Spondyloarthritis (SpA) refers to a group of HLA-B27–
associated rheumatic diseases sharing clinical and genetic
features that include ankylosing spondylitis (AS), undifferentiated
SpA, reactive arthritis, SpA subsets of psoriatic arthritis,
Crohn disease, and ulcerative colitis.1 The prevalence of SpA in
the population ranges from 0.23% to 1.6% and depends on the
population’s prevalence of HLA-B27 and the design of the study.
Most studies, including those following the recommendations of
the World Health Organization/International League Associa-
tions for Rheumatology Community Oriented Program for the
Control of Rheumatic Diseases (COPCORD),4 focus first on the
identification of individuals with back pain (BP).3–11 Then,
the recognition of SpA relies on typical signs and symptoms of SpA
and on the criteria of Amor et al12 or the European SpA Study
Group (ESSG) classification criteria,13 or modified sets of such
criteria. In this regard, the importance of inflammatory BP (IBP)
has increased in recent years as one of the initial steps in the
recognition of preradiographic axial SpA or AS,14 but little is
known about its prevalence in the community. In a recent study,
Weisman et al15 found a prevalence of 6.0% in the American
population, including individuals older than 50 years.

In this article, we determined the prevalence of SpA
according to ESSG criteria in the Mexican population and in
addition the prevalence of IBP and AS. Although the prevalence
of SpA in México is still unknown, their incidence has in-
creased in most specialized departments in the last 10 years.
Clinically, the presentation of AS and other SpA in Mexicans is
often a combination of axial and peripheral symptoms, and
most patients with AS have HLA-B27.16,17 The prevalence of
this allele in the general population is around 4% to 5%.16,18

MATERIALS AND METHODS

This is a community-based, door-to-door survey of indi-
viduals older than 18 years in a predetermined urban population
(Cuajimalpa, México City) comprising 9269 individuals iden-
tified by the American British Cowdry (ABC) Medical Center
in a population census in 2005. The local ethics and research
institutional review committee approved the protocol of this
investigation. Study participants were informed about the study
before signing an informed consent of collaboration.

Trained nurses screened all study participants with the
Mexican adaptation of the COPCORD stage 1 questionnaire2,4
starting in 2009 in search of traumatic and nontraumatic mus-
culoskeletal (MSK) pain as well as diverse aspects in relation
with the joints and/or the MSK system. Specifically, the nurses
looked for individuals with nontraumatic BP scoring of 1 or
greater (0 = no pain at all to 10 = the most intense pain on a
visual analog scale) in the last 7 days and/or any time in the
past. Once identified, such individuals were referred to the ABC
Medical Center primary health clinic where trained general phy-
sicians (GPs) and rheumatology fellows confirmed or refuted
such diagnosis and identified those suspected of having IBP if

From the *Department of Rheumatology, Hospital General de México;†American British Cowdry Medical Center, México, México;‡Universidad
Autónoma de Chihuahua, Chihuahua and Instituto Nacional de Salud Pública, Cuernavaca; and §Department of Rheumatology, Hospital General
de México, Faculty of Medicine, Universidad Nacional Autónoma de México, México, México.
Rubén Burgos-Vargas has served as member of advisory boards of and
speaker for Abbott, BMS, Janssen, Pfizer, and Roche.
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Correspondence: Rubén Burgos-Vargas, MD, Department of Rheumatology,
Hospital General de México, Dr Balmis 148, México DF 06720, México.
E-mail: burgossi@prodigy.net.mx.
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ORIGINAL ARTICLE

A Community-Based Study on the Prevalence of
Spondyloarthritis and Inflammatory Back Pain in Mexicans

Ingris Peláez-Ballestas, MD, PhD,* José Eduardo Navarro-Zarza, MD,*
Bernardo Julian, MD,* Armando Lopez, MD,† Roxanna Flores-Camacho, MD,*
Julio C. Casasola-Vargas, MD,§ Luz Helena Sanin, MD, PhD;‡ Lourdes Rivas, MD,†
Janitzia Vázquez-Mellado, MD, PhD,* and Rubén Burgos-Vargas, MD§

Background: The prevalence of spondyloarthritis (SpA) varies across
populations. In Mexicans, the prevalence of SpA is still unknown.
Objective: The objective of this study was to determine the prevalence
of SpA in the community as well as that of inflammatory back pain
(IBP) and ankylosing spondylitis (AS).
Methods: We identified individuals older than 18 years with non-
traumatic back pain (BP) in a door-to-door nurse survey using the
Community Oriented Program for the Control of Rheumatic Diseases.
Then, general physicians and rheumatology fellows selected those likely
to have IBP (Berlin criteria). Finally, 2 expert rheumatologists assessed
IBP according to clinical data and classification criteria and
requested HLA-B27 and radiographic studies to determine the clinical
condition of the individual and SpA (European SpA Study Group)
classification.
Results: The prevalence of BP among 4059 individuals was 14.6%
(95% confidence interval [CI], 13.6–15.8). The prevalence of IBP and
SpA was 1.3% (95% CI, 1.0–1.7) and 0.6% (95% CI, 0.4–0.9), re-
spectively. Ankylosing spondylitis prevalence was 0.1% (95% CI,
0.02–0.2). Inflammatory back pain and SpA percentage of males and
females was similar. The percentage of individuals with IBP according
to the 2 experts was lower than that determined by general physicians
and rheumatology fellows, but all cases with HLA-B27, radiographic
sacroilitis, SpA, and AS had previous IBP confirmation by the expert.
Conclusions: The prevalence and sex distribution of patients classi-
fied with SpA in this community study—as well as that of patients di-
agnosed with AS—are consistent with those found in recent studies.
Expert assessment of individuals with positive responses to ques-
tionnaires is relevant for the classification of IBP and SpA.
Key Words: spondyloarthritis, inflammatory back pain, ankylosing
spondylitis, spondyloarthritis in Mexicans

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they fulfilled at least one of the following Berlin clinical criteria: (1) morning stiffness longer than 30 minutes, (2) improvement with exercise, but not with rest, (3) awakening in the second half of the night, and (4) alternating buttock pain. Regarding the Berlin entry criteria, we modified the age at onset of BP (<50 years of age at the onset of BP instead of <45 years) and duration of symptoms (>6 weeks instead of >3 months) to avoid recalling biases. Individuals with suspected IBP were referred to the rheumatology department for expert’s evaluation.

Two expert rheumatologists reassessed all individuals with suspected IBP for the presence of IBP according to the modified Berlin entry criteria and at least 1 IBP parameter. Individuals fulfilling such criteria underwent the following assessments: clinical history and physical examination, HLA-B27 (polymerase chain reaction oligotyping), serum high-sensitivity C-reactive protein (CRP) concentration (nephelometry), and posteroanterior x-rays of the pelvis with 30-degree caudal angulation. At the same time, all participants underwent magnetic resonance imaging of the pelvis and the lumbar spine (not reported here). Interpretation of the clinical, laboratory, and imaging studies was carried out independently and blindly to each other’s results. One radiologist and 1 rheumatologist interpreted x-ray studies independently (κ value of 0.8); their discrepancies were solved by consensus. The modified New York criteria for AS were required to fulfill the diagnosis of AS.

Statistical Analysis

Demographic and clinical characteristics were analyzed with descriptive statistics. Group’s comparisons were carried out with the χ², Fisher exact, and Student t tests. The level of significance was set at 0.05. Radiographic interobserver’s agreement was assessed by the κ test. The prevalence of SpA, IBP, and AS was calculated on the basis of the population surveyed door-to-door and expressed as percentage and 95% confidence interval (95% CI).

RESULTS

We screened 4059 (43.8%) of 9269 individuals listed in the ABC Medical Center primary health clinic with the COPCORD’s stage 1 questionnaire in the door-to-door survey. The mean (SD) age of the screened population was 44.6 (16.8) years, and 2795 (68.8%) were women. Mean (SD) educational level was 7.4 (4.0) years, and 2581 (63.6%) had a paid job. The diagnosis of nontraumatic BP was confirmed by GPs and rheumatology fellows in 596 individuals (78.6%) of 758 identified in the door-to-door survey by the nurses; 397 (66.7%) were women, and 199 (33.3%) were men, and their mean (SD) age was 42.4 (14.7) years.

One hundred eighty-seven of those 596 individuals with nontraumatic BP were suspected of having IBP and were therefore referred to the rheumatology department. According to opinion of the 2 experts, 58 individuals did not fulfill any of the 2 entry criteria or any clinical parameter of the modified Berlin criteria for IBP and were therefore not further assessed. Likewise, 8 additional individuals with contraindications for imaging studies (n = 6) or who withdrew consent (n = 2) were also excluded from the study.

In all, 121 individuals with probable IBP were assessed for the presence of SpA. Their mean (SD) age was 41.3 (11.1) years, and 60.4% were women. The frequencies of HLA-B27 and familial aggregation of SpA were 4.1% and 6.9%, respectively. The mean (SD) level of pain was 7.3 (2.3), and as result of IBP, 27 individuals (22.3%) had impaired functioning, and 88 (72.7%) regularly took nonsteroidal anti-inflammatory drugs. Grade 2 bilateral or grade 3 or 4 unilateral radiographic sacroiliitis was seen in only 3.3% of these individuals. According to the expert, 28 individuals (23.1%) fulfilled the ESSG classification criteria for SpA, and 4 (3.3%) fulfilled the modified New York criteria for AS.

The subgroup of individuals with definite IBP (n = 52), defined by the 2 experts’ opinion on the presence of at least 2 of the 4 Berlin clinical criteria, was compared with those with probable IBP (n = 69), which comprised all individuals that according to the experts had only one of such criteria. The frequency of most demographic and clinical features concerning SpA, except for CRP, was significantly higher in the group with definite IBP (Table 1). All patients with HLA-B27, radiographic sacroiliitis, SpA, and AS had definite IBP.

We also compared the characteristics of the group of individuals with SpA and those without SpA (Table 2). We found no significant differences in regard to demographic features, but the

<table>
<thead>
<tr>
<th>TABLE 1. Univariate Analysis of Demographic and Clinical Characteristics as Well as Classification Categories in Individuals With Probable or Definite IBP</th>
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</thead>
<tbody>
<tr>
<td><strong>Probable IBP (n = 69)</strong></td>
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<tr>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>n (%)</strong></td>
</tr>
<tr>
<td>Males</td>
</tr>
<tr>
<td>21 (30.4)</td>
</tr>
<tr>
<td>Females</td>
</tr>
<tr>
<td>48 (59.6)</td>
</tr>
<tr>
<td>Age, mean (SD), y</td>
</tr>
<tr>
<td>42.3 (9.9)</td>
</tr>
<tr>
<td>HLA-B27</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Pain NRS, mean (SD), cm</td>
</tr>
<tr>
<td>7.0 (2.6)</td>
</tr>
<tr>
<td>Impaired functioning</td>
</tr>
<tr>
<td>13 (18.5)</td>
</tr>
<tr>
<td>Regularly taken NSAID</td>
</tr>
<tr>
<td>46 (66.6)</td>
</tr>
<tr>
<td>Raised hsCRP (&gt;3 mg)</td>
</tr>
<tr>
<td>16 (23.2)</td>
</tr>
<tr>
<td>SpA family aggregation</td>
</tr>
<tr>
<td>2/63 (3.2)</td>
</tr>
<tr>
<td>Radiographic sacroiliitis</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>SpA, ESSG criteria</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>AS, modified New York</td>
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<tr>
<td>0</td>
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</tbody>
</table>

*Grade 2 bilateral or grade 3 unilateral. These 4 patients were those with AS according to the modified New York criteria.
NRS indicates numerical rating scale; NSAID, nonsteroidal anti-inflammatory drugs; hsCRP, high-sensitivity CRP.
In contrast, the higher prevalence of SpA found in this study according to ESSG classification criteria was 0.6%, and HLA-B27 was indeed significantly higher in patients with SpA.

Classification categories were established by the experts’ opinion on the presence or absence of classification criteria (Table 3). The prevalence of SpA according to ESSG was 0.6%. The prevalence of IBP was 1.3%, and that of AS was 0.1%. Applying such figures to the Mexican population, we estimated that 431,242 individuals could fulfill SpA-ESSG criteria, 934,359 may have IBP, and 64,686 could meet the ESSG criteria for AS.

DISCUSSION

This study investigated the prevalence of SpA as well as those of IBP and AS in the community. For each of the steps performed, we collected information through questionnaires derived from specific criteria and then evaluated the clinical condition of each individual by expert review and opinion. The prevalence of SpA found in this study according to ESSG classification criteria was 0.6% with no sex predominance. Such prevalence was slightly higher than that reported in Sweden, France, Greece, and China (Han population) and similar to that reported in Lithuania. Our SpA prevalence was also similar to that found by Reveille et al among Mexican Americans in the United States according to Amor criteria.

but less than a half when ESSG criteria were applied. It was also lower than that found in Azores, other parts of China, and Turkey. On the other hand, the prevalence of SpA in our study was much lower than that of rheumatoid arthritis (1.60% [95% CI, 1.42–1.78]) found in a parallel community study in our country.

To determine if IBP clinics were a reliable method for finding SpA, we compared their results with those of ESSG criteria for IBP. The prevalence of SpA was also lower than that found in Azores, other parts of China, and Turkey.

The relatively increased proportion of women classified as SpA in the community may be related with the prevalence of MSK complaints in women in whom physical, psychological, and intellectual demands are imposed by home duties, socioeconomic deprivation, and complementary jobs. In the clinic, explanations include increasing awareness of SpA and its clinical features among women and the implementation of IBP and IBP referral clinics. In contrast, the higher prevalence of men with AS in rheumatology clinics has been attributed to more severe disease in such genre than in women.

TABLE 3. Prevalence of the Different Diagnostic and Classification Categories

<table>
<thead>
<tr>
<th>Classification</th>
<th>Criteria</th>
<th>n (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nontraumatic BP</td>
<td>COPCORD 596</td>
<td>14.6</td>
<td>13.6–15.8</td>
</tr>
<tr>
<td>IBP</td>
<td>Modified Berlin 52</td>
<td>1.3</td>
<td>1.0–1.7</td>
</tr>
<tr>
<td>SpA*</td>
<td>ESSG 28</td>
<td>0.6</td>
<td>0.4–0.9</td>
</tr>
<tr>
<td>AS*</td>
<td>Modified New York 4</td>
<td>0.09</td>
<td>0.02–0.2</td>
</tr>
</tbody>
</table>

*including those with ankylosing spondylitis.
of IBP was based on the responses to a well-designed questionnaire for the ascertainment of IBP administered by trained interviewers, but not verified by any physician or experienced rheumatologist.

The distinction of individuals with probable IBP from those with definite IBP was certainly problematic, and we therefore relied on the expert opinion to diagnose it. Thus, the prevalence of IBP established by the expert was 71.8% lower than that found by GPs and rheumatology fellows. Interestingly, the prevalence of IBP found by GPs and rheumatology fellows (4.6%) was close to that found by trained interviewers in the United States (6%).

The validity of rheumatologist’s reassessment is supported by the circumstance that most individuals with SpA features, including those classified as SpA and AS, were in the group of individuals with definite IBP.

Because the identification of individuals with IBP attending orthopedic and primary care clinics plays an important role in the recognition of preradiographic sacroiliitis or axial SpA, we consider that an experienced person should perform the assessment of IBP in the clinic. It is clear that the identification of patients in the early, predominantly inflammatory stage of the disease may result in early treatment with biologic agents and better responses. In this context, we would expect an improvement in the rationale for using biologic therapies in SpA. Currently, some articles have suggested changes in the role of IBP in diagnostic algorithms for axial SpA. However, the identification of IBP seems to be the best screening method for axial SpA thus far. In fact, the diagnostic properties of a new set of criteria have been recently improved.

In this study, 0.1% of the population had AS, which is in the lowest range of that found in other populations, but very close to that found in Sweden. The 4% prevalence of HLA-B27 in Mexican Americans is likely to determine such a low prevalence of AS in our study.

In conclusion, the prevalence of SpA in the Mexican community was 0.6%. The sex distribution in this population is consistent with that found in some recent epidemiologic studies. The prevalence rates of IBP and AS were 1.3% and 0.1%, respectively. In our experience, the role of experts in each step resulted in a more careful assessment of classification criteria.

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