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Work Productivity and Costs Related to Patients with Ankylosing Spondylitis, Rheumatoid Arthritis, and Psoriasis

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ABSTRACT

Objectives: To determine and compare the impact of rheumatoid arthritis (RA), ankylosing spondylitis (AS), and psoriasis on work productivity, to calculate the productivity costs (PC), and to map out factors that influence (functional status and disease activity) work productivity. **Methods:** The Work Productivity and Activity Impairment questionnaire was used to evaluate productivity losses of patients with RA (n = 77), AS (n = 230), and psoriasis (n = 93). Demographic data, patient-reported outcomes (PROs) (Health Assessment Questionnaire [HAQ] and Bath Ankylosing Spondylitis Disease Activity Index [BASDAI]), and clinical parameters (Disease Activity Score in 28 joints [DAS28], body surface area [BSA], and Psoriasis Area and Severity Index [PASI]) were collected. The correlations among PROs, clinical parameters, and overall productivity loss were examined, and multiple regression models were used to examine relationships among parameters and productivity loss. PC were calculated using the friction cost approach. **Results:** Mean patient age and disease duration were 47.1 and 15.7 years, respectively. The mean HAQ and DAS28 in patients with RA were 1.22 and 5.6, respectively. The mean BASDAI score in patients with AS was 4.43. The mean BSA

and PASI score in patients with psoriasis were 21.1% and 12.9, respectively. The percentage of patients with psoriatic arthritis (in those with psoriasis) was 24.7%. We did not find significant differences in Work Productivity and Activity Impairment domains among various diagnoses. Patients with AS, RA, and psoriasis reported overall work productivity losses of 40.9%, 42.9%, and 42.8%, respectively. Daily activity impairments were approximately 50.0%. Overall work productivity loss strongly correlated with PROs, whereas correlations with clinical parameters were weak. The HAQ and BASDAI were identified as major predictors of productivity impairment. **Conclusions:** The greatest loss in productivity was in those with psoriatic arthritis; however, it was not significant. In contrast to clinical parameters (DAS28, BSA, and PASI score), PROs (HAQ and BASDAI score) significantly influence loss of productivity. The average annual lost PC per patient was estimated to be €2000. **Keywords:** ankylosing spondylitis, productivity costs, psoriasis, psoriatic arthritis, rheumatoid arthritis, work productivity, WPAI.

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Introduction

Rheumatoid arthritis (RA), ankylosing spondylitis (AS), and psoriasis are chronic diseases leading to progressive disability, with significant costs arising not only to the health care system. Hence, the performance of health economic studies from the health care system perspective leads to substantial underestimation of total disease burden [1,2].

Patients suffer from decreased quality of life related to health problems; in addition, there are work restrictions and lost work productivity resulting from these diseases, with lost productivity being related to diminished participation in the labor market [3]. Reduced work opportunities affect both the national economy and personal finances and contribute overall to reduced quality of life [4].

During the illness, patients can move among different health states; there can be periods of normal productivity, presenteeism, the state of being at work but working at reduced productivity, also referred to as “at-work productivity loss” or “at-work disability”, interspersed with reduced productivity associated with increased temporary absenteeism, as well as periods of chronic or permanent absenteeism [5,6].

In cases of RA, 20% to 30% of the patients have been reported to have become totally disabled in the first 2 to 3 years after the disease was diagnosed [7].

Kobelt et al. [8] states that the overall percentage of patients who must leave their jobs is 20% to 50%, depending on the sample of patients and the country where the study was conducted.

The prevalence of these chronic conditions (i.e., RA, AS, and psoriasis) ranges from 0.1% to 1.0% of the population [9,10]. The

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first symptoms often appear early in life (especially with AS) and affect the entire productive life of the individual [11]. This is why these conditions generate not only health costs but also significant costs to patients, employers, and society as a whole [12].

With the increasing loss of productivity (due to physical impairment), significant costs associated with lost productivity are generated. From the societal and patient perspective, these costs are referred to as “productivity costs” (PC) and “productivity loss,” respectively. These costs represent 40% to 80% of the total societal cost attributed to these diseases (RA, AS, psoriasis) [13]. Another important part of the costs is social pensions and various allowances based on the degree of dependence [14], which is indirect costs that the government bear and do not represent the productivity costs from the societal perspective [15].

In general, there is no discussion that the burden of rheumatic diseases and psoriasis on the society is substantial. There are several methods of measurement and valuation of the productivity impairment and productivity costs. Based on different approaches of quantification of productivity losses, the overall calculated impact/economic burden can differ significantly [16,17]. It should also be noted that there are differences in guidelines across countries on how to implement productivity losses and costs into decision making [17].

Several instruments/questionnaires are used for the measurement of productivity and disability in rheumatic diseases and psoriasis. These instruments have proved their reliability, validity, and responsiveness in various diseases. The most frequently used instruments are Rheumatoid Arthritis Specific Work Productivity Survey, Workplace Activity Limitations Scale, Work Instability Scale for Rheumatoid Arthritis, Work Limitations Questionnaire, and Work Productivity and Activity Impairment (WPAI) questionnaire [5,18]. The development of the “ideal” tool for the valuation of productivity losses, however, is still a subject of research [19–21].

Two main approaches are used for calculating the costs associated with reduced or lost productivity. The first approach is the human capital approach, which includes the value of any potentially lost productivity. Productivity loss is then calculated or monetized as all of the expected or potential loss of profit because of an illness, disability, or a prematurely deceased patient. An essential precondition for the application of this human capital approach method is the “absolute loss of productivity” and the impossibility of its replacement; therefore, a fully utilized labor force is assumed (i.e., zero unemployment) [8,22].

The second approach used for calculating productivity costs is the friction cost approach (FCA). This approach assumes that those with reduced or lost productivity will be replaced by other workers. In this scenario, productivity loss is calculated as the maximum period of time needed to restore full productivity of the position concerned. This period of time is called the “friction period”; after expiration of the friction period, the cost to society is assumed to be zero. The friction period should also include the new employee’s training period [8,23].

Methods

The study was carried out using cross-sectional data collection among randomly selected patients from a patient organization (AS), specialized centers for the treatment of skin diseases (four centers for psoriasis), and specialized centers for the treatment of rheumatic diseases (three centers for RA). Data collection was performed through self-reporting questionnaires returned by regular mail for patients with AS (65% recoverability) and by direct physician-administered questionnaires for patients with RA and psoriasis.

Structure and scope of the data were represented by the WPAI questionnaire in patients with relevant diagnoses [24], a Health Assessment Questionnaire (HAQ) [25], and the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) [26]. In addition, the Disease Activity Score in 28 joints (DAS28) in patients with RA, body surface area (BSA), and Psoriasis Area and Severity Index (PASI) in patients with psoriasis were collected.

Demographic data (age, sex, work status, educational level) and the year of diagnosis were also collected. Patients were eligible for the study if they were in their productive years. Hence, old-age pensioners (retirement pension patients), students, and women on maternity leave were excluded from the study.

The WPAI:Specific Health Problem questionnaire is a variation of a specific questionnaire developed to measure the impact of specific diseases on work productivity. The questionnaire has demonstrated validity, reliability, and sufficient predictive value to measure the impact of the disease with regard to absenteeism, presenteeism, and overall productivity impairment in such a way that it could be monetized [27–29]. In general, the WPAI questionnaire is a quantitative tool used for measuring reduced productivity at work and during leisure activities (i.e., typical activities that a person performs on a regular basis, such as household activities, shopping, childcare, and exercising). Four scores, expressed as percentage deterioration, are obtained from the WPAI questionnaire. Higher percentage scores are worse in terms of absenteeism, presenteeism, overall productivity, and leisure activity impairment relative to lower scores.

The HAQ is used to monitor functional abilities of patients with RA. It is intended to reflect the impact of the disease on daily life. It contains 20 questions regarding ability to perform activities in eight areas (dressing and grooming, rising, eating, walking, hygiene, reach, grip, and activities). The final score ranges from 0 to 3, where 0 indicates no functional impairment and 3 indicates the worst impairment. For some analysis, we divided patients with RA according to their HAQ score into five categories [30]. The BASDAI questionnaire focuses on the subjective assessment of disease activity (or disease status) in patients with AS. It uses six questions. Using a visual analogue scale, patients record their degree of fatigue, spinal pain, joint pain/swelling, areas of localized tenderness, and severity and duration of morning stiffness. The total score can range from 0 to 10, with higher values indicating greater disease activity or limitations. A score higher than 4 indicates very active disease [31].

DAS28 was used for evaluation activity in patients with RA and psoriatic arthritis. DAS28 is derived by assessing the number of swollen and tender joints, sedimentation, and global assessment of the patient [32,33].

The PASI score and BSA were used to evaluate the severity of skin changes (size of the affected BSA) of patients with psoriasis. The PASI score ranges from 0 to 72; a score of 72 means that the patient is having erythroderma. The BSA ranges from 0% to 100%, where the percentage describes the total area of the affected skin [34].

The costs associated with lost work productivity were calculated using the FCA [23,35,36]. Loss of productivity was then calculated to include the time necessary to replace and train the new employee, after which it is assumed that the original productivity is restored. This time period (friction period) was set to 130 working days according to the present conditions for the Czech Republic [37,38]. The average gross wage in the Czech Republic (€42.85/d, year 2010) was used for the valuation of lost productivity [39]. The cost of lost productivity, using the FCA method, is calculated as follows:

$$PC_{FCA} = \text{Total loss of work productivity (based on the WPAI score)} \times \text{Average gross salary for the friction period} \times \text{coefficient of elasticity. [35,40]}$$

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