Research Article

Cardiology & Vascular Research

Direct Cost of Cardiovascular Diseases in Cardiology Department of University Hospital Gabriel Touré (Uh Gt): Comparative Study Between Patients With and Without Medical Insurance

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ABSTRACT

Aim: *This study aims to compare cardiovascular diseases direct costs for patients with and those without medical insurance.*

Methods: *It was a prospective study from Mai 02 to August 31 2016 in the cardiology department of the UH GT. All outpatients aged 15 years and older, who came to visit, accepted to participate in the study and were involved. Direct costs (transport, consultation, labor tests and medicaments) were recorded for each patient at each visit. Data were inserted in a MS Access 2010 database and exported in SPSS 20 for analysis, comparing 2 groups (patients with and without medical insurance). Chi-2 and Fisher tests if applicable were used for statistical tests.*

Results: *All patients seen in the study time (922 patients of whom 62.9% were female and 35.7% between 60-74 years) were included. A proportion of 30.5% had medical insurance (281/922). Patients with diabetes, dyslipidemia and obesity were found among patients with medical insurance with respectively 47.5, 62.4 and 49.2%.*

Most frequent cardiovascular diseases among patients with medical insurance were high blood pressure without and with complications, acute coronary syndrome with respectively 36.2, 34.7 and 29.2%.

Direct costs for patients with medical insurance were 1.06 to 1.77 times higher. Labor tests generated the highest costs. Direct costs for all cardiovascular diseases were higher for patients without medical insurance, up to 4 times for venous thrombo-embolic disease. Total costs were higher for patients with medical insurance.

Conclusions: *Direct costs for pathologies were higher for patients without medical insurance. Palpitation was the only pathology with direct costs higher for patients with medical insurance. Total costs for patients were higher for patients with medical insurance.*

Keywords

Cardiovascular diseases, Direct costs, Medical insurance, Bamako.

Introduction

Cardiovascular disease is a major burden for the health system in the world, as noted by several authors [1-3]. Although medical care in developed countries is very performant, the situation is very different in developing countries, with many issues, notably an unsuitable or even failing health system or the lack of universal health insurance among others.

Cost studies exist from several countries [4-9] around the world

and in Africa for prevention [10] and for arterial hypertension [11].

In Mali, geographical health services accessibility has considerably improved [12], but affordability remains a major challenge [13]. The support of a part of the expenses by the health insurance system constitutes an important step in the improvement of the financial accessibility. In Mali, its implementation is relatively recent (2011), but has considerably reduced the costs for the insured with the support of 70% of the total costs (consultation, labor exams and drugs).

An evaluation of the costs compared to those who are not insured has not been realized and this a gap to fill. We then conducted this study on the assumption that the costs per pathology will be higher for the insured patients because of the possibility of more explorations and regular payment of drugs. In addition, an estimate of actual costs could help in planning and decision-making.

Methodology

We conducted a prospective study from May 02, to August 31, 2016 in the Cardiology Department of CHU Gabriel on all patients aged 15 years and over without any distinction.
Inclusion criteria: All patients seen in consultation agreed to participate in the study and were consecutively seen in cardiology consultations from May 02 to August 31, 2016.

All patients at each visit for 3 months were systematically questioned about the costs generated namely:
- Transportation costs
- The consultation fees
- The costs of additional examinations
- Costs related to the purchase of medicines

The analysis was conducted in:
- readjusting the expenses of the insured, by raising them to their value without participation of the insurance, to have the real cost west african franc (FCFA, for memory 1 FCFA= 0,001843 USD or 1 USD = 542.74 XOF).
- dividing patients into:
o Uninsured (Ass-)
o Assured (Ass +)
- estimating the overall cost for each of the 2 groups
- making the ratio Insured patients/not insusured patients (rCost).

Regarding diagnoses, we limited ourselves to the 7 most represented pathologies, which concerned 833 out of 922 patients in the sample, making 90.34% of all diagnoses.
The data were entered into an MS Access 2010 database then processed by MS Excel and analyzed by SPSS 20. The quantitative data are presented in the form of mean (+ standard deviation). Chi-2 and Fisher tests were used if suitable.

Results

During the study period 922 patients were seen in consultation among which 62.9% of female subjects and 35.7% aged 60-74 years. The proportion of insured patients was 30.5% (281/922). There was no statistically significant difference in gender (62.6% of female uninsured versus 63.7% male insured). The age group 60-74 years (49.1%), the Bamako dwellers (79.7%), secondary school level (24.9%) and from house to hospital coming (61.2%) predominated among the insured patients against respectively 29,1, 63.5, 08.3 and 35.9% for uninsured patients. The differences observed were statistically significant (Table 1).

Variables		Ass - N (%)	Ass + N (%)	Total N (%)	p (Khi-2)
Sex	Féminin	401 (62.6)	179 (63.7)	580 (62.9)	0.741
	Masculin	240 (37.4)	102 (36.3)	342 (37.1)	
Age group (ans)	< 30	091 (14.2)	010 (03.6)	101 (11.0)	< 0.0001
	30-44	120 (18.7)	030 (10.7)	150 (16.3)	
	45-59	182 (28.4)	085 (30.2)	267 (29.9)	
	60-74	192 (29.8)	138 (49.1)	329 (35.7)	
	≥ 75	057 (08.9)	018 (06.4)	075 (08.1)	
Professional Statut+	Working	621 (96.9)	226 (80.4)	847 (91.9)	< 0.0001
	Retired	020 (03.1)	054 (19.2)	074 (08.0)	
Résidence	Bamako	407 (63.5)	224 (79.7)	631 (68.4)	< 0.0001
	Region	062 (09.7)	016 (05.7)	078 (08.5)	
	Cercle	152 (24.8)	040 (14.2)	199 (21.6)	
	Out of Mali	006 (0.9)	000 (0.0)	006 (0.7)	
	Others	007 (01.1)	000 (00.0)	007 (0.8)	
School level	None	431 (67.2)	107 (38.1)	538 (58.4)	< 0.0001
	< Primary	050 (07.8)	013 (04.6)	063 (06.8)	
	Primary	084 (13.1)	039 (13.9)	123 (13.3)	
	Secondary	053 (08.3)	070 (24.9)	123 (13.3)	
	High	023 (03.6)	052 (18.5)	075 (08.1)	
Coming from	House	230 (35.9)	172 (61.2)	402 (43.6)	< 0.0001
	UH GT*	241 (37.6)	075 (26.7)	316 (34.3)	
	CSRef**	057 (08.9)	009 (03.2)	066 (07.2)	
	CSCom***	042 (06.6)	010 (03.6)	052 (05.6)	
	Clinic	033 (05.1)	006 (02.1)	039 (04.2)	
	Cabinet	038 (05.9)	009 (03.2)	047 (05.1)	

Table 1: Sociodemographics for the sample of 922 patients.
+ 1 personne sans activité, *UH GT : University Hospital Gabriel Touré, **CSRef : Centre de Santé de Référence, ***CSCom : Centre de Santé Communautaire.

Age, body mass index (BMI), waist circumference (WC), Waist-to-hip ratio (whr), pulsed pressure (PP), and heart rate (HR) were significantly higher for insured patients (Table 2).

Variables	Ass -		Ass +		P
	Mean	SD	Mean	SD	
Age	52,02	17,613	58,40	12,914	< 0,0001
BMI	24,56	5,818	27,08	6,507	< 0,0001
WC	86,34	13,745	93,35	13,415	< 0,0001
WHR	0,91	0,069	0,93	0,068	0,001
PP	50,96	18,497	54,46	17,661	0,008
HR	86,55	18,866	80,51	13,155	< 0,0001

Table 2: Description of anthropometric and hemodynamical characters of

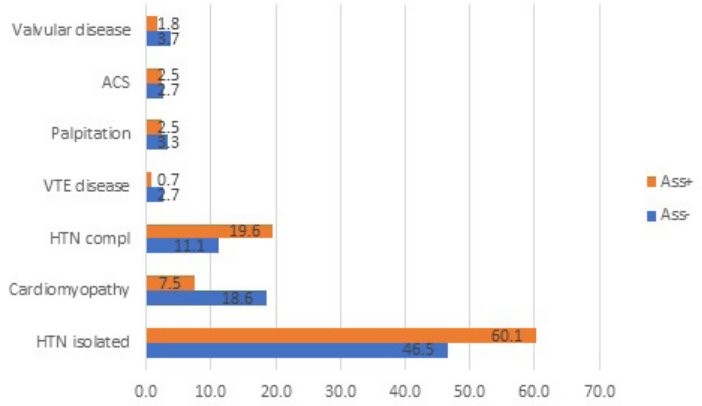
the sample of 922 outpatients.

The highest proportions of insured patients were found among those suffering diabetes mellitus, dyslipidemia and obesity with resp. 47.5, 62.2 and 49.2% (Table 3).

CVrf		Ass - (%)	Ass + (%)	Total	P
Hypertension	No	80.8	19.2	271	<0.0001
	Yes	64.8	35.2	651	
Diabetes mellitus	No	72.6	27.4	781	<0.0001
	Yes	52.5	47.5	141	
Dyslipidemia	No	70.8	29.2	885	<0.0001
	Yes	37.8	62.2	37	
Alcohol consumption	No	69.6	30.4	913	0.852
	Yes	66.7	33.3	9	
Sedentary	No	70.9	29.1	688	0.111
	Yes	65.4	34.6	234	
Obesity (BMI)	No	70.9	29.1	859	0.001
	Yes	50.8	49.2	63	

Table 3: Cardiovascular risk factors (CVrf) at inclusion in the sample of 922 outpatients.

All pathologies were found in greater proportions in subjects without medical insurance. Cardiomyopathy and venous thrombo-embolic disease (VTE disease) were the exceptions (Diagram 1).

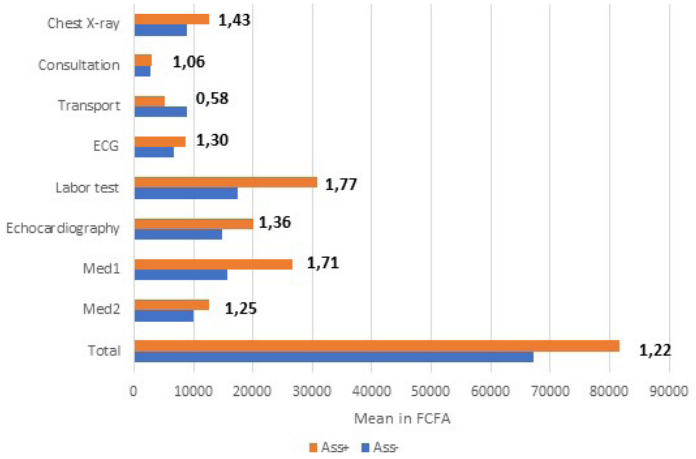


HTN compl.: Hypertension complicated; ACS: acute coronary syndrome.
Diagram 1: Proportion of patients by pathology related to insurance status.

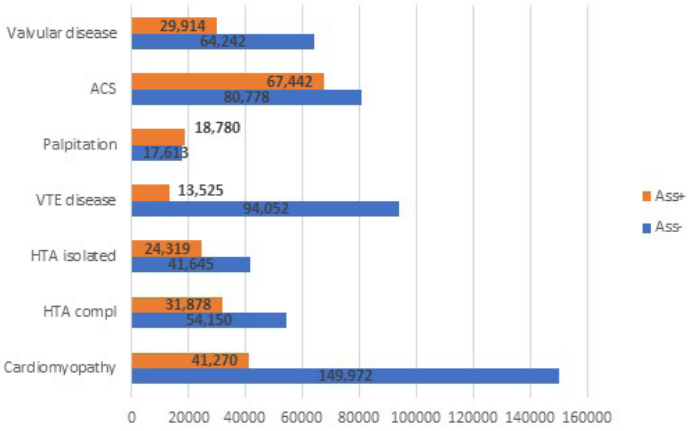
The actual cost (patient part + insurance part) for insured patients is 1.06 to 1.77 times higher except for transportation which is not covered by the insurance anyway. Biological assessment is the first item of expense (Diagram 2).

The costs of managing the pathologies did not differ significantly between the insured and the uninsured, except for palpitation (Diagram 3).

In contrast to the total, the different spending pockets differed significantly in consultation fees, ultrasound and drug costs (Table 4).



Med1: cardiovascular medication; Med 2: other medication.
Diagram 2: Cost ratio for consultation, labor tests and medication related to insurance status.



1 FCFA= 0,001843 USD or 1 USD = 542,74 XOF
Diagram 3: Total cost (FCFA) for main pathologies related to insurance status.

Discussion

Our sample was as representative as possible with the inclusion of all patients seen by different prescribers during the study period and this in a consecutive way. The procedure of collecting the details of the expenses including those related to the transport to come to the consultation, the various labor tests constitute a solid base for future studies. In Mali, cost data exist as in the DHS surveys [12], but not specifically dedicated to pathologies seen in the cardiological environment.

As in many other studies we have a high proportion of female subjects, probably because this group reacts quicker searching medical consultation. The sample also included 35.7% of subjects aged 60-74 years, this can be explained by the fact that cardiovascular diseases increase with age [14-15] and that these people are not sufficiently disabled (disease - age) to come to hospital for consultation.

The proportion of insured patients was low in our sample and also reflects the low level of health insurance coverage, which is a new

Pathologies	Statut	Cons	Trsp	Chest x-ray	ECG	Biol	Echo	Med1	Med2
CMP	Ass -	3489	9928	10067	7149	17394	16559	18434	19659
	Ass +	2905	10507	8333	10648	41650	22745	27936	20000
HTN compl	Ass -	2654	7422	8200	6500	18686	13951	17764	6947
	Ass +	2815	3739	12333	9704	33570	20875	39403	26806
HTN isolated	Ass -	2384	8424	8000	6640	15738	14024	11159	6807
	Ass +	3117	5066	13033	8156	28795	19003	22419	9022
VTE disease	Ass -	7067	12147	8667	6700	13508	13000	27921	
	Ass +	2250	1750			14167	10000	16167	
Palpitation	Ass -	1643	1703	7000	5600	29800	15833	13150	17338
	Ass +	2143	1821		14667	55333	39444	13333	9700
ACS	Ass -	3525	15467	8500	6879	29960	10786	30937	15000
	Ass +	4667	5143		8333	19887	23333	50718	11667
Valvular disease	Ass -	3604	7217	7000	7190	18300	14795	22152	20500
	Ass +	2700	2900		5000	47083	18000	22680	
p		<0,0001	0,592	0,989	0,166	0,102	0,040	<0,0001	0,036

Table 4: Costs in FCFA related to cardiovascular disease and insurance status. p not significant except for consultation, echocardiography and medication. CMP: Cardiomyopathy; Cons: Consultation; Med1: Cardiovascular medication; Med2: non Cardiovascular Medication; Echo: Echocardiography; VTE: Venous thrombo-embolic disease; ACS: Acute Coronary Syndrome; HTN compl.: Hypertension complicated; Biol: Labor Test; Trsp: Transport.

situation, more accessible to salaried workers. This could also partly explain the increase in the rate of insured with the increase in the level of schooling. The fact that insured patients had a higher average age could explain the presence of other risk factors such as obesity, hypertension, diabetes that increase with age (Table 2,3).

The place of hypertension as the predominant risk factor is found as indicated in the diagram 1. This fact had been described in previous and recent studies [16-17] and in several unpublished theses and dissertations.

The place of the health insurance came out through data in chart 2 with higher costs for all the types of expenses reimbursed by the insurance service. The highest cost was due to performing biological assessment (x1.77) and the least cost for consultation (x1.06). An explanation could be the substantial decrease in costs so that patient is able to do more labor tests and medication purchase. Previous studies carried out in Bamako [16,18] did not take into account the detail of the different types of expenditure as we did in our study. Another explanation could be the possibility for the practitioner to request more for labor exams for all insured patients, since there is less cost to pay.

With the exception of 2 pathologies (Cardiomyopathy and Thrombo-embolic venous disease), all the pathologies were more expensive for the insured patients, the explanation being possible for the assessment carried out and the purchase of the drugs facilitated as indicated above.

For the moment, we have not been able to find a satisfactory explanation for the proportion of insured patients among the hypertensives. Is it because hypertension and its complicated form were the most common in the sample or would there be other factors?

Limits

The amounts found here are related to direct costs. In this study, we were unable to evaluate the percentage of completion for medical prescriptions and labor exams, which would reinforce the hypothesis, set out above to explain the increase in costs associated with participation in Medicare costs.

Estimates are often approximate from the patient especially regarding transportation costs.

Conclusion

The costs of treatment by pathology are up to 3 times higher in uninsured patients. Palpitation is the only pathology for which uninsured patients spend less. On the other hand, the total cost per patient is higher for insured patients.

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