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 47.5, 62.4 and 49.2%.

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:
  - uninsured (Ass-)
  - assured (Ass+)
- estimating the overall cost for each of the 2 groups
- making the ratio Insured patients/not insured 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).

**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, ***CSCCom : 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).

**Table 2:** Description of anthropometric and hemodynamical characters of
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).

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

| 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** |         |           |       | 0.852  |
| No                    | 69.6      | 30.4      | 913   |        |
| Yes                   | 66.7      | 33.3      | 9     |        |
| **Sedentary**         |           |           |       | 0.111  |
| No                    | 70.9      | 29.1      | 688   |        |
| Yes                   | 65.4      | 34.6      | 234   |        |
| **Obesity (BMI)**     |           |           |       | 0.001  |
| No                    | 70.9      | 29.1      | 859   |        |
| Yes                   | 50.8      | 49.2      | 63    |        |

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

### Diagram 1: Proportion of patients by pathology related to insurance status.

HTN compl.: Hypertension complicated; ACS: acute coronary syndrome.

### 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
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 exams 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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