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Original article

Impact of rheumatoid arthritis in the public health system in Santa Catarina, Brazil: a descriptive and temporal trend analysis from 1996 to 2009

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ABSTRACT

Introduction: There are few studies that carried out a descriptive and trend analysis based on available data from the Unified Health System (SUS) between pre- and post-free dispensing of pharmacological treatment of rheumatoid arthritis (RA) from the perspective of the public health system, in terms of the direct cost of the disease among adults and elderly residents of the State of Santa Catarina, Brazil. This study aims to characterize the direct cost of medical and surgical procedures before and after the dispensing of drugs in this state.

Methods: This is a time series-type study with a cross-sectional survey of data from the Hospital (SIH) and Outpatient (SIA) Information System of SUS during the period from 1996 to 2009.

Results: Between 1996 and 2009, the total expenditure for hospital- and outpatient pharmacological treatment of rheumatoid arthritis was R$ 26,659,127.20. After the dispensing of drug treatment by SUS a decrease of 36% in the number of hospital admissions was observed; however, an increase of 19% in clinical procedures was noted.

Conclusion: During the observed period, a reduction in the number of hospital admissions for both clinical and orthopedic surgical procedures related to this disease was observed. Nevertheless, there was an increase in the cost of medical admissions.

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Impacto da artrite reumatoide no sistema público de saúde em Santa Catarina, Brasil: análise descritiva e de tendência temporal de 1996 a 2009

Palavras-chave:
Artrite reumatoide
Custo direto
Brasil
Sistema Único de Saúde

RESUMO

Introdução: Poucos estudos fizeram uma análise descritiva e de tendência dos dados disponíveis do Sistema Único de Saúde (SUS) entre os períodos pré e pós-dispensação gratuita do tratamento medicamentoso da artrite reumatoide (AR) sob a perspectiva do sistema público de saúde em termos de custo direto da doença entre adultos e idosos moradores do Estado de Santa Catarina, Brasil. O presente trabalho tem o objetivo de caracterizar o custo direto de procedimentos clínicos e cirúrgicos antes e após o fornecimento de medicamentos no estado.

Métodos: Estudo do tipo série temporal com levantamentos transversais entre 1996 e 2009 dos dados do Sistema de Informação Hospitalar (SIH) e Ambulatorial (SIA) do SUS.

Resultados: Entre 1996 a 2009, o gasto total para o tratamento hospitalar e medicamentoso ambulatorial da artrite reumatoide foi de R$ 26.659.127,20. Após a dispensação do tratamento medicamentoso pelo SUS observou-se queda de 36% do número de internações hospitalares. Entretanto notou-se um aumento de 19% nos procedimentos clínicos.

Conclusão: No período observado notou-se uma redução do número de internações hospitalares tanto para procedimentos clínicos quanto cirúrgicos ortopédicos relacionadas a essa doença. Apesar disso, ocorreu um aumento do custo das internações clínicas.

Introduction

The World Health Organization (WHO) called the period 2000–2010 the "decade of bone and joint" due to the increasing prevalence of rheumatic diseases and consequent socioeconomic impact triggered by this situation.[1] Rheumatoid arthritis (RA) is a systemic inflammatory disease that affects joints, lungs, heart and other organs.[2–4] In Brazil, it is estimated that the prevalence of RA ranges from 0.2 to 1.0% and has a worldwide distribution.[5] New options for RA treatment have emerged in order to minimize the damage attributed to the disease, including a faster and more resolutive intervention, the combination of drugs, and innovations in pharmacological formulations.[6]

The interest in estimating the economic consequences and the impact on public health stemmed by these new therapies emerged from the relationship between the high cost of medications and the direct and indirect clinical benefits achieved with treatment.[7] A bibliographic search on direct costs of rheumatoid arthritis in Brazil for our public health, held in major databases, found a limited number of publications on this subject.[8–12]

The Brazilian public health system (SUS) provides free access to treatment of RA, such as disease-modifying antirheumatic drugs (DMARDs) and the immunobiological agent, tumor necrosis factor-alpha blocker (anti-TNF-alpha) – which are high-cost drugs. Ordonnances of 2002 and 2006 from the Brazilian Ministry of Health (MOH) established that the patient should have been in use of at least two combinations of DMARDs without success as a precondition for the provision of an anti-TNF blocker.[13] More recently, new biopharmaceuticals were included in the list of drugs available for the treatment of RA.[14]

In most of the times, the treatment of RA is carried out on an outpatient basis. Nevertheless, studies show that the cost generated by hospital treatment is the most significant part of the expenses with this disease, ranging from 55 to 68% of the total cost, although only 10% of patients are hospitalized annually.[15] Pharmaceuticals represent a significant expense, especially early in the disease, when hospitalizations are less frequent, being the second largest component of expenses related to RA, accounting for over 25% of the total.[15] Brazilian studies using administrative databases covering the direct costs of outpatient and drug treatment of RA indicate that pharmaceuticals accounted for 68.72% of the total amount spent.[16]

From a survey of available data from Hospital (SIH) and Outpatient (SIA) Information System for the State of Santa Catarina (SC), Brazil, we conducted a descriptive analysis of the economic impact of RA in this state; Furthermore, we also evaluated the trend of costs of the disease during the years 1996–2009. Finally, we analyzed the direct costs of the disease, from the perspective of the public health system.

Materials and methods

This is a time series-type study conducted to evaluate the costs of rheumatoid arthritis among adults and elderly people living in the State of Santa Catarina, Southern Region of Brazil, whose survey data cover the period from 1996 to 2009. Information on outpatient and hospital and drug treatment of RA was obtained searching the website of the Computer Department of SUS – DATASUS from MOH, which is freely accessible, public domain documents. Older adults of both genders and with a primary diagnosis of rheumatoid arthritis according to

the 10th revision of the International Classification of Diseases (ICD-10), -10 M05-M06, DIAG_PRINC. Column, were enlisted.

Data from the Health Information System (SIS) were exported in its original form (.dbc file) and decompressed with TabWin program, available at DATASUS website (.dbf file). After that, the results were converted into Excel spreadsheets in order to elaborate a database, and filters for refining the data and processing of information of interest for the study were applied. The information collected from SIH was: number of permits for hospital admissions (AIH) and total amount paid, available in VAL_TOT column, codes 78500036 (from 1996 to 2007), and 0303090324 (from 2008 to 2009), corresponding to clinical procedures for RA, consisting of hospital treatment and monitoring of inflammatory polyarthropathies, including diagnostic and/or therapeutic arthrocentesis. Hospitalizations for orthopedic surgical procedures available from 2003 were: 39003124 – partial hip arthroplasty; 39016129 – total hip arthroplasty; 39022145 – total knee arthroplasty, 39003051 – shoulder arthroplasty, 39010147 – knee synovial exploration, 39011020 – spine osteotomy, 39011070 – arthroscopic lavage, and 39014053 – shoulder arthroplasty. Both codes are for procedures performed and classified in PROC_REA column.

The information obtained from SIA beginning in 2002 was: number and total cost of permits for high-cost procedures (APAC) for the main code of this disease at APA_CIDPRI column; for age at APA_IDDAAA or AP_NUIDADE column; and the medications were separated, both for DMARDs and for anti-TNF, in APA_TOTAL or AP_VL_AP column. During this period, changes occurred for abbreviations at age and medication columns. The first regulatory ordonnance (No. 865/2002) regarding drug treatment was established in November of the same year. In order to balance the pre- and post-medications dispensed by SUS, it was decided to split the time into two periods: the 1st period from 1996 to 2002, and the 2nd period 2 between 2003 and 2009, respectively.

This study was submitted and approved by the Human Research Ethics Committee of the Fundação Universidade Regional University de Blumenau (CEP-FURB) under protocol number 026/12.

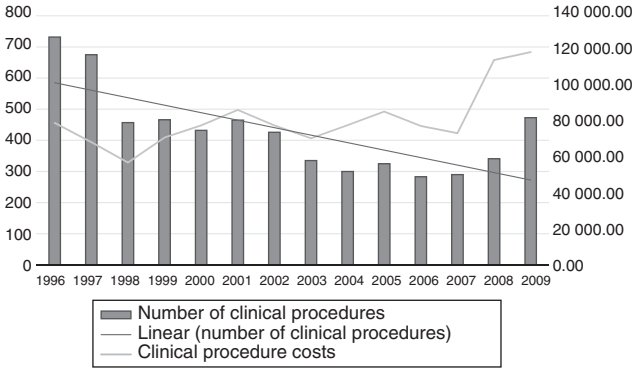

Fig. 1 – Trends in the number and cost of hospital admissions for medical procedures for patients with rheumatoid arthritis in Santa Catarina, Brazil, between 1996 and 2009 in adults and elderly individuals. Clinical procedure – treatment and follow-up of inflammatory polyarthropathies, including diagnostic and/or therapeutic arthrocentesis.

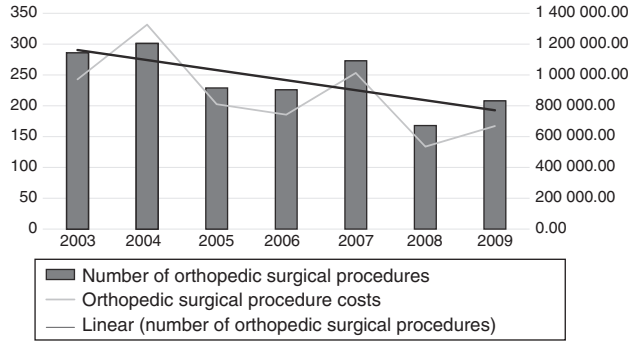

Fig. 2 – Trends in the number and cost of hospital admissions for orthopedic surgical procedures for patients with rheumatoid arthritis in Santa Catarina, Brazil, between 2003 and 2009 in adults and elderly individuals. Orthopedic procedure – knee, hip and shoulder arthroplasty, knee synovial exploration, spine osteotomy, and arthroscopic lavage.

Results

In the state of Santa Catarina between the years 1996–2009, the total SUS expenses for hospital and outpatient medical treatment of RA was R$26,659,127.20. The number of hospital admission permits was 7691, with a corresponding cost of R$7,212,498.45, representing 27% of total costs. Of this amount, 6000 admissions were due to clinical procedures, accounting for 78% of all procedures performed, with costs of R$1,144,402.08, representing only 15.9% of hospital expenses with the disease, when compared to orthopedic surgical procedures, even considering that these latter procedures were only booked from 2003. One can observe that before and after the administration of the pharmacological treatment by SUS, a decreasing trend of 36% was noted in the number of admissions due to clinical issues; this downward trend (of 28%) was also observed in orthopedic surgical procedures. With regard to costs, there was a 19% increase in clinical procedures; however, this increase was offset by a decrease of 32% of orthopedic procedures (Figs. 1 and 2).

In the outpatient scenario, the total number of high-cost procedure permits (APAC) for the pharmacological treatment of this disease was 40,188, at the cost of R$19,446,628.75, corresponding to the biggest part of the total expenditure with rheumatoid arthritis. Only 14.7% of the total number of APACs had been allocated to the group of anti-TNF agents, but these drugs represented approximately 82% of the final cost of pharmacological treatment, that is, R$15,975,767.24 (Table 1).

Discussion

This study found that a change occurred in the profile of direct costs of RA in the time interval of 14 years, with a progressive increase in costs related to permits for high-cost procedures with reference to the pharmacological treatment of RA. Notwithstanding the lower total volume for the

Table 1 – Total number and cost (in R$) of high-cost procedure permits for rheumatoid arthritis in Santa Catarina, Brazil, from 2003 to 2009 for adults and elderly individuals.

Year	Number of high-cost procedure permits (*n*)				Cost of high-cost procedure permits (R$)			
	Total number	DMARD	Anti-TNF	Var. (%)	Total cost	DMARD	Anti-TNF	Var. (%)
2003	410	380	30	–	318,324.67	21,883.74	296,440.93	–
2004	966	894	72	2.35	468,530.65	77,823.78	390,706.87	1.47
2005	2638	2469	169	2.73	892,556.33	176,000.37	716,555.96	1.90
2006	2787	2673	114	1.05	661,825.66	149,505.46	512,320.20	0.74
2007[a]	43	43	0	–	3376.24	3376.24	0	–
2008	15,838	13,835	2003	–	7,707,046.64	1,564,400.13	6,142,646.51	–
2009	17,506	14,729	2777	1.10	9,394,958.56	1,477,871.79	7,917,096.77	1.21
Total	40,188	35,023	5165		19,446,628.75	3,740,861.51	15,975,767.24	

Anti-TNF, anti-tumour necrosis factor; DMARD, disease-modifying antirheumatic drug.

[a] No data available in the Outpatient Information System (SIA/SUS).

immunobiological agents dispensed, the expenses with the pharmacological treatment of RA accounted for most of the financial charges for this disease. As for hospital admissions – the second largest direct cost of the disease, the number of admission permits by clinical procedure showed a significant downward trend after the free access to drug treatment by SUS. Orthopedic surgical procedures also showed a decrease in the number of permits and also in costs.

Medical consultation represents the lowest percentage of the total cost of the disease, when compared to hospital and drug costs, ranging between 10–25%.[15] Similar findings in a study conducted in Argentina in 2002 (in the prebiological era) indicated that the admissions accounted for 73% of the total direct cost, while drugs and outpatient procedures represented 16% and 8%, respectively.[17] In a study conducted in Germany, its authors found that over half of the medication costs was attributed to immunobiological agents; however, the costs associated with rheumatoid arthritis were unchanged throughout the study period. This only occurred thanks to the compensation of the increase in drug expenses and to the lower hospitalization expenditures and productivity costs.[18]

A multicenter cross-sectional study with 1109 participants conducted in 2000 in France established that the main reason for hospitalization was the disease itself,[19,20] even with a more appropriate control of the inflammatory activity of RA, demonstrably achieved with an early and aggressive treatment with synthetic drugs (alone or in combination with immunobiological agents).[21,22] The decrease of 36% in the number of hospital clinical admissions as a result of RA, found in our study when comparing the 2nd *versus* 1st period, is corroborated by a study based on a Southern region of Sweden database in a period of 10 years, where a decrease of 27% and 28% for men and women, respectively, was observed. It was also noted a decrease of 28% in the number of hospitalizations for orthopedic causes, compared with 39% and 36% of Swedish men and women, respectively.[22] Similarly, a cohort study conducted in Germany comparing the costs of hospitalizations in the periods without *versus* with immunobiological agents (anti-TNF) showed a decrease, in terms of costs, from 29% to 13%[18] – differently from the increase of 19% in costs in our results for clinical admissions.

According to the authors, the direct cost for hospitalization and medications represents something between 70% and 80% of the total cost of the disease,[23,24] of which the greater portion is related to the pharmacological treatment of rheumatoid arthritis, especially with immunobiological agents (anti-TNF), overcoming the expenses on hospitalizations.[25] A US longitudinal, three-year (1999–2001) study with 7527 participants showed that the direct cost of medications represented 66% of the total cost, a substantially higher percentage when compared with the findings of the pre-immunobiological era; and only 25% of subjects had been receiving immunobiological agents.[26] Another 2009 study in South Korea, which used a national database, estimated that the cost of medications was approximately 48.6%; according to its authors, this cost is directly related to the immunobiological therapy.[27] The result of this study points in the same direction, in that 73% of expenditures were allocated to pharmaceuticals, even considering the use of only 14.7% of anti-TNF agents. Just as in Brazil, other developing countries such as Colombia and Mexico established that pharmaceuticals constitute the largest component of the total direct cost.[28,29]

This study has some limitations inherent to the fact that we used a secondary database for the collection of information for its conduction, which can determine that the costs may be higher than those reported, since many SIS data are underreported or are simply lost along the consolidation flow, as occurred, for example, in 2007, with reference to the number and total cost of the high-cost procedure permits. Moreover, this form of data collection does not allow that one becomes aware of the individual characteristics, for example, disease duration, disease severity (from the milder forms, which have a lower risk of hospitalization or of an orthopedic surgical procedure, to the most serious situations); the determination of what were the therapeutic regimens administered throughout the disease; the presence of comorbid conditions; and activity indices for this disease, in addition to a regular access to health care unit providing a specialist. It is worth emphasizing that this study may have been influenced in its results, due to the decrease in the number of hospital beds offered by SUS in the state of Santa Catarina – from 12,750 in 2005 to 11,175 in 2009 (www.sc.ripsa.org.br; site accessed on July 31, 2013). In contrast, a Brazilian study with 12,218,632 hospital discharges in 1998 (data from SIH/SUS) evaluated the existence of inconsistencies with respect to diagnostic, gender, and age information. The result obtained establishes that

the total inconsistencies for these three variables were under 0.5%, *i.e.* a negligible error.[30]

Another limitation concerns the characteristics of economic evaluation studies. It should be borne in mind the difficulty of comparing costs between countries with different economic situations, especially among developed and developing countries, and also the monetary value of local currency, which undergoes changes over time, due to its exchange rate. Furthermore, the monetary data obtained through an analysis of information systems refer to SUS charges or expenses, with no information based on total costs for goods and services consumed in the healthcare service.

The knowledge of the distribution of the total direct cost of RA leads to a better use of resources; besides, this knowledge points to what are the areas of health care where resources can be saved. Despite the downward trend observed in the number of hospital admissions (both for clinical reasons and for an orthopedic surgery) related to RA since the availability of free medical care offered by the Brazilian National Health System, the study indicates that the ratio between the high cost of medications and the effectiveness in reducing hospitalizations still tends to hold an unfavorable ratio. It is suggested that new studies for monitoring databases from health information systems, resulting in a long-term economic analysis, be regularly carried out, in order to recommend new possibilities for reducing the direct costs of RA.

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Conflicts of interest

The authors declare no conflicts of interest.

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