WORK PRODUCTIVITY AND PRODUCTIVITY COSTS OF PATIENTS WITH RHEUMATOID ARTHRITIS, ANKYLOSING SPONDYLITIS AND PSORIASIS IN THE CZECH REPUBLIC

Klára Kruntorádová[1,2], Jiří Klimeš[1,3], Tomáš Doležal[1], Milan Vocelka[1,4], Alena Petříková[3]

[1]Institute of Health Economics and Technology Assessment, Czech Republic
[2]CzechHTA, Faculty of Biomedical Engineering, Czech Technical University in Prague, Czech Republic
[3]Faculty of Pharmacy, Charles University in Prague, Czech Republic
[4]3rd Faculty of Medicine, Charles University in Prague, Czech Republic

HETA — Institute of Health Economics and Technology Assessment

OBJECTIVE

Rheumatic diseases are the leading diagnoses in terms of productivity loss and disability, hence productivity (indirect) costs are generally considered to be extremely relevant within these diagnoses. To assess and measure the impact on work productivity is crucial step to understand their economic impact as well.

Our aim was to assess and compare the impact of rheumatoid arthritis (RA), ankylosing spondylitis (AS) and psoriasis (Ps) on work productivity, to estimate productivity costs in the Czech Republic and to evaluate the effect of functional status and disease activity on productivity costs across these three/ four rheumatic diseases (25% of patients with psoriasis revealed also psoriatic arthritis).

METHODS

The authors Reilly MC [1], Maksymowych WP [2], Zhang [3] proved that the Work Productivity and Activity Impairment Questionnaire (WPAI) questionnaire is a reliable, responsive, valid tool for assessing work productivity and calculating productivity costs. We used Czech validated version of WPAI (WPAI: RA, AS, Ps) to assess and measure productivity loss of patients with RA (n=77), AS (n=230), Ps (n=93) in productive age (all younger than 65).

We collected demographic characteristics, for each diagnosis relevant clinical parameters (DAS28 within RA and BSA, PASI within Ps) and patient-reported outcomes (PROs) (HAQ within RA, BASDAI within AS).

The interdependence among PROs and overall work productivity loss or productivity costs were described by Spearman's rank correlation coefficient. Multivariate linear regression analysis was applied to identify major productivity cost drivers.

Productivity costs were calculated by friction cost approach (FCA) using friction period of 130 work-days. We used an average gross income as factor. Factor was € 42.85 per working day. Overall WPAI score was used as a multiplier reflecting productivity loss. Into the formula it was also included correction factor (coefficient of elasticity) due to compensation mechanisms on the workplace because these mechanisms (i.e. substitution of college) can diminish the real loss of productivity. The value of correction factor (coefficient of elasticity) was 0.8. In particular to calculate productivity costs, we used this equation: *overall WPAI*$\times 42.85 \times 130 \times 0.8 = FCA_{EXT}$.

RESULTS

Average patients' age was 47.1 years (22-62) and average disease duration was 15.7 years. Patients with RA revealed higher HAQ (1.22) compared to AS patients (1.00), which is expectable because of pathophysiology of each diagnosis. Mean DAS28 of RA patients was 5.58 and mean BASDAI of AS patients was 4.43. Mean BSA and PASI for Ps patients were 21.09% and 12.85 (**Table 1**). The percentage of psoriatic arthritis (Ps patients) was 24.7%. We did not reported significant differences of WPAI domains among all diagnoses. Absenteeism for patients with RA, AS and Ps (PsA) was 8.39%, 10.79% and 14.90% (20.32%). Presenteeism was 40.26% for patients with RA, which was greater by 7.29% and 5.83% compared to AS and Ps patients. Presenteeism of patients with PsA was 54,21%. Patients with AS, RA and Ps (PsA) reported overall work productivity loss of 40.85%, 42.92% and 42.82% (59.97%), respectively. Activity impairments were approximately 50.00% but among PsA patients it was 71.30% (**Figure 1**). Average annual productivity costs per one patient with RA, AS and Ps (PsA) were € 1,913, € 1,809 and € 1,908 (€ 2,673), respectively. HAQ and BASDAI were identified as major predictors for overall work productivity and productivity cost, respectively (**Table 2**). Overall work productivity loss or productivity costs strongly correlated with PROs, whereas correlations with clinical parameters were weak (**Table 3**).

Table 1. Patients characteristics (demographic, clinical and PRO parameters)

Parameter	RA					AS					Ps (PsA)				
	n	%				n	%				n	%			
Number of patients	77	100.0				230	100.0				93 (23)	100.0 (100.0)			
Work-active patients (participation)	58	75.3				154	67.0				89 (19)	95.7 (82.6)			
Women (participation)	50	64.9				96	41.7				28 (9)	30.1 (39.1)			
	Mean	SD	Median	Min	Max	Mean	SD	Median	Min	Max	Mean	SD	Median	Min	Max
Age (years)	45.3	9.6	47.0	24.0	61.0	49.3	8.7	50.0	22.0	61.0	43.3 (45.5)	10.0 (8.1)	44.0 (48.0)	23.0 (31.0)	62.0 (59.0)
Disease duration (years)	7.4	6.8	5.0	1.2	40.0	18.0	9.6	17.0	0.0	44.0	17.0 (16.2)	11.7 (9.8)	15.0 (21.5)	0.4 (0.4)	50.0 (42.0)
HAQ[RA,AS], BSA (%)[Ps(PsA)]	1.2	0.7	1.0	0.1	2.9	1.0	0.6	1.0	0.0	2.6	21.1 (25.3)	19.2 (22.1)	15.0 (18.0)	2.0 (5.0)	90.0 (75.0)
DAS 28[RA], BASDAI[AS], PASI[Ps(PsA)]	5.6	0.7	5.7	3.4	6.8	4.4	2.1	4.4	0.0	9.2	12.9 (14.0)	11.9 (7.9)	15.8 (11.8)	0.4 (3.0)	43.4 (35.4)

AS - Ankylosing Spondylitis, BSA - Body Surface Area, BASDAI - Bath Ankylosing Spondylitis Disease Activity Index, DAS 28 - Disease Activity Score, HAQ - Health Assessment Questionnaire, PASI - Psoriasis Area and Severity Index, Ps - Psoriasis, PsA - Psoriatic Arthritis, RA - Rheumatoid Arthritis
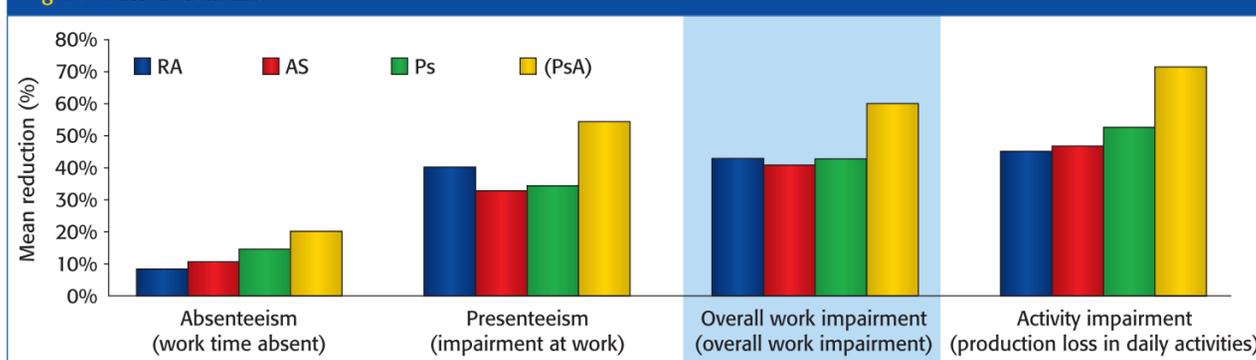

Figure 1. WPAI domains

Table 2. Predictors of productivity loss and productivity cost, multivariate linear regression analyses

Parameter	RA			AS			Ps (PsA)		
	$\beta_{overal\ WPAI}$	$\beta_{PC(FCA)}$	P-value	$\beta_{overal\ WPAI}$	$\beta_{PC(FCA)}$	P-value	$\beta_{overal\ WPAI}$	$\beta_{PC(FCA)}$	P-value
HAQ[RA,AS], BSA (%)[Ps(PsA)]	23.9	21.2	< 0.001	20.1	17.9	< 0.001	222.0 (-236.0)	0.2 (-0.2)	0.433 (0.613)
DAS 28[RA], BASDAI[AS], PASI[Ps(PsA)]	-141.0	-0.1	0.977	6.2	5.5	< 0.001	-195.0 (-681.0)	-0.2 (-0.6)	0.780 (0.636)

β - beta regression coefficient, $\beta_{overal\ WPAI}$ - %, $\beta_{PC(FCA)}$ - €

Table 3. Spearman's correlation coefficient between overall work productivity loss or productivity cost

Correlation between overall WPAI/ PC$_{FCA}$ and parameter	RA		AS		Ps (PsA)	
	r^s	P-value	r^s	P-value	r^s	P-value
HAQ[RA,AS], BSA (%)[Ps(PsA)]	0.504	< 0.001	0.618	< 0.001	0.052 (-0.317)	0.630 (0.185)
DAS 28[RA], BASDAI[AS], PASI[Ps(PsA)]	-0.099	0.465	0.665	< 0.001	0.013 (-0.212)	0.906 (0.385)

r^s-Spearman's correlation coefficient
RA: r^s (0-0.1$\overline{9}$ weak correlation, 0.20-0.3$\overline{8}$ moderate correlation, 0.39-1 strong correlation), AS: r^s (0-0.1$\overline{1}$ weak correlation, 0.12-0.2$\overline{2}$ moderate correlation, 0.23-1 strong correlation), Ps: r^s (0-0.1$\overline{7}$ weak correlation, 0.18-0.3$\overline{4}$ moderate correlation, 0.35-1 strong correlation), PsA: r^s (0-0.3$\overline{4}$ weak correlation, 0.35-0.6$\overline{9}$ moderate correlation, 0.70-1 strong correlation)

CONCLUSIONS AND DISCUSSIONS

The limitation of comparison is the heterogeneity of patients within all diagnoses in terms of disease duration and time from diagnoses, however these comparisons are always questionable because of heterogeneity of these diseases itself.

Our finding was that among patients within our study, the productivity loss was almost the same within all three diagnoses. However, the highest productivity loss and thus productivity costs was captured by PsA patients. These phenomena can be simply clarified by occurrence of two diagnoses within one patient (Ps and simultaneously PsA).

HAQ, BASDAI in contrast to DAS28, BSA/PASI influenced overall work productivity loss or productivity costs, respectively. Reported results are in accordance with previously described findings [4, 5, 6].

Average annual productivity costs per each patient were almost € 2,000.

References

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AUTHOR CORRESPONDENCE – e-mail: kruntoradova@iheta.org