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Cost of Illness and Quality of Life of Patients with Rheumatoid Arthritis in South Korea

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A B S T R A C T

Objective: To estimate the cost of illness (COI) and health-related quality of life (HRQOL) of rheumatoid arthritis (RA) according to four different levels of functional severity. **Methods:** A face-to-face interview survey was administered to patients with RA recruited at the Rheumatology Clinic of Seoul National University Hospital. Direct costs (medical costs [treatment, drug, private physiotherapy, traditional Chinese medicine, other alternative medicine], nonmedical costs [travel, dietary supplements, auxiliary device, home assistance]), indirect costs (productivity loss due to job loss and sick leave), and deterioration in the HRQOL of patients with RA were measured. Factors associated with the COI and the HRQOL were analyzed by using multiple regression and multivariate logistic regression. **Results:** A total of 196 patients were enrolled for this study. As RA functional severity worsened, the total costs increased accordingly (class I: 4,230,204 Korean won, class II: 7,250,674 Korean won, class III: 8,046,434 Korean won, class IV: 8,206,215 Korean won). Direct costs also increased with the severity of the functional status, with a sharp decrease in class IV. The average HRQOL score was 0.49, showing an evident impact of RA severity (class I: 0.67, class II: 0.50, class III: 0.29, class IV: 0.23). Functional class and comorbidity were significant determinants of the COI and the HRQOL. **Conclusion:** Functional severity was a major factor associated with higher COI and lower HRQOL scores. Therefore, preventing the aggravation of functional severity is crucial for decreasing the COI and improving the HRQOL of patients with RA.

Keywords: cost, functional status, quality of life, rheumatoid arthritis.

Introduction

Rheumatoid arthritis (RA) is a chronic autoimmune disease that is primarily manifested by pain and swelling of multiple synovial joints. The exact cause of RA is unknown, but it is thought to be multifactorial, with genetic predisposition and environmental factors (infection, smoking, or hormones) believed to play a role [1,2]. Symptoms of RA vary depending on the degree of inflammation and include joint pain and stiffness, fatigue, anorexia, and low-grade fever. Inflammatory reactions in the joints occur commonly in a symmetric manner. RA can also manifest as a systemic autoimmune disease that affects the musculoskeletal, nervous, respiratory, cardiovascular, renal, and hematological systems.

The worldwide prevalence of RA is estimated to be around 1%, affecting women two or three times more than men. In South Korea, the self-reported prevalence rate of RA based on the National Health and Nutrition Examination Survey was estimated to be 2.1% [3] while the physician-diagnosed prevalence rate of RA based on community surveys was estimated to be 1.4% [4]. If left untreated, 20% to 30% of patients with RA suffer from permanent joint damage within 2 to 3 years of diagnosis; they may also have difficulty in carrying out normal daily activities. Moreover, complications from RA can arise during the disease course. For these reasons, RA requires an early treatment once it is diagnosed [5].

Because RA is a chronic disease accompanied by physical disabilities and a number of comorbidities, it results in a significant economic burden, reduced productivity, and deteriorated quality of life (QOL) [6]. McIntosh [7] reported that the total cost of RA in England was estimated to be more than £1.2 billion, of which 52% was indirect costs. Leardini et al. [8] noted that the disease burden varied depending on the functional status of the patients with RA, with direct medical costs increasing and the QOL decreasing as the functional status worsened. A comparative analysis of 1415 patients with RA and a control group conducted by Birnbaum et al. [9] from 1995 to 1997 indicated that the total medical and drug cost and productivity loss incurred by these patients amounted to $7193 per person per year, 2.11 times higher than that of the control group, which totaled $3405. Rat and Boissier [10] and Pugner et al. [11] conducted studies of the RA burden and concluded that, on average, indirect costs accounted for 64% (20%–79%) of the total RA burden. This indicates that the cost of productivity loss due to the physical disabilities caused by RA is considerable worldwide.

Published evidence of the burden of RA in South Korea is very limited. The only reported cost-of-illness (COI) study was on the

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direct and indirect costs incurred by 52 patients with RA in 1995. In this study, the mean direct cost was found to be Korean won (KRW) 181K per patient per month while the mean indirect cost ranged from KRW 83K to KRW 106K per patient per month depending on the location of residence [12]. In a study that estimated the QOL of 100 patients with RA and 228 healthy people by using the Korean version of European quality of life-five dimensions (KEQ-5D) tool, the QOL of patients with RA was 0.58 whereas that of healthy people was 0.91, indicating that patients with RA had a far lower QOL than did healthy controls [13].

The results of burden-of-disease studies can be used for prioritizing health policies and justifying the needs for spending on disease prevention, management, and social intervention. As very few such studies have been performed in South Korea, the present study was performed to assess the COI and impact of RA on the health-related quality of life (HRQOL). Particularly, we investigated the differences in the COI and the HRQOL according to the functional status of patients with RA to improve the understanding of the true burden of RA.

Methods

The following data sources were used to estimate the COI and the HRQOL of patients with RA: patient surveys, medical chart reviews, and reviews of electronic hospital records.

Patients

Patients with RA were enrolled at the Rheumatology Clinic of Seoul National University Hospital, which is located in Seoul, South Korea, between November 18, 2009, and February 2, 2010. The inclusion criteria were as follows: 1) the patient meets the American Rheumatism Association 1987 revised criteria for the classification of RA [14] and 2) the patient must have visited the medical institution at least twice before the interview. Functional status was assessed according to the American College of Rheumatology 1991 revised criteria for the classification of global functional status in RA [15]. Definitions of the four classes were as follows: 1) class I: completely able to perform the usual activities of daily living (self-care, vocational, and avocational), 2) class II: able to perform the usual self-care activities and vocational activities but limited in the ability to perform avocational activities, 3) class III: able to perform the usual self-care activities but limited in the ability to perform vocational and avocational activities, and 4) class IV: limited in the ability to perform the usual self-care, vocational, and avocational activities. Usual self-care activities include dressing, bathing, grooming, and toileting. Avocational (recreation and/or leisure) and vocational (work, school, homemaking) activities are patient desired and specific to age and sex. This study was carried out with the approval of the Institutional Review Board of the hospital.

Data

Sociodemographic and clinical characteristics

Information on sociodemographic characteristics such as age, gender, marital status, household income, employment status, educational status, and health insurance type were collected by using the data from the patient surveys. Information on clinical features was collected from reviews of medical charts, which included information pertaining to comorbidity, the duration of morning stiffness, rheumatoid factor, bone erosion, and medication.

Cost of illness

In the view of South Korean circumstances, direct medical costs included in-hospital, prescription drugs, private physiotherapy, traditional Chinese medicine, and other alternative medicine costs, whereas direct nonmedical costs included travel, auxiliary devices, dietary supplements, and home assistance costs. Indirect costs included productivity loss from job loss and sick leave [16,17]. Productivity loss related to career changes, in other words reduced productivity at work, was not considered in the analysis of indirect costs, because there was one patient who reported a RA-related career change and whose average wage did not change. Because it was impossible to estimate the mortality rate of patients with RA, lost productivity from premature death is not reflected in this study.

In-hospital costs were estimated from hospital electronic data records based on the expense for the physician visit, treatments, hospitalization, and monitoring throughout the year of 2009. Out-of-hospital medical costs, direct nonmedical costs, and indirect costs were estimated on the basis of patient surveys from face-to-face interviews. The reference period for out-of-hospital medical

Table 1 – Sociodemographic characteristics of the patients with rheumatoid arthritis.

	n (%)				
	Class I	Class II	Class II	Class IV	Total
The number of patients	66 (33.7)	81 (41.3)	32 (16.3)	17 (8.7)	196 (100)
Gender (female)	53 (80.3)	65 (80.2)	28 (87.5)	13 (76.5)	159 (81.1)
Age (y), mean (SD)	60.2 (11.2)	62.9 (10.1)	64.3 (12.1)	66.9 (9.6)	62.5 (10.8)
Marital status					
Married	57 (86.4)	70 (86.4)	21 (65.6)	13 (76.5)	161 (82.1)
Widowed	5 (7.6)	10 (12.3)	9 (28.1)	2 (11.8)	26 (13.3)
Others	4 (6.1)	1 (1.2)	2 (6.3)	2 (11.8)	9 (4.6)
Household monthly income, mean (SD)	3806 (5300)	2801 (3186)	1540 (1579)	2187 (2466)	2836 (3872)
Unemployment	42 (63.6)	66 (81.5)	29 (90.6)	14 (82.4)	151 (77.4)
Education					
Elementary school or less	9 (13.6)	26 (32.1)	13 (40.6)	7 (41.2)	55 (28.2)
Middle school	7 (10.6)	15 (18.5)	3 (9.4)	3 (17.6)	28 (14.4)
High school	30 (45.5)	22 (27.2)	11 (34.4)	6 (35.3)	69 (35.4)
College	20 (30.3)	17 (21.0)	5 (15.6)	1 (5.9)	43 (22.1)
Health insurance					
National health insurance	64 (97.0)	80 (98.8)	27 (84.4)	14 (82.4)	185 (94.4)
Medical aid	2 (3.0)	1 (1.2)	5 (15.6)	3 (17.6)	11 (5.6)

Household monthly income: X1000 Korean won.