

# Willingness to Pay for Medicines used in the Management of Hypertension and Diabetes Mellitus in Plateau State, Nigeria.

Dauda A Dangiwa<sup>1\*</sup>, Nanloh S. Jimam<sup>1</sup>, Grace M. Ebuga<sup>2</sup>, Falang D. Kakjing<sup>3</sup>, Rotkangmwa Charity Okunlola<sup>1</sup>, Anthony Waka Udezi<sup>5</sup>, Lomak Albert Paul<sup>6</sup>, Suwaiba Mohammed Garba<sup>1</sup>, Josiah Nanpon Dangun<sup>4</sup>, Bala Iliyasu Shuaibu<sup>6</sup>

<sup>1</sup>Department of Clinical Pharmacy and Pharmacy Practice, University of Jos

<sup>2</sup>Pharmacy Department, Bingham University Teaching Hospital, Jos

<sup>3</sup>Department of Pharmacology and Toxicology, University of Jos

<sup>4</sup>College of Health Technology, Zawan, Plateau State

<sup>5</sup>Department of Clinical Pharmacy and Pharmacy Practice, University of Benin, Benin City

<sup>6</sup>Pharmacy Department, Rasheed Shekoni Specialist Hospital, Dutse

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### \* Corresponding Author:

daudadangiwa@gmail.com

+234 803 722 4113

<https://orcid.org/0000-0002-4658-2785>

## ABSTRACT

**Background:** Due to poverty, in low- and middle-income countries the increase in cost leading to unwillingness to pay for life long treatment of most chronic diseases like hypertension and diabetes in Nigeria is always on the increase resulting to increase in morbidity and mortality. To find out the solution, the willingness to pay for essential medicines by hypertensive and diabetic patients in Jos and environs in 2019 was used as a tool. **Method:** A cross sectional descriptive study using the health valuation method with the 5 dimension 3 level version of European Quality of Life 5 Dimensions 3 Level Version EQ-5D (EQ-5D-3L) is a generic tool for Patient Reported Outcomes (PRO) measurement that can assess patients' quality of life, irrespective of the disease introduced in 1990 by the European quality of life (EuroQol) group questionnaire was adopted the five dimensions namely: Mobility, Self-care, Usual activities, Pain / discomfort, and Anxiety / depression while the 3 Levels include: No problems/ pain/ anxiety, Some problems/ pain/ anxiety, and Extreme problems/ pain/ anxiety. **Results:** Out of the 360 respondents of which majority were females 192 (53.3%), respondents aged 55 years were in majority 303 (84.2%). Those with hypertension were higher 257 (71.40%) than those with diabetes and those with both diseases. Majority of the respondents earn between NGN61,000 to NGN140,000 23 (64.5%) while only 5 (1.4%) of them earn NGN181,000 and above. **Conclusion:** Most of the respondents (75.4%) were willing to pay between NGN3,000.00 and less for their treatment while only a few (1.2%) were willing to pay NGN15,000.00 and above. Over 70% of the respondents indicated no problems with mobility, self-care, carrying out usual activities, and anxiety/depression while 98.2% had no problems of taking care of themselves. There was significant relationship between gender and anxiety/depression (P=0.001). Married respondents reported problems with mobility more than others (P=0.0001). Those who earn between NGN61,000 and NGN100,000 significantly did not have any problems with mobility (P=0.0001) and self-care (P=0.031) respectively compared to other income categories.

## 1. Introduction

The prevalence of chronic non-communicable diseases (NCD) like diabetes and hypertension has been on the increase with a financial rise in burden in low- and middle-income countries (LMICs) in Africa and Nigeria where more than two thirds are living in extreme poverty on less than one dollar a day<sup>1</sup>. Hypertension and diabetes mellitus

represent 48% (18.2 million) and 3.5% (1.33 million) respectively with the 38million deaths from non-communicable diseases in 2012. Unfortunately-enough, 28 million deaths occur in low and middle-income countries (LMIC)<sup>2</sup>. In Nigeria it has been found that one out of every five adults between the ages of 30 and 70 die due to NCDs; Hypertension and diabetes mellitus accounted for 2.08

million deaths in 2014<sup>3</sup>. Hypertension is a major risk factor for stroke and complications of increased blood pressure which include: heart failure, peripheral vascular disease, renal infection, retinal and visual impairment. Treatments of hypertension were done according to Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) guidelines. The prevalence of type 2 diabetes mellitus (T2DM) is increasing and is likely to affect 500 million people worldwide by 2030 with up to 1 in 8 adults suffering from the disease (IDF, 2018). Globally spending on diabetes.<sup>4</sup>

Diabetes mellitus (DM) is a chronic debilitating metabolic disease characterized by a disorder of carbohydrate, fats and protein metabolism due to defects in insulin secretion, insulin action, or both. It is also associated with long term damage and disorder such as the eyes, kidney, nails, heart and blood vessels. (IDF 2015)<sup>5</sup>. In Africa 14.2 million people with a prevalence of 3.8% had diabetes as at 2015 where many of these patients were in the urban settlement of the country (IDF 2015). In Nigeria DM affects 1.6 million people being the third most affected country after Republic of South Africa and Democratic Republic of Congo (IDF 15)<sup>5</sup>. Most payments for essential medicines in the management of diabetes and hypertension in Nigeria are done out of pocket (OP), which has resulted to high cost of health care delivery both at the macro and micro levels. The Nigerian Health Insurance Scheme (NHIS) has become a viable alternative for financing health care, yet with few enrollees making OP the only viable and acceptable alternative for payments for essential medicines (Uzochukwu et al., 2015)<sup>6</sup>. Poverty, availability, affordability and diseases are triplets of a common site in LMICs. It was found that in South Western Nigeria, among 48% of patients who visited the clinic in a month pay NGN3000 (\$8.6) and above to the hospital.<sup>7</sup> Due to the financial constraints patients in low and middle-income countries show apathy and unwillingness to pay for their medications resulting to non-adherence and in almost one half of the patients dropping out of treatment (Abodunrin et al., 2017)<sup>8</sup>. The patients discontinuation or dropout of treatment could be as a result of personal cost; uncontrolled symptoms of disease and unavoidable economic burden.<sup>9</sup> In view of the fact that few researches have been done to ascertain factors affecting the willingness to pay for treatment of chronic diseases along with the inappropriate prevalence in Jos Plateau state and environs, this gap needed to be filled to ascertain the willingness to pay for these two chronic non-communicable diseases.

## 2. Methods:

The central study area is Jos the capital of plateau state in the north central rejoin of Nigeria. Healthcare provision in Plateau state is provided by the state government through the general hospitals in the seventeen local government headquarters and primary healthcare centers being managed by the various local governments. There is a federal owned Jos university teaching hospital and many private and faith-based hospitals. Due to the poor number of enrollees in the national health insurance scheme (NHIS), and the Plateau State Contributory Healthcare Management Agency (PLASHEMA), most patients access their medicines through out-of-pocket (OOP) payments. A Contingent Valuation Method questionnaire was adopted containing a cross sectional descriptive study using the 5 dimension 3 level version of EQ-5D (EQ-5D-3L) introduced in 1990 by the EuroQol group to find the following sub-headings: a. demographics, section b, describing the health status at the first day of the study c. five dimensions: mobility, self-care, usual activities, pains/discomfort and anxiety/depression. The Yamane sample size calculation was used with a patient population of 1910, sample size 330.74 and a degree of error 0.05, the sample size determined was 360 providing for 10% attrition. Each dimension (5) had 3 levels namely: No problems/ pain/ anxiety, Some problems/ pain/ anxiety, and Extreme problems/ pain/ anxiety. This was administered to respondents to extract information for the research. Ethical clearance with registration number NHREC/09/23/20106, NHREC/21/12/2012 and JUTH/DCS/ ADM/127/ XXV/016 were obtained from the Plateau Specialist Hospital Jos, Nigeria, Federal Medical Center Keffi, Nigeria and Jos University Teaching Hospital Jos, Nigeria respectively.

## 3. Results

The total population of both groups of patients assessing care was 1910 while the sample size was 330.74. it was made up to 360 with a provision for attrition. Majority of them were females (192, 53.3%). Respondents aged above 55 years were the majority (160, 44.4%) and married persons were significantly high in number (303, 84.2%). Those with Hypertension were more in number (257, 71.4%) than those with Diabetes compared to those with both diseases. Only 18 (5.0%) of the respondents were unemployed while Government workers constituted majority of the respondents (165, 45.8%). Majority of the respondents were government workers earning between NGN61, 000 to NGN140, 000 (232, 64.5%) while only 5

(1.4%) of them earn NGN181, 000 and above. 27 (7.5%) of them were uneducated (Table 1).

The findings suggested that willingness to pay is not directly related to respondents' earnings as also observed by Alozie et al.,<sup>10</sup>. Only 5% of the respondents were unemployed. The quality of life of most respondents was above 85% except for pain and discomfort where 51.4% of them complained of pain with 29.7% of them complaining of anxiety and depression Figure 1-2.

Table 2:  
Self-reported Quality of life of the Respondents

<b>Variable</b>	<b>Number responding</b>	<b>Percentage</b>
<b>Gender</b>		
<b>Male</b>	168	46.7
<b>Female</b>	192	53.3
<b>Age (years)</b>		
<b>18 -24</b>	2	0.6
<b>25 -34</b>	19	5.3
<b>35 -44</b>	63	17.5
<b>45 -54</b>	116	32.2
<b>55 and above</b>	160	44.4
<b>Diagnosis</b>		
<b>Hypertension</b>	257	71.4
<b>Diabetes</b>	38	10.6
<b>Hypertension and Diabetes</b>	65	18.1
<b>Marital status</b>		
<b>Married</b>	303	84.2
<b>Single</b>	11	3.1
<b>Others</b>	46	12.8
<b>Occupation</b>		
<b>Student</b>	1	0.3
<b>Government worker</b>	165	45.8
<b>Self employed</b>	83	23.1
<b>Unemployed</b>	18	5.0
<b>Private sector worker</b>	69	19.2
<b>Retired</b>	24	6.7
<b>Educational level</b>		
<b>Nil</b>	27	7.5
<b>Primary</b>	35	9.7
<b>Secondary</b>	80	22.2
<b>Tertiary</b>	218	60.6

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<b>Income</b>		
<20, 000	21	5.8
20,000 - 60,000	59	16.4
61, 000 - 100, 000	167	46.4
101, 000 - 140, 000	65	18.1
141,000 - 180,000	29	8.1
≥181,000	5	1.4
Nil	14	3.9

Over 70% of the respondents indicated No problems with Mobility, Self-care, carrying out usual activities and anxiety/depression while only 48.6% of them had no issues with Pain or discomfort. 7.2% of the respondents have problems with self-care, while 92.8% reported no form of problems with taking care of themselves. Pain and discomfort had a higher proportion (51.4%) among respondents reporting problems (moderate and extreme pains) (Table 2).

Table 2:  
Self-reported Quality of life of the Respondents

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	Number responding	Percentage (%)
<b>Mobility</b>		
No Problem	307	85.3
Problem	53	14.7
<b>Self -care</b>		
No Problem	334	92.8
Problem s	26	7.2
<b>Usual activity</b>		
No Problem	289	80.3
Problem	71	19.7
<b>Pain/Discomfort</b>		
No Problem	175	48.6
Problem	185	51.4
<b>Anxiety/Depression</b>		
No Problem	253	70.3
Problem	107	29.7

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Table 3 shows the relationship between demographic factors and self-reported Health Quality of Life for the 5 domains of the EQ 5D-3L questionnaire. There is a significant relationship between Gender and Anxiety/Depression (P=0.0017). More females experienced anxiety and depression compared to males. Married respondents reported problems with mobility more than other respondents (P=0.001). A significantly higher number of Government Workers reported problems with mobility compared to other occupational groups (P=0.01). Those who earn between NGN61, 000 and NGN100, 000 significantly did not have any problems with mobility (P=0.0001) and Self-care (P=0.0031) respectively compared to other income categories. There was no significant relationship between Age, level of education, diagnosis and reported health status for all the domains (Table 3, Figure 3 - 4).

Table 3:  
Relationship between demographic factors and Self-reported problems in EuroIQoL domain

	Mobility		Self-care		Usual Activities		Pain/Discomfort		Anxiety/Depression	
	NP	P	NP	P	NP	P	NP	P	NP	P
<b>Gender</b>										
Male	134	27	146	15	125	36	83	78	127	34
Female	158	25	173	10	148	34	84	99	115	68
P-value	0.5141		0.2439		0.4624		0.3841		0.0017	
<b>Age</b>										
18-24	2	0	2	0	2	0	2	0	2	0
25-34	16	3	16	3	17	2	11	8	11	8
35-44	51	8	57	2	49	10	29	30	41	18
45-54	95	15	104	14	120	34	73	81	112	42
55 and above	128	26	140	14	120	34	73	81	112	42
P-value	0.9042		0.3066		0.6458		0.5670		0.5957	
<b>Diagnosis</b>										
Hypertension	215	30	232	13	199	46	129	116	177	68
Diabetes	28	8	31	5	25	11	13	23	21	15
Hypertension and Diabetes	49	14	56	7	50	14	25	38	44	19
P-value	0.0649		0.0772		0.2604		0.0533		0.2320	
<b>Marital status</b>										
Married	249	39	269	19	230	58	144	144	202	86
Single	5	6	8	3	7	4	5	6	10	1
Others	38	7	42	3	37	8	18	27	30	15
P-value	0.0010		0.0342		0.3806		0.4490		0.2826	
<b>Occupation</b>										
Student	1	0	1	0	1	0	1	0	1	0
Government worker	139	16	145	10	118	37	78	77	117	38
Self employed	66	13	77	2	69	10	42	37	50	29
Unemployed	13	5	15	3	14	4	7	11	11	7
Private sector worker	58	10	62	5	56	11	28	39	46	21
Retired	16	8	19	5	16	8	11	13	17	7
Nil	18	9	22	5	17	10	11	16	20	7
P-value	0.0100		0.0207		0.0793		0.6078		0.5068	
<b>Educational level</b>										
Primary	30	5	33	2	30	5	16	19	26	9
Secondary	69	9	76	2	60	18	37	41	53	25
Tertiary	175	29	188	16	167	37	103	101	143	61
P-value	0.8343		0.2614		0.4844		0.8175		0.7932	
<b>Income</b>										
<N20,000	11	10	16	5	11	10	9	12	13	8
N20,000-n60,000	47	11	52	6	44	14	26	32	42	16
61,000-100,000	142	18	154	6	137	23	84	76	114	46
101,000-140000	55	5	55	5	50	10	27	33	41	19
141000-180000	26	1	27	0	21	6	14	13	19	8
—	3	2	5	0	4	1	2	3	3	2
Nil	8	5	10	3	7	6	5	8	10	3
P-value	0.0001		0.0031		0.0033		0.8466		0.9567	

Key: NP = No problems; P = Problems reported

Table 4 shows the relationship between Demographic factors and effectiveness of treatment. There was no significant relationship between demographic factors and effectiveness of treatment. There was a significant relationship between age, diagnosis marital status and cost effectiveness of treatment ( $P < 0.05$ ).

Table 4:  
Relationship between Demographic factors and Effectiveness of treatment

	N	Effectiveness $\pm$ SD	Cost Effectiveness $\pm$ SD
<b>Gender</b>			
Male	161	13.67 $\pm$ 10.83	673.65 $\pm$ 1265.79
Female	183	13.00 $\pm$ 10.05	712.00 $\pm$ 1105.75
<b>P-value</b>		0.5523	0.7644
<b>Age</b>			
18-24	2	8.00 $\pm$ 15.56	-1651.75 $\pm$ 2425.26
25-34	19	11.63 $\pm$ 8.66	422.59 $\pm$ 366.53
35-44	59	12.41 $\pm$ 9.03	567.73 $\pm$ 749.03
45-54	110	13.63 $\pm$ 10.37	600.75 $\pm$ 564.77
55 and above	154	14.09 $\pm$ 11.10	873.42 $\pm$ 1584.54
<b>P- value</b>		0.6775	0.0074
<b>Diagnosis</b>			
Hypertension	245	12.85 $\pm$ 9.71	594.38 $\pm$ 838.73
Diabetes	36	14.61 $\pm$ 10.78	625.03 $\pm$ 764.95
Hypertension and Diabetes	63	15.30 $\pm$ 12.54	1122.03 $\pm$ 2097.396
<b>P-value</b>		0.1976	0.0060
<b>Marital status</b>			
Married	288	13.63 $\pm$ 10.53	660.60 $\pm$ 1183.34
Single	12	11.09 $\pm$ 13.87	632.36 $\pm$ 676.51
Others	45	13.16 $\pm$ 8.69	924.49 $\pm$ 1259.49
<b>P-value</b>		0.6942	0.0001
<b>Occupation</b>			
Student	1	19.00 $\pm$ 0.0	63.16 $\pm$ 0.00
Government worker	155	12.61 $\pm$ 9.90	740.45 $\pm$ 1461.09
Self employed	79	13.44 $\pm$ 9.39	631.08 $\pm$ 675.97
Unemployed	18	16.22 $\pm$ 11.47	493.72 $\pm$ 576.23
Private Sector worker	67	15.19 $\pm$ 12.55	640.00 $\pm$ 861.89
Retired	24	12.17 $\pm$ 9.40	931.51 $\pm$ 1568.06
<b>P-value</b>		0.3425	0.7224
<b>Educational level</b>			
Nil	27	13.19 $\pm$ 10.12	855.57 $\pm$ 1459.54
Primary	35	12.91 $\pm$ 8.66	789.99 $\pm$ 790.27
Secondary	78	15.23 $\pm$ 12.17	410.86 $\pm$ 701.10
Tertiary	204	12.95 $\pm$ 9.98	765.04 $\pm$ 1324.74
		0.4150	0.1143
<b>Income</b>			
<20k	21	9.48 $\pm$ 7.74	648.11 $\pm$ 845.69
20k -60k	58	13.79 $\pm$ 10.54	515.04 $\pm$ 494.66
61k – 100k	160	13.77 $\pm$ 10.86	772.62 $\pm$ 1466.20
101-140k	60	14.05 $\pm$ 9.98	599.52 $\pm$ 674.81
141k – 180k	27	14.67 $\pm$ 11.43	719.37 $\pm$ 906.04
$\geq$ 181k	5	19.80 $\pm$ 8.64	272.72 $\pm$ 343.13
		7.54 $\pm$ 1.16	1139.16 $\pm$ 2118.19
		0.3731	0.6385

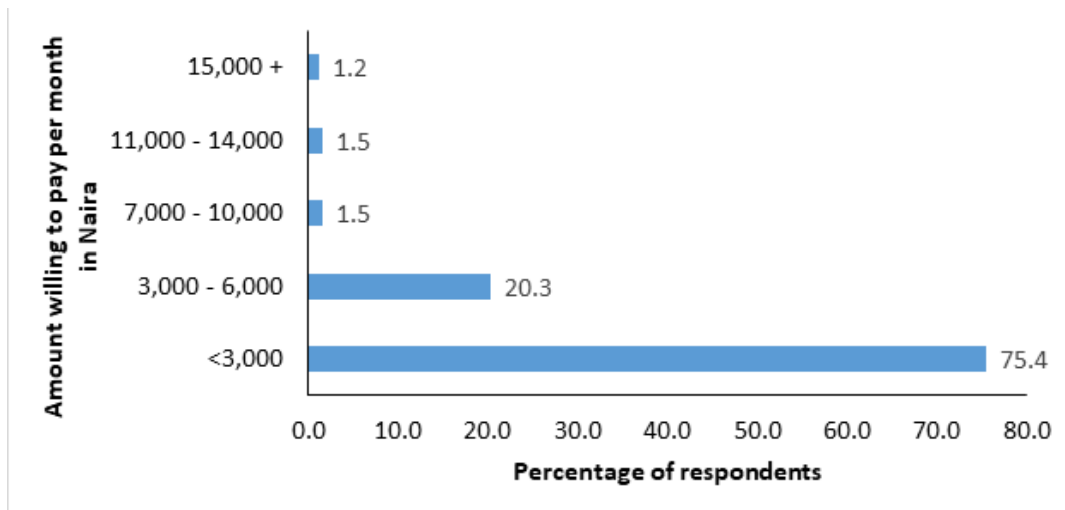


Figure 1 Amount the respondents were willing to pay for essential medicines

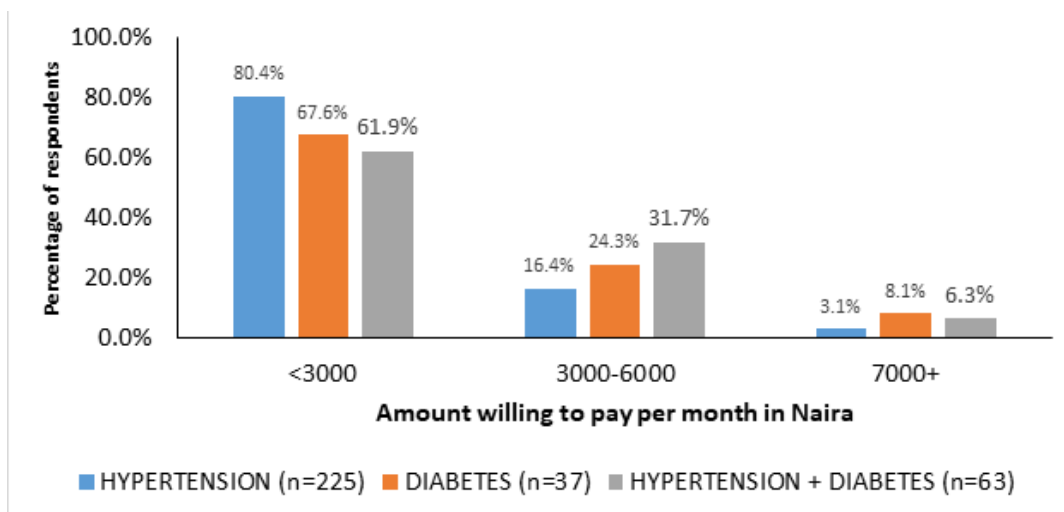


Figure 2 Amount respondents were willing to pay according to diagnosis.

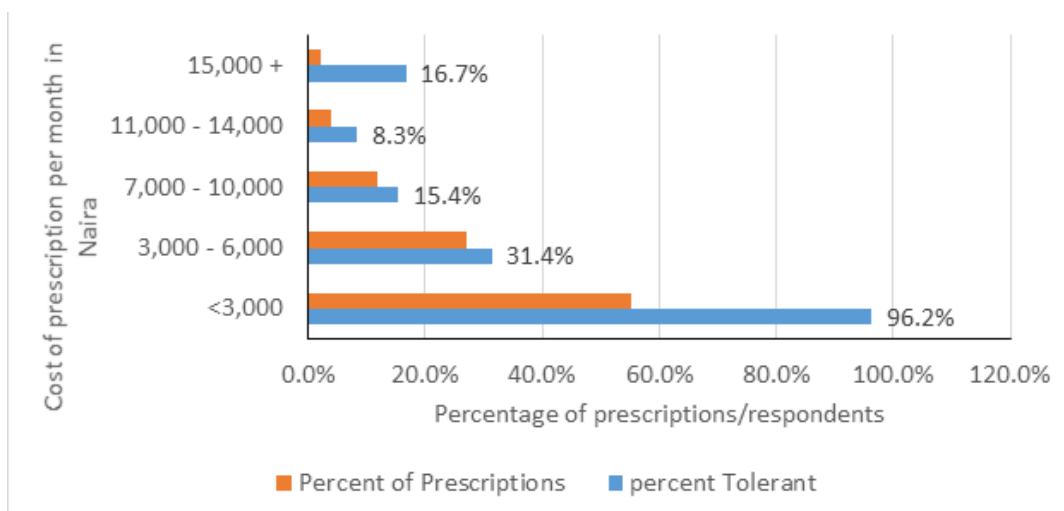


Figure 3 Level of cost tolerance of respondents

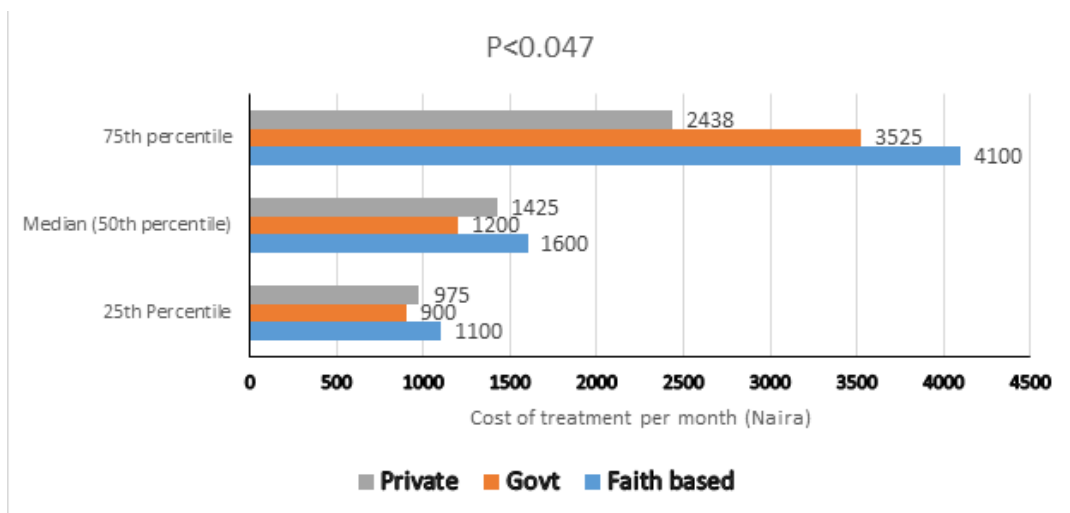


Figure 4 Cost of treatment per month (NGN) for respondents.

Table 5: Comparison monthly cost of medicines to treat diabetes across different facilities

Type of facility	N	Mean Rank of cost of monthly treatment	Chi -square	P value
Public	17	33.74	6.133	.047
Private	37	26.31		
Faith based	5	44.60		

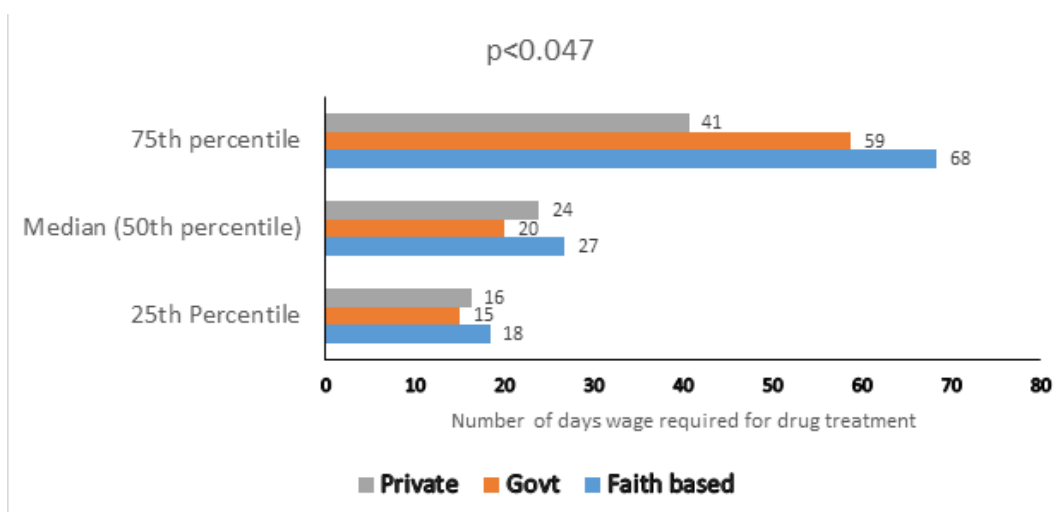


Figure 7 Number of days wage required for drug treatment



Table 6

Various forms of alternative therapy used by respondents for care of hypertension and diabetes

Alternative treatments	Frequency	(%)
Nutritional diet	61	18
Herbal drugs	108	32
Physical exercise	95	28
Blood cooping	17	5
Spiritual activities	51	15
Others	12	3

Willingness to Pay (WTP) = FS +  $\beta$ MS + BMI –  $\beta$ Age –  $\beta$ ALTr.....Equation 1

**Where:**  $\beta$ = constant, FS = Financial status, MS = Marital Status, MI = Monthly income, Age=Age, ALTr = Alternative Treatment

#### 4. Discussion

From our study, more of the respondents were females which corroborated with <sup>8-12</sup>. respondents with higher income were more willing to pay and tolerant to cost of antidiabetic and antihypertensive medications. Most of the respondents with higher income also had fewer problems with mobility and self-care which agrees with the findings of <sup>11-13</sup>. Demographically, there was no significant relation between gender and willingness to pay for hypertensive, diabetic and comorbid medicines.

Findings from a study in Oshogbo corroborate our results<sup>8</sup>; respondents with higher income were more willing to pay for antihypertensive medications, but also highlighted that poverty was not always an indication for unwillingness to pay results from another study conducted in California on WTP for Medicare services showed that low-income respondents were not likely to pay for their medications compared to higher income earners.<sup>14</sup>

A similar finding was made in a study conducted in China which indicated that willingness to pay for antihypertensive and antidiabetic medications decreased in uninsured

patients, and it was also observed that increasing out-of-pocket payments decreased willingness to take antihypertensive medications and proportion of patients with good blood pressure control were higher among medically insured patients<sup>15</sup>.

A study conducted in Canada showed those who earned more than \$15,000 CAD annually and were paying for antihypertensive medications out of pocket were also less likely to adhere to medications compared to those not paying out-of-pocket<sup>16</sup>. Our study also indicated that more than half of our patients who were hypertensive and diabetic were tolerant of cost of acquiring medications, 62.16%, 62.03% respectively. Patients with both hypertension and diabetes were less tolerant to cost of medications 46.03%. Also, in a study carried out in Taiwan the presence of specific co morbidities for patients with diabetes did not have a significant impact on their willingness to pay for a cure. However, body mass index, health-related quality of life and ability to decrease blood glucose level were significantly associated with willingness to pay<sup>17</sup>. According to another study, in addition to avoiding

weight gain, reduction in hypoglycaemic events, reduction in HbA1c, convenience of dosing regimen, and clinical efficacy were significant predictors of WTP for diabetes treatment<sup>18</sup>.

From our study there were no correlation between educational status and willingness to pay for antidiabetic and antihypertensive medications. A study conducted among five developing countries also indicated that level of educational had no correlation with patients' willingness to pay for treatments in chronic heart failure corroborating our findings from our study we found a strong correlation between being married and fewer problems with self-care and mobility and also cost effectiveness. A study conducted in Oshogbo Southwest Nigeria, results indicated that respondents who were married were more willing to pay for medications corroborating our findings.<sup>19</sup> From our study we found a strong correlation between being married and fewer problems with self-care and mobility and also cost effectiveness.

It was also discovered that the willingness to pay in other alternative treatments comprising herbal drugs, physical exercise, nutritional diet, spiritual activities, blood cooping and others in descending order of relevance, financial status, marital status, monthly income and age were major determinants<sup>20</sup>.

## 5. Conclusion

The study showed that most respondents involved in the survey were females. Respondents with higher income (NGN60,000.00 – NGN100,000.00) (USD1 = NGN365.00) showed willingness to pay for their medicines while demographically there was no relationship with the willingness to pay for the treatment of the diseases. It was also observed that there was no correlation between educational status and the willingness to pay for the medicines. Our study also revealed that more than half of the hypertensive and diabetic patients were tolerant of the cost of acquiring their medications. It was also deduced that there was a correlation between being married, and fewer problems with self-care, mobility and cost effectiveness.

**Recommendation:** From the above findings, there is a clear need to increase the knowledge of the complications on patients' attitude towards the unwillingness to pay for chronic diseases like hypertension and diabetes in Jos Nigeria and environs where alternative treatments are on the increase. It will also be necessary to conduct a further study between willingness to pay and ability to pay for essential medicines in chronic diseases like hypertension and diabetes.

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## Disclosure of conflict of interest

Authors hereby declare no conflict of interest of any sort.

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