardized to 0.1kg. Subjects stood on the weighing scale without shoes,
85 remain upright on the scale with the upper limbs to the sides of the body and the weight was read
86 to the nearest 0.1kg and recorded.

87 Height was measured with the subjects standing barefooted against an erect metric rule placed on
88 a perpendicular wall. The subjects stood erect, barefooted, heels together against the wall with
89 the buttocks and back touching the metric rule. The subjects looked straight ahead and a 30cm
90 metric rule was placed on the head of the subjects to note the height of the subject on the metric
91 rule on the wall. The subject moved away from the 30cm metric rule, the height of the subject
92 was read at the point of the head piece on the calibrated wall metric rule to nearest 0.1cm. The
93 body mass index was calculated using the formula $BMI = \text{WEIGHT (kg)} / \text{HEIGHT (m}^2\text{)}$. Waist
94 circumference was done with a measuring tape applied to waist line which is the equidistant
95 abdominal circumference between the costal margin and the iliac crest. The hip circumference
96 which is the widest circumference of the hip was done by measuring the inter-trochanteric
97 diameter of the right and left hip.

98 The blood pressure of the subject was measured using Accuson mercury sphygmomanometer
99 with cuff of appropriate size in a sitting position. Korotkoff sounds one and five were used as
100 systolic and diastolic blood pressure respectively. Two measurements were taken for each
101 subject at 5 minutes interval and the mean blood pressure was used for the analysis. Systolic
102 blood pressure of 140mmHg and above and Diastolic blood pressure of 90mmHg and above
103 were taken as Hypertension [2].

104 Sample population were patients attending the General Outpatients Clinic from where young
105 people diagnosed with essential Hypertension were selected. All young people diagnosed with
106 essential Hypertension over a period of one year January to December 2013 were selected as
107 respondents. Sampling method was consecutive sampling.

108 Exclusion criteria were young persons with secondary hypertension, persons with essential
 109 hypertension above the age of 44 years, young persons with hypertensive heart failure or those
 110 with essential hypertension who were too ill to partake in the study. **Informed written consent**
 111 was received from all subjects selected. Ethical approval was obtained from the Ethical
 112 Committee of the University of Uyo Teaching Hospital for this study. Data analysis was done
 113 using SPSS17.0 version. Results are presented as frequencies and proportions, Chi square was
 114 used while level of significance was set at 0.05.

115

116 Table 1: Socio demographic characteristics of young hypertensive patients attending general out-
 117 patient clinic in Uyo

Variable	Hypertension		Total	Statistical indices
	Stage 1	Stage 2		
Age group				$\chi^2=2.5425$ Df = 4 P value =0.637
20-24	6 (12.5)	7 (6.8)	13 (8.6)	
25-29	11 (22.9)	21 (20.9)	32 (21.2)	
30- 34	12 (25.0)	28 (27.2)	40 (26.5)	
35—39	11 (22.9)	33 (32.0)	44 (29.1)	
40-44	8 (16.7)	14 (13.6)	22 (14.6)	
Sex				$\chi^2=0.0610$ Df = 1 P value =0.805
Male	22 (45.8)	45 (43.7)	67 (44.4)	
Female	26 (54.2)	58 (56.3)	84 (55.6)	
Education				$\chi^2=4.6094$ Df = 3 P value =0.156*
No education	1 (2.1)	1 (1.0)	2 (1.3)	
Primary	4 (8.3)	11 (10.7)	15 (9.9)	
Secondary	26 (54.2)	38 (36.9)	64 (42.4)	
Tertiary	17 (35.4)	53 (51.5)	70 (46.4)	
Marital status				$\chi^2=0.9627$ Df = 2 P value =0.596*
Single	25 (52.1)	45 (43.7)	70 (46.4)	
Married	22 (45.6)	56 (54.4)	78 (51.7)	
Widowed	1 (2.1)	2 (1.9)	3 (2.0)	
Occupation				$\chi^2=5.0525$ Df = 6 P value =0.572*
Applicants	2 (4.2)	8 (7.8)	10 (6.6)	
Artisan	7 (14.6)	16 (15.5)	23 (15.2)	
Civil servants	6 (12.5)	19 (18.5)	25 (16.6)	
Students	13 (27.1)	20 (19.4)	33 (21.8)	
Trading	16 (33.3)	30 (19.4)	46 (30.5)	
Teaching	2 (4.2)	9 (8.7)	11 (7.3)	
Professional	2 (4.2)	1 (1.0)	3 (2.0)	

118

119 Table 1 shows that socio demographic characteristics of both stages of disease are similar among
 120 the respondents.*= Fishers exact.

121 Table 2: Risk factors associated with stages of hypertension among the respondents attending
 122 general out -patient clinic in Uyo.

Variable	Hypertensive		Total	Statistical indices
	Stage 1	Stage 2		
Family history of Hypertension				$\chi^2=10.1666$ Df = 1 P value =0.001
Yes	16 (33.3)	63 (61.2)	79 (52.3)	
No	32 (66.7)	40 (38.8)	72 (47.7)	
Known DM				$\chi^2=1.6381$ Df = 1 P value =0.290*
Yes	5 (10.4)	5 (4.9)	10 (6.6)	
No	43 (89.6)	98 (95.2)	141 (93.4)	
Alcohol consumption				$\chi^2=1.6381$ Df = 1 P value =0.584*
Not significant	44 (91.7)	90 (87.4)	134 (88.7)	
Significant	4 (8.3)	13 (12.6)	17 (11.3)	
Smoking				$\chi^2=0.3314$ Df = 1 P value =1.000*
Yes	1 (2.1)	4 (3.9)	5 (3.3)	
No	47 (97.9)	99 (96.1)	146 (96.7)	
Extra salt				$\chi^2=7.5115$ Df = 1 P value =0.006
Yes	32 (66.7)	59 (57.3)	75 (49.7)	
No	16 (33.3)	44 (42.7)	76 (50.3)	

123

124 Table 2 shows that family history of hypertension is associated with stage -2 disease and adding
 125 extra salt to food is associated with stage 1 disease.*=Fishers exact.

126

127 Table 3: Anthropometric variables of young hypertensive respondents attending general out-
 128 patients clinic in Uyo

Variables	Hypertension		Total	Statistical indices
	Stage 1	Stage 2		
Weight (kg)				tt=0.9972 Df = 149 P value =0.320
Mean (SD)	75.3 (11.8)	73.1 (12.9)	73.8 (12.5)	
Height (cm)				tt=1.6933 Df = 149 P value =0.0925
Mean (SD)	164.9 (9.2)	162.5 (7.9)	163.3 (8.4)	
BMI (kg/m2)				

Normal	14 (29.2)	35 (34.0)	49 (32.5)	$\chi^2=0.3461$ Df = 2 P value =0.841
Overweight	18 (37.5)	36 (35.0)	54 (35.8)	
Obese	16 (33.3)	32 (31.1)	48 (31.8)	
Waist circumference Median (interquartile range)	91 (20)	88 (15)	89 (16)	Z=1.088 P value= 0.2768
Waist hip ratio Normal	36 (75.0)	87 (84.5)	123 (81.5)	$\chi^2=1.9423$ Df = 1 P value =0.163
Abnormal	12 (25.0)	16 (15.5)	28 (18.5)	

129

130 **Result:**

131 A total of one hundred and fifty one (n=151) respondents were recruited into the study. 48
132 respondents had stage 1 hypertension while 103 had stage 2 hypertension (JNC7). More women
133 had hypertension n=84 (55.6%) with n=58 (56.3%) of them having stage 2 hypertension. More
134 respondents n=26(54.2%) with secondary level of education had stage 1 hypertension while
135 n=53(51.5%) with tertiary level of education had stage 2 hypertension. Married respondents
136 n=78(51.7%) had hypertension (n=22(45.6%) had stage 1 and n=56(54.4%) had stage 2). Traders
137 n=46(30.5%) were more than other respondents in occupation. See details in table one

138 Family history of hypertension was present in n=79(52.3%) while n=72(47.7%) respondents did
139 not have any family history of hypertension. Stage 2 hypertension was associated with having a
140 positive family history of hypertension, p=0.001. Most of the respondents did not have co-
141 morbid diabetes mellitus n=141(93.4%) and having diabetes mellitus was not associated with
142 stage 1 or 2 hypertension. Majority of the respondents did not take significant alcohol
143 n=134(88.7%), did not smoke cigarette n=146(96.7%), but n=75(49.7%) added extra salt to meal
144 on table before eating and it was associated with stage 1 hypertension p=0.006.

145 Mean weight of respondents was 73.8kg (12.5 SD), mean height of respondents was 163cm
146 (8.4SD), n=54(35.8%) were overweight, median waist circumference was 89cm and waist hip
147 ratio was normal in n=123(81.5%). There was no significant statistical association between
148 hypertension and anthropometric variables in young people in this study.

149

150 **Discussion**

151 Essential hypertension was rarely diagnosed in young people previously but is now commonly
152 seen in many centers. Hitherto, hypertension in young person were diagnosed as secondary
153 hypertension until proven otherwise. This study of 151 young persons with hypertension showed

154 that essential hypertension was commoner among young females than young males compared to
155 previously held view that hypertension was commoner among males until age 65 when it
156 becomes commoner among females. The finding of this study agrees with the work of Ulasi et al
157 that found that hypertension was commoner among young women aged 20-30 years than males
158 [20].

159 On educational level of respondents in previous studies, it was shown that the less educated a
160 respondent was, the more likely the person to develop hypertension. This is supported by the
161 work of Harvard school of public health on African Americans that showed that low educational
162 level was a risk factor for hypertension [21]. Wang et al also found that respondents with low
163 level education had greater frequency of hypertension 27.7% while those with middle level
164 education (18.8%), and those with higher level of education had less frequency of hypertension
165 (15.8%) [22]. However, in this study the reverse was found. Few respondents with low level or
166 no education at all n=17(11.2%) had hypertension while those respondents with middle and
167 higher education had higher frequency of hypertension n=134(88.8). **The finding from this study**
168 **collaborates the work of Tedesco et al that found most hypertensive had higher education [23].**
169 The finding of hypertension among highly educated people may be due to adoption of western
170 lifestyle and behavior.

171 Family history of hypertension is an additive risk factor for development of essential
172 hypertension. This study found that a positive family history of hypertension was a strong factor
173 for development of hypertension in young people p=0.001. Van der Sande et al had reported that
174 people with a positive family history of hypertension were likely to develop hypertension at a
175 younger age [24]. **Also Ranasinghe et al found the prevalence of hypertension was significantly**
176 **higher in subjects with family history of hypertension than those without a family history [25].**
177 Positive family history of hypertension is also a predictor of increased susceptibility to
178 hypertension because of interaction between genetic trait, environmental factors and behavior.

179 High salt diet is another risk factor for developing hypertension. The relationship between salt
180 intake and blood pressure is direct and progressive as there is a dose response relationship
181 between salt intake and blood pressure in the range of 3 to 12g of salt intake per day [26].
182 **Though ,some studies say only those individuals with salt sensitivity develop hypertension with**
183 **increase salt intake [27] ,** this study found a relationship between adding extra salt to meal before
184 eating and stage one hypertension p= 0.006 maybe those with this response are salt sensitive.

185 Obesity increases the risk of development of hypertension; numerous clinical and animal studies
186 have confirmed a strong relationship between obesity and hypertension [28]. There was no
187 significant relationship between obesity and hypertension in this study even-though n=54(35.8%)
188 respondents were overweight.

189 **The use of self report to measure some risk factors brought recall bias which may have been a**
190 **limitation in this study.**

191 **Conclusion:** Young people affected by hypertension are becoming numerous in my
192 environment. Many factors have been known to be associated with development of hypertension
193 at a younger age but amongst them, having a positive family history of hypertension and adding
194 extra salt to serve meals were strongest. So, regular screening of young people with family
195 members with hypertension and desisting from adding extra salt to serve meals will be
196 beneficial.

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199

200 **References :**

- 201 1. Carrero O A, Oparil S. Essential hypertension, definition and etiology. *Circulation*
202 2000;101(3):325-329
- 203 2. Katakam R, Brukamp K, Townsend R. What is the proper work up of a patient with
204 hypertension. *Cleveland Clinic Journal of Medicine* 2008;75(9):663-672
- 205 3. Kaur J, Singh S, Kaur K Prevalence and effects of various risk factors influencing the blood
206 pressure values. *Cardiology and andrology An International Journal* 2(3):118-113,2014.
- 207 4. Kearney PM, Whalton M, Reynold K, Jiang H. Global burden of hypertension; analysis
208 of worldwide data. *Lancet* 2005;365:217-233
- 209 5. Yoon SS, Burt V, Louis T, Carrol M D. Hypertension among adults in the United States,
210 2009-2010. NCHS data no. 107 National centre for health statistics 2012.
- 211 6. Nwazor F O O, Oputa S C. Blood pressure among young people in South Eastern Nigeria: A
212 cross sectional survey. *Ebonyi Medical Journal* 77-83
- 213 7. Mijinyawa M S, Iliyasu Z, Borodo M M. Prevalence of hypertension among teenage
214 students in Kano, Nigeria. *Niger J Med* 2008; 17(2):173-8
- 215 8. Ekore R I, Ajayi IO, Anje A. Case finding for hypertension in young adult patients
216 attending a missionary hospital in Nigeria. *African Health sciences* 2009;9(3):193-199
- 217 9. Go A S, Mozaffanan D, Roger V L, Benjamin E J, Berry J D, Borden W B et al Heart
218 disease and stroke statistics-2013 update: a report from the American Heart Association.
219 *Circulation* 2013; 127: e6 - e245.
- 220 10. Einhorn P T Interventions to improve hypertension control rates in African American.
221 *Circulation; cardiovascular quality and outcome* 2009;2:236-240
- 222 11. Savoco M R, Quandt S A, Evans C D, Flint T L, Bradfield A G, Morton T B et al. Views of
223 hypertension among young African Americans who vary in their risk of developing
224 hypertension. *Ethn Dis* 2009;19:28-34
- 225 12. Bani I Prevalence and related risk factors for essential hypertension in Jazan region, Saudi
226 Arabia. *Sudanese Journal of Public Health* 2011;6(2):45-50.

- 227 13. Kaufman J S, Durazo- Arvizu R A, Rotimi C N, McGee D L, Cooper R S. Obesity and
228 hypertension in populations of African region. The investigators of the international
229 collaborative study on hypertension in blacks. *Epidemiology* 1996;7(4):398-405
230 14. Nandhini S Essential hypertension. A review article *J Pharm.Sci Res* 2014;6(9):305-307
231 15. Primatesta P, Falaschetti E, Gupta S, Micheal G M, Neil R P. Association between smoking
232 and blood pressure. Evidence from the health survey for England. 2001;37:187-193
233 16. Bello S, Fatiregun A, Oyo-ita A, Ikpeme B. Dose –response relationship between alcohol
234 use and blood pressure among drivers of commercial vehicles in Calabar, Southern Nigeria.
235 *Journal of Public Health in Africa* 2010;1:e5
236 17. Freitas S R S, Cabello P H, Moura-Neto R S, Dolinsky L C, Boia M N Combined analysis
237 of genetic and environmental factors on essential hypertension in a brazillian rural
238 population in the amazon region. *Arq. Bras Cardiol* 2007;88(4):14
239 18. Essien I O. Hypertension an overview. *Ibom Medical Journal* 2011;4(1):1-2
240 19. Drenjancevic – peric I, Jelakovic B, Lombard J H, Kunert M P, Kibel A, Gros M High salt
241 diet and hypertension : Focus on Renin Angiotensin System *Kidney Blood Press Res*
242 2011;34(1):1-11
243 20. Ulasi I, Ijeoma C K, Onwubere B J C, Arodiwe E, Onudugo O, Okafor C. High prevalence
244 and low awareness of hypertension in a market population in Enugu ,Nigeria. *Int J.*
245 *Hypertension* 2011;869675 doi 10.4061/2011/869675.
246 21. www.hsph.harvard.edu/news/hypertension- african american. accessed june29 2015
247 22. Wang T, Chen J, Wang K, Edward C L Education as an important risk factor for the
248 prevalence of hypertension and elevated blood pressure Chinese men and women. *Journal of*
249 *Human Hypertension* 2006;20:898-900
250 23. Tedesco M A, Di Salvo G, Caputo S, Natale F, Ratti G, Lamssi D et al Educational level
251 and Hypertension : Low socioeconomic differences condition healthcare *J Hum Hypertens*
252 2001;15(10):727-31.
253 24. Van der Sande M, Walravan G, Milligan P, Banya W, Ceesa S, Nyan O et al Family
254 history : an opportunity for early interventions and improved control of hypertension,
255 obesity and diabetes. *Bulletin of World Health Organisation* 2001;79:321-328
256 25. Ranasinghe P, Cooray D N, Java Wardena R, Katulanda P The influence of family history
257 of hypertension on disease prevalence and associated metabolic risk factors among Sri
258 Lankan adults *BMC Public Health* 2015;15:576 doi 10.1186/s12889-015-1927-7
259 26. Frisoli T M, Schmeider R E, Grodzuki T, Messerli F Salt and hypertension: is salt dietary
260 reduction worth the effort. *American Journal of Medicine* 2012;125(5): 433-439
261 27. Moo-Yong R High sodium intake: Review of recent issues on its association with
262 cardiovascular events and measurement methods. *Korean Circ J* 2015;45(3):175-183
263 28. Rahmouni K, Correia M L, Haynes W G, Mark A L Obesity associated hypertension.
264 *Hypertension* 2005;45: 9-14.

