Prevalence of Rheumatic Regional Pain Syndromes in Adults from Mexico: A Community Survey Using COPCORD for Screening and Syndrome-specific Diagnostic Criteria

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ABSTRACT. ***Objective***. To assess the prevalence of rheumatic regional pain syndromes (RRPS) in 3 geographical areas of México using the Community Oriented Program in the Rheumatic Diseases (COPCORD) screening methodology and validate by expert consensus on case-based definitions.

Methods. By means of an address-based sample generated through a multistage, stratified, randomized method, a cross-sectional survey was performed on adult residents (n = 12,686; age 43.6 ± 17.3 yrs; women 61.9%) of the states of Nuevo León, Yucatán, and México City. Diagnostic criteria for specific upper (Southampton group criteria) and lower limb (ad hoc expert consensus) RRPS were applied to all subjects with limb pain as detected by COPCORD questionnaire.

Results. The overall prevalence of RRPS was 5.0% (95% CI 4.7–5.4). The most frequent syndrome was rotator cuff tendinopathy (2.36%); followed by inferior heel pain (0.64%); lateral epicondylalgia (0.63%); medial epicondylalgia (0.52%); trigger finger (0.42%); carpal tunnel syndrome (0.36%); anserine bursitis (0.34%); de Quervain's tendinopathy (0.30%); shoulder bicipital tendino - pathy (0.27%); trochanteric syndrome (0.11%); and Achilles tendinopathy (0.10%). There were anatomic regional variations in the prevalence of limb pain: Yucatán 3.1% (95% CI 2.5–3.6); Nuevo León 7.0% (95% CI 6.3–7.7); and México City 10.8% (95% CI 9.8–11.8). Similarly, the prevalence of RRPS showed marked geographical variation: Yucatán 2.3% (95% CI 1.8–2.8); Nuevo León 5.6% (95% CI 5.0–6.3); and México City 6.9% (95% CI 6.2–7.7).

Conclusion. The overall prevalence of RRPS in México was 5.0%. Geographical variations raise the possibility that the prevalence of RRPS is influenced by socioeconomic, ethnic, or demographic factors. (J Rheumatol 2011;38 Suppl 86:15–20; doi:3899/jrheum.100953)

Key Indexing Terms:
SOFT TISSUE RHEUMATOLOGY RHEUMATIC REGIONAL PAIN SYNDROMES
TENDONITIS BURSITIS EPIDEMIOLOGY PREVALENCE

Rheumatic regional pain syndromes (RRPS) constitute a group of clinical entities affecting the appendicular musculoskeletal (MSK) system that share at least 2 of the following features: (1) pain localized in a discrete part of an extremity as the main clinical complaint; (2) the anatomical cause (other than entrapment neuropathies, which are not MSK RRPS but are traditionally included in the group) is a derangement of paraarticular structure, such as tendon, fas-

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Supported by the CONACYT-Salud 2007-C01-69439, CONACYT-Salud 2007-C01 69765, and FUMERAC/Colegio Mexicano de Reumatología grants.

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cia, ligament, or bursa; and (3) a consistent etiologic pathway derived from acute or chronic MSK overuse[1].

Although RRPS are commonly cited as one of the most frequent causes of rheumatic complaints, an epidemiological profile has not been definitively established. Although some attempts have been made concerning the epidemiological profile of syndromes such as shoulder pain and rotator cuff tendinopathy[2,3,4], epicondylitis[5], and trochanteric syndrome[6], analysis of the literature shows that, since the report by Darmawan, *et al*[7], only 12 additional articles, mostly from developing countries, have addressed the issue[8,9,10,11,12,13,14,15,16,17,18,19]. Although almost all those reports used the Community Oriented Program in the Rheumatic Diseases (COPCORD) methodology for MSK pain as a screening tool, it is remarkable that the overall prevalence of RPPS has worldwide variations, from 0.7% to 15.0%[7,8,9,10,11,12,13,14,15,16,17,18,19].

Because in all the cited reports diagnosis of RRPS was based on the clinical judgment of the surveying physician and did not rely on a standardized or validated set of diagnostic or classification criteria, we wondered whether prevalence variations were real or a misconception caused by a faulty or heterogeneous case definition[3].

The aim of our study was to evaluate overall and individual prevalence of the most important RRPS in adults in 3 geographical regions of México: the northern state of Nuevo León, central México City, and the southern state of Yucatán, using the COPCORD screening methodology and a set of validated or standardized diagnostic criteria as syndrome definition.

MATERIALS AND METHODS

Our study is part of a larger, multistage, stratified, randomized, cross-sectional survey intended to assess the epidemiological influence of the main rheumatic diseases in 3 geographical areas of México: the northern state of Nuevo León, the southern state of Yucatán, and the exclusively urban México City, located in central México.

The subject selection procedure was according to the 3 phases suggested for stage I COPCORD methodology[20,21,22]. With the Mexican adaptation of COPCORD as screening instrument[23], we identified individuals with nontraumatic MSK pain during the last 7 days. Next, every subject with MSK pain in the extremities underwent a clinical examination by specially trained primary care physicians in the community or in primary clinics, and in case of diagnostic uncertainty, an examination by a certified rheumatologist was performed. Case detection and clinical evaluation of MSK limb pain by the primary care physician were done the same day. When needed, rheumatologic evaluation was done a maximum of 24 hours after case detection. All participating primary care physicians and the rheumatologist were trained in the case definition methodology through a one-day workshop.

Although sample size was not calculated before our study, once the data were collected, we calculated based on the studied population (n = 12,686) and the obtained overall prevalence of RRPS, that the power of our study was higher than 90%.

Ethics issues. The protocol was approved by the Ethics and Research Committees of the Hospital General de México and the Hospital Universitario of Monterrey, México. All participants signed informed consent before entry to the study. Every subject identified as having any disease (rheumatic or nonrheumatic) without medical care was advised to look for medical assistance and oriented as to the appropriate level of care according to their respective healthcare system.

RRPS case definitions. Upper limb syndromes (other than trigger finger) were defined based on the Southampton group criteria, whose validity and consistency for epidemiological research purposes have been established[24,25]. Because no validated criteria were available for lower limb syndromes, we developed an expert consensus for specific case-definition of trochanteric syndrome, anserine bursitis, Achilles tendinopathy, and inferior heel pain, in addition to trigger finger, which were established according to the key diagnostic signs[26,27,28,29,30]. For every specific RRPS a criteria-based checklist was developed; final diagnoses were required to fulfill the diagnostic checklist.

Statistical analysis. Prevalence figures (in percentages) with 95% confidence intervals (CI) were used for depicting the descriptive epidemiological effects of the studied syndromes. The association between the collected clinical and sociodemographic variables and the presence of RRPS was initially explored by univariate analysis: unpaired t test and chi-square with Yates correction or Fisher's exact test, according to variable type. Finally, all those variables having a significant p value in univariate analysis were entered in a stepwise logistic regression model, and the corresponding odds ratios with the 95% CI were calculated. Variables were included one by one according to p value < 0.05. The final model was integrated only by those variables with a significant influence that contributed to increasing the predictive and explanatory value of the model, so the final model was the most parsimonious. The adjustment of the final model was tested. The analysis was done using the Stata statistical software.

RESULTS

Overall, 12,686 individuals (age 43.6 ± 17.3 yrs; range 18–98 yrs; women 61.9%) were included in this study (Figure 1). Recruited subjects comprised 4712 (37.1%) in the state of Nuevo León (northern zone); 4059 (32.0%) in México City (central zone); and 3915 (30.9%) in the Yucatán state (southern zone). Significant differences in some of the demographic and social variables were identified between the 3 studied regions, resulting in different geographical profiles for subjects' age, gender, marital status, the average having remunerated work, and type or residence (urban vs rural; Table 1).

After applying the COPCORD questionnaire, the presence of nontraumatic MSK pain in the last 7 days was detected in 5267 (41.5%; 95% CI 40.6–42.3) subjects; nontraumatic and noninflammatory limb pain was found in 892 (7.0%; 95% CI 6.6–7.5) subjects, who were included into the RRPS diagnostic screening phase. In 251 of these subjects, RRPS could not be diagnosed according to the case definition. The overall prevalence of a defined RRPS was 5.0% (95% CI 4.7–5.4), corresponding to the remaining 641 subjects. The total account of individual RRPS was 773 because 532 subjects presented an isolated syndrome and 109 subjects presented 2 or more concurrent syndromes: 92 had 2 syndromes, 12 had 3 syndromes, 4 had 4 syndromes, and 1 subject had 5 syndromes (Figure 1).

Shoulder rotator cuff tendinopathy was by far the most prevalent entity of the 773 detected RRPS, while inferior heel pain was the most prevalent lower limb RRPS. Aside

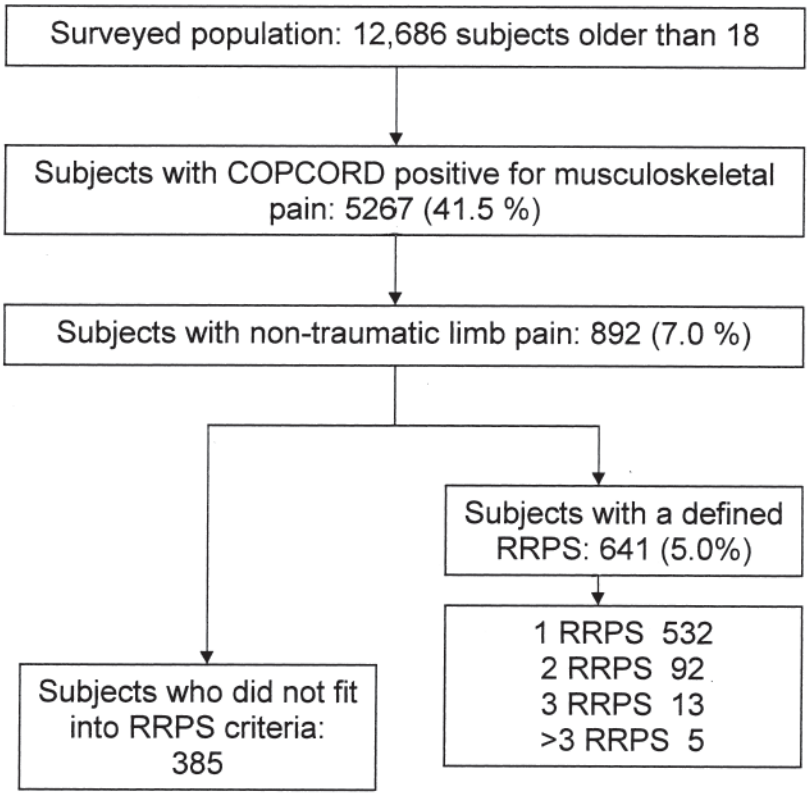

Figure 1. Sequence used in the identification of subjects with a defined rheumatic regional pain syndrome (RRPS) in 3 geographic regions of México.

from shoulder rotator cuff tendinopathy, the remaining individual syndromes had a prevalence of less than 1% (Table 2).

Finally, significant differences in limb pain prevalence in addition to overall and lower or upper limb RRPS prevalence were identified between the 3 studied communities. A consistent trend for a higher prevalence for all of RRPS

Table 1. Sociodemographic variables that differed significantly among the 3 geographical regions of México in the study.

Characteristics	Central	Northern	Southern	p
All Subjects	n = 4059	n = 4712	n = 3915	
Age, yrs, mean ± SD	44 ± 17.9	43.6 ± 17.3	42.7 ± 17.1	< 0.01
Female (%)	2795 (68.8)	2639 (55.9)	2422 (61.8)	< 0.01
Married (%)	2822 (69.6)	3045 (64.0)	2765 (70.6)	< 0.01
No. remunerated job (%)	1478 (36.4)	270 (5.7)	1025 (26.2)	< 0.01
Rural residence (%)	0	611 (13)	1787 (45.6)	< 0.01
Subjects with limb pain	n = 489	n = 331	n = 122	—
Age, yrs, mean ± SD	41.4 ± 15.3	41.9 ± 16.5	48.7 ± 13.2	0.01
Female (%)	316 (64.6)	206 (62.2)	95 (77.8)	0.001
Married (%)	319 (72.6)	243 (73.4)	96 (78.6)	0.005
No. remunerated job (%)	8 (1.8)	23 (6.9)	22 (18.0)	< 0.001
Rural residence (%)	0	36 (10.8)	42 (34.4)	< 0.001
Subjects with RRPS	n = 283	n = 266	n = 92	—
Age, yrs, mean ± SD	41 ± 15.7	42.1 ± 16.3	49.2 ± 13.4	< 0.01
Female (%)	198 (69.9)	168 (63.1)	70 (76.0)	< 0.01
Married (%)	206 (72.7)	197 (74.0)	72 (78.2)	< 0.01
No. remunerated job (%)	5 (1.7)	17 (6.3)	20 (21.7)	< 0.01
Rural residence (%)	0	0	26 (28.2)	< 0.001

RRPS: rheumatic regional pain syndrome.

Table 2. Comparative prevalence of the 773 individual RRPS cases detected in 12,686 subjects.

Syndrome	n	Prevalence, % (95% CI)
Upper limb		
Rotator cuff tendinopathy	300	2.36 (2.10–2.63)
Lateral epicondylalgia	80	0.63 (0.49–0.77)
Medial epicondylalgia	66	0.52 (0.39–0.65)
Trigger finger	54	0.42 (0.31–0.54)
Carpal tunnel syndrome	46	0.36 (0.26–0.47)
de Quervain's tendinopathy	39	0.30 (0.21–0.40)
Bicipital tendinopathy	35	0.27 (0.18–0.37)
Lower limb		
Inferior heel pain	82	0.64 (0.51–0.78)
Anserine bursitis	44	0.34 (0.24–0.45)
Trochanteric syndrome	14	0.11 (0.06–0.18)
Achilles tendinopathy	13	0.10 (0.05–0.17)
Insertional	9	—
Noninsertional	4	—

could be identified for the central region (urban México City) and consistently lower prevalence for the southern zone (Table 3). The higher likelihood of presenting RRPS by living in the central region of México persisted even after analysis by logistic regression (OR 8.8, 95% CI 1.4–12.2, $p < 0.01$), entering subject age, gender, marital status, type of job (high level of repetitiveness/forced), and type of residence (urban vs rural) as covariates.

DISCUSSION

Because of striking variation in the reports that have tangentially approached the issue[7,8,9,10,11,12,13,14,15,16,17,18,19], it is valid to say that the real overall epidemiological effect of the RRPS has not been definitively established. Thus, the question is still valid: Is this marked prevalence variation real or just the result of methodological flaws observed in the studies concerning the issue? First, except for the study of Darmawan, *et al*[7], in all of the studies that have reported on the prevalence of RRPS, the issue was approached in a collateral fashion because their main study object was to establish the prevalence of main rheumatic diseases, not specifically to address the epidemiological effect of RRPS[8,9,10,11,12,13,14,15,16,17,18,19]. Further, despite the fact that in almost all the reports, a consistent, validated and specifically transculturized screening instrument (COPCORD) was used, the case definition used could be consistently qualified as flawed, or at the best, heterogeneous[7,8,9,10,11,12,13,14,15,16,17,18,19].

On the other hand, because all reports were done in different countries, it remains possible that this marked variation in RRPS prevalence is real and caused by the influence of social factors (i.e., gender, race, ethnicity, type of residence, healthcare system), economic factors (i.e., income, average wage of economically active people, physical demands of the job), or biological factors (i.e., genetics, comorbidities, nutritional status) present in those populations[31,32].

In our study, with the use of COPCORD screening methodology for MSK pain, validated diagnostic criteria for upper limb RRPS, ad hoc diagnostic criteria for lower limb RRPS, and a standardized diagnostic process for the participating health team, we found that the overall prevalence of RRPS in México was 5.0%. This prevalence lies in an intermediate level between the extremes of prevalence data found in articles that approached the issue using the same screening methodology[7,8,9,10,11,12,13,14,16,17,18,19].

It is not a surprise that shoulder rotator cuff tendinopathy emerged as the most prevalent, affecting 2.3% of the studied population, whereas all other individual RRPS had a prevalence lower than 1.0%. The prevalence of the shoulder rotator cuff tendinopathy observed in our study is lower than that reported in other community-based studies that have approached the issue[2,3,4,7,33]. The explanation for this may reside in the heterogeneous case definition[3] used in all those reports. We consider that ours may be more accurate because the shoulder rotator cuff tendinopathy case definition used by us has been proven to be valid and consistent for epidemiological surveys, even if performed by nonphysician health workers[24,25]. In addition to differences in case definition, a different age profile of the surveyed population may explain the higher prevalence figures for epicondylitis found by Darmawan, *et al*[7], or trochanteric syn-

Table 3. Comparative prevalence of limb pain and defined RRPS between the 3 geographic regions of México*.

	Overall, n = 12,686	Central, n = 4059	Northern, n = 4712	Southern, n = 3915	p
Limb pain, n	892	439	331	122	
Prevalence, % (95% CI)	7.0 (6.5–7.4)	10.8 (9.8–11.8)	7.0 (6.3–7.7)	3.1 (2.5–3.6)	< 0.001
Overall RRPS, n	641	283	266	92	
Prevalence, % (95% CI)	5.0 (4.7–5.4)	6.9 (6.2–7.7)	5.6 (5.0–6.3)	2.3 (1.9–2.8)	< 0.001
Upper limb RRPS, n	620	304	244	72	
Prevalence, % (95% CI)	4.8 (4.5–5.2)	7.4 (6.6–8.3)	5.1 (4.0–5.8)	1.8 (1.4–2.2)	< 0.001
Lower limb RRPS, n	153	70	54	29	
Prevalence, % (95% CI)	1.2 (1.0–1.4)	1.7 (1.3–2.1)	1.1 (0.8–1.4)	0.7 (0.4–1.0)	< 0.001

* Central: Mexico City; northern: state of Nuevo Leon; southern: state of Yucatan. RRPS: rheumatic regional pain syndrome.

drome, as reported by Segal, *et al*[6]. On the other hand, our prevalence figures for medial and lateral epicondylitis were closer than those reported by Shiri, *et al*[5], where the case definitions and the age profile of the population were similar to those used and studied by us. Regarding all other syndromes, the scant information devoted to its epidemiological effect precludes any comparison at the present time.

As mentioned, marked variation in the epidemiological effects of the RRPS could be explained by the variability in social, economic, or biological issues of the several countries where the topic has been studied[7,8,9,10,11,12,13,14,15,16,17,18,19,31,32]. Our findings partially support this notion, because we not only found a different socioeconomic and demographic profile between the 3 studied regions of México, but also marked and significant differences in prevalence of limb pain and overall RRPS, which persisted after correction for relevant socioeconomic variables.

Our results must be considered with caution because, although the physician team participated in a diagnostic workshop, the diagnosis of RRPS was validated by the rheumatologist in only a small minority of patients; moreover, the validity and consistency of diagnostic criteria we applied for lower limb RRPS have not yet been established; and finally, we surveyed only the most representative RRPS, leaving aside those syndromes that have been cited as having extremely low prevalence.

In conclusion, using COPCORD sampling methodology and a set of validated or standardized diagnostic criteria for case definition, the overall prevalence of RRPS in México was 5.0%. Shoulder rotator cuff tendinopathy was the most prevalent RRPS. A marked variation in the geographic prevalence of RRPS was found, suggesting that RRPS prevalence is influenced by ethnic, demographic, or economic factors. Our observations warrant future research to identify differential modifiable socioeconomic risk factors that are amenable to correction, with the aim to ameliorate the significant socioeconomic impact that RRPS currently pose worldwide.

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