Medical Comorbidities and Physical Disability among Hypertensive Patients from a Teaching Hospital Clinic in Enugu, South East Nigeria

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Abstract

Introduction: Physical disability in hypertension may be due to medical comorbidities and the complications of hypertension. It may pose limitations in blood pressure control in Sub Saharan Africa because of added cost of treatment. Little is known about the pattern of medical comorbidities and disability among hypertensive patients in south East Nigeria. **Methods:** This was study cross sectional and descriptive study conducted in the medical outpatient clinic of Enugu State University Teaching Hospital, Enugu Nigeria. Data was collected using a semi structured questionnaire. Level of Physical disability was estimated using the Barthel Index of Activities of Daily Living score. Data was analyzed using SPSS software. **Results:** A total of 436 subjects were surveyed. Males and females were 161 (36.9%) and 275 (63.1%) respectively with a male to female ratio was 1:1.7. Most patients 379 (86.9%) had at least one comorbidity with most of them having two (30.3%). A total of 234 (53.7%) areas of dependency were reported in 69 (15.8%) individuals with an average of 3.4 per individual. The most frequent areas of disability among the 69 were mobility: stair climbing (66.7%), ambulation (58%) and transfers (27.5%). Severe disability was significantly more common in males and increased with age. In bivariate correlation analysis, age, history of stroke, use of herbal drugs positively correlated with the level of disability. BMI negatively correlated with level of dependence. **Conclusions:** Patients with hypertension have high rates of disability and comorbidities especially in the elderly. Measures targeted towards improving adherence and treatment of comorbidities should be developed for these centers.

Keywords: Hypertension; Disability; Comorbidity; Nigeria

Introduction

In Sub Saharan Africa (SSA), hypertension has assumed epidemic proportions and is the single most important modifiable risk factor for cardiovascular disease. Because of low levels of awareness [1-4] patients are likely to present late and often with complications. Hypertension has a lot of complications and may co-exist with virtually any other illness especially diabetes mellitus. [3] Medical comorbidities, complications of hypertension and physical disability can pose limitations in blood pressure control in Sub SSA. The urban-rural differences in the prevalence of hypertension [5] suggest that the burden of the disease may be higher in urban areas. Complications of hypertension such as stroke, renal failure and congestive cardiac failure are common among hypertensives in SSA. [6-9] Arthritis which is also very common in the elderly is frequently treated with NSAIDS hence may pose limitations with blood pressure control. [10] There are mixed findings on the association between hypertension and mood disorders such as anxiety and hypertension. [11-16] These co-morbidities and/or complications of hypertension may result in physical disability. Oyewole et al [17] reported a 62%-90.1% prevalence of disability among stroke patients most of whom who also had hypertension.

To the best of our knowledge, the pattern of physical disability among people living with hypertension has not been previously reported in Nigeria. Exploring the profile of medical comorbidities and pattern of physical disability in people living with hypertension in referral centers not only provides a window into the top end of the problem but also an empirical data for public health educators and policy makers for proper distribution of healthcare resources.

Patients and Methods

Setting

This study was cross sectional and descriptive in nature. It was conducted in the medical outpatient clinic of Enugu State

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University Teaching Hospital (ESUTH), Enugu Nigeria. Enugu is the regional capital of the former Eastern region and presently the capital of Enugu state. It is an educational, governmental, industrial trade Centre located at the foot of the Udi plateau at the intersection of roads from Aba, Onitsha, Abakiliki. Geographically, Enugu is located between longitude 7 degrees 26" E and 7 degrees 30" E and latitude 6 degree 28" N. Its work force consists mainly of civil servants, business men/women, industrialists, artisans, and students. Rural dwellers in the state are mainly farmers. Enugu is bounded by Kogi Benue states (north), Abia and Imo states (south), Anambra (west) and Ebonyi (East). Parklane hospital receives patients also from these surrounding states. At the time of the study, Parklane had 350 beds distributed among the various specialties with 50 inpatient beds for adult admissions for medical cases.

Cases of hypertension are primarily treated by the cardiologists; however, many non-complicated cases are also treated by non-cardiologists. All consecutive consenting patients with hypertension were recruited. In all cases hypertension was considered the primary diagnosis and any other disorder a co morbidity. All cases of acute febrile illness or cough lasting less than 3 weeks were not included as comorbidities. Only cases of hypertension diagnosed by the supervising consultants were included in the study. Exclusion criteria were refusal to participate. Ethical clearance was obtained from the ethics committee of the Enugu State University Teaching Hospital. Ethical conduct was maintained during data collection and throughout the research process. Informed consent was obtained from each study participant. Study duration was 6 months (June to November 2013).

Study design

A semi structured questionnaire was used to collect data on selected sociodemographic characteristics and lifestyle behaviors including smoking, drinking and use of herbal drugs. Past medical history was obtained from the subjects and confirmed from the case notes. The scope of the present study was limited to behavioral and physical measurements, and did not include biochemical measurements (excluding fasting blood glucose).

All participants were interviewed in the clinic. After they had rested in a sitting position for 5-10 minutes, we recorded the blood pressure thrice by means of mercury sphygmomanometer (Chris Aloy®) according to the guidelines of the European Society of Hypertension. [18] The measurements were done by one of the investigators or a doctor not below the rank of a Registrar in the Department of Medicine, ESUTH. All blood pressure measurements were obtained from one arm. Fasting blood glucose was measured using a glucometer (Fine test premium, Infobia co Ltd, Dongan-gu. South Korea) after overnight fasting. Fasting blood glucose was obtained once during recruitment in all the patients. Weight was measured using a bathroom scale in kilograms. Height was measured in centimetres with the patient standing erect. on a flat surface. Body mass index (BMI) was calculated as weight (Kg) divided by squared height (m^2) and categorized as Underweight <18.5 kg/m^2, Normal weight 18.5–24.9 kg/m^2, Overweight 25–29.9 kg/m^2, Obese ≥ 30 kg/m^2.

Definition of terms

Hypertension was defined as a systolic blood pressure (SBP) of ≥ 140 mmHg and/or diastolic blood pressure (DBP) of ≥ 90 mmHg and/or reporting use of anti-hypertensive drug therapy or based on medical records of the subjects. Recent tobacco and alcohol use were defined as use of tobacco in any form and consumption of alcohol within the last 4 weeks. The safe limit of alcohol was defined based on WHO guidelines of 21 U for men and 14 U for women per week. [19] Occupation was defined as the primary job which takes at least 50% of the working hours in a week. An artisan was defined as skilled manual laborers such as masons, mechanics, tailors, welders, metal workers and other crafts. Medical co-morbidities (diabetes, epilepsy and stroke) were defined using standard criteria or past medical history diagnosed by a qualified personnel (doctors). Level of education was the individual's highest educational (formal) attainment

Study instruments

Symptoms of anxiety and depressive were explored using the Hospital Anxiety and Depression Score questionnaire (HADS). [20] The HADS questionnaire is a self-assessment scale developed to detect states of depression, anxiety and emotional distress. [21] Scores for each subscale (anxiety and depression) range from 0 to 21 with scores categorized as follows: normal 0–7, mild 8–10, moderate 11–14, and severe 15–21. The HADS is brief and simple to use and was completed by the patients themselves with help from the investigators. Level of Physical disability was estimated using the modified Barthel Index of Activities of Daily Living (BADL) score. [21] BADL score was used to measure functional disability by quantifying patient's performance in 10 activities of daily life. These activities were grouped according into self-care (feeding, grooming, bathing, dressing, bowel and bladder care, and toilet use) and mobility (ambulation, transfers, and stair climbing) depending on what the patient was actually able to do. Direct testing of the patient was done or with the help of their care giver when necessary. Originally designed by Mahoney and Barthel the instrument has been validated in different settings. [22-25] Level of disability was scored as follows: 0 (0-10) totally dependent, 1 (15-45) severe disability, 2 (50-75) moderate disabilities and 3 (80-95) mild disabilities.

Statistical methods

For database management and statistical analyses, SPSS version 22 (IBM Corporation, New York, USA) was used. Data were presented in tables. For continuous variables, mean values and standard deviation were calculated. Rates were expressed as percentages. Categorical values were compared using the Chi Square test or the Fisher's exact test. Mean values were compared using the independent t-test. In all, p value of < 0.05 was regarded as statistically significant. Conclusions were drawn at 95% confidence interval.

Results

A total of 436 subjects were surveyed. Males and females were 161 (36.9%) and 275 (63.1%) respectively with a male to female ratio was 1:1.7. The age range was 26 – 95 years with a mean of 59.8 ± 12.8. The peak age was the 7th decade followed by the 6th [Table 1]. About 22.7% (90/436) were business men and women and 19.7% (86/436) were retired.

Table 1: Characteristics of participants.

Characteristics	Female	Male	Total	P-value
Anthropometrics				
N, (%)	275 (63.1)	161 (36.9)	436 (100)	<0.01
Age, years, (sd)	57.3 (12.9)	64 (11.1)	59.8 (12.7)	<0.01
Body mass index, kg/m^2 (mean sd)	29.5 (6.5)	27.2 (6.4)	28.7 (6.6)	0.01
Age group (years)	-	-	- 24 (5.5)	
<40, n (%)	22 (57.7)	2 (1.2)	71	
40-49, n (%)	57 (22)	14 (8.7)	(16.5)	
50-59 n (%)	80 (14)	34 (21.1)	114	
60-69 n (%)	68 (6.3)	63 (39.1)	(26.1)	
≥70 n (%)	48 (11.1)	48 (29.8)	131 (30)	-
			96 (22)	
Occupation	-	-	-	
Business, n (%)	81 (29.5)	18 (11.2)	99 (22.7)	
Retired, n (%)	36 (13.1)	50 (31.1)	86 (19.7)	
Civil/public servants/office workers, n (%)	50 (18.2)	35 (21.7)	85 (19.5)	
Farmers, n (%)	44 (16)	11 (6.8)	55 (12.6)	
Artisans, n (%)	18 (6.5)	35 (21.7)	53 (12.2)	-
Unemployed, n (%)	20 (7.3)	5 (3.1)	25 (5.7)	
Housewives, n (%)	24 (8.7)	-	24 (5.5)	
Others (%)	2 (2.1)	7 (4.3)	9 (2.1)	
Level of Education				
None /Primary, n (%)	101 (36.7)	75 (46.6)	179 (40.4)	
Secondary, n (%)	38 (13.8)	25 (15.5))	63 (14.4)	-
Tertiary	136 (49.5)	61 (37.9)	197 (45.2)	
Residence	-	-		
Within Enugu	179 (65.1)	120 (74.5)	299 (68.6)	
Outside Enugu	96 (34.9)	41 (25.5)	137 (31.4)	
Peripheral haemodynamic	-	-	-	
SBP, mmHg, mean (sd)	146.2 (20.5)	145.2 (23.9)	145 (21.5)	0.64
DBP, mmHg, mean (sd)	86.6 (21.8)	86.1 (35.3)	86.4 (11.9)	0.66
Blood pressure controlled	45 (16.4)	30 (18.6)	75 (17.2)	0.54
Glucose, mg/dL (±sd)	154.3 (70.6)	171 (105.9)	160.2 (85)	0.13
Lifestyle	-	-	-	
Current tobacco use, n (%)	25 (9.1)	42 (26.1)	67 (15.4)	<0.01
Current alcohol use, n (%)	78 (28.4)	47 (29.2)	125 (28.7)	0.41
Use of herbal drugs (≤12 months)	195 (70.9)	119 (73.9)	314 (72)	0.5
Chronic use of NSAIDS n (%)	110 (68.3)	182 (66.2)	292 (67)	0.69
Number of comorbidities	-	-	-	
One	81 (29.5)	50 (31.1)	131 (30)	
Two	90 (32.7)	42 (26.1)	132 (30.3)	
Three	55 (20)	32 (19.9)	87 (20)	
Four	12 (4.4)	15 (9.3)	27 (6.2)	
Five	1 (0.4)	1 (0.6)	2 (0.5)	
None	36 (13.1)	21 (13)	57 (13.1)	0.99
HADS Score	5.9 (3.5)	6.1 (3.8)	5.9 (3.6)	0.51
Depression scores	2.4 (2.2)	2.4 (2.4)	2.4 (2.3)	0.96
Anxiety scores	3.5 (2.3)	3.7 (2.5)	3.5 (2.6)	0.33

P-values are for the sex differences. Peripheral systolic and diastolic blood pressure was the average of 3 consecutive measurements.

Behavioral risk factors and medical history

Means of weight and height measurements are shown in Table 1. The mean (SD) of body mass index (BMI) was 28.7 (6.6) kg/m^2 significantly higher in females than males. P=0.01. Two hundred and fifty-four (58.3%) were either overweight or obese. More males 42 (26.1%) than females 25 (9.1%) reported current use of tobacco. p<0.01. Overall, 314 (72%) used herbal remedies in the last 12 months, 292 (67%) were using NSAIDS and 125 (28.7%) drank alcohol at least occasionally [Table 1].

Co-morbidity

The gender distribution of the number of co-morbidities is also shown in Table 1. Most patients 379 (86.9%) had at least one comorbidity with most of them having two (30.3%). The frequency of various comorbidities is shown in Table 2. Commonest co-morbidities were arthritis 212 (48.6%), diabetes mellitus 185 (42.4%) and headache 177 (40.6%). Strokes and Parkinson's disease were more frequently found in males than females. There was no significant difference in mean the ages of those who had comorbidities and those who did not have. P=0.46.

Table 2: Sex distribution of comorbidities in the population.

Variables	Males	Females	Total	p-value
Arthritis	77 (47.8)	135 (49.1)	212 (48.6)	0.8
Diabetes	63 (39.1)	122 (44.6)	185 (42.4)	0.29
Stroke	34 (21.1)	28 (10.2)	62 (14.2)	**<0.01**
Headache	56 (34.8)	121 (44)	177 (40.6)	0.06
Heart Failure	17 (10.6)	20 (7.3)	37 (8.5)	0.24
Parkinson's disease	14 (8.7)	6 (2.2)	20 (4.6)	**<0.01**
Peptic Ulcer	10 (6.2)	17 (6.2)	27 (6.2)	0.51
Chronic liver disease	5 (3.3)	7 (2.5)	12 (2.8)	0.13
Chronic Cough	5 (3.3)	5 (1.8)	10 (2.3)	0.55
Renal Failure	-	3 (1.1)	3 (0.7)	0.67*
Dementia	3 (1.9)	3 (1.1)	6 (1.4)	0.5*
Asthma	6 (3.7)	3 (1.1)	9 (2.1)	0.24*
TB	2 (1.2)	1 (0.2)	3 (0.7)	0.28*
Epilepsy	1 (0.6)	3 (1.1)	4 (0.9)	0.63*
SSD	1 (0.6)	-	1 (0.2)	0.19*
Total	294	481	775	

*Fisher's Exact test

Barthel index of activities of daily living

A total of 234 (53.7%) areas of dependency were reported in 69 (15.8%) individuals with an average of 3.4 per individual. The most frequent areas of disability among the 69 were mobility: stair climbing (66.7%), ambulation (58%) and transfers (27.5%) [Table 3]. The distribution of levels of dependence showed that only 1.8% were totally dependent (males 2.5% and females 1.5%). Severe disability was significantly more common in males and increased with age. P=0.01 [Table 4]. About 14.6% of those 70 years and above were moderately/severely dependent [Table 5]. In bivariate correlation analysis [Table 6], age, history of stroke, use of herbal drugs positively correlated with the level of disability. BMI negatively correlated with level of dependence.

Table 3: Sex distribution of areas of physical dependence.

Variables	Dependent	Males	Females	p-value
Self-care				
Feeding	9 (13)	4 (2.5)	5 (1.8)	0.30
Grooming	12 (17.4)	4 (2.5)	8 (2.9)	0.79
Bathing	37 (53.6)	15 (9.3)	22 (8)	0.63
Dressing	29 (42)	10 (6.2)	19 (6.9)	0.86
Bowel care	11 (15.9)	6 (3.7)	5 (1.8)	0.22
Bladder care	13 (18.8)	5 (3.1)	8 (2.9)	0.97
Toilet Use	19 (27.5)	7 (4.3)	12 (4.4)	0.66
Mobility				
Ambulation	40 (58)	18 (11.2)	22 (8)	0.54
Transfers	19 (27.5)	7 (3.4)	12 (3.4)	0.60
Climbing stairs	46 (66.7)	22 (13.6)	24 (8.7)	0.23
Total	69*	33 (20.5)	36 (13.1)	0.04

*Multiple areas of dependence were observed. p-values for males and females.

Table 4: Sex distribution of levels of physical dependence.

Variables	Total	Males	Females	p-value
Totally independent	367 (84.2)	128 (79.5)	239 (86.9)	
Mild dependence	25 (5.7)	18 (11.2)	7 (2.5)	
Moderate-Severe dependence	36 (8.3)	11 (6.8)	25 (9.1)	
Total dependence	8 (1.8)	4 (2.5)	4 (1.5)	0.01
Total				

Table 5: Age distribution of levels of physical dependence.

Variables	<40	40-49	50-59	60-69	≥70
Totally independent	22 (91.7)	67 (94.4)	99 (86.8)	110 (84)	69 (71.9)
Mild dependence	1 (4.2)	1 (1.4)	3 (2.6)	9 (6.9)	11 (11.5)
Moderate-Severe dependence	1 (4.2)	2 (2.8)	10 (8.8)	9 (6.9)	14 (14.6)
Total dependence	-	1 (1.4)	2 (1.8)	3 (2.3)	2 (2.1)
Total	24 (5.5)	71 (16.3)	114 (26.1)	131 (30)	96 (22)

Table 6: Single correlation coefficients.

Variables	Barthel score (p-value)
Age	**-0.21 (<0.01)**
Sex (1 male, 2 female)	**-0.09 (0.07)**
BMI	**-0.12 (0.02)**
Residence (1 urban, 2 rural)	0.04 (0.32)
Systolic blood pressure	0,00 (0.94)
Diastolic blood pressure	0.02 (0.73)
Blood pressure control (1 yes, 0 no)	-0.01 (0.48)
Number of comorbidities	0.04 (0.31)
Stroke	**-0.24 (<0.01)**
Parkinson's disease	-0.06 (0.22)
Headaches	0.04 (0.39)
Diabetes	-0.01 (0.83)
Congestive heart failure	0.02 (0.65)
Peptic ulcer	0.05 (0.35)
Arthritis	0.05 (0.32)
Herbal medicine (1 yes, 0 no)	**-0.12 (0.01)**
Alcohol (1 yes, 0 no)	-0.08 (0.12)
Depressive symptoms	0.01 (0.77)
Anxiety Symptoms	**-0.15 (<0.01)**
Level of adherence	-0.01 (0.89)

Values are single correlation coefficients (*P*-value).

Discussion

Hypertension is one of the commonest non-communicable medical disorders in SSA however, little is known about the pattern of co-morbidities and physical disability in people living with hypertension. Because of late presentation it is expected that people living with hypertension in SSA will have high rates of complications which may contribute to physical disability and the overall burden of the disease especially in the elderly [8]. Physical disability also adds to an already high cost of treatment in a region where out of pocket payment for medical care is wide spread. [9] This study has demonstrated high rates of physical disability among patients with hypertension attending medical out-patient's clinic in Enugu. Most of the patients (86.9%) had at least one comorbidity with most of them having two (30.3%). It also demonstrated that as many as many as 15.8% of people with hypertension seen in a tertiary medical center may have physical disability with an average of 3.4 areas of disability per individual. Disability was significantly more common in males and increased with age. Important correlates of physical disability include older age, past history of stroke and the presence of anxiety symptoms.

The age distribution of the participants confirms the presently held view that hypertension increases with increasing age 1-5. The relationship between hypertension and age has been attributed to several factors including higher BMI among older individuals and to arterial stiffness. [10,26] The peak age of 60-69 years was similar to a similar study from South South Nigeria and within the range reported in a community based study from the same region 3-5. The age distribution in this study when interpreted in the context of the gender and occupation of the participants gives some insight on the socioeconomic status of patients attending government hospitals. Public health institutions in Nigeria remain the some of the cheapest places to get specialist care in the country and are widely used by health insurance companies. It is not surprising therefore that most of the patients were retired, traders and civil servants. These groups represent the bulk of Nigeria's low-income group. Studies in the country have documented higher prevalence of hypertension among the lower socioeconomic group. [5,26,27]

The rates of tobacco and alcohol use were higher than previously reported 3.5 and may be attributed to the fact that we estimated the use of all forms of tobacco, including snuff

and the consumption of all types of alcohol including local brews. The use of these products may lead to the heightening of cardiovascular complications of hypertension. Our study also revealed a high mean BMI suggesting high rate of obese subjects in the study population. The reasons for this may be older age of patients and low levels of physical activity in these patients. Blood pressure control was achieved only in 17.2% similar in males and females. Previous studies have demonstrated low rates blood pressure control in the region. [1-4,28] Mean SBP and DBP were similar in males and females and is in line with previous reports. [5,28] Based on WHO 2011 database, [29] there has been a consistent increase in the mean SBP and DBP among Nigerians over the past two decades. Our finding is definitely affected by hospital bias, low adherence rates, high rate of obesity and chronic use of NSAIDS8. [30]

The five commonest comorbidities were arthritis, diabetes, headache and strokes. The relationship between hypertension, strokes, congestive cardiac failure and diabetes mellitus has long been documented. [7,9,16,31-33] Chronic use of NSAIDs may explain the very high rates of headache (medication overuse headaches). [33] As expected disorders such as strokes were significantly higher in males which support previous findings. [7,8,34,35] The common comorbidities in the index study are also common causes of disability especially in the elderly. [7,8,34-39] Considering that about 227 (52%) of the subjects were 60 years and above, a large proportion of these patients may have greater burden of disease due to added disability.

Disability was reported in 69 (15.8%) individuals (Barthel score<100) especially in the area of mobility. In a population based study by Marengoni et al. [37] functional disability increased with age and the number of chronic disorders and was seen in 17.9% of participants similar to 15.8% in the index study. The authors demonstrated that the prevalence of disability was higher in specific pairs of diseases such as hypertension and heart failure, hypertension and diabetes, stroke and hypertension. These disorders were common among our cohorts. Similar to our index study, they also found that the prevalence of disability increased with age. In a community based study of elderly Japanese, [38] a total of 20.1% had disability, a proportion slightly higher than 15.8% in this study. The prevalence of disability among the Japanese cohorts also increased with age. In the index study disability was higher in men unlike in these previous studies. Dissimilarities between the index study and these other studies may be attributed to older age of their female cohorts. Considering the gender and the urban/rural differences in the prevalence of hypertension, the burden of disability among people living with hypertension may be overrepresented in the urban areas. [6]

This study revealed a mean HADS score for depression and anxiety of 2.3 and 2.6% respectively. Depression and anxiety among hypertensives have been described in the continent. [10] In SSA where an estimated 16% of adults living with an anxiety disorder and 10% with major depression [39,40] these disorders may play a central role not only in defining the burden of hypertension but also associated physical disability in the community. High rate of drug use including tobacco and alcohol may also contribute to the burden of physical disability in these patients. [41]

This study has some limitations. The index study was conducted in a tertiary referral center likely to attract severe and complicated cases of hypertension as well as an over representation of urban dwellers. We collected data from a teaching hospital setting therefore limiting the generalization of our findings. We applied a cross sectional design which may not reflect the condition of the patient's over time. The significantly higher proportion of female subjects may have biased some of the findings. The instruments used also have some limitations. Even though the HADS scores may be affected by factors relating to cross-cultural challenges in measuring mental health. [42] Barthel Index is limited by inherent ceiling and floor effects, potentially limiting its responsiveness to change in the chronic setting. [22,25]

Nevertheless, our results may useful in formulating local health policies, at least for patients attending tertiary healthcare centers in south east Nigeria.

Conclusion

Patients with hypertension have high rates of disability and comorbidities especially in the elderly. Measures targeted towards improving adherence and treatment of co-morbidities should be developed for these centers.

Conflict of Interest

All authors disclose that there was no conflict of interest.

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