



## ORIGINAL RESEARCH

### Cost of Hypertension Therapy in Tertiary Health Facilities in Nigeria - Patient's Perspective

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#### ABSTRACT

**Background** - Funding needs to be sustainable for hypertension treatment so there is need to evaluate the cost of therapy regularly to guide decision making.

**Objective** - The aim is to evaluate the cost of achieving goal blood pressure (BP) of 139mmHg systolic and or 89mmHg diastolic from the patients' perspective in 2 tertiary health facilities.

**Methods** - Folders of clinically diagnosed hypertensive adult patients aged 21-80years in 2 tertiary health facilities were surveyed retrospectively. Sampling was by systematic random sampling technique choosing every third folder from a list. Sample size was calculated with Cochran formula for population less than 10,000. Out of 723 folders reviewed 227(31.4%) achieved goal BP. Cost of therapy was computed for the 227 folders using the facility price list and local costs for transportation and BP monitoring. Bottom-up, Sum\_Diagnosis specific technique was used to compute component costs excluding intangible costs. Discounting and sensitivity tests were not applicable.

**Results** - The cost range was NGN3,105-NGN35,350(\$8.87-\$101) per patient for 30days Mean monthly patient cost was NGN10,460.38 (\$30). Proportion of component costs in total costs was as follows, Laboratory tests 35.17%, Medicines 31.89%, Hospital charges 22.86%, Transportation 5.58%, Income loss 2.53% and BP monitoring 1.97%. The pattern revealed one facility had slightly higher costs and lower proportion of patients reaching goal BP.

**Conclusion** - Cost of therapy was too high. Monthly cost range was 17.5-19.6% of minimum wage. Policy makers need to adopt strategies to reduce cost and protect hypertensive patients.

**Keywords:** Cost, Hypertension therapy, Component Costs, Patient's perspective, Pharmacoeconomics

#### INTRODUCTION

Hypertension is a chronic health condition that needs to be managed for a lifetime. The efforts of all stake holders in managing this condition for optimum results need to be sustainable. Sustainability is the issue expressed in SDG goal<sup>1</sup>. Hence, there is

need to evaluate the cost of therapy which is an aspect of pharmacoeconomics<sup>2</sup>. Pharmacoeconomic evaluation is an essential tool that enables stakeholders to compare estimated costs and health related outcomes for pharmacy related interventions<sup>2</sup>. Cost of illness studies was the first economic evaluation technique used

in the health industry to measure economic burden of illness<sup>3</sup>. However, many different methods produce varying results. Drummond *et al* (2005)<sup>4</sup> in their work stated that ‘To conduct a cost of illness study, it is necessary to define the disease, the epidemiological approach, types of costs and study perspectives’. They also advocated a careful description and explanation of method adopted. Segel<sup>5</sup>, (2006) highlighted different epidemiological approaches such as top-down, bottom-up or econometric and either prevalence or incidence-based studies. Akobundu *et al*<sup>6</sup>, (2006) in their review of methods of computing cost of illness studies noted that four methods used were Sum\_ All Medical, Sum\_Diagnostic Specific, Matched control and Regression. They further remarked that Sum\_ Diagnostic specific only deals with costs related to the diagnosis. The varying cost values from the different methods are amongst the reasons for the reluctant reliance on these studies for decision making<sup>7</sup>. Nevertheless, a descriptive observational bottom-up studies will identify the actual clinical management of illness and thus will provide information for decision making at different levels<sup>3</sup>. In Nigeria, majority of the population pay for health services directly—out of pocket (OOP) since the various insurance schemes only capture a small percentage of the population. Two insurance policies in Bayelsa state namely, the National Health Insurance Scheme (NHIS) and the Bayelsa Health Insurance Scheme (BHIS) presently enrol a small proportion of the formal sector. This means the average citizen pays for all his/her health needs out of pocket. This research aims to estimate the cost of reaching and sustaining goal BP for adult hypertensive patients attending clinic in two tertiary health facilities in Bayelsa state namely the Federal Medical Centre (FMC) Yenagoa and Niger Delta University Teaching Hospital (NDUTH) Okolobiri, both situated in the capital territory of the state.

## METHODS

### Study Design and Area

A cross-sectional retrospective study design was employed. The study was conducted from July to September 2019 in 2 tertiary health facilities namely Federal Medical Centre (FMC)Yenagoa and Niger Delta University Teaching Hospital (NDUTH) Bayelsa State. NDUTH is located about 10km away from the Yenagoa metropolis while FMC is within the Yenagoa town, which is the capital city of the state.

### Study population

The sample of hypertensive patient’s folders was obtained from the medical records by systematic random sampling choosing every third folder in the serially recorded population data. The folders of patients who attended clinic between 1<sup>st</sup> January 2016 to December 31<sup>st</sup>, 2017, made up the total population of about 1500 in either hospital. Inclusion criteria was all hypertensive patients between 21 and 80 years of age who have been taking anti-hypertensive treatment for at least past four months and attend the health facilities for a refill of their medications. Diagnosis of hypertension was based on the clinical measurement of BP on at least two occasion recording systolic BP greater or equal to 140 mmHg and or diastolic BP greater or equal to 90 mm Hg. Exclusion criteria were pregnant patients, psychiatric patients, patients on clinical trials and patients whose hypertension is secondary to other disease.

### Sample size determination and techniques

Cochrane formula for population less than 10,000 was used. Sample size of 310 patients was required for each hospital. Four hundred data collection forms were made available for filling. in each facility out of which 357 and 366 questionnaires were valid from NDUTH and FMC respectively after removing invalid questionnaires.

### **Data collection procedure and instruments**

Pharmacists were trained to collect socio-demographic, laboratory tests performed, clinical information and medication history from the folders with a questionnaire. The folders for patients who attained a goal BP of less than 140 mmHg for systolic and or less than 90 mmHg for diastolic for 2 months consistently were sorted out. Price lists were obtained from the departments of administration, diagnostic services and Pharmacy for the computation of the various costs. Unit cost of each component was assessed and summed up. Sum\_ diagnostic specific method was applied thus restricting the computed costs to procedures and medicines specific for hypertension. Transportation was assessed from the public transportation department of the community. The cost of monitoring BP was obtained from community pharmacies within the city metropolis. Direct medical costs such as cost of medications, laboratory tests, hospital charges for visits and emergencies, as well as cost of monitoring BP was computed for a month. Also computed in the same manner were direct non-medical costs such as cost of transport, and indirect costs such as income lost due to inability to work and or income paid to informal care giver.

### **Statistical Data analysis**

All data collected were fed into the computer and analyzed using Excel Spread sheet. The results were presented in the form of tables and charts.

### **Data quality assurance**

A pretest was done on thirty patients' folders three weeks before the collection of data. Based on the result, the questionnaire was modified.

### **Ethical considerations**

Ethical clearance was obtained from the Research Ethics Committee of the Federal

Medical Centre, Yenagoa, and Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State before data collection for this study. Ethical conduct was maintained during data collection and throughout the research process.

### **RESULTS**

The costs of various components as paid for by the patient were computed together for all patients who attained the defined goal for the 2 facilities separately and later combined. Cost is shown in Nigerian naira (NGN) and US dollar (NGN 350=\$).

At FMC, Yenagoa the total cost for 137 patients was NGN 1,197,623.00 (\$3,421.8) hence mean value per patient was NGN 8,741.80 (\$25) and a range of NGN 3,105 to NGN 24,380.00 (\$9-\$70) per month see Table 1 for details.

At NDUTH, Okolobiri the total cost for 90 patients was NGN 1,095,569.00 (\$3,130) given a mean of NGN 12,178.98 (\$ 35) and a range of NGN 4650.00 to NGN 35,350.00 (\$13.3-\$101). See Table 2.

Mean cost per patient across both facilities was NGN 10,460.38 (\$30) and the range NGN 3105.00 - NGN 35,350.00 (\$9-\$101). The least cost for components except transport were from FMC, Yenagoa while the highest costs for components were from NDUTH excluding transport. Most costly component was the laboratory diagnostic tests totalling NGN 806,600.00 (\$2304.57) constituting 35.2% of total cost followed by the medicines component which totalled NGN 731,222.00 (\$2089) constituting 31.9% of total cost. The medicines component cost per patient ranged from NGN 900 (\$2.6) to NGN 10,050 (\$28.7) with the mean of NGN 3,221 (\$9.2). The cost of monitoring BP was the least at 1.9% of the total cost and next to it was that for income lost due to missing work or paying for informal care at 2.52% of total cost. The detailed results are shown in the tables below.

**Table 1. Cost of therapy for Federal Medical Centre (FMC) Yenagoa (N = 137)**

Cost type	Medicines	Lab. Tests	Hospital charges	BP monitoring	Transport	Income loss	Total
<b>Total</b>	375,023	480,700	241,000	27,000	73,500	0	1,197,623
<b>Mean</b>	2737.4	3508.8	1760.6	200	536.5	0	8741.8
<b>Least</b>	600	0	1700	200	0	0	
<b>Individual Highest</b>	10,050	11,900	6,700	200	7000	0	
<b>Individual Least total</b>							3,105
<b>Individual Highest total</b>							24,380

USD2017 1\$ = NGN350

**Table 2—Cost of therapy for Niger Delta University Teaching Hospital (NDUTH) , Okolobiri (N=90)**

Cost type	Medicines	Lab. Tests	Hospital charges	BP monitoring	Transport	Income loss	Total
<b>Total</b>	356,169	325,900	283,000	18,000	54,500	58,000	1,095,569
<b>Mean</b>	3,957.43	3,621.11	3,144.44	200	605.55	644.4	12,178.98
<b>Least</b>	900	0	2,000	200	100	0	
<b>Individual Highest</b>	7,950	14,500	23,000	200	3000	10,000	
<b>Individual Least total</b>							4,650
<b>Individual Highest total cost</b>							35,350

USD 2017 1\$=NGN350

**Table 3: Cost of therapy summary for NDUTH, Okolobiri and FMC Yenagoa (N= 227)**

Definition	Medicines	Lab. Test	Transport	Hospital charges	Income loss	BP monitor	Grand Total
<b>FMC Total</b>	375,023	480,700	73,500	241,200	0	27,200	1,197,623
<b>NDUTH Total</b>	356,199	325,900	54,500	283,000	58,000	18,000	1,095,599
<b>FMC + NDUTH</b>	731,222	806,600	128,000	524,200	58,000	45,200	2,293,222
<b>Mean costs</b>	3,246.8	3,585.5	564.8	2,316.7	255.5	200	10,169.2
<b>Least cost item</b>	600 (FMC)	0 (none done)	0 (FMC)	1,700 (FMC)	0 (FMC)		
<b>Highest cost item</b>	10,050 FMC	14,500 NDUTH	7,000 FMC	23,000 NDUTH	10,000 NDUTH		
<b>Least total cost</b>							3,105 (FMC)
<b>Highest total cost</b>							35,350 (NDUTH)

USD 2017- 1\$=NGN350

**Table 4: Cost of therapy Comparison in NGN; FMC versus NDUTH for individual respondent**

Cost components	Least cost		Highest cost		Mean cost		Total cost range	
	FMC	NDUTH	FMC	NDUTH	FMC	NDUTH	FMC	NDUTH
Medicines	600	900	10,050	7950	2,737.4	3,957.4		
Lab. test	000	000	11,900	14,500	3,508.8	3,621		
Transport	000	100	7,000	3,000	536.5	605.5		
Hospital charges	1,700	2,000	6,700	23,000	1,760.6	3,144.4		
Income loss	000	000	000	10,000	000	644.4		
BP monitoring	200	200	200	200	200	200		
<b>Total</b>					8,741.8	12,172.9	3,105- 24,380	4,650- 35,350

**Table 5: Summary of cost of therapy per month, N =227**

Cost components	TOTAL COST in NGN (USD)	% of Total cost
Medicines	731,222 (2089)	31.89
Laboratory Test	806,600 (2304,57)	35.17
Hospital charges	524,200 (1497.75)	22.86
BP monitoring	45,200 (129.1)	1.97
Transport	128,000 (361.7)	5.58
Income loss	58,000 (165.7)	2.53
Total Costs	2,293,222 (6553.06)	100.00

## DISCUSSION

The mean cost per patient was less in FMC, Yenagoa and also 37.4% of patients on treatment attained goal BP in FMC against 25.2% that attained goal BP in NDUTH, Okolobiri. The lower cost of therapy will increase affordability and clinic attendance which should lead to a higher proportion reaching goal. A second factor that would contribute to a greater proportion reaching goal at FMC would be the fact that FMC is situated in the capital city while NDUTH is on the outskirts of the capital therefore FMC should be easier to access. Pesa *et al*<sup>8</sup> (2012) reported that for every US \$ 1 increase in patient's out of pocket spending there was 1.1 days decrease in proportion of days covered by hypertensive therapy.

The mean cost for a patient was \$30 per month (\$25-\$35). Some other studies in low and medium- income countries (LMICs) were found to yield similar results. Ganiyu and Suleiman<sup>9</sup> (2014) reported \$27.5 per

month in a Nigerian private teaching hospital, while Oyando<sup>10</sup> *et al.* (2019) reported \$304.8 per annum (\$25.4/month) in public health facilities in Kenya.

The range of total cost to the individual was between \$8.87 - \$101 for a month and for medicines \$2.6-\$28.7. This amount is reasonably too high to be spent by an individual on a chronic disease (excluding cost for co-morbidities) in a country where the minimum wage at the time was \$51.4 per month. The range represent 17.4%—196.5% of the minimum wage. Given the high prevalence of greater than 15%<sup>11-14</sup>, Nigerians would spend enormous resources in therapy of hypertension alone. Hence, a multidisciplinary healthcare team should be equipped to manage hypertension<sup>15</sup>. Uncomplicated hypertension should be managed at the lower level of care. Also, cost-effective options of medicines should be prescribed to reduce the wide cost range for prescription medicines<sup>16</sup>. There should be emphasis on predisposing factors for

hypertension and the need for lifestyle modifications as this has proved effective in high BP reduction<sup>17</sup>.

The diagnostic services components were highest constituting 35.2% followed by medicines 31.8%. Hospital charges which constitute 22% would have been lower if basic care for hypertension was limited to lower level of care. The lower levels of health care are often nearer to the patients and so would further reduce the cost.

## CONCLUSION

The mean cost per month for a patient was found to be in the range of NGN 8741.8 to NGN 12,178.9 (\$25-\$35). The total cost per month was found to be in the range of NGN3,105 to NGN 35,350 (\$9-\$101) representing 17.4% to 196.5% of the national monthly minimum wage at the time of study. This cost is too high to ensure sustainability hence the need for policy makers to formulate policies that would reduce cost. Cost-effective medicines should be prescribed to reduce the wide range of prescription medicines.

Government should facilitate the move towards universal health coverage to protect citizens. The health system should have multidisciplinary teams to manage hypertension and other chronic diseases in an integrated way. Uncomplicated hypertension should be managed at the lower levels of care.

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