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Predictors of Cost of Follow-up Care among Patients with Hypertension and Diabetes Mellitus Attending a Teaching Hospital, North Central, Nigeria

O. A. Bolarinwa[1*], A. Abdulahi[1], E. O. Sanya[2], P. M. Kolo[2], H. A. Ameen[1], K. A. Durowade[4], M. M. B. Uthman[1], J. A. Ogunmodede[2], S. A. Buliaminu[5], L. O. Odeigah[3] and T. M. Akande[1]

[1]Department of Epidemiology and Community Health, Faculty of Clinical Sciences, UITH/University of Ilorin, Nigeria; drdeji@yahoo.com
[2]Department of Medicine, Faculty of Clinical Sciences, UITH/University of Ilorin, Nigeria
[3]Department of Family Medicine, UITH, Ilorin, Nigeria
[4]Department of Community Medicine, Federal Teaching Hospital Ido-Ekiti/ABUAD, Ado-Ekiti, Nigeria
[5]Department of Chemical Pathology, Faculty of Basic Medical Sciences, UITH/University of Ilorin, Nigeria

Abstract

Background: In sub-Saharan Africa, hypertension and diabetes mellitus (type II) remain major causes of cardiovascular disease. The prevalence of hypertension and diabetes remain high in Nigeria while the initial and follow-up management are almost entirely hospital-based. This constitutes huge financial burden not only to the patients, care givers and families, but also to the health system and the government. Information on basic cost of care of hypertension and diabetes and of those having both diseases as co-morbidities is still scanty in Nigeria. There is need to study the factors that strongly determine cost of follow-up care among this group of patients. **Methodology:** This study is a hospital-based cross-sectional study of 1,203 hypertensive and diabetic patients attending general and medical outpatient clinics of a teaching hospital in Nigeria. **Results:** The patients spend N6,401 ($32.16) on the average whenever they attend follow-up clinic. Close to three-quarter (71.3%) of the patients spent more than 30 minutes to access follow-up clinic while similar proportion (74.3%) spent more than an hour waiting to be seen at the clinics. Major predictors of cost of follow-up care among hypertensive and Diabetics were; Drug, transportation and laboratory costs. Other predictors were; Male gender, long waiting time, accompanies persons; and co-morbidity of hypertension and diabetes. **Conclusion:** This study recommended that strategies that will reduce the cost of drugs, laboratory tests, and reducing waiting time will reduce the cost of managing hypertension and diabetes in Nigeria.

Keywords: Care, Costs, Diabetes, Follow-up, Hypertension, Predictors.

1. Introduction

Nigeria, just like many other developing Countries is in epidemiologic transition where chronic Non-Communicable Diseases (NCDs) are assuming both medical and economic importance. Hypertension and Diabetes Mellitus (DM) top the list of NCDs with high public health importance in Nigeria[1].These two chronic medical conditions are the most important risk factor for Cardiovascular Diseases (CVDs) in sub-Saharan Africa. Thus, they have emerged as major public health concern due to the enormous financial burden associated with the diseases[1,2]. For instance, hypertension was ranked first in a multi-centre study of cardiovascular diseases in Nigeria and was reported to be the medical illness most frequently diagnosed among elderly Nigerians[3,4]. The management of both hypertension and DM requires many years of investment in order to prevent complications and ensure disease-free year among

*Author for correspondence

those affected. Hypertension alone has been estimated to cost about 4.5% of the global disease burden due to the long treatment period[5]. In addition, tackling these two diseases remains complex because of the multifaceted lifestyle approaches in treating them and the cost implication of a lifetime treatment regime.

There are direct cost (monies spent during the process of accessing health care), indirect cost (time spent in accessing care, temporary/permanent disabilities) and intangible cost (psychological and physical pain) incurred while managing chronic diseases like hypertension and diabetes[6]. These costs which are largely borne by the patients in developing countries usually form huge barrier to successful treatment outcome. For instance, over 7 million cases of DM were recorded in the Africa in the year 2000 and these accounted for total economic loss of over $ 25 billion[6]. This simply meant about $3,633 was spent per patient with DM in the region.[6] The World Health Organization (WHO) has projected that the total economic burden of diabetes mellitus and CVDs in low and lower middle income countries from the year 2011-2025, to be about 0.11 and 1.24 trillion US dollars respectively[7]. The economic burden of CVDs in Africa is reported to be significant high[8]. It has been projected that if hypertension and diabetes are not adequately controlled, CVDs will cost the continent billions of dollars in the next decade[9]. There is already financial burden in the form of direct healthcare costs related to treatment of CVDs and its risk factors which include hypertension and diabetes[9]. These costs will be borne by the individuals, governments, and the private sector.

Presently, there are numerous costs related to hypertension and diabetes morbidity, data for which are fragmented for most African countries. These costs include the loss of productivity of workers who have cardiovascular complications like stroke, heart failure, and ischemic heart disease[8]. Other costs include the loss of savings and assets that are foregone when families must meet catastrophic healthcare expenditures[8]. In addition to these, there are major economic and social (opportunity) costs to families, who in the near absence of formal care systems need to provide often intensive long term care to older relatives[10]. The average amount of healthcare expenditure as a percentage of Gross Domestic Products (GDP) for African countries is 6.3%[10]. There is also a wide range of health care expenditure per capita across African countries from as little as $6 per capita in Ethiopia to as much as $390 per capita in South Africa[10]. Nonetheless, the observed ratio in Africa is quite small compared with $ 3,727 per capita for high-income countries[10].

The high cost of care for hypertension and DM is a serious concern for low resource setting like Nigeria with per capita income of $3,203 in 2014and minimum wage of ₦18000.000 (US$90.45)[11]. If a large percentage of this monthly income is spent on follow up care such as transport to health facility, investigations and purchase of medication, it leaves a very little amount for the family upkeep. This can easily result in catastrophic health expenditure for the patients[12]. Alternatively, this can result in patients prioritizing their spending and forego follow-up care in order to buy food and other essential supplies for the family[9,12]. In some instances, the cost of prescribed medications could be a barrier for many patients to access the healthcare services[13]. This could result into Cost-Related Non adherence (CRN) which is defined as any form of medication under use because of cost, including unfilled prescriptions, delayed prescriptions, smaller doses and less frequent doses[13].

While studies[14–16] have reported some cost analysis among Nigerians with hypertension, fewer studies[17,18] exist on cost of DM care in Nigeria with little to nothing on factors that predict cost of care among Nigerians with both hypertension and DM. This study was carried out to assess the cost of follow-up care and its predictors among Nigerian patients with hypertension and DM attending outpatient's clinics in a tertiary hospital in Ilorin, Nigeria.

2. Methods

2.1 Study Design and Study Setting

This is a hospital based cross-sectional study among registered patients with hypertension and DM (type II) attending outpatient clinics (General Outpatient Department and the Medical Outpatient Department) of the University of Ilorin Teaching Hospital (UITH), Ilorin, Kwara state of Nigeria. The hospital serves as a tertiary health facility and receives referral from public and private hospitals from within and outside the state. Adult patients (of over 18 years of age) with hypertension, DM or having both diseases were recruited into the study. Desired sample size of 1,203 patients was recruited using systematic random allocation over 6 months between 2015 and 2016.

2.2 Informed Consent and Ethics

Informed consent was obtained from eligible patients after explaining research concept to the patients in the language they best understand. Ethical approval for this study was obtained from the UITH Ethical Review Committee.

2.3 Data Collection and Analysis

Data was collected using Clinical Report Form (CRF) and questionnaire. The data collection was between October 2014 and April 2015 as part of a large cross-sectional survey on profile and predictors of medical outcome of patients with hypertension and diabetes. The CRF was used to collect data on patients' medical information and parameters such as; Blood Pressure (BP), Body Mass Index (BMI), disease history, drug history, complication and co-morbidity history and hospital follow-up history. An interviewer-administered questionnaire was used to collect information on socio-demography and expenditure on clinic follow-up visits.

The data was analysed using IBM© SPSS version 22. A descriptive analysis of socio-demographic characteristics and cost of care was done. Inferential statistics on determinants of costs of care was performed using t-test and F-tests. These formed initial screening analysis for regression modelling. Official exchange rate of Nigerian Naira (₦) 199 per US$ was used to convert cost from local currency (₦) to US$. Predictors of cost were modelled with linear regressions. Variable with p-value of < 0.25 or clinical importance (biological plausibility) were included in the modelling. Stepwise analysis was used for Multiple Linear Regression (MLR). Model fits well at R^2 (regression coefficient) = 0.779, model assumption was met and there were no interaction and multi-colinearity. The levels of significance were set at 95% confidence interval (95% CI) while p-value of < 0.05 was set to be statistically significant.

3. Results

Table 1 shows the socio-demographic distribution. The mean age of patients with hypertension and diabetes was 57 years ± 12 years. Females predominate with 73.5%. Yoruba is the predominant tribe (92.3%) in the study area while over a third (36.9%) of the patients had no formal education. Though majority was married (74.7%), more than a fifth of the patients had lost their spouses. Muslims were almost two-third (65.6%) of the patients' population. Small business owners (48.4%) and civil service (21.7%) were the two predominant occupations among the patients, however, 87 (7.2%) of the patients studied were with no paid job.

Table 1. Socio-demographic characteristics (N=1203)

Variables	Frequency	(%)	Mean (SD)
Age			
21-30	18	(1.5)	57.5 (12.3)
31-40	94	(7.8)	
41-50	243	(20.2)	
51-60	385	(32.0)	
61-70	315	(26.2)	
>60	148	(12.3)	
Gender			
Male	319	(26.5)	
Female	884	(73.5)	
Ethnicity			
Yoruba	1111	(92.3)	
Hausa	6	(0.5)	
Igbo	18	(1.5)	
Others	68	(5.7)	
Educational level			
No School at all	444	(36.9)	
Primary	217	(18.0)	
Junior Sec (JSS)	28	(2.4)	
Senior Sec (SSS)	154	(12.8)	
Quranic	48	(4.0)	
Higher Institution	224	(18.6)	
Postgraduate	71	(5.9)	
Vocational Training	12	(1.0)	
Others	5	(0.4)	
Marital status			
Married	899	(74.7)	
Single	17	(1.4)	
Divorced	24	(2.0)	
Widowed	263	(21.9)	
Religion			
Islam	789	(65.6)	
Christianity	375	(31.2)	
Traditional African	22	(1.8)	
Others	17	(1.4)	
Main job			
Technician/Artisan	16	(1.3)	

Small Business	582	(48.4)
Large business	49	(4.1)
Farmer	64	(5.3)
Civil Servant	261	(21.7)
Health Care worker	32	(2.7)
Student	23	(1.9)
Others	89	(7.4)
No paid Job	87	(7.2)

Cost and access to follow-up care is shown in Table 2. This table showed that majority of the patients' household (92%) earned less than ₦20,000 ($100) per head/month with a mean and median monthly income of ₦8,949 ($44.9) and ₦4,000 ($20.1) per head respectively. Close to half of the patients (45.4%) were living on less than $2 while more than a quarter (26.7%) were living in an extreme poverty of less than $1 per day. About 77% of patients took public transport to the clinic with an

Table 2. Cost and access to follow-up care (N=1169)

Variables	Mean (SD)	Median (IQR)	Freq.	(%)
Monthly Household income per head (₦)	*8949 (17576)*	4000 (8333)		
<20000			1075	(92.0)
21000-30000			38	(3.3)
31000-40000			21	(1.8)
41000-50000			11	(0.9)
>51000-60000			24	(2.0)
Patients living on < 2 USD				
< 2 USD			538	(45.4)
> 2USD			648	(54.6)
Methods of payment for clinic cost (n=1203)				
Out of Pocket			611	(50.8)
Health Insurance			111	(9.2)
Employer			26	(2.2)
Relative			455	(37.8)
Hospital travel time (Minutes)	55 (37)	45 (30)		
<30			345	(28.7)
30 – 60			689	(57.3)
>60			169	(14.0)
Clinic waiting time (hrs. mins)	2.54 (1.65)	2.00 (2.50)		
<1hour			301	(25.7)
1-2hour			343	(29.4)
2-3hour			214	(18.3)
3-4hour			157	(13.4)
4-5hours			95	(8.2)
>5hours			59	(5.0)
Cost of care (₦)				
Transportation	495.43 (799.68)	500 (600)		
Drug cost	2402.04 (2319)	2500 (2275)		
Laboratory test cost	934.99 (3484)	700 (1900)		
Hospital charges	251.33 (247)	200 (100)		
Accompany persons cost(N =78)	3881.86 (4661)	2000 (9000)		
Total Expenditure	6401.33 (10707)	3650 (3025)		

average cost of ₦495 ($2.5) per visit. Similarly, the total expenditure was ₦6,401 ($32.16) on the average for clinic attendance. Drug constituted a third (₦2,402) of the total expenditure. Close to three-quarter (71.3%) of the patients spent more than 30 minutes to travel to the hospital while similar proportion (74.3%) spent more than an hour before they were attended to by doctors (Table 2).

The determinants of cost of attending clinics are shown in Table 3. Our results showed that male patients significantly ($p<0.01$) spent more money than their females counterpart during follow-up visits. Patients with accompanying person(s) spent far more than those who came alone for their follow-up clinic appointments ($p<0.001$). Although patients whose employer paid for the cost of follow-up visit spent more (₦7,536) compared to those who self-financed their cost (₦4,112) and other forms of healthcare financing. The observed difference did not attain any statistical significant on post-hoc (Tamhane test) analysis. Individuals who self-financed their hospital cost had significantly higher cost than those on Health Insurance Scheme with a p-value of < 0.001 (post-hoc Tamhane test). Patients with both hypertension and DM significantly spent more than those with either hypertension or diabetes alone (post-hoc Bonferoni) [$p<0.05$]. Similarly, patients with cardiovascular complications and presence of other comorbidities spent more than those without co-morbidity. The observed difference was not statistically significant ($p=0.137$). The level of blood pressure control and poverty did not influence the cost of follow-up care.

Table 4 shows Simple Linear Regression (SLR) and Multiple Linear Regression (MLR) analysis. These analyses determined the main predictors of cost of follow-up care among patients with hypertension and DM in UITH, Ilorin. On SLR the following 3 direct costs predicted the cost of follow-up care; i) for every ₦1 increase in drug, the cost of follow-up care increased by ₦1.34 ($p<0.001$. CI=1.25, 1.42), ii) for every ₦1 increase in transport, the cost of follow-up care increased by ₦2.59 ($p<0.001$. CI=2.30, 2.89) and iii) for every ₦1 increase in laboratory test, the cost of follow-up care increased by ₦1.21 ($p<0.001$. CI=1.16, 1.25).

The socio-demographic and clinical factors (Table 4) that increased cost of care were; i) male gender increased costs of care by ₦1,132 ($p<0.001$. CI=537, 1,727), ii) having both hypertension and DM as co-morbidity increased

Table 3. Determinants of cost of follow-up care

Factor	Sub-group (n)	Mean + SD(₦)	Test Statistic	p-value	CI
Gender	Male	4714 + 7416	2.642[a]	0.009*~	289, 1975[#]
	Female	3582 + 3073			
Accompany person for follow-up visit	Yes	5294 + 6048	5.080[a]	0.000*~	1161, 2628[#]
	No	3399 + 3999			
Co-morbidity	Yes	4186 + 5316	1.489[a]	0.137^	-1.37, 1002
	No	3753 + 4335			
BP Control	Yes	3926 + 5241	0.710[a]	0.478^	-356, 764
	No	3723 + 3102			
Financing follow-up healthcare	Out of Pocket	4112 + 4828	14.195[b]	0.000*~	-
	Health Insurance	1726 + 2227			-
	Employer	7536 + 13907			-
	Relative	3889 + 3323			-
Morbidity Type	Hypertension	3722 + 4902	4.199[b]	0.015*^	-
	Diabetic	3670 + 2137			-
	Both	4810 + 3748			-
Living less than USD	<1USD	3863	-0.104[a]	0.918^	-634, 571
	>1USD	3895			

a = t-test, b = F-test, IQR = Interquartile range, * = significant (p-value < 0.05), [#] = significant 95% CI.
^ = Equal variance assumed, ~ = Equal variance un-assumed

cost of care by ₦1,091 (p<0.01. CI=352, 1,829) and iii) having employer pay for follow-up care increased cost by ₦3,735 (p<0.001. CI=1,934, 5,537).

The indirect cost predictive factors for the follow-up care in this study were (Table 4); i) for every hour increase in waiting time there was increase in cost of care by ₦517 (p<0.001. CI=373, 666), ii) those with accompany person to the clinic had the cost of care increased by ₦1,889 (P<0.001. CI=1,290, 2,487) and iii) for every one minute increase in travel time to the clinic, there was ₦32 increase in the cost of care (p<0.001. CI=25, 39).

On MLR while adjusting (controlling) for other variables in the model, only 4 factors predicted cost of follow-up care and these were; i) every ₦1 increase in cost of transportation increased the cost of follow-up care by ₦1.49 (adjusted), ii) every ₦1 increase in laboratory test increased the cost of follow-up care by ₦1.10 (adjusted), iii) every hour increase of waiting time increase the cost of follow-up care by ₦175 (adjusted), and iv) having both hypertension and DM increased the cost of follow-up care by ₦1,237 (adjusted).

4. Discussion

The age distributions showed that majority of the patients were above 40 years of age with a mean age of 57 years which is close to retirement age of 60 years in the Nigerian civil service[19]. This could have affected on the earning capacity of these patients thereby reducing their accessibility to follow-up care. Furthermore, majority of the patients earned less than ₦20,000 ($100) per month with an average monthly household income of ₦8,949 ($44.9) per head. The proportion (92%) of patients earning less than ₦20,000 per month is higher than 67% reported by Ilesanmi et al.,[15] among hypertensive patients in a semi-urban hospital in a neighbouring state to the study site. This difference could probably be adduced to difference in study settings and patients' population. The high proportion of low income earners among the study population was further buttressed by our analysis which showed that close to half of them lived on less than $2 per day while a quarter lived on less than $1 per day. This figure indicated high poverty rate among the patients with hypertension

Table 4. Main predictors of cost of follow-up care

Variables	SLR[a]		MLR[b]		
	β (95% CI)	p-value	Adjusted β (95% CI)	test statistic	p-value
Drug cost	1.34 (1.25, 1.42)	<0.001*	-	-	-
Transport cost	2.59 (2.30, 2.89)	<0.001*	1.49 (1.32, 1.66)	17.16	<0.001
Laboratory test cost	1.21 (1.16, 1.25)	<0.001*	1.106 (1.06, 1894)	53.51	<0.001
Hypertension and Diabetics comorbidity	1,09 (352, 1829)	0.004*	1,237 (880, 1594)	6.80	<0.001
Waiting time in the clinic (hrs)	517 (374, 667)	<0.001*	175 (104.3, 245.7)	4.86	<0.001
Adherent to drug	2.59 (-29, 1035)	0.126	-	-	-
Male Patient	1,132 (537, 1727)	<0.001*	-	-	-
Accompany person to the clinic	1,89 (1290, 2487)	<0.001*	-	-	-
Travel time to the clinic (min)	32 (25.30, 39.2)	<0.001*	-	-	-
Employer pays for care	3,735 (1934, 5537)	<0.001*	-	-	-
Out of pocket spending for care	469 (-58, 997)	0.081	-	-	-
Presence of Co-morbidity	443 (-12.7, 1012)	0.126	-	-	-
BP control	70 (-475, 4616)	0.801	-	-	-

* significant
[a] Simple Linear Regression (SLR)
[b] Multiple Linear Regression (MLR)
Variable with p-value of <0.25 or clinical importance were included in the modelling
Stepwise used for MLR
Probability of F to enter < 0.050. Probability of F to remove > 0.100
R^2 = 0.779, model fits well, model assumptions are met and there are no interaction and multicolinearity.

and diabetes in Ilorin, Nigeria. It also reflected the poverty index rate of the country where over 70% of its population lives on less than $1 per day[20,21].

Hypertension and DM run chronic courses therefore people living with these diseases have to be on medical treatment for a lifetime[5]. This will improve patients' well-being and also reduces the cardiovascular complications. Therefore the implication of our study finding is that; it will be difficult for patients that live on less than $2 but spend $32 for every follow-up visit to achieve treatment and follow-up visit compliant. Similarly the patients will have difficulty meeting other household's finances and financing other basic needs of life thereby resulting in catastrophic health expenditure[12].

The patients from our study spent ₦6,401 ($32.16) on the average for follow-up clinic cost. This cost of clinic follow-up attendance is high, keeping in view the high poverty rate observed among the patients. This finding is comparable to a study by Osibogun et al.,[14] that assessed anti-hypertensive prescription and cost pattern in an Outpatient department of a teaching hospital in Lagos State, Nigeria. The study reported that over 30% of minimum wage is spent monthly by patients[14]. Our finding was however lower than a micro-costing study[16] which assessed the costs of CVD prevention and care in a Primary Health Care (PHC) clinic. The study revealed that the cost of CVD prevention care was $144 per patient per year[16]. This was conducted among enrollees in a health insurance programme of a rural community in Kwara State, Nigeria[16]. The subsidized prepayment insurance scheme nature of this study would have biased the higher cost reported. In addition, the Kwara study reported both inpatients and outpatients scenarios, in contrary to our study which studied outpatient patients. However our finding was higher than the study conducted by Ilesanmi et al.,[15] in another neighboring state. This study found that the mean cost of treatment was ₦1440±560 ($9.6±3.7) with 52.8% of the patients spending more than 10% of their income on treatment[15]. The difference in study settings between Ilesanmi et al (rural setting) and our study (urban) could be the most binding reason for the observed difference.

On descriptive analysis, our study found that drug constituted major component of cost of follow-up visits for the patients. This is similar to other studies that have reported drugs as major financial demands of managing hypertension[14–16] and diabetes[17]. It was also observed that over three-quarter of the patients spent more than 30 minutes to get to the clinic in this study. This observation is less than the recommendation for travel time to health facility in developing countries[22]. Similar proportion of the patients also spent more than an hour to be seen in the clinic. This probably reflects the health system that is being overwhelmed by disease burden (including hypertension and diabetes) which has characterized Nigerian health system in recent time[20].

This study screened several factors for inferential analysis so as to establish statistical significance of observed mean differences in the cost of follow-up care by the patients. It was revealed by this study that male patients significantly spent more on their clinic follow-up care than their female counterparts despite the fact that close to three-quarters of females made up attendance at the outpatient clinics. This shows the gender inequalities characterized by male financial dominance in the study area and health financing implication of low female education and empowerment in Nigeria[20]. The patients who had accompanying person(s) to the clinic also spent more than those that came alone. While this shows the culture of family support in the management of diseases in Nigeria, it adversely contributed to the indirect cost of managing hypertension and diabetes in Nigeria.

Expectedly, the patients whose cost of follow-up care was financed by their employer spent more but this was not statistically significant. However, patients who paid by Out-of-Pocket (OOP) and those paid for by their relatives significantly spent more than those on health insurance. The health insurance scheme program among the patients in the study area is predominantly Nigerian National Health Insurance Scheme (NHIS). This scheme was established as a social security system where the health care of the employees in the formal setting is paid for by a pooled contribution from the employee and employer[21]. While OOP expenditure and family supports still remained the commonest health financing options in Nigeria, health insurance scheme remains the best option for patients with hypertension and diabetes. There is requirement for a steady and sustainable source of fund[21] in the management of hypertension and diabetes which OOP and family sources may not be able to sustain.

Previous study[14] documented association between co-morbidity and cost of medication prescription. This study also reported that the cost of patients with co-morbidity such as diabetes could be as high as ₦7000.00 per month[14]. Unlike other cost analysis studies in Nigeria that singled out either patients with hypertension or diabetes for

analysis, this study collected data on naturally occurring scenarios of hypertension and diabetes comorbidities in outpatients clinics where one of the diseases is a risk factor for the other. Therefore, this study found that patients with comorbidity of hypertension and diabetes significantly spent more than those patients with hypertension or diabetes alone. Likewise, the patients with more cardiovascular complications (like stroke and heath failure) also spent more (significantly) than those without any complication. This implies that co-existence of other chronic conditions and/or complication will increase the cost of follow-up care thereby further worsen financial access to follow-up care.

The inference made from the Linear Regression (LR) modeling performed in this study can be broadly categorized into 2 namely; SLR and MLR. The predictors of cost follow-up care obtained from SLR were classified into 3 namely; i) Direct costs predictors, ii) socio-demographic and clinical profile predictors and iii) Indirect cost predictors. The direct cost predictors were drugs, transport cost and laboratory cost. Expectedly, drug has been established as a major driver of cost of care of cardiovascular disease in Nigeria[15,16,20,21]. This study also reported the importance of transport and laboratory costs in the follow-up care of patients with hypertension and diabetes in Nigeria. The socio-demographic and clinical profile predictors established by this study were; male gender, comorbidity of hypertension and diabetes and finance by employ. The indirect costs that predicted cost of follow-up care were; waiting time, accompanying person(s) and travel time. After adjusting for other factors in MLR only 4 factors predicted costs of follow-up namely; transport cost, laboratory cost, waiting time and comorbidity of hypertension and diabetes. Surprisingly after adjustment, drug no longer predicted cost of care but transport care and laboratory did predict cost of follow-up care.

5. Conclusion and Recommendation

This study showed high cost of follow-up care among patients with hypertension and diabetes attending clinics in UITH Ilorin, Nigeria compared to their earning capacity. Patients with health insurance spent far less than those with OOP and those with support from relatives. Drug, transport and laboratory cost are major direct costs that predicted their cost of follow-up care while waiting time, accompanying person(s) and travel time are major indirect cost predictors. Gender inequalities, patients with comorbidity of hypertension and diabetes; and finance by employer are the other factors that predict cost of follow-up care. It is recommended that social benefit in the form of health insurance scheme should be scaled-up to patients living with hypertension and diabetes so as to improve their financial accessibility to health care. Strategies to reduce waiting time in teaching hospital like strengthening of secondary and primary hospital should be implemented. Health intervention strategies like home based care, task shifting scheme and mobile health (m-health) could be used to reduce both direct and indirect costs; and reduce health inequalities.

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