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Original article

Healthcare service utilisation costs attributable to rheumatoid arthritis in France: Analysis of a representative national claims database



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ABSTRACT

Objective: To estimate healthcare service utilisation costs of patients with rheumatoid arthritis in France and to estimate the fraction of these costs attributable to RA.

Method: The “Échantillon généraliste des bénéficiaires” (EGB) is a 1/97 random sample of the main national claims database covering the French population. A cohort of patients with rheumatoid arthritis was constituted of all adults benefiting from full coverage for rheumatoid arthritis (ICD-10 M05-06) on 1st January 2009. A control group matched for age and gender was identified. Health expenditures were assessed from the payer's perspective for the year 2010.

Results: The annual *per capita* reimbursed total health expenditure was €6,404 in 2010, an amount around two times higher than in the control group €3,095 ($P < 0.0001$). The main contributors to this extra cost were outpatient care (+€2,407; 72.7%), including medication (+€1,686; 50.0%), and inpatient care (+€903; 27.3%). Patients treated by biological agents generated an age-adjusted *per capita* annual expenditure about three times higher than untreated patients (€15,757 versus €4,640).

Conclusion: Only half of medical expenditure by patients with rheumatoid arthritis is attributable to their disease and use of biological agents has become a major driver of cost.

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1. Introduction

The economic burden of rheumatoid arthritis (RA) and the impact of the utilisation of biological disease-modifying antirheumatic drugs (bDMARDs) on the structure of costs and its evolution over time remain poorly documented. Previous studies have varied with respect to data collection, methods and populations evaluated. Some relied on assumptions about standard medical resource utilisation defined by experts [1], others were performed on retrospective data based on patient declaration [2,3] or on populations of patients treated by bDMARDs delivered only in an inpatient setting [4–8]. A national claims database has recently been made available for epidemiological and pharmaco-economic research by the French National Sickness Fund (*Caisse nationale*

d'assurance maladie des travailleurs salariés). This includes basic demographic data and reimbursed medical expenses since 2003, and information on acute care hospitalisations from 2006 onwards. This database allows the economic burden of chronic diseases to be estimated in representative samples of patients integrating both outpatient and inpatient care costs.

We have decided to assess medical resource consumption in a cohort of patients from the general RA population using the “Échantillon général des bénéficiaires” (EGB) database. The index date for inclusion in the cohort was the 1st January 2009. The constitution of this cohort will enable successive evaluations of healthcare at regular intervals to be made. The objectives of the present analysis were to describe total health resource use and associated direct costs of RA patients in 2010, and estimate the fraction of these direct costs attributable to RA. The accompanying article describes the characteristics of these patients and the principal features of the pattern of their care at the time of inclusion in the cohort.

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2. Methods

2.1. The EGB database

The “Échantillon généraliste des bénéficiaires” (EGB) is a national 1/97 random representative sample of individuals covered by the French public health insurance [9]. This fund covers all salaried workers and their relatives (*Caisse nationale d'assurance maladie des travailleurs salariés* – General Scheme), corresponding to around 80% of the whole population, with the self-employed and certain other professions being covered by specific schemes. The EGB database contains information on around 600 000 individuals relating to all items of healthcare eligible for reimbursement.

2.2. Study population

A cohort of all patients with RA in the EGB database on 1st January 2009 was identified through ALD status. The analysis was performed for all patients in the cohort alive on 31st December 2010.

2.3. Cost analysis

Total medical expenditure was determined for the calendar year 2010. All items of healthcare consumption eligible for reimbursement and their associated costs were assessed with the exception of services, devices or drugs not documented in the EGB database since they are not eligible for reimbursement. It should be noted that healthcare consumption was not restricted to RA but covered all-cause consumption. All hospitalisations (overnight as well as day hospitalisation) in public or private acute-care facilities, whatever the cause, were recorded and included in the analysis with the exception of rehabilitation care provided in an inpatient setting (“Établissements de soins de suite et réadaptation”). Documented medication includes all medication dispensed in community care and intravenous bDMARDs administered in hospitals. Other drugs administered during inpatient stays are not documented and their cost is assigned to the hospitalisation cost. Conventional synthetic DMARDs (csDMARDs) included methotrexate, sulfasalazine, leflunomide, hydroxychloroquine, gold salts and immunosuppressant drugs. Biological DMARDs included etanercept, adalimumab, infliximab, anakinra, tocilizumab, rituximab and abatacept. Neither daily allowances paid for sick leave of salaried workers nor allowances associated with permanent disability were included in the analysis. The analysis was restricted to direct reimbursed costs and measured from the perspective of French statutory public health insurance. Indirect costs such as absenteeism and productivity loss were not taken into account.

Due to the impossibility of directly attributing any item of medical consumption to RA (except hospitalisation in acute care), the fraction of medical expenditure attributable to RA was estimated through a case-control study.

A control group of individuals not presenting with RA on 1st January 2009 and alive on 31st December 2010, matched by gender and age, was identified in the EGB database. Three controls for each case were randomly selected in the database. This number was considered adequate to provide sufficient statistical power to test for significant differences with the non-parametric Mann-Whitney test [10].

2.4. Statistical analysis

Data presentation is principally descriptive. Continuous data are presented as mean values \pm standard deviation (SD) and median values and categorical data as frequency counts and percentages. Costs were compared between cases and controls using non-parametric tests (Wilcoxon and Kruskal-Wallis tests). A bilateral

probability threshold of 0.05 was used to determine statistical significance. All statistical analyses were performed using SAS® software version 9.2 (Cary, USA).

2.5. Ethical considerations

Since this was a retrospective study of an anonymised database and had no influence on patient care, ethics committee approval was not required. Access to the EGB database has been authorised for Inserm unit U1018-UVSQ (Julie Gourmelen).

3. Results

3.1. Healthcare resources used and total health expenditure of RA patients

Overall utilisation of healthcare resources in this population in 2010 is presented in Table 1. Certain items of medical consumption of particular interest in the RA population were documented, namely rheumatologist consultations, community physiotherapy and day hospitalisation. The annual *per capita* reimbursed all-cause health expenditure was €6,404 in 2010. Outpatient care accounted for 65.6% of the total, including medication, which represented 36.3% of the total, a proportion similar to the contribution of inpatient care (34.4%).

3.2. Direct costs according to treatment regimen

Table 2 presents the breakdown of annual *per capita* costs of RA patients according to their treatment regimen. Patients were categorised into four groups according to their current pharmacological treatment. The “symptomatic treatments” category concerned patients with reimbursement claims for analgesics, NSAIDs or glucocorticoids (or combinations of these) exclusively. We also included, in this group, patients with no medication claims in 2010. The csDMARD monotherapy category included patients dispensed a csDMARD only (with or without symptomatic treatments). The bDMARD monotherapy group included patients dispensed a bDMARD only (with or without symptomatic treatments) and the combination DMARD group included patients dispensed both csDMARDs and bDMARDs (with or without symptomatic treatments).

The unadjusted *per capita* annual expenses of patients treated by bDMARDs (monotherapy or combined with csDMARDs) were three times higher than in individuals not treated with these agents (€15,257 versus €4712, $P < 0.0001$) with an absolute mean annual supplementary cost of €10,545. Drug costs were respectively €8477 (55.6% of total) versus €1151 (24.4% of total) ($P < 0.0001$) and hospitalisation €4878 (32.0% of total) versus €1696 (36.0% of total) ($P < 0.0001$). The contributions of drugs and inpatient care to the supplementary annual cost were of 69.5% and 30% respectively.

In comparison to patients not treated by bDMARDs, treated patients did not differ significantly in terms of gender ratio (23.2% of men versus 24.2%; $P = 0.76$) and time since registration for RA coverage (9.1 versus 8.5 years, $P = 0.25$), although patients treated with bDMARDs were significantly younger (55.3 years \pm 12.9 versus 64.0 years \pm 14.6, $P < 0.0001$). After adjustment for age taken as a binary variable, the mean annual extra cost per patient on bDMARDs was estimated to be €11,117, this difference increasing with age.

3.3. Fraction of total direct cost attributable to RA

Our estimation of cost attributable to RA was based on a comparison with a control group. The annual medical costs of the

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