One-year Predictors of Presenteeism in Workers with Rheumatoid Arthritis: Disease-related Factors and Characteristics of General Health and Work

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ABSTRACT. ***Objective.*** Rheumatoid arthritis (RA) affects adults of working age and leads to productivity losses because of presenteeism that results from limitations while at work. The aim of our study was to gain insight into disease-related factors, general health, and work characteristics as predictors of presenteeism in workers with RA.

Methods. Workers with RA (n = 150) recruited by rheumatologists completed questionnaires at baseline and after 1 year. Medical information was retrieved from patient records. Presenteeism was measured by the Work Limitations Questionnaire. Disease [28-joint Disease Activity Score (DAS28), Health Assessment Questionnaire (HAQ), pain, fatigue], general health (mental, physical, deterioration of health), and work characteristics (work instability, social support, workload) were assessed as predictors of presenteeism after 1 year using linear regression analyses.

Results. Presenteeism was 4.0 h over a 2-week period based on an average work week of 28.7 hours. More RA-related disability (HAQ; B = –1.20, 95% CI –2.12 to –0.28), poorer mental health (B = –0.04, 95% CI –0.08 to –0.01), and health deterioration over a 1-year period (B: –0.02, 95% CI –0.04 to –0.01) were associated with more presenteeism. Work characteristics were not associated with presenteeism.

Conclusion. Disease-related factors and general health characteristics were significantly associated with presenteeism at 1-year followup, although the effects of the general health characteristics were considered not to be relevant. To reduce presenteeism and improve functioning at work, it is important to pay attention to reducing RA-related disability in addition to reducing disease activity. A broader perspective is needed and should also take into account the level of RA-related disability. (First Release March 1 2018; J Rheumatol 2018;45:766–70; doi:10.3899/jrheum.170586)

Key Indexing Terms:
RHEUMATOID ARTHRITIS WORK PRESENTEEISM SOCIAL PARTICIPATION

Rheumatoid arthritis (RA) develops in adults around 50 years old and has major consequences for functioning in daily life. Because many patients with RA are of working age, the disease also affects work. RA leads to productivity losses as a result of being absent from work (i.e., sick leave, work disability, or job loss). Costs related to loss of productivity are one-third of the total societal costs of RA[1]. Many studies have focused on predictors of productivity loss as a result of absenteeism. In addition to disease-related factors (disease activity, RA-related disability), general health (quality of life), and the work environment (demands, resources such as social support) play a role[2]. In addition to absenteeism,

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another cause of productivity loss leading to high, often hidden, costs is presenteeism. Presenteeism is defined as workers' presence on the job, but having reduced productivity resulting from lack of optimal function because of illness or disease. Nearly half of all workers with RA reported work impairments or reductions in work performance leading to an average of 38% of hours lost from work owing to presenteeism[3].

According to the conceptual framework by Johns[4], presenteeism of a long duration may lead to a deterioration of health status, and subsequent absenteeism. It can thus be hypothesized that presenteeism is a precursor for absenteeism that in severe cases may lead to work disability and loss of paid work. Focusing on predictors of presenteeism is important because this may give guidance for the development of interventions focusing on sustained employability for workers with RA. A higher disease activity and more RA-related disability were associated with more presenteeism, but work-related variables were not included[2]. To the best of our knowledge, the only study focusing on more than disease-related factors and general health characteristics was a previous cross-sectional study, in which presenteeism was closely associated with a combination of disease-related, personal, and environmental factors[5].

The aim of our study was to gain insight into 1-year predictors related to the disease, general health, and work characteristics of presenteeism in workers with RA. We hypothesized that factors related to the disease, general health, and work characteristics predict presenteeism after 1 year.

MATERIALS AND METHODS

This is a prospective cohort study based on the data of the Care for Work study, a randomized controlled trial evaluating intervention to support at-work productivity for workers with RA. The intervention was not effective on any of the outcome measures after 12 months[6]. Workers with RA were recruited from a specialized rheumatology clinic (Reade, formerly the Jan van Breemen Institute), regional hospitals (Reade outposts), and an academic hospital (VU University Medical Center, Department of Rheumatology) in Amsterdam, the Netherlands.

Inclusion criteria for our study were patients who possessed (1) a diagnosis of RA according to the 2010 RA criteria; (2) age of 18–64 years; (3) a paid job; (4) work of ≥ 8 hours per week; and (5) experience of at least minor difficulties in functioning at work. We asked patients to indicate the extent that RA interfered with their work functioning, on a scale from 1 to 5. Minor difficulties were operationalized as a score of ≥ 2 on this scale.

Workers with RA were excluded if they had severe comorbidity, were unable to read or understand Dutch, or had had > 3 months of sick leave at the time of inclusion.

Our study was approved by the medical ethics committees of the participating centers (Slotervaart Hospital and Reade (NL36845.048.11) and the VU University Medical Center (2011/246). All participants gave written informed consent according to the Declaration of Helsinki.

Measures. Clinical characteristics were retrieved from the patients' medical records and self-reported information on the disease; general health and work characteristics were retrieved from questionnaires at baseline and after 12 months of followup.

Outcome measure. Presenteeism was measured using the 25-item Work Limitations Questionnaire, a questionnaire for assessing productivity loss in workers with RA[7]. Presenteeism is defined as being present at the job, but not being able to function optimally, as measured by hours lost from work[8]. The total score from the questionnaire represents the percentage of productivity loss. Multiplied by the number of working hours in 2 weeks, this leads to the number of hours that a worker has not been fully productive at work.

Potential predictors. For the disease characteristics we included the 28-joint Disease Activity Score[9]. RA-related disability was measured by the Health Assessment Questionnaire (HAQ)[10]. The HAQ score ranges from 0 to 3; a higher score indicates increased RA-related disability. Pain and fatigue resulting from RA were measured with single items using the visual analog scale, which ranges from 0 to 10.

For general health characteristics, we measured mental health, physical role limitations, physical functioning, general health perception, and perceived health change of the RAND-36[11]. All scales were transformed into a scale score ranging from 0 to 100, with a higher score indicating better health.

For the work characteristics, we included job type (physical vs nonphysical) based on the classification by De Zwart, *et al*, which is based on the distribution of all occupational classes in the Netherlands[12]. In addition, we included supervisor and coworker support, and psychological and physical job demands from the Job Content Questionnaire[13]. The score of each subscale ranges from 1 to 4, with a higher score indicating more support and demands. In addition, we included the RA Work Instability Scale[14]. A score of 0–9 indicates low, 10–17 moderate, and 18–23 high work instability.

Potential confounders. Age, sex, educational level, comorbidity, and membership in an intervention or control group were included as potential confounders.

Statistical analyses. Univariate linear regression analyses were performed with presenteeism as the dependent variable and each predictor as an independent variable to obtain the crude effects. Next, relevant confounders were added to obtain the adjusted models in 2 steps. The first step was that for each predictor, associations of all potential confounders (including the other predictors) and the predictor were tested using linear regression analyses. Potential confounders with $p < 0.15$ were taken to step 2, which consisted of a separate adjusted analysis for each predictor of interest and confounders (backward selection $p < 0.10$). P values of < 0.05 were considered statistically significant. All analyses were performed in IBM SPSS version 20.0.

RESULTS

At baseline, the population consisted of 150 participants, who were diagnosed 10 years ago (Table 1). There were 46% who were using biologics. Participants were mostly female and mean age was 50 years. There were 47% who were in remission, and 34% had high disease activity. Comorbidity was reported by 65% (n = 97) of the respondents. Most reported comorbidities were severe headache/migraine (12%), cardiovascular disease (9%), stomach/bowel disorders (8%), chronic obstructive pulmonary disease (6%), and diabetes (4%). After 12 months, 143 of the 150 (95.3%) workers at baseline completed the questionnaire.

Predictors of presenteeism. Both the crude and adjusted analyses revealed that only disease-related factors and general health characteristics were significantly associated with presenteeism at the 1-year followup measurement. In the crude models, more fatigue, worse physical role functioning, deterioration of health over the past year, and higher work instability scores were associated with more

Table 1. Population and baseline characteristics. Values are mean ± SD or n (%).

Characteristics	Values, n = 150
Population characteristics	
Age, yrs	49.68 ± 8.58
Education	
Low	32 (21)
Middle	48 (32)
High	70 (47)
Sex, female	126 (84)
Comorbidity	97 (65)
Work limitations	
None	20 (13)
Light	114 (76)
Heavy	16 (11)
Contract, hrs/wk	28.7 ± 10.0
Presenteeism, hrs lost/2 wks	3.99 ± 2.70
Disease characteristics	
DAS28	
Range, 2–10	2.70 ± 1.23
Remission, ≤ 2.6	71 (47)
Low activity, 2.61–3.2	28 (19)
High activity, ≥ 3.2	51 (34)
RA-related disability, HAQ, range 0–3	0.78 ± 0.55
Pain, range 0–10	3.72 ± 2.50
Fatigue, range 0–10	4.59 ± 2.53
General health characteristics	
Physical functioning, range 0–100	67.11 ± 21.50
Role functioning, physical, range 0–100	48.00 ± 40.29
Mental health, range 0–100	77.23 ± 14.54
Change in health, range 0–100	51.67 ± 26.65
Work instability, range 0–23	8.87 ± 4.80
Work characteristics	
Job type, physical	106 (71)
Physical job demands, range 1–4	1.98 ± 0.61
Psychological job demands, range 1–4	2.65 ± 0.31
Co-worker support, range 1–4	3.08 ± 0.46
Supervisor support, range 1–4	2.99 ± 0.62

DAS28: 28-joint Disease Activity Score; RA: rheumatoid arthritis; HAQ: Health Assessment Questionnaire.

hours lost from work as a result of presenteeism (Table 2). The adjusted analyses showed that more disability resulting from RA was associated with more hours lost from work as a result of presenteeism, as well as a deterioration of health and poorer mental health.

DISCUSSION

Disease-related factors and general health characteristics predict presenteeism after 1 year: more RA-related disability, poorer mental health, and health deterioration were longitudinally associated with more hours lost at work because of health limitations. Work characteristics were not associated with presenteeism after 1 year of followup.

Our finding that RA-related disability was predictive for presenteeism is in line with previous studies[2,3]. Van Vilsteren, *et al*[5], using the same population, did not find associations between RA-related disability and presenteeism; however, only univariate associations were presented because the study was aiming at an association model. We can hypothesize that the level of disability is more relevant for functioning at work than disease activity, because we did not find indications for a longitudinal association between DAS28 score and presenteeism. Similar findings have been reported for workers with chronic pulmonary disease, where the severity of the disease was not predictive for sick leave, but functional limitations were[15]. This can be interpreted within the context of the World Health Organization–International Classification of Functioning, Disability and Health model, because both personal and environmental characteristics explain differences in limitations and disability between persons with similar disease severity. Another explanation may be that disease activity in our population was relatively low (47% were in remission; DAS28 ≤ 2.6).

Regarding the association of general health with more presenteeism after 1 year, it should be mentioned that the effect sizes were very small (–0.02 and –0.04 on a scoring range of 0–100) and therefore not relevant. In our present study, we did not find indications that work characteristics were predictive for presenteeism, although this does not necessarily mean that this link does not exist. Nevertheless, we were surprised that we did not find associations because the work environment has been shown to be predictive for productivity loss resulting from absenteeism in workers with RA[16]. An explanation for this unexpected finding may be that the work characteristics in our study population were quite optimal, based on the relatively low levels of limitations at work reported at baseline. Also, given the average duration after diagnosis (> 10 yrs), our participants had sufficient time to cope with the diagnosis and may have found jobs that matched their abilities. Within the context of the healthy worker effect, those workers who did not manage to adjust their work to their capabilities were more likely to have left the workforce. However, because RA is a progressive and episodic disease, workers will have to continuously adjust to their environment, guided by their symptoms and limitations.

One strength of our study is that, to our knowledge, this is the first study to longitudinally investigate disease-related factors, general health, and work characteristics as predictors of presenteeism in a sample of workers with RA. Our study originates from a cohort participating in an intervention study, and focused on workers experiencing at least minor difficulties at work, which may have caused selection bias.

The intervention group showed significant improvement in supervisor support after 6 months, but this effect was no longer present after 12 months[6]. We have included membership in an intervention or control group as a confounder in the present analyses, but adding this variable did not relevantly change our findings. All participants were recruited in a similar way, by their rheumatologist, but may differ from the general population of workers with RA. They might have been more interested in improving their work

Table 2. One-year predictors of presenteeism (crude and adjusted models).

Predictors	Crude Model 95% CI				Adjusted Model 95% CI			
	B	Lower	Upper	p	B	Lower	Upper	p
Disease-related factors								
DAS28	0.19	–0.21	0.58	0.35	0.02	–0.39	0.43	0.93
RA-related disability, HAQ	–0.10	–0.96	0.76	0.82	**–1.20**	**–2.12**	**–0.28**	**0.04**
Pain	0.14	–0.04	0.33	0.13	0.13	–0.10	0.36	0.26
Fatigue	**0.22**	**0.03**	**0.40**	**0.02**	0.09	–0.09	0.27	0.34
General health characteristics								
Physical functioning	–0.02	–0.04	0.01	0.17	–0.02	–0.05	0.01	0.21
Physical role functioning	**–0.02**	**–0.03**	**0.00**	**0.01**	0.01	–0.02	0.01	0.39
Mental health	–0.06	–0.09	–0.02	**0.001**	**–0.04**	**–0.08**	**–0.01**	**0.01**
Change in health	**–0.02**	**–0.04**	**0.00**	**0.02**	**–0.02**	**–0.04**	**–0.01**	**0.002**
Work instability	**0.16**	**0.07**	**0.26**	**0.001**	0.12	0.00	0.24	0.05
Work characteristics								
Physical vs nonphysical job	0.39	–0.64	1.42	0.45	0.23	–0.80	1.26	0.66
Physical job demands	0.18	–0.58	0.94	0.65	–0.30	–1.03	0.43	0.42
Psychological job demands	–0.56	–2.12	0.99	0.47	–0.11	–1.68	1.46	0.89
Co-worker support	0.08	–0.98	1.14	0.88	0.26	–0.75	1.27	0.61
Supervisor support	–0.002	–0.74	0.74	0.996	0.19	–0.54	0.91	0.61

Values in bold face indicate $p < 0.05$. DAS28: 28-joint Disease Activity Score; HAQ: Health Assessment Questionnaire; RA: rheumatoid arthritis.

functioning compared to nonparticipants, and may have had a supervisor with interest in the worker's health. However, as the intervention was not effective on any of the outcomes after 12 months, being part of either the intervention or the control group did not have any effects on the associations reported in our present study.

Another strength of our study was the use of the Work Limitations Questionnaire, a widely used measure for presenteeism that has been validated in the RA population. It would have been interesting and useful to have a complete denominator for the prevalence of presenteeism in our study. However, of the 319 people we originally contacted, we do not know the reasons of those who did not respond (e.g., were not working or were working but not interested); therefore, it was not possible to report an accurate estimate of the prevalence of presenteeism in the overall population of workers with RA.

Although we did include the most important work characteristics for presenteeism, we might have missed other predictors at work that could have contributed to presenteeism, such as autonomy or job control opportunities. Including a broader range of work characteristics might have changed our conclusion about the importance of work characteristics for presenteeism.

Presenteeism is an invisible problem with potentially large consequences for participation in society. Because our study showed that RA-related disability predicts presenteeism, health professionals should focus on reducing RA-related disability. Current clinical practice is focused on reducing disease severity by optimizing treatment and reducing RA activity until remission. The findings of our study contribute to previous findings that reducing disease severity alone is not sufficient to improve functioning at work. A broader approach is needed, taking into account the level of disability.

Because job loss in patients with RA is high and has major consequences for the patient, as well as for society, prevention of job loss is important and should start with early detection of workers at risk (e.g., groups with high rates of sick leave or presenteeism). A healthy work environment is of continuous concern. In a previous study, it was shown that work adjustments are often implemented after sick leave[17]. Ideally, work adjustments should be implemented earlier to prevent presenteeism.

More RA-related disability is predictive for higher levels of presenteeism in workers with RA. Poorer mental health and a deterioration of health were associated with more presenteeism, although effect sizes were very small. Reducing disease severity is not sufficient to improve functioning at work, because RA-related disability is predictive for presenteeism. Our findings advocate for a broader perspective — one that includes the level of RA-related disability, for example, in collaboration with an occupational therapist.

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