ORIGINAL ARTICLE

Factors influencing sick leave episodes in Mexican workers with rheumatoid arthritis and its impact on working days lost

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Abstract To evaluate impact of working days lost and factors for developing sick leave episodes in Mexicans workers with rheumatoid arthritis (RA). A prospective cohort of 123 patients with RA was followed for 1 year. Factors evaluated for sick leave episodes included: demographics, job characteristics, comorbidity, depressive symptoms, and clinical/therapeutic variables. Rates of sick leave episodes, working days lost, and permanent work disability (PWD) were identified. Statistical analysis included Cox regression models estimating hazard risks (HR) and their 95 % confidence intervals (95% CI). Cumulative time of follow-up for the cohort was 43,380 days, 24 % of workers had at least one episode of sick leave, with a mean of working days lost per patient-year of 18.36; 4.1 % developed

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PWD. Development of sick leave in the Kaplan–Meier analysis was associated with: age \geq 40 years (p = 0.04), having a couple (p = 0.04), performing manual work (p = 0.03), suffering depressive symptoms (p = 0.04), limitations in functioning (p = 0.01), and poor global functional status \geq III (p = 0.01). Cox regression models identified HAQ-Di \geq 0.6 as the stronger predictor for sick leave (HR = 4.04, 95 % CI 1.41–11.58, p = 0.009) followed by age (HR = 1.05, 95 % CI 1.01–1.11, p = 0.04), \geq 4 risk factors had a HR to 9.4 (95 % CI: 2.1–42.7) for sick leave. In this prospective cohort of Mexican workers with RA, we identified several factors associated with sick leave episodes and working days lost that should be potentially addressed by a multidisciplinary approach, being required to

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revaluate these strategies with the aim of increasing the work permanence of these patients.

Keywords Rheumatoid arthritis · Sick leave episodes · Risk factors · Work disability · Prospective cohort study

Introduction

Rheumatoid arthritis (RA) is a systemic, inflammatory, chronic disorder that primarily affects synovial joints; in severe cases, patients may develop destructive changes and joint ankylosis leading to diverse grades of functional disability [1]. Approximately 0.3 % (0.1–0.6) of the Mexican population may suffer from RA [2]. Among a multiplicity of factors, the presence of pain, structural changes, and impairment of joint function may affect a number of domains related with patients' health-related quality of life; among these domains, it is found decreasing in the performance of the patients to work affecting their social role. Thus, the severe consequences of RA for many patients may include impairment of work capacities, increasing the number of working days lost, and the rates of permanent work disability (PWD) [3, 4].

There is an increase in indirect costs associated with RA secondary to the higher number of working days lost representing a relevant burden for the society [5, 6]. Approximately 58 % of patients report to experience working day lost during the first 2 years after RA diagnosis [6]. The rate of working days lost may vary widely from study to study, possibly due to dissimilarities in the populations' characteristics included in these studies, differences among health systems in the different countries, and variability in the study designs. In Latin America, there is a lack of information regarding to the variables associated with sick leave and working days lost in patients with RA. This information would be useful to plan medical care resources, to develop strategies to ameliorate the social burden associated with functional impairment and work disability, and to design health care programs in order to decrease the high rates of sick leave and disability pension in these patients. Therefore, we assembled a prospective cohort to evaluate the rates of sick leave, the number of working days lost, and the associated risk factors in Mexican patients with RA.

Materials and methods

Study design

The design was a prospective cohort study. Patients with RA were recruited from an outpatient rheumatology clinic

in a secondary-care center (Hospital General Regional 110, from the Mexican Institute for Social Security (IMSS)) in Guadalajara, Mexico. Inclusion criteria were patients diagnosed with RA according to the 1987 American College of Rheumatology [7], \geq 18 years old, workers receiving a salary, and to be covered by the insurance system (IMSS). Exclusion criteria were: overlapping syndrome, to have sick leave or disability pension at the time of study onset.

Characteristics of the public health system

Because the patients included were salaried workers covered by the IMSS (the major public social insurance in Mexico where are included approximately 46-50 % of the Mexican population), it is required a brief description of this system: IMSS is the main prepaid compulsory social insurance system for salaried workers and their families [8]. This system covers payments for sick leaves and permanent work disability. During the sick leave resulting from RA or its complications, patients receive only a 60 % of their basic salary without bonus or additional benefits. As a requirement for payment for a sick leave episode, the date of onset, duration, and underlying cause of the episode must be reported by health care personnel to the employers. After loss of 100 continuous working days due to sick leave secondary to a disease, all the patients must be evaluated by labor medicine specialists in order to identify those patients that require disability pension [9].

Study development

A structured questionnaire was administered to assess the following aspect at study entry:

- (a) Demographic characteristics, including age, gender, years of formal education, and marital status.
- Work types classified as manual work (including jobs (b) in agricultural, industrial, and transport sectors) or non-manual work (including jobs in administrative, servicing, and specialist or managerial sectors) [10]. The number of hours worked per week was defined as total number of hours worked at the same job per week and was categorized as full-time (an average of \geq 40 h per week) or part-time (<40 h per week) according to the official Mexican Federal Law for Workers in Mexico [9]. Salary per day was defined as the income in Mexican pesos per day of work, being the official minimal income for the year 2010, \$57.46 Mexican pesos per day (equivalent to \$4.43 American dollars) for the city of Guadalajara, Mexico. Job seniority was computed according to the total number of laboring years, calculated from the onset of the first job until the time of the study. A salaried couple was defined as when the patient's partner/spouse was a

salaried worker and economically contributed to the family support.

- (c) Disease features at the time of the cohort onset. Included disease duration, disease activity score (DAS28), swollen joint counts, patient and clinician visual analogue scales, disease, pain severity and functioning (assessed by the validated Spanish version of the health assessment questionnaire disability index, HAQ-Di) [11], pharmacological treatments prescribed by a rheumatologist as well as type and combinations of disease-modifying antirheumatic drugs for RA (DMARDs), presence of rheumatoid factor, radiological stage according to the Steinbrocker's criteria [12], and delay in DMARD (calculated from the time of disease onset to the date of first DMARD prescription), and corticosteroids use at study baseline,
- (d) Comorbid diseases included the presence and severity of depressive symptoms according to the Spanish validated version Beck's scale [13] and the presence and type of other comorbidities.

Follow-up strategy

Two trained researchers prospectively evaluated all subjects included in the cohort at each visit from the baseline to 48 weeks. Participants were assessed for development of one or more sick leave episodes, the causes of the episode(s), and the number of working days lost during these episode(s). Additional calculations included total number of episodes of sick leave per year and cumulative number of working days lost due to sickness. The rate of PWD during the follow-up was also obtained.

Outcome variables

Sick leave was defined as a temporary inability to work as a consequence of disease (RA) or treatment complications, resulting in absence from work [3, 14]. The number of working day lost was defined as the total number of days that a person was absent from work as a consequence of a sick leave. Working days lost due to other causes other than RA were identified but excluded from the analysis. The total number of working days lost due to one or more episodes of sick leave in the 48-week study period was computed to obtain cumulative data. PWD was defined as employment leave definitely resulting from the inability to work due to RA; complete work disability (\geq 75 %) had to be certified by the Board of Labor Medicine and was evaluated after 100 days or more days of continuous sick leave.

Statistical analyses

Qualitative variables are expressed as number and percentages, while quantitative variables are expressed as mean \pm standard deviation (SD). Chi-square test or Fisher's exact test was used to compare qualitative variables in patients who developed sick leave versus those who did not developed this outcome, and quantitative comparisons were computed with independent Student's *t* test. Unadjusted relative risks were obtained dividing the incidence of the outcome (sick leave) among the exposed by incidence of the outcome among the non-exposed; 95 % confidence intervals (95 % CI) for each relative risk were calculated.

Kaplan–Meier analysis was used to estimate survival time free of sick leave episodes since study onset in patients with the presence of a risk factor compared with patients without that risk factor. Cox regression analysis models were performed to identify factors associated with the development of the first episode of sick leave. The model included factors that were significant in the univariate analysis and the final model adjusted by gender, age, and disease duration ≤ 4 years. Hazard risks (HR) and 95 % CI were computed to estimate adjusted risks for the development of one episode of sick leave using the Enter method. Statistical significance was set up at p < 0.05level. All the statistical analyses were performed with SPSS (version 8.0).

Results

One hundred and twenty-three patients were included in the cohort (Table 1); of these, 106 patients (86.2 %) completed the entire year of follow-up. The cumulative number days of follow-up on the patients included in the cohort was 43,380 days, equivalent to 352.6 days of follow-up per person-year. The mean patient age was 44 years and 73 % of patients were female. Disease duration at the time of the study entry was of 7 years in average, with a delay to rheumatologist treatment of 3 years (data are not shown in table). At the beginning of the study, the disease activity score (DAS 28) in the patients included in the cohort had a mean of 4.21 ± 1.11 ; the mean values for visual analogue scales (VAS) were: morning stiffness 52 ± 30 , pain severity 50 ± 30 , disease severity according to physician 44 \pm 28. The mean swollen joint counts(from 0 to 28 joints) was 3 ± 3 with a mean of tenderness joint counts of 5 \pm 3. Half of the patients had an HAQ \geq 0.6 and positive rheumatoid factor. Comorbid diseases were observed in a high proportion of patients, in order of frequency depressive symptoms were observed in 46 % of the patients, systemic arterial hypertension in 22 % and diabetes mellitus in 7 % (data are not shown in table). According to characteristics of the job, manual work was performed by 49 % of the study participants. Twenty-nine patients (24 %) developed at least one episode of sick leave during the follow-up year, with a mean of 3 ± 3 episodes

Table 1 Characteristics of the patients included in the study cohort		Total $(n = 123)$				
	Sociodemographic characteristics					
	Age (year), mean \pm SD	44 ± 10				
	Female gender, n (%)	90 (73)				
	Education level: primary school or lower, n (%)	50 (40)				
	Married or part of a couple, n (%)	71 (58)				
	Job characteristics					
	Job seniority (year), mean \pm SD	25 ± 12				
	Type of work: manual, n (%)	61 (49)				
	Hours worked/day, mean \pm SD	9 ± 2				
	Income per day of salary (American dollars), mean \pm SD	$$10.64 \pm 6.39$				
	Disease characteristics at the baseline					
	Disease duration, mean \pm SD	7 ± 6				
	Disease activity (patient VAS, 0–100 mm) mean \pm SD	56 ± 29				
	Pain severity (patient VAS, 0–100 mm) mean \pm SD	50 ± 30				
	Morning stiffness (VAS, 0–100 mm) mean \pm SD	52 ± 30				
	DAS 28, mean \pm SD	4.21 ± 1.11				
	Disease severity (physician, VAS, 0–100 mm) mean \pm SD	44 ± 28				
	Swollen joints counts (0–28), mean \pm SD	3 ± 3				
	Tenderness joints counts (0–28), mean \pm SD	5 ± 3				
	HAQ-Di \geq 0.6, <i>n</i> (%)	64 (52)				
	Global functional status (III-IV), n (%)	29 (24)				
	Radiological stage by Steinbrocker (III-IV), n (%)	25 (20)				
	Positive rheumatoid factor, n (%)	77 (63)				
	Characteristics of sick leave					
expressed in frequency (%)	Patients who developed sick leave in the year, n (%)	29 (24)				
Ouantitative variables were	Episodes of sick leave/year in the entire cohort, mean \pm SD	3 ± 3				
expressed in mean \pm SD	Days of sick leave, mean \pm SD	75 ± 103				
(standard deviation)	Total working days lost in the entire cohort	2182				
\$4.43 American dollars is the	Mean salary by work day lost/year in the entire cohort	\$75.24				
equivalent to \$57.46 Mexican pesos	Mean cost of sick leave/year in the entire cohort	\$800.56				
	Mean total cost of sick leave/year in the entire cohort	\$23,216.46				
evaluated from 0 to 100 mm,	Characteristics of permanent work disability					
DAS 28 disease activity score,	Patients who developed permanent work disability in the year, n (%)	5 (4.1)				
HAQ-Di health assessment questionnaire disability index	Age of patients who developed permanent work disability, mean \pm SD	47 ± 9				

per patient, and losing in the cohort a total 2,182 working days due to sick leave (18.36 working days lost per personyear). These working days lost generated an indirect cost of \$800.50 American dollars per person-year (\$1,029.59 Mexican pesos), whereas the cumulative incidence of PWD was 4.1 % in the year of follow-up.

Univariate comparison of baseline characteristics shows that the group patients who developed one or more episodes of sick leave had a higher proportion of manual workers (71 vs. 48 %, p = 0.03), higher proportion of patients with impairment in functioning according to HAQ-Di score > 0.6 (72 vs. 46 %, p = 0.01), and global functional class III or IV (38 vs. 19 %, p = 0.04) compared with patients who did not developed sick leave (Table 2). Testing the hypothesis that patients with shorter disease
> duration ≤ 4 years would have an increasing in the development of sick leave, and these comparisons were included in that table although not statistical difference was observed (p = 0.84). Also patients who developed sick leave during the follow-up had a higher score for patient assessment of disease activity (68 vs. 52, respectively, p = 0.006), although DAS28 did not show statistical differences at the baseline between patients with development of sick leave versus patients who did not develop this event (4.2 vs. 4.1, respectively, p = 0.62). In data not shown in tables, the comparison between patients with one or more episodes of sick leave had higher with patients without development of sick leave had higher age $(47 \pm 8 \text{ vs.})$ 43 ± 11 years, respectively p = 0.019), fewer years of formal education $(7 \pm 4 \text{ vs. } 9 \pm 5 \text{ years, respectively})$

Table 2	Differences in characteristics	between patients	s who develop	ed one or n	nore episodes o	of sick leave	compared wit	h those	who did not
develop	these episodes								

Variables	Sick leave $(n = 29)$	Non sick leave $(n = 94)$	RR	95 % CI	р
Sociodemographic characteristics					
Female gender, n (%)	20 (69)	70 (75)	0.7	0.3-1.8	0.63
Age ≥ 40 year	25 (86)	61 (65)	3.3	1.08-10.5	0.03
Years of formal education, mean \pm SD	7 ± 4	9 ± 5	-	-	0.01
Education (\leq primary school), <i>n</i> (%)	18 (62)	39 (43)	2.2	0.9–5.2	0.08
Married or part of a couple, n (%)	21 (28)	48 (48)	2.4	0.9–5.9	0.08
Job characteristics					
Type of work: manual, n (%)	20 (71)	41 (48)	2.7	1.09-6.9	0.03
Salary by work day lost, mean \pm SD	9.35 ± 5.42	9.84 ± 4.74	-	-	0.69
Comorbidity					
Depression (Beck score \geq 10), <i>n</i> (%)	20 (80)	38 (55)	3.2	1.09-9.6	0.03
Disease characteristics					
Disease duration, mean \pm SD	7 ± 5	7 ± 6	-	-	0.83
Disease duration ≤ 4 years			1.07	0.57-2.01	0.84
Disease duration >4 years (referent)			1		
Disease activity (patient) mean \pm SD	68 ± 22	52 ± 28	-	-	0.006
Pain severity (patient) mean \pm SD	64 ± 23	54 ± 30	-	-	0.11
Morning stiffness, mean \pm SD	59 ± 26	49 ± 31	-	-	0.14
DAS 28, mean \pm SD	4.2 ± 1.1	4.1 ± 1.1	-	-	0.62
Disease severity (physician) mean \pm SD	54 ± 27	40 ± 28	-	-	0.03
Swollen joints counts, mean \pm SD	4 ± 3	3 ± 3	-	-	0.50
Tenderness joints counts, mean \pm SD	5 ± 3	5 ± 3	-	-	0.71
Delay ≥ 5 years of DMARDs use, n (%)	7 (26)	12 (14)	2.1	0.7-6.2	0.14
HAQ-Di, mean \pm SD	0.96 ± 0.65	0.68 ± 0.63	-	-	0.05
Impairment in HAQ-Di \geq 0.6, <i>n</i> (%)	21 (72)	43 (46)	3.0	1.2-7.5	0.01
Functional status (III or IV), n (%)	11 (38)	18 (19)	2.5	1.03-6.4	0.04
Radiological stage (III or IV), n (%)	7 (24)	18 (19)	1.2	0.44-3.45	0.78
Positive rheumatoid factor, n (%)	19 (68)	58 (63)	1.2	0.5-3.0	0.82
DMARD utilization ≥ 2 drugs, <i>n</i> (%)	15 (52)	46 (49)	1.0	0.4–2.5	1.00
Corticosteroids utilization, n (%)	25 (86)	66 (72)	2.4	0.7–7.7	0.14

In disease duration in order to compute relative risk (RR) a subanalysis was performed using patients with a disease ≤ 4 years (risk factor for development of sick leave) versus disease duration >4 years as referent

Comparisons between differences in proportions were performed with Chi-squared or Fisher exact tests. Comparisons between differences in means were performed using independent Student t tests

HAQ-Di health assessment quality-disability index, DMARDs disease-modifying antirheumatic drugs, Radiological stage was classified in hands according to Steinbrocker's criteria, RR relative risk, 95 % CI 95 % confidential intervals, SD standard deviation

p = 0.015), and higher score in Beck's depression inventory (20 ± 11 vs. 13 ± 11, respectively p = 0.005). There were no statistical differences between patients with sick leave episode or episodes compared with those who did not develop sick leave in disease duration (7 ± 5 vs. 7 ± 6 years, p = 0.82), delay in treatment prescribed by the rheumatologist (4 ± 4 years in both groups, p = 0.87), proportion of full-time workers (85 vs. 88 %, respectively, p = 0.73), number of hours worked per day (9 ± 2 vs. 9 ± 3 h, respectively, p = 0.87), proportion of salaried couple (67 vs. 54 %, p = 0.32), or mean income per day perceived by salary (\$9.6 American dollars vs. \$10.5 American dollars, respectively, p = 0.69).

Kaplan–Meier analysis shows the variables associated with the first episode of sick leave (Table 3). Factors associated with lower survival time for the development of a sick leave episode were an age ≥ 40 years (p = 0.04), patients married or with a couple (p = 0.04), performing manual work (p = 0.03), Beck's score ≥ 10 (p = 0.04), impairment in HAQ-Di ≥ 0.6 (p = 0.01), and poor global functional status \geq III (p = 0.01). A trend was observed for lower survival time for the development of sick leave in

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Table 3Kaplan-Meieranalysis of variables associatedwith the first episode of sickleave in the cohort

	п	Development of sick leave (%)	Time to develop of sick leave	p (log rank)		
			Mean of days	Rank of days		
Age						
Age ≥ 40 year	86	26 (29)	303	277-328	0.04	
Age <40 year	37	4 (11)	334	305-365		
Marital status						
With couple	69	21 (30)	293	262-324	0.04	
Without couple	52	8 (15)	334	313-355		
Type of work						
Manual	61	20 (33)	288	255-321	0.03	
Not-manual	53	8 (15)	333	307-359		
Hypertension						
Yes	27	10 (37)	281	230-333	0.06	
No	96	19 (20)	318	297-338		
Depression						
Beck scale ≥ 10	58	20 (34)	293	261-325	0.04	
Beck scale <10	36	5 (14)	325	291-359		
Disease duration (RA)					
Shorter (≤4 years)	55	14 (25%)	299	269-330	0.79	
Longer (>4 years)	68	15 (22%)	318	289-346		
HAQ-Di						
<u>≥</u> 0.6	64	21 (33)	290	257-322	0.01	
<0.6	58	8 (14)	334	313-355		
Global functional sta	tus					
III–IV	29	11 (38)	257	205-309	0.01	
I–II	94	18 (19)	330	311-350		

Other variables not associated with increase in log rank for sick leave episodes were: education level, radiological stage, rheumatoid factor, or delay of DMARDs use *HAQ-Di* health assessment quality-disability index

patients with systemic hypertension (p = 0.06). Other variables including education level, disease duration, radiological stage, rheumatoid factor, and delay in DMARDs use were not associated with sick leave episodes.

The cumulative survival curves for the development of the first episode of sick leave in the presence versus absence of a particular risk factor appear in Fig. 1. The following baseline factors show an increase in risk for the development of the first episode of sick leave: age ≥ 40 years, p = 0.04 (Fig. 1a); marital status, p = 0.04(Fig. 1b); manual work, p = 0.03 (Fig. 1c); Beck's score ≥ 10 , p = 0.03 (Fig. 1d); HAQ-Di score ≥ 0.6 , p = 0.01 (Fig. 1e); and having a global functional status III or IV: p = 0.01 (Fig. 1f).

After the adjustment for gender, age, and shorter disease duration (\leq 4 years), Cox regression analysis (Table 4) identified as the major risk factor for the development of sick leave to have a score in HAQ-Di \geq 0.6 at the baseline (HR = 4.04, 95 % CI 1.41–11.58, p = 0.009) followed by

age (HR = 1.05, 95 % CI 1.01–1.11, p = 0.04). Other variables that were associated in the Kaplan–Meier analysis did not remain as significant in this adjusted model (marital status, performing manual work, hypertension, or depressive symptoms); also in this Cox regression model, the shorter disease duration (≤ 4 years) had no increasing in HR.

The last graph (Fig. 2) shows the cumulative hazard curves from three subgroups of patients according to a construct in the number of risk factors for the development of sick leave. At the baseline, 30 % of the patients had from 0 to 1 risk factor, 44 % of the patients had 2–3 risk factors, and 26 % of the patients had \geq 4 risk factors identified for the development of sick leave. Using as comparator those patients who had 0–1 risk factors (HR = 1), the subgroup with 2–3 risk factors had a HR of 5.4 (95 % CI 1.2–24.1, *p* =), and the subgroup \geq 4 risk factors had a significant increasing in HR = 9.6 (95 % IC 2.1–42.7, *p* =) for the development of sick leave.



Fig. 1 Survival without episodes of sick leave (Kaplan–Meier curves) according to following factors: age (a), marital status (b), type of work (c), Beck score (d), HAQ-Di (e), and global functional status (f)

Discussion

This prospective cohort study shows that factors associated with the development of one or more episodes of sick leave in Mexican patients with RA are age (\geq 40 years), marital status, performing manual work, depressive symptoms (Beck's score \geq 10), and impairment in functioning (either global functional status \geq III or HAQ-DI \geq 0.6). Among these factors, the strongest predictor observed for the development of sick leave was HAQ-Di \geq 0.6 at the baseline of this cohort. Also it was observed that salaried workers with RA lost a mean of 18.36 working days per person-year of follow-up, with a mean duration of absence from work of 75 days per person-year for patients who developed sick leave episodes. These data highlight the importance of an earlier identification of risk factors for sick leave in these patients.

There are substantial differences in health system requirements between countries for the expedition sick leave

certificate. There are also some problems in comparability among previous studies that evaluate the incidence of sick leave in RA, including that some studies included patients currently in sick leave or PWD at the time of study entry that may modify substantially the sick leave rates. Björk et al. [6] reported that approximately 53 % of patients with RA were on sick leave at the time of diagnosis, but Hallert et al. [15] observed that 28 % of their patients were on sick leave at baseline in their study. Patients with early RA (disease duration <12 months) experienced an increase in the rate of sick leave from 35 % at baseline to 53 % after 1 year of follow-up [16]. Because our aim was to identify factors related with the development of sick leave on a prospective cohort, we excluded patients who were currently on sick leave at the time of study onset; under this design, we observed that 24 % of the study participants developed sick leave episodes within 1 year of follow-up.

The number of working days lost due to RA per patientyear also varies from study to study. Hallert et al. [16]

 Table 4
 Multivariate analysis evaluating factors associated with the first episode of sick leave

	HR	95 % CI	р
Female gender	1.27	0.40-3.97	0.67
Age (years)	1.05	1.01-1.11	0.04
Disease duration ≤ 4 years	1.29	0.49-3.37	0.59
Type of work: manual	1.70	0.58-4.94	0.32
$HAQ-Di \ge 0.6$	4.04	1.41-11.58	0.009

Variables not included into the final mode were: having a couple, depressive symptoms (Beck's score \geq 10), disease activity according to the patient and functional class III or IV

The variables were adjusted using Cox regression model, using the Enter method

HAQ-Di health assessment quality-disability index



Fig. 2 Hazard function for developing the first episode of sick leave after the baseline visit in the cohort of workers with RA according to the presence of the following risk factors: age \geq 40 years, manual work, HAQ-Di \geq 0.6, functional class III or IV, depressive symptoms (Beck's score \geq 10) risk curves for developing sick leave in patients with Rheumatic arthritis

reported an average of 170 working days lost among patients on sick leave; this figure represents more than the double of our measurement of 75 working days lost per patient. Nevertheless, other studies have found similar results to the present work, Merkesdal et al. [17] observed in patients with RA and long disease duration a lost in average of 17 days, whereas Puolakka et al. [18] found a median of 23 working days lost per patient-year in their cohort. According to our observations the mean of 18 work days lost per person-year, is quite similar to the data observed by Merkersdal et al. [17].

We consider that our identification of risk factors for the development of sick leave in Mexican patients with RA is relevant; because these factors have been only evaluated previously on other races, some similarities and differences can be observed across the different studies in comparison with the present work. Age is considered one consistent predictor of working day lost across studies. Puolakka et al. [18] observed that patients of higher age had an increase in the number of sick leave days in a follow-up study. We also observed an association between age with risk for the development of sick leave episodes. Instead, the association between sick leave and years of formal education is less consistent. Puolakka et al. [18] reported that fewer years of formal education are associated with working days lost, and Björk et al. [6] identified a protective effect of higher education against the development sick leave. In comparison with these studies, we only observed a trend for the development of sick leave in patients with low formal education being other factors stronger predictors for this outcome. We observed a higher risk for development of sick leave in patients with heavy work. Similarly, Bjork [6] and Puolakka [18] identified an association between heavy work and sick leave in their studies. Impairment of functioning is also a consistent predictor for a higher number of working days lost; these findings were also observed in our study, where both global functioning score and HAQ-Di were predictive for sick leave in concordance with the data published by Puolakka et al. [18] and Bjork et al. [6].

Depression associated with sick leave episodes is one of the most interesting risk factors explored in our cohort. Although depression is highly prevalent in patients suffering from RA and other connective tissue diseases, this variable has not been sufficiently evaluated as a risk factor for sick leave or PWD and the data to this regard scarce. De Buck et al. [4] reported an association between job loss and depression, as assessed by a test of anxiety and depression. Beck's depression inventory is a useful index for screening of depressive symptoms in epidemiological studies, and it has been previously validated in Mexican patients with RA [13]. The present study is the first evaluating the clinical value of Beck's index as a predictor for sick leave episodes; we identified a relevant association of the score of this index and the development of episodes of sick leave. Therefore, a potential application Beck's index may include to help clinicians and labor specialists to identify higher risk salaried workers for unfavorable job outcomes.

Our study is the first in evaluating the rates and risk factors for the development of sick leave in a prospective cohort of Mexican patients with RA, having some advantages including a limited lost of follow-up (13.8 %), use of Kaplan–Meier analysis, a statistical strategy that only few other studies have employed. Additionally, this study is less likely to overestimate the impact of working day loss than studies that have included patients who were on sick leave at the time of the study onset. However, we did not evaluate other outcomes such as absenteeism, presentee-ism, and labor transitions that may impact on the disease burden from the societal perspective. Another factor that was not evaluated in the present study is the frequency of patients who had a previous development of sick leave before the study entry; it is likely that patients who had previous sick leave episodes have higher risk for another episode of sick leave. An additional limitation of our study was that the patients were assembled in different point of their disease, and this may affect the frequency of the development of the event (sick leave); therefore, future studies with a design of inception cohort are required. Another limitation was a short follow-up time in order to obtain more cases of PWD. Therefore, the establishment of prospective cohort studies of workers with RA with longer follow-up represents a future research agenda in Mexico.

In summary, the present study shows that nearly onequarter of Mexican workers with RA will develop at least one episode of sick leave per year and 4 % PWD. Since clinical and epidemiological risk factors for development sick leave are easily identifiable in a regular consultation, systematic strategies for decreasing the high rates of this outcome should be designed for these high-risk subgroups in order to decrease the impact of RA on labor productivity.

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