

Prevalence of Disability in Patients With Musculoskeletal Pain and Rheumatic Diseases in a Population From Cuenca, Ecuador

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Objective: The aim of this study was to determine the prevalence of disability in patients with musculoskeletal pain and rheumatic diseases in Cuenca, Ecuador.

Methods: We performed a cross-sectional analytical study with randomized sampling in 4877 subjects, from urban and rural areas. COPCORD (Community Oriented Program for Control of Rheumatic Diseases)–validated questionnaire was administered house-to-house to identify subjects with nontraumatic musculoskeletal pain and rheumatic diseases. The subjects were assessed by rheumatologists for diagnostic accuracy, and the Health Assessment Questionnaire Disability Index was administered to assess functional capacity. A logistic regression analysis was conducted to determine the association of rheumatic diseases with functional disability.

Results: Functional disability was found in 221 subjects (73.1% women), with mean age 62 (SD, 18.2) years, residing in rural areas (201 [66.5%]), with education of 6.9 (SD, 5.3) years, and of low income (77 [47.2%]). The value of HAQ-DI was a mean of 0.2 (0–2.9). The real prevalence of physical disability was 9.5%. Moderate and severe disability predominated in activities such as kneeling (4.9% and 3.3%), squatting (4.8% and 2.7%), and leaning to pick up objects (3.7% and 0.9%), respectively. Rheumatic diseases associated with physical disabilities were knee osteoarthritis (95 [31.4%]) and hand osteoarthritis (69 [22.8%]), mechanical low-back pain (43 [14.2%]), fibromyalgia (27 [9.5%]), and rheumatoid arthritis (11 [3.6%]; $P < 0.001$).

Conclusions: Physical disability was associated with older age, female sex, rural residence, lower education, and lower income. Moderate and severe disability predominated in the dimensions of kneeling, squatting, and picking up objects. Rheumatic diseases associated with disability were hand and knee osteoarthritis, back pain, fibromyalgia, and rheumatoid arthritis.

Home Message:

1. This is the first study conducted in Ecuador to determine the prevalence of functional disability in patients with musculoskeletal pain and rheumatic diseases.
2. The results of this study shed important light on functional limitation in individuals with rheumatic diseases, particularly older women, living in rural areas and with lower education and income.
3. These new data should be considered in determining health care priorities by the government because of personal, family, work, and social impact of these disorders.
4. Health policies need to be implemented that allow for a better health coverage to diagnose and treat these diseases in a timely fashion.

Key Words: community, HAQ-DI, musculoskeletal pain, physical disability, rheumatic diseases

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Musculoskeletal (MSK) diseases are chronic conditions with multisystem involvement and are one of the leading causes of disability worldwide.¹ Disability is an umbrella term, covering impairments, activity limitations, and participation restrictions, as defined in the International Classification of Functioning, Disability and Health.²

Disability can occur in a number of chronic degenerative diseases; it is considered a marker of impact of rheumatic diseases that affect daily activities and comes with a high social and economic cost³ due to loss of productivity, absenteeism, and a higher health care cost. In European countries, chronic pain caused by rheumatic diseases and back pain translated into an expense of up to 2% of gross domestic product per year.⁴

The World Health Organization considers MSK diseases to be a cause of disability.⁵ The burden of rheumatic diseases is very high⁶; they are one of the top 10 reasons for total disability in Canada and Mexico. In the United States, they are the leading cause of disability and bear a huge economic impact on the state, patients, families, and their social environment.⁷

In most Latin American countries, data on the impact of rheumatic diseases on the functional capacity are scarce, even though it is the most important indicator of impact on the population.⁸ According to some studies, the population disabled by rheumatic disorders is approximately 2.8% in the United States and 8% in Britain⁹; 1% to 2% of the Chinese population with rheumatoid arthritis have functional limitations in daily activities, whereas 3% to 6% stopped working because of disability¹⁰; in Peru, 2% of individuals with MSK pain had permanent work disability.¹¹

In Ecuador, there have been no studies of disability caused by rheumatic diseases in the general population or per geographical location. Unlike city dwellers, rural population has more limited access to public health services and lower income, barely enough to meet basic needs such as food and clothing, relegating health care to the background. It is therefore important to understand disability as manifested in these two population groups and fill an information gap in the literature.

The COPCORD (Community Oriented Program for Control of Rheumatic Diseases) model was introduced in 1981 by the International League of Associations for Rheumatology in response to the World Health Organization calling for an increase in research into the causes and consequences of MSK diseases. The COPCORD methodology is a screening strategy to detect rheumatologic and MSK disorders in the community and has proven to be effective.^{12,13}

The objective of this study was to determine the prevalence of disability in individuals with MSK pain and rheumatic diseases

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by using the COPCORD methodology^{12,13} in rural and urban communities of the Cuenca Canton, Ecuador.

MATERIALS AND METHODS

A cross-sectional analytical community-based study was conducted.

Study population was composed of individuals 18 years or older residing at their current address for at least 6 months in urban and rural parishes of Cuenca Canton from January to December 2014.

Ecuador is constituted by provinces, which correspond to the first level of organization; at the same time, the provinces are made up of 1 or more cantons, which represent the second level of administrative division. The cantons are subdivided into parishes, which can be rural or urban. There are 24 provinces, 221 cantons, and 1500 parishes in the country.

The Cuenca Canton is located in southern Ecuador and has a total population of 505,585. Women account for 52.6% and men for 47.3% of the population; 65.2% reside in urban and 34.7% in rural areas, according to the 2010 National Institute of Statistics and Census. The sample size was calculated from a 50% MSK pain prevalence. A nonresponse rate of 20% was estimated for a confidence interval of 95%.¹⁴

Sampling was mixed and random, by stratum (urban and rural) and conglomerate (household); the methodological details can be found in a previous report.¹⁵

This research involved medical students as standardized pollsters, internists, and rheumatologists. The population data were collected through 3 successive phases:

Phase I: This phase was carried out in the community, household-to-house survey.

Phase II: All individuals who accepted our invitation to participate in the study underwent the Ecuadorian adaptation of the COPCORD questionnaire,¹⁶ Health Assessment Questionnaire Disability Index (HAQ-DI), and a socioeconomic questionnaire by the National Institute of Statistics and Census, assisted by a medical student during the door-to-door survey. Both had been verified by the coordinators.

Phase III: COPCORD-positive patients (cases with MSK pain in the last 7 days or at any point in life) were assessed by rheumatologists at their homes.

Two pilot tests were run to validate the questionnaires cross-culturally, and 1 pilot test was run to adjust for field work. The period for the study was set at 18 months.

COPCORD questionnaire¹⁷ used in the study had the following sections: self-reported comorbidity; work history; pain, swelling, and stiffness in the last 7 days or at some point in life; functional disability; treatments received; treatment seeking trajectory; and coping with disease. The COPCORD questionnaire also identified (a) responders: all subjects with MSK pain in the last 7 days (current) and any time (chronic) and (b) disability, as a self-reported disability in physical activities of daily living.

Functional capacity was assessed using the validated version of the HAQ-DI, which includes questions about daily activities aimed at evaluating fine motors skills of upper and lower limbs. The questions were divided into 20 categories and 8 dimensions, including clothing, arising, eating, walking, hygiene, reaching, and grasping objects, and other activities. There were 4 possible answers for patients: able to perform without any difficulty, with some difficulty, with much difficulty, or unable to perform. The patients were asked to choose an answer placing an X according to their functional capacity during the last week. Each answer

was scored with a value of 0 to 3.¹⁸ The score of 0 to 1 ($0 < \text{score} \leq 1$) indicates slight disability; 1 to 2 ($1 < \text{score} \leq 2$), moderate disability; and 2 to 3 ($2 < \text{score} \leq 3$), severe disability. The HAQ-DI was graded following standard procedures¹⁹ and then converted into a dichotomous variable, indicating the presence/absence of disability using 0.8 as a cutoff point, as described by Moreno-Montoya et al.²⁰ in a population-based study.

All 1587 participants (32.5%) corresponded to positive responders, and they were examined by 5 rheumatologists who

TABLE 1. Sociodemographic Characteristics of Cuenca Population (n = 4877)

Demographics	
Sex, n (%)	
Female	2916 (59.7)
Male	1961 (40.2)
Age, mean (SD, range), y	42.8 (17.8; 18–97)
Education, mean (SD, range), y	10.2 (5.3; 0–28)
Marital status, n (%)	
Single	1235 (25.3)
Married	2756 (56.1)
Widowed	290 (5.9)
Free union	264 (5.4)
Separated	87 (1.7)
Divorced	230 (4.7)
Other	4 (0.08)
Residence, n (%)	
Urban	3400 (69.7)
Rural	1477 (30.2)
Employment (yes), n (%)	3091 (63.3)
Employment, n (%)	
None	28 (0.5)
Professional	793 (16.6)
Clerk	496 (10.3)
Trader	417 (8.7)
Laborer	383 (8.0)
Housemaker	1224 (25.6)
Craftsperson	436 (9.3)
Agricultural worker	111 (2.3)
Domestic employee	117 (2.4)
Student	416 (8.1)
Activities: load +4 kg, n (%)	1774 (36.3)
Repeating activities, n (%)	2402 (49.2)
Income	
<US \$340	1262 (37.9)
US \$341–\$700	1092 (32.8)
US \$701–\$1000	351 (10.5)
US \$1001–\$1500	159 (4.7)
>US \$1500	55 (1.6)
Unemployed	92 (2.7)
No answer	315 (9.4)
Health care type, n (%)	
Regional hospital/health center	2016 (42.0)
Private health care	1493 (31.1)
Social Security	1167 (24.3)
None	122 (2.5)
Other	

participated in the study and carried out home visits during the 7 days of the survey.

For the diagnosis of rheumatic diseases, rheumatologists used the classification criteria of the American College of Rheumatology: rheumatoid arthritis,²¹ hand osteoarthritis,²² knee osteoarthritis,²³ fibromyalgia,²⁴ gout,²⁵ low-back pain,²⁶ and systemic lupus erythematosus.²⁷ For back pain, a questionnaire was administered to screen for inflammatory chronic low-back pain.

Ethical Aspects

This study was approved by the ethics committee of the University of Cuenca School of Medical Sciences and the Bioethics Committee in Quito, Ecuador, on February 21, 2014. Each participant signed an informed consent after having been explained the study.

Statistical Analysis

Discrete variables were operationalized as number of cases (n) and percentages (%), and continuous variables were operationalized as averages and SDs for parametric and median and interquartile range for nonparametric. For group comparison, we used χ^2 test, Student *t* test, or Mann-Whitney *U* test, as well as Kruskal-Wallis test for the nonparametric variables. Bilateral *P* < 0.05 was accepted as significant difference. A multivariate analysis was performed using a multiple logistic regression; dependent variables were physical disability as measured by HAQ-DI (0 = <0.8 and 1 = ≥0.8), and independent variables were age, sex, residence, education, socioeconomic variables and work, pain in the last 7 days or at some point in life, history of treatment, and diagnosis of a rheumatic disease. Stata v11 for Mac statistical software (College Station, TX) was used.

RESULTS

Phase I. Of 4877 (97.5%) of 5000 individuals who participated in the study, 2916 (59.7%) were women; average education was 10.2 (SD, 5.3)years; average age was 42.8 (SD, 17.8)years; 3400 (69.7%) of the participants lived in urban areas and 1477 (30.2%) in rural areas (Table 1).

Phase II. Musculoskeletal pain in the last 7 days occurred in 1587 subjects (67.4% were females); 532 participants (61.2% were female) had no current physical limitations, but had past limitations; 451 (69.8% were female) had current physical limitations; the median HAQ score was 0.2 (range, 0–2.9).

Phase III. The results of the HAQ-DI questionnaire revealed that both moderate disability (“able to perform with some difficulty”) and severe disability (“unable to perform”) prevailed in

certain daily activities as kneeling (4.9% moderate disability vs. 3.3% severe disability), squatting (4.8% moderate disability vs. 2.7% severe disability), and leaning to pick up objects (3.7% moderate disability vs. 0.9% severe disability) (Table 2).

A comparison between individuals who reported having a physical disability and those who did not revealed that all sociodemographic factors (sex, education, residence, income, employment, socioeconomic status) were significantly associated with physical disability, with the exception of possession of property. A comparison of residence showed that the percentage of subjects with disabilities living in rural areas was almost twice as high as that in urban areas (66.5% vs. 33.4%; *P* < 0.001). Musculoskeletal pain in the last 7 days was reported in 215 (71.1%) and historical pain in 257 (85%) of individuals with physical disabilities with *P* < 0.001. As for rheumatic diseases in subjects with physical disabilities, knee osteoarthritis was observed in 95 (31.4%), hand osteoarthritis in 69 (22.8%), mechanical low-back pain in 43 (14.2%), fibromyalgia in 27 (9.5%), and rheumatoid arthritis was observed in 11 (3.6%) with a significant *P* value (<0.001) (Table 3).

In multiple logistic regression analysis, a significant association was observed between the dependent variable of physical disability as measured by the HAQ-DI and the independent variables: age (odds ratio [OR], 1.04; 95% confidence interval [CI], 1.04–1.05; *P* < 0.001), pain in the last 7 days (OR, 2.45; 95% CI, 1.84–3.25; *P* < 0.001), pain at some point in life (OR, 2.10; 95% CI, 1.44–3.06; *P* < 0.001), and history of treatment (OR, 1.35; 95% CI, 1.02–1.78; *P* < 0.001) (Table 4).

With reference to rheumatic diseases in multiple logistic regression analysis, physical disability as measured by the HAQ as a dependent variable and rheumatic diseases as independent variable exhibited more significant association with rheumatoid arthritis (OR, 7.7; 95% CI, 3.4–17.4; *P* < 0.001), fibromyalgia (OR, 5.2; 95% CI, 3.1–8.7; *P* < 0.001), knee osteoarthritis (OR, 5.08; 95% CI, 3.6–7.0, *P* < 0.001), hand osteoarthritis (OR, 3.39; 95% CI, 2.3–4.9; *P* < 0.001) (Table 5).

DISCUSSION

This study showed that disability was prevalent in a considerable percentage of patients from Cuenca with MSK pain and rheumatic diseases, being more prevalent in women, rural dwellers, and individuals with lower education and a lower income.

The prevalence of current physical disability in this study was 9.5%, a higher figure than that described in southeastern Mexico with 6.6%,²⁸ Venezuela with 4.7%,²⁹ and Mexico City with 1.4%,³⁰ and lower than that reported in a suburban region

TABLE 2. Description of HAQ for the Population of Cuenca

	Without Any Difficulty = 0, n (%)	With Some Difficulty = 1, n (%)	With Much Difficulty = 2, n (%)	Unable to Perform = 3, n (%)
1. Dressing without help including tying shoelaces	4411 (91.5)	296 (6.1)	87 (1.8)	25 (0.5)
2. Getting in and out of bed	4134 (85.8)	559 (11.6)	116 (2.4)	7 (0.1)
3. Lifting food to mouth	4652 (96.5)	124 (2.5)	30 (0.6)	10 (0.2)
4. Walking on flat ground	4416 (91.7)	336 (6.9)	53 (1.1)	9 (0.1)
5. Washing and drying the whole body	4519 (93.8)	217 (4.5)	58 (1.2)	19 (0.3)
6. Bending down to pick up clothing from the floor	3864 (80.2)	725 (15.0)	181 (3.7)	46 (0.9)
7. Turning faucets on and off	4587 (95.2)	178 (3.7)	34 (0.7)	17 (0.3)
8. Getting in and out of a car	4374 (90.8)	325 (6.7)	94 (1.9)	22 (0.4)
9. Squatting	3678 (76.3)	773 (16.0)	234 (4.8)	133 (2.7)
10. Kneeling	3600 (74.6)	826 (17.1)	238 (4.9)	159 (3.3)

TABLE 3. Comparison of the Population With Some Physical Disability (HAQ = <0.8) and No Physical Disabilities (HAQ = 0) of the Cuenca Canton Population, 2014

Variables	Physical Disability, n = 302 (6.1%)	No Physical Disability, n = 4575 (93.8%)	P
Sociodemographics			
Mean age (SD), y	62.0 (18.2)	41 (17.1)	<0.001
Sex (female), n (%)	221 (73.1)	2695 (58.8)	<0.001
Education, mean (SD), y	6.9 (5.3)	10.4 (5.2)	<0.001
Residence, n (%)			
Urban	101 (33.4)	1376 (30.0)	
Rural	201 (66.5)	3199 (69.6)	<0.001
Income, n (%)			
<US \$340	77 (47.2)	1185 (37.4)	<0.001
US \$341–\$700	39 (23.9)	1053 (33.2)	<0.001
US \$701–\$1000	13 (7.9)	338 (10.6)	<0.001
US \$1001–\$1500	1 (0.6)	158 (5.0)	<0.001
>US \$1500	0	55 (1.7)	
Unemployed	81 (2.5)	81 (2.5)	
No answer	22 (13.5)	293 (9.2)	<0.001
Possession of assets, mean (SD), \$	5.5 (2.5)	5.9 (2.6)	0.07
Employment (yes), n (%)	129 (42.7)	2962 (63.7)	<0.001
Health care, n (%)			
Hospital/health center	130 (43.4)	1883 (41.8)	
Private	72 (24.0)	1423 (31.6)	0.03
Social Security	90 (30.1)	1075 (23.8)	0.03
None	7 (2.3)	115 (2.5)	
Physical activity, n (%)			
4-kg Load	29 (26.1)	1695 (37.0)	<0.001
Repetitive tasks	114 (37.7)	2288 (50.0)	
MSK pain, n (%)			
7-d Pain	215 (71.1)	1372 (29.9)	<0.001
Historical pain	257 (85.0)	1985 (43.3)	<0.001
Rheumatic disease, n (%)			
Mechanical back pain	43 (14.2)	333 (7.2)	<0.001
Inflammatory back pain	8 (2.6)	71 (1.5)	<0.001
Hand osteoarthritis	69 (22.8)	191 (4.1)	<0.001
Knee osteoarthritis	95 (31.4)	266 (5.8)	<0.001
Rheumatoid arthritis	11 (3.6)	32 (0.7)	<0.001
Fibromyalgia	27 (9.5)	73 (1.7)	<0.001

of Brazil with 24.2%.³¹ The disability figures in published studies vary and do not allow definitive conclusions to be drawn.

Functional capacity as measured by the HAQ-DI (interquartile range) in the study population was 0.2, which is the same as described in Spain,⁹ lower than that reported in Germany with 0.3,³² Venezuela with 0.5,²⁹ India with 0.8,⁵ and Cuba with 0.8,³³ and higher than that observed in Nuevo Leon, Mexico,³⁴ and France.³⁵ These differences in the measurement of disability using the HAQ-DI can be explained by this instrument to measure disability perceived by the subject; therefore, there are cultural variations in the perception of disability. Besides, since over the past decade in Ecuador there have been implemented health policies that benefit persons with disabilities both urban and rural; a lower degree of disability in our study may be due to these health policies.

Age is a factor that affects the individual's functional capacity; adding a rheumatic disease to the mix contributes to an increased risk of disability. In our study, disability was most frequently observed in women and seniors, similar to what was

reported in Peru¹¹ and France,³⁵ where disability was reported to be higher in women and increasing with age. In another study in

TABLE 4. Logistic Regression Analysis of the Variables Associated With Having a Physical Disability as Measured by the HAQ as Dependent (Cutoff Point 0.8) and Independent Variables (Age, Sex, Education, Socioeconomic Status, Health Coverage, Physical Work, Community Type, Work Characteristics) (Model 1)

Independent Variables	OR (95% CI)	P
Age (older age)	1.04 (1.04–1.05)	<0.001
Sex (female)	1.47 (1.10–1.95)	0.008
Pain in the last 7 d	2.45 (1.84–3.25)	<0.001
Pain at some point in life	2.10 (1.44–3.06)	<0.001
History of treatment	1.35 (1.02–1.78)	<0.001
Diagnosed with a rheumatic disease	2.06 (1.57–2.70)	<0.001

TABLE 5. Logistic Regression Analysis of the Variables Associated With Having a Physical Disability as Measured by the HAQ as Dependent and Independent Variables (for Each of the Most Prevalent Rheumatic Diseases) (Model 2)

Independent Variables	OR (95% CI)	P
Back pain	1.49 (1.24–1.80)	<0.001
Rheumatoid arthritis	7.78 (3.46–17.48)	<0.001
Hand osteoarthritis	3.39 (2.34–4.93)	<0.001
Knee osteoarthritis	5.08 (3.69–7.00)	<0.001
Fibromyalgia	5.20 (3.10–8.71)	<0.001

a population older than 65 years in Germany,³² disability was shown to be higher in older women. In China,¹⁰ Zhao et al.¹⁰ reported that patients with rheumatoid arthritis had severe and more prevalent disability in females.

When comparing individuals with physical disabilities with subjects without disabilities, we observed that the sociodemographic factors such as lower education and a lower income were associated with disabilities. This is in line with the results reported in Peru, Spain, and India.^{9–11} In 1 study in Germany,³² disability was shown to be associated with just lower income, whereas another study in India reported that the level of education was associated with disabilities.⁵

Disability predominated in women from rural areas. This is probably related to work activities as farm and household work, which increase daily load on the joints, coupled with the lack of health coverage especially for rheumatoid arthritis or osteoarthritis, which are chronic problems with medium- and long-term physical limitations if not treated promptly. The frequency of disability in subjects with arthritis was lower in the rural populations of Yucatan³⁶ and China¹⁰ compared with the rural population in our study.

Administering the HAQ-DI questionnaire to the study population and evaluating daily activities revealed the predominance of moderate and severe disability for kneeling, squatting, and picking up objects. This is in line with the study by Rodríguez-Amado et al.,³⁴ who found that subjects with MSK pain had greater difficulty kneeling and squatting compared with individuals without MSK pain. Another study reported that the dimension of squatting was associated with moderate disability,³⁷ even though this is at odds with the results of a study in India, where moderate disability was associated with walking, running errands, and keeping personal hygiene.⁵

With regard to the geographical location, a study conducted in Shanghai¹⁰ showed that the dimensions of walking on flat ground and squatting were the most affected in the urban area; however, these results are lower compared with those reported for the urban population in our study. In the rural area of Cuenca, the dimension of having difficulty walking on flat ground was found to be affected more frequently than in rural areas of Beijing and Shantou.³⁷

Rheumatoid arthritis patients in our research had a significantly higher percentage of disability, above the figures described by Xiang and Dai³⁷ in China (1%–2% of disability in daily activities) and below those reported by Zhao et al.¹⁰ in southeastern China.

Rheumatic diseases such as knee and hand osteoarthritis, low-back pain, fibromyalgia, and rheumatoid arthritis were significantly associated with physical disability in our study. This is similar to the results of a study in Spain that revealed moderate disability being associated with rheumatoid arthritis, low-back pain, knee and hand osteoarthritis, and fibromyalgia.⁹

One limitation of our study that must be considered was the lack of cooperation of a small group with a higher socioeconomic standing. The group refused to participate in the research, arguing that they had sufficient financial resources to afford private health care.

CONCLUSIONS

This study demonstrated a considerable prevalence of disability in subjects with MSK pain and rheumatic diseases such as hand and knee osteoarthritis, rheumatoid arthritis, and fibromyalgia. Moderate and severe disability predominated in the dimensions of kneeling, squatting, and picking up objects. The sociodemographic factors associated with physical disability were higher mean age, female sex, lower education, and lower income.

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