



## Cumulative Rate and Factors Associated with Self-Reported Work Disability among Patients with Systemic Lupus Erythematosus: Data from the Province of Cordoba, Argentina

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### Abstract

**Background:** Systemic Lupus Erythematosus (SLE) can inflict significant morbidity, reflected not only in patients' overall clinical status but also in their ability to work.

**Objective:** To examine the cumulative rate and factors associated VARIABLES with self-reported work disability in SLE patients in the Province of Córdoba, Argentina.

**Methods:** Two-hundred twenty-five SLE patients were included. The cumulative rate of work disability was estimated using the Kaplan-Meier method. The relationship between socioeconomic and demographic data, self-reported quality of life, clinical features (clinical manifestations, diagnostic criteria, disease activity, damage, co-morbidities) and work disabilities were examined with univariable and multivariable analysis.

**Results:** Fifty-five (24%) patients were work-disabled. The cumulative rate (standard error) of work disability was 5% (0.018) at one year, 25% (0.039) at five years and 54% (0.058) at 10 years. In the multivariable analysis, a lower socio-economic status (OR=1.984; 95% CI 1.154-3.410) and quality of life (OR=0.953, 95% CI 0.914-0.993) were associated with work disability.

**Conclusion:** The cumulative rate of self-reported work disability is high among this sample of SLE patients, reaching 25% at five years. Patients of lower socio-economic status and quality of life are at higher risk of becoming work disabled.

**Keywords:** Systemic lupus erythematosus; Work disability; Socio-economic status; Quality of life

### Introduction

As a chronic condition, Systemic Lupus Erythematosus (SLE) can inflict significant and, sometimes, irreversible morbidity that may impact not only the patients' overall clinical status but also in their ability to work.

As SLE affects patients during their productive years of life, work disability may impose an important economic burden [1] that will be reflected beyond the individual patient, meaning the household and the society level.

A systematic review published in 2009 showed that at least 30% of patients participating in different cohort studies, mainly from Europe and the United States, become work disabled at some point during the disease course [2]. There are, however, scarce data on work disability rates in

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Received Date: 08 Mar 2022

Accepted Date: 29 Mar 2022

Published Date: 04 Apr 2022

#### Citation:

Bertoli A, López Pérez MJ, Alba P, Albiero A, Albiero E, Alessio D, et al. Cumulative Rate and Factors Associated with Self-Reported Work Disability among Patients with Systemic Lupus Erythematosus: Data from the Province of Cordoba, Argentina. *Clin Case Rep Int.* 2022; 6: 1304.

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patients with SLE from South America.

In this study, we pursue to determine the cumulative rate and the variables associated with work disability in the Province of Córdoba, Argentina.

## Patients and Methods

This was a cross-sectional, multicenter study of patients with SLE in the Province of Córdoba, Argentina. All participating patients must meet the 1987 American College of Rheumatology (ACR) criteria for the classification of SLE [3] with no time limits in their disease duration. The Institutional Review Board of each participating center approved the study, and written informed consent was obtained from each subject according to the declaration of Helsinki and local regulations. Data were gathered through a patient interview and medical records review.

### Variables

Work disability was defined by patients' self-report of their inability to work because of their health status through the answer of four questions:

- Were you employed with a paid job at diagnosis of Lupus?
- Are you now employed with a paid job?
- Is the Lupus the reason of your unemployment?
- When did you stop working?

We also examined variables from the following domains: socioeconomic-demographic, clinical and patient self-reported health-related quality of life.

Variables from the socioeconomic-demographic domain were age at diagnosis, gender and socio-economic status ascertained with the Graffar scale [4].

Clinical variables included the number of the 1987 ACR criteria [3] both, at diagnosis and cumulative over time, disease duration, disease manifestations according to the 1987 ACR criteria [3] and disease activity assessed as per the SELENA-SLEDAI [5] at the patient enrollment.

The SELENA-SLEDAI [5] is a cumulative and weighted index used to assess disease activity across 24 different disease descriptors in patients with SLE. The SELENA-SLEDAI is a validated tool for measuring disease activity in patients with SLE. This assessment can be completed to objectively assess the patient's current state of disease. All SLE-related descriptors (16 clinical manifestations and eight laboratory parameters) that are present at the time of the visit or within the previous 10 days are scored. Physicians also grade disease activity using a semi-quantitative scale where 0 is no disease activity and 3 represents severe disease activity.

Comorbidities were assessed as per the SLICC Damage Index and the Charlson Index. The Systemic Lupus International Collaborating Clinics (SLICC) Damage Index (SDI) [6] documents cumulative and irreversible damage irrespective of its cause in 12 different organ systems. To be scored, each manifestation must be present for at least six months, unless otherwise noted in the instructions accompanying this instrument.

The Charlson's clinical comorbidity index [7] is a weighted index that takes into account the number and the seriousness of comorbid diseases including 19 categories. The components of the weighted

index are then computed giving a final count that ranges from zero to 37, zero accounting for no comorbidity and 37 for the sum of all possible comorbidities included in the index. In this study, we used a modified version, deleting the connective tissue disease category; therefore, diminishing the maximum possible value of the sum to 36.

Finally, self-reported quality of life was ascertained with the Lupus PRO [8]. Lupus PRO is a disease-targeted, patient-reported outcome measure that was developed and validated in the United States of America among patients with SLE. Lupus PRO has two constructs: Health-Related Quality of Life (HRQoL) and Non-Health-Related Quality of Life (Non-HRQoL). Individual domains, total HRQoL and total non-HRQoL scores range from 0 to 100, where higher scores indicate better health. In this study, we used a Spanish-translated and validated version [9]. This Spanish Lupus PRO version has demonstrated fair psychometric properties.

All the variables were ascertained at study entry, except for cumulative lupus manifestations and co-morbidities that were gathered retrospectively.

### Statistical analyses

The cumulative rate of work disability was estimated using the Kaplan-Meier method. The relationship between socioeconomic-demographic, self-reported quality of life (as per the Lupus PRO) as well as clinical data (clinical manifestations, diagnostic criteria as per the 1987 ACR criteria, disease activity as per the SELENA-SLEDAI, damage as per the SLICC Damage Index, co-morbidities as per the Charlson Index) and work disability was examined with Chi-Square and Mann-Whitney U test. Variables with a p value  $\leq 0.10$  in these analyses were then examined by multivariable logistic regression with work disability as the dependent variable. Variables with a p value  $\leq 0.05$  were considered statistically significant. The analyses were performed using the IBM SPSS statistics package, version 20.0.

## Results

Two-hundred twenty-five SLE patients were studied. Patients were predominantly females (89%) with a median (Interquartile Range, IQR) age at diagnosis of 26.0 (16.0) years. Median (IQR) disease duration was 96.0 (144.0) months.

### Work disability

One hundred twelve (49%) patients were working at disease diagnosis. Thirty-nine (17%) patients reported themselves to become work disabled at the time of the diagnosis while 17 (7%) sometime afterwards, summing a total of 55 (24%) patients with work disability specifically attributed to the disease.

The cumulative rate (standard error) of work disability was 5% (0.018) at one year, 25% (0.039) at five years and 54% (0.058) at 10 years (Figure 1).

### Univariable analyses

Disabled patients were more likely to be of low socio-economic status and to have lower levels of quality of life. Hematological and immunological criteria were more frequent among disabled patients. They also exhibited higher levels of disease activity at study entry and a higher number of cumulative diagnostic criteria. Among the comorbidities, congestive heart failure and peptic ulcer disease were more frequent among disabled patients. These data are depicted in Table 1 and Supplemental Table.

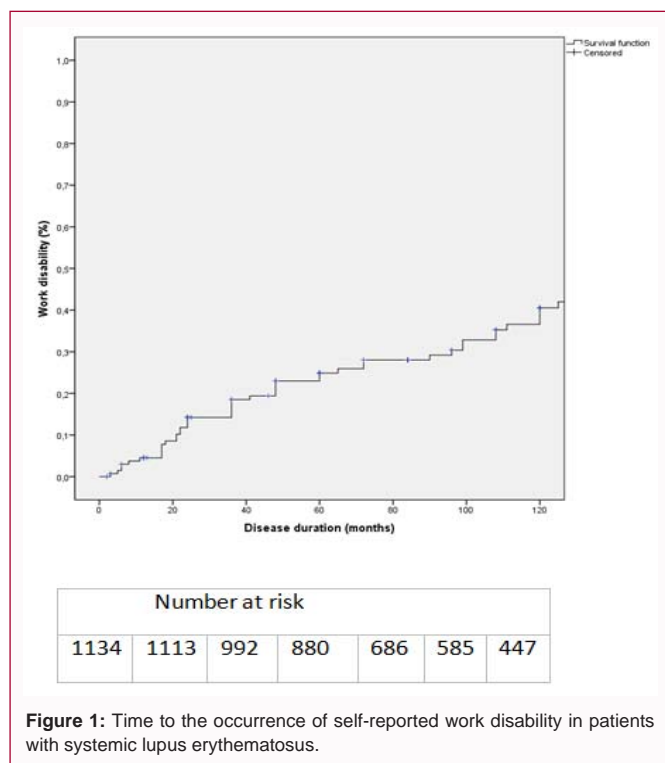


Figure 1: Time to the occurrence of self-reported work disability in patients with systemic lupus erythematosus.

**Multivariable analysis**

As noted in Table 2, variables predictive of work disability were a low socio-economic status [Odds Ratio (OR) =1.984; 95% Confidence Interval (CI) 1.154-3.410] and a lower self-reported quality of life (OR=0.953, 95% CI 0.914-0.993). None of the clinical variables were retained in the model.

**Discussion**

In this study we found that 25% of the patients with SLE become work disabled specifically attributed to the disease at five years and half of them at 10 years. We also found that socioeconomic status and a lower self-reported quality of life, rather than disease manifestations and co-morbidities, were associated with work disability.

Work disability was reported to be higher among patients with SLE compared to the general population [2] reaching a third of the patients at some point during the disease course. Although most of these studies were performed mainly in Europe [10-13], Canada [14,15] and the United States [16-20], these data are consistent with ours. There is, however, one study that have addressed work disability among the Hispanic population in the United States [16]; in that study, the rate of work disability among this ethnic group was 20%, similar to our study.

Although ethnicity [16-18] and age [14,16] was consistently found to affect the patients' ability to work, there are some other socio-demographic variables that are associated with the extend of work disability: Education [14,18,19] and poverty among them [14,16]. This is not surprising since these two variables are also associated with the rate of employment in the general population [21]. In our study, socioeconomic status was measured with a composite index that reflects not only the patient's and family income but also the level of education [4].

According to the latest study performed in Argentina by the National Institute of Statistics and Census in 2018, 11.8% of the

Table 1: Socioeconomic-demographic, clinical features and quality of life of lupus patients according to their work disability status.

Feature	Work disability		p value*
	Yes n=55	No n=170	
Sex, Female %	90.7	95.1	
Age, years, median (IQR)	25.0 (19.0)	21.0 (21.0)	
Low socio-economic status , %	61.8	36.3	0.034
Total disease duration, months, median (IQR)	99.0 (138.0)	84.0 (151.0)	0.047
Classification criteria, median (IQR)†	6.0 (3.0)	5.0 (1.0)	0.026
Organ-system involvement, %†			
Malar rash	64.8	61.1	
Discoid rash	16.7	11.4	
Photosensitivity	79.6	77.2	
Oral ulcers	57.4	44.3	
Arthritis	92.6	83.5	
Serosal	20.4	17.7	
Renal	44.4	32.9	
Neurological	5.6	12.7	
Hematological	51.9	30.4	0.013
Immunological	90.7	77.2	0.043
Disease activity, median (IQR)‡	4.0 (8.0)	1.0 (4.0)	<0.026
Patient's global assessment, median (IQR)	4.5 (3.4)	3.2 (2.8)	0.03
Self-reported quality of life§	67.7 (14.4)	75.1 (23.8)	<0.001
Health-related quality of life	60.5 (19.5)	81.7 (24.5)	<0.001
Non health-related quality of life	72.3 (21.3)	76.6 (31.3)	0.094

\* Only p values ≤ 0.10 are noted; † As per the 1987 American College of Rheumatology criteria; ‡ As per the SELENA-SLEDAI; § As per the Lupus PRO

inhabitants among the work force had any permanent disability; 55.4% among them being unemployed [22]. The frequency of unemployment, however, does not necessarily represents true work disability, as many other variables may be influencing this rate, the current economic situation of the country, among others.

Self-perceived quality of life is also found in the literature to be related to work disability among patients with different chronic conditions; rheumatoid arthritis [23], multiple sclerosis [24], inflammatory bowel diseases [24] and SLE [17,18], among others. In our patients both, the health related and non-health related components of the LupusPRO-9 were associated with work disability, with work disabled patients reporting lower levels of quality of life.

Most of the studies stress that disease duration have an impact on the patient's employment status [14,16]. Although longer disease duration was associated with work disability in the univariable analyses, this variable was not retained in the multivariable model in our study.

While reports on this topic found certain disease specific manifestations, such as integument, renal and neuropsychiatric manifestations to be associated with work disability, this was not the case in our study [15,18,25]. Likewise, none of the classifications criteria nor the number of classification criteria were associated with work disability.

Other variables that influence work disability are disease activity and organ damage [14,16,17,19]. Disease activity in most of the

**Table 2:** Cumulative damage and co-morbidities in lupus patients according to their work disability status.

Feature	Work disability		p value <sup>†</sup>
	Yes n=55	No n=170	
Organ damage score, median (IQR) <sup>†</sup>	0 (2.0)	0 (1.0)	
Presence of any organ damage (%)	49.1	45	
Organ/system damage %			
Ocular	12.7	9.9	
Neuropsychiatric	12.7	14.6	
Renal	10.9	9.9	
Pulmonary	5.5	6.2	
Cardiovascular	5.5	1.2	
Peripheral vascular	5.5	1.2	
Gastrointestinal	0	0	
Musculoskeletal	21.8	13.6	
Dermatological	7.3	2.5	
Premature gonadal failure	3.6	2.5	
Diabetes	5.5	2.5	
Malignancy	5.5	2.5	
Comorbidity Index, median (IQR) <sup>§</sup>	0 (1.0)	0 (0)	
Comorbidities (%)			
Myocardial infarction	0	0	
Congestive heart failure	9.1	1.2	0.04
Peripheral vascular disease	1.8	1.6	
Cerebrovascular disease	0	2.5	
Dementia	0	0	
Chronic pulmonary obstructive disease	0	1.2	
Peptic ulcer disease	5.5	0	0.064
Mild liver disease	0	1.2	
Diabetes	5.5	2.5	
Hemiplegia	0	1.2	
Moderate to severe renal disease	3.6	3.7	
Diabetes with organ damage	0	0	
Any neoplasia	7.3	2.5	
Leukemia	0	0	
Lymphoma	0	0	
Moderate to severe liver disease	0	0	
Solid tumor metastasis	1.8	0	
AIDS	0	1.2	

Only p values  $\leq 0.10$  are noted; <sup>†</sup>As per the SLICC Damage Index; <sup>‡</sup>As per the SELENA-SLEDAI; <sup>§</sup> As per the Charlson's clinical comorbidity index

studies was measured over time; on the contrary, in our study was only measured at the patient entry to the study. We acknowledge that this is a limitation in the design of the study that could have influence the impact of this variable on work disability. Also, we were not able to associate the presence of any comorbid condition or any type of damage with work disability; one possible explanation being that this sample of patients had, overall, accrued a low degree of organ damage in contrast to that reported in other cohorts.

The study is not without limitations. Firstly, we did not compare the rate of work disability with a matching non-SLE population.

**Table 3:** Factors associated with work disability by multivariable logistic regression analysis<sup>\*</sup>.

Feature	Odds Ratio	95% Confidence Interval	p value <sup>†</sup>
Low socio-economic status	1.984	1.154-3.410	0.013
Total disease duration	0.997	0.992-1.002	
Classification criteria	0.083	0.598-1.302	
Hematological criteria	2.303	0.822-6.456	
Immunological criteria	1.912	0.473-7.733	
Disease activity <sup>‡</sup>	1.055	0.963-1.115	
Patient's global assessment	0.966	0.971-1.022	
Self-reported quality of life <sup>§</sup>	0.953	0.914-0.993	0.022
Congestive heart failure	1.542	0.083-28.750	
Peptic ulcer disease	1.19	0.098-23.450	

<sup>\*</sup>Adjusted by age and gender; <sup>†</sup>Only p values  $\leq 0.05$  are noted; <sup>‡</sup>As per the SELENA-SLEDAI; <sup>§</sup>As per the Lupus PRO

However, the last population census performed in 2010 in the Province of Córdoba, Argentina, reported that 10% of the work force population has some degree or permanent limitation in their ability to work. This number is certainly much higher among patients with SLE. Secondly, we performed a cross sectional study. This type of design may have precluded some variables to be associated with work disability, disease activity, among others. As deceased patients were not examined, it is also possible that both, the rate and the variables of work disability, would have been slightly different if this group of patients were analyzed.

In conclusion, in this sample of patients with SLE we found that almost a quarter of the patients become work disabled at any point of the disease course. None of the clinical variables were associated with this outcome. On the contrary, a lower socio-economic status and self-perceived quality of life influenced the patients' ability to work. Measures should be undertaken at the individual and, specially, the society level in order to lower the work disability rate among this population of patients.

## Funding

Supported by a grant from the Argentine Society of Rheumatology.

## Author Contribution

To Meenakshi Jolly, MD, MS - Rush University Medical Center, who shared the Lupus PRO with us for, which we are very grateful?

To Ana Echevarría Bertoli for her excellent performance as data entry.

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