

Prevalence of Back Pain in the Community. A COPCORD Based Study in the Mexican Population

INGRIS PELÁEZ-BALLESTAS, ROXANNA FLORES-CAMACHO, JACQUELINE RODRIGUEZ-AMADO, LUZ HELENA SANIN, JORGE ESQUIVEL VALERIO, EDUARDO NAVARRO-ZARZA, DIANA FLORES, LOURDES RIVAS L, JULIO CASASOLA-VARGAS, and RUBEN BURGOS-VARGAS

ABSTRACT. Objective. Back pain (BP) is frequent in the community; its prevalence in México is 6%. Our objective was to determine the prevalence of BP in Mexican communities and determine its most important characteristics.

Methods. A cross-sectional study of individuals aged > 18 years was conducted in Mexico City and in urban communities in the state of Nuevo León. Sampling in Mexico City was based on community census and in Nuevo León, on stratified, balanced, and random sampling. Procedures included a door-to-door survey, using the Community Oriented Program for the Control of Rheumatic Diseases, to identify individuals with BP > 1 on a visual analog scale in the last 7 days. General practitioners/rheumatology fellows confirmed and characterized BP symptoms.

Results. In all, 8159 individuals (mean age 43.7 yrs, two-thirds female) were surveyed and 1219 had BP. The prevalence of nontraumatic BP in the last 7 days was 8.0% (95% CI 7.5–8.7). The mean age of these individuals was 42.7 years, and 61.9% were female. Thirty-seven percent had inflammatory BP [prevalence of 3.0% (95% CI 2.7–3.4)]. Compared with the state of Nuevo León, the characteristics and consequences of BP in Mexico City were more severe. In logistic regression analysis, living in Mexico City, having a paid job, any kind of musculoskeletal pain, high pain intensity, and obesity among other variables were associated with BP.

Conclusion. The prevalence of nontraumatic BP in the last 7 days in urban communities in México is 8.0%. However, clinical features and consequences differed among the communities studied, suggesting a role for local factors in BP. (J Rheumatol 2010;37 Suppl 86:26–30; doi:3899/jrheum.101035)

Key Indexing Terms:

BACK PAIN

INFLAMMATION

EPIDEMIOLOGY

MÉXICO

Back pain (BP) is one of the most important musculoskeletal (MSK) disorders affecting humans. The prevalence of

From the Rheumatology Department, Hospital General de México, México City; Rheumatology Department, Hospital Universitario de Nuevo León Jose Eleuterio Gonzalez, Monterrey, Nuevo León; Universidad Autonoma de Chihuahua, Instituto Nacional de Salud Publica, Cuernavaca, Morelos; American British Cowdray Medical Center, Mexico City; and Faculty of Medicine, Universidad Nacional Autónoma de México, México City, México.

Supported by a research grant from the National Council of Science and Technology (CONACYT) Project Salud 2007-C01-69765 and Salud 2007-C01-69439.

I. Peláez-Ballestas, MD, PhD; R. Flores-Camacho, MD, Rheumatology Department, Hospital General de México; J. Rodriguez-Amado, MD, Rheumatology Department, Hospital Universitario de Nuevo León Jose Eleuterio Gonzalez; L.H. Sanin, MD, PhD, Universidad Autonoma de Chihuahua, Instituto Nacional de Salud Publica; J. Esquivel-Valerio, MD, DrMed, Rheumatology Department, Hospital Universitario de Nuevo León Jose Eleuterio Gonzalez; E. Navarro-Zarza, MD, Rheumatology Department, Hospital General de México; D. Flores, MD, DrMed, Rheumatology Department, Hospital Universitario de Nuevo León Jose Eleuterio Gonzalez; L. Rivas, MD, American British Cowdray Medical Center; J. Casasola-Vargas, MD, Rheumatology Department, Hospital General de México; R. Burgos-Vargas, MD, Rheumatology Department, Hospital General de México and Faculty of Medicine, Universidad Nacional Autónoma de México.

Address correspondence to Dr. R. Burgos-Vargas, Rheumatology Department, Hospital General de México, Dr. Balmis 148, México DF 06720. E-mail: burgosv@prodigy.net.mx

BP in the general population ranges from 22% to 33%¹, but diverse studies indicate that 11% to 84% of the population suffers from BP at some time in their lives². Moreover, the prevalence of BP increases with age, but in most cases BP occurs between 45 and 49 years of age³. The consequences of BP are linked to transitory or permanent disability⁴, job loss, and significant costs⁵.

The prevalence of BP and other MSK pain disorders in México is only partially known. In 2002, Cardiel and Rojas-Serrano⁶ found a prevalence of 23% for MSK pain and 6.3% for BP among 2500 individuals from an urban community in México City. In their study, Cardiel and Rojas-Serrano relied on an adaptation of the Community-Oriented Program for the Control of Rheumatic Diseases (COPCORD) stage 1 questionnaire for the Mexican population as a screening tool. Other COPCORD studies, particularly those in developing nations, report figures that ranged from 4.3% to 43.8%^{7,8,9,10,11,12,13,14}. In addition to such findings, some studies have also attempted to determine the cause of BP, but results vary widely^{1,2,3}. Overall, only 15% to 20% appear related to identifiable causes¹⁵.

In our study, we determined prevalence of BP in the community using the Mexican adaptation of COPCORD as a screening tool. We also tried to determine some of the most

important characteristics of BP and identify factors related to its presence in the community.

MATERIALS AND METHODS

We performed a cross-sectional study of individuals ≥ 18 years of age residing for ≥ 6 months in México City and in urban communities in the state of Nuevo León. The protocol of our study was approved by the Ethics Committee of each center. All participants in the study were informed about procedures of the protocol, and after agreeing to participate, they signed an informed consent.

Sampling and settings. Sample size calculation was based on a prevalence of MSK pain of 50%, a level of uncertainty of 3%, a confidence level of 95%, and a statistical power of 80% to discriminate up to 5% differences in prevalence¹⁶. In México City, sampling was based on a community census performed by the American British Cowdray Medical Center primary health clinic as part of a health program for vulnerable populations. In the state of Nuevo León, sampling was based on mixed and complex strategies in which an updated census of the country¹⁷ was used to generate a stratified (by region), balanced, and random sample of subjects ≥ 18 years of age, representative of all health states; in each region of the state, a second random assignment was done to select one or more municipalities (according to proportional sample size); in each municipality one or more basic geostatistical areas^{13,14} were selected to carry out interviews in all homes. The study was carried out in Corpus Christi, Santa Lucia, and Cuajimalpa III districts in Cuajimalpa, México City, and in urban communities of the state of Nuevo León. México City — the largest city in the country — has a population of 8,720,916 inhabitants (8.4% of Mexico's population); 99.7% of that population is urban and their mean education level is 10.2 years. The state of Nuevo León — divided into 7 regions, located in north-east México, on the southern border of the USA — has a population of 4,199,292 inhabitants.

Procedures. During the first phase of the study, 6 interviewers were trained on the protocol, and procedures were standardized. Individuals age ≥ 18 years who lived at an address provided in the last 6 months were invited to participate in the study. The COPCORD questionnaire was administered at home, in a door-to-door survey. If needed, interviewers returned up to 5 times to the same home to administer the questionnaire. Surveys were cross-checked by the different interviewers during screening and later by the coordinators. Individuals with BP — including pain associated with trauma — scoring > 1 on a visual analog scale (VAS) ranging from 0 (no pain) to 10 (very painful), occurring in the last 7 days or at any time in the past, were examined by general practitioners and rheumatology fellows to confirm the information and characterize BP symptoms. The interval between the door-to-door survey and physical examination was 7 days. The definition of BP for the calculation of prevalence and all other analysis was nontraumatic BP scoring > 1 on a VAS (0 to 10) occurring in the last 7 days as confirmed by a study-trained physician.

Statistical analysis. We performed an exploratory analysis of the variables included in the theoretical model. Univariate analysis of each variable was done using one-way and 2-way analysis of variance for the continuous variables, and chi-squared test for ordinal, nominal, or categorical variables. Adjusted OR were estimated through logistic regression. Statistical analysis was performed using Stata SE version 9.0 for Windows¹⁸.

RESULTS

Surveys were carried out between August 2008 and August 2009. In total, 8159 individuals from all the communities included in the study participated in the COPCORD survey. Their mean age was 43.7 years and nearly two-thirds of the participants were female (Table 1). Most individuals were married and had a paid job.

A total of 4201 (51.4%) individuals reported having

Table 1. Main demographic and clinical data (n = 8159). Values are number (%) unless otherwise indicated.

Characteristic	
Female	5038 (61.7)
Male	3121 (38.2)
Age, yrs, mean (SD, range)	43.7 (16.8, 18–98)
Married	5457 (66.8)
Not married	2702 (33.2)
Paid job	6469 (79.3)
Employees with social security	2518 (30.8)
Commerce	1863 (22.8)
Employees without social security	1093 (13.4)
Craftsmanship	825 (10)
Other	170 (2.6)
MSK pain in last 7 days, n (% , 95% CI)	4201 (51.4, 50.3–52.5)
Not related to trauma, n (% , 95% CI)	3063 (37.5, 36.5–38.6)
Related to trauma, n (% , 95% CI)	1138 (13.9, 13.2–14.7)
Pain intensity (VAS), median (IQR)	2 (0–7.5)
MSK pain any time in the past, n (% , 95% CI)	1480 (18.1, 17.3–18.9)
Past physical limitation	1048 (12.8)
Current physical limitation	478 (5.8)
Never had physical limitation	6033 (81.3)
Difficulties in adjusting to discomfort	2648 (32.4)
HAQ-DI ≥ 0.8 , score, n (% , 95% CI)	675 (8.7, 7.6–8.8)
Received medication	1652 (40.7)
Complementary/alternative medicine	191 (4.1)

MSK: musculoskeletal; VAS: visual analog scale; IQR: interquartile range; HAQ-DI: Health Assessment Questionnaire-Disability Index.

MSK pain over the last 7 days, with a median intensity of 2 (Table 1). Most individuals did not relate their MSK pain to trauma and most had never experienced physical limitation as a consequence of it; past physical and current limitations were reported by 12.8% and only 5.8%, respectively. Around 30% had problems in adjusting to discomfort and 8.7% had physical disability according to the Health Assessment Questionnaire-Disability Index score. Regarding treatment, 40.7% received some form of treatment, which mostly (84%) consisted of nonsteroidal antiinflammatory drugs or simple analgesics. Most individuals with MSK pain (74.6%) took medications by themselves or by recommendation of non-health professionals. On the other hand, 5034 (61.7%) individuals reported some comorbidity.

In the door-to-door survey, 1219 individuals (14.9%, 95% CI 14.1–15.7) reported BP. However, the definite prevalence of nontraumatic BP in the last 7 days and/or in the past was 13.9% (95% CI 13.2–14.7) according to physician-confirmed diagnosis in 1141 out of 1219 individuals. Mean age was 42 years and nearly 60% of the cases were female (Table 2). Besides BP in the last 7 days, most individuals (69.1%) reported having BP in the past (Table 2). Less than 25% of all individuals with pain related its onset to trauma.

Six hundred-sixty individuals, 303 from México City and 357 from the state of Nuevo León, fulfilled the definition of nontraumatic BP scoring > 1 on a VAS in the last 7 days,

Table 2. Individuals with nontraumatic back pain in the last 7 days. Comparison between Mexico City and the state of Nuevo León. Values are number (%) unless otherwise indicated.

	Total, n = 660	Mexico City, n = 303	Nuevo León, n = 357	p
Female	409 (61.9)	213 (70.3)	196 (54.9)	0.11
Male	251 (38)	90 (29.7)	161 (45.1)	0.14
Age, yrs, mean (SD, range)	42.7 (15.5, 18–91)	43.8 (14.5, 18–91)	41.7 (16.3; 18–83)	0.04
Paid job	572 (86.6)	231 (40.3)	341 (59.6)	0.8
Pain intensity, VAS (SD, range)	6.8 (2.2, 0–10)	7.3 (2.1, 0–10)	6.3 (2.5, 1–10)	< 0.01
Inflammatory back pain	250 (37.8)	187 (61.7)	63 (17.6)	< 0.01
Past physical limitation	111 (16.8)	48 (15.8)	63 (17.6)	0.3
Current physical limitation	54 (8.1)	50 (16.5)	4 (1.1)	< 0.01
Never had physical limitation	495 (74.3)	205 (67.6)	290 (81.2)	0.07
Difficulty adjusting to discomfort	392 (59.3)	124 (40.9)	268 (75.0)	< 0.01
HAQ-DI \geq 0.8	70 (10.6)	31 (10.2)	39 (10.9)	0.4
Received medication	365 (55.3)	156 (51.4)	209 (58.5)	0.1
Complementary/alternative medicine	57 (8.6)	28 (9.2)	29 (8.1)	0.3

VAS: visual analog scale; HAQ-DI: Health Assessment Questionnaire-Disability Index.

with a prevalence of 8.0% (95% CI 7.5–8.7). The mean pain intensity on VAS was 6.8. More than 50% of individuals with BP received medication. However, less than 10% of BP cases had any current physical limitation. Interestingly, 37.8% of individuals with BP had symptoms compatible with inflammatory BP (IBP), for which prevalence in these communities was 3.0% (95% CI 2.7–3.4).

Comparison of demographic and clinical variables related to BP between México City and Nuevo León communities yielded significant differences in several variables (Table 2). The prevalence of nontraumatic BP in the last 7 days was 3.7% (95% CI 3.3–4.1) in México City and 4.3% (95% CI 3.9–4.8) in Nuevo León ($p < 0.1$). The prevalence of BP not related to trauma versus BP related to trauma were 9.0% (95% CI 8.1–9.9) and 2.9% (95% CI 2.4–3.4) in México City; and 12.5% (95% CI 11.5–13.6) and 3.4% (95% CI 2.9–4.0) in Nuevo León ($p < 0.1$ vs México City in both comparisons). Similarly, the prevalence of BP at any time in the past and IBP were 7.4% (95% CI 6.6–8.2) and 4.6% (95% CI 3.9–5.2) in México City and 11.8% (95% CI 10.9–12.9) and 1.5% (95% CI 1.1–1.9) in Nuevo León ($p < 0.1$ vs México City in both comparisons).

Overall, BP was higher as measured by pain VAS and appeared to have more consequences among México City individuals than those from Nuevo León (Table 3). The prevalence of comorbidities was generally higher in México City (Table 3). Rank order was also different; for example, gastritis, peripheral vascular disease, and blood hypertension were ranked in first to third place in México City, whereas in Nuevo León, these ranks were occupied by blood hypertension, gastritis, and diabetes mellitus.

Individuals with nontraumatic BP scoring > 1 on VAS in the last 7 days differed from all other individuals — regardless of their clinical status — in some variables at a significant level (Table 4). As expected, such differences reflected the presence of pain and associated factors.

In logistic regression analysis, the variables associated with presence of BP were living in México City and having a paid job; while the variables associated with MSK pain in the last 7 days and any time in the past were high pain intensity and treatment, including complementary/alternative medicine (Table 5). Obesity and other comorbidities were also associated with BP.

DISCUSSION

The prevalence of nontraumatic BP in the urban communities of 2 major cities in México was 8.0%, which is in the range of most studies in this area. Interestingly, however, such prevalence is higher than that in other Latin American countries with the COPCORD stage 1 questionnaire, and in the wide range of reports from the Middle East and Asia with the same methodology. Specifically, the prevalence of BP in reports from Latin America was 6.3% in México City⁶, 7.0% in Lima, Peru¹⁹, and 5.7% in Santa Clara, Cuba⁷. Lower figures have also been found in Bangladesh (9.2%)¹², China (8.0%)¹³, Vietnam (11%)¹¹, and Pune, India (5.5%)²⁰. Prevalence of BP in Iran was 15.4%²¹ and in Thailand 22.7%⁹. Based on such data, we may conclude that although all these studies relied on COPCORD as a screening tool, variations in the prevalence of BP exist.

Demography of the populations in such studies shows little variation, and methodology appears to be the same. It is possible that local additional factors influenced our results, particularly the mean age of the population.

When we compared the prevalence and the characteristics of BP in the 2 communities in our study, we found significant differences. In México City communities, the prevalence of BP was in general lower than in the state of Nuevo León. Only IBP was more frequently found in México City. It is possible that differences in sampling and perhaps response rate could explain some differences; by looking at the communities included in this study, it seems

Table 3. Comorbidity in individuals with nontraumatic back pain in the last 7 days using the COPCORD survey. Comparison between Mexico City and the state of Nuevo León*. Values are number (%).

Comorbidity	Total, n = 660	Mexico City, n = 303	Nuevo León, n = 357
Gastritis	199 (30.1)	145 (47.8)	54 (15.1)
Peripheral vascular disease	162 (24.5)	136 (44.8)	26 (7.2)
Blood hypertension	125 (18.9)	72 (23.7)	53 (14.8)
Smoking	81 (12.2)	54 (17.8)	27 (7.5)
Obesity	97 (14.7)	78 (25.7)	19 (5.3)
Diabetes mellitus	65 (9.8)	32 (10.5)	33 (9.2)
Depression	97 (14.7)	95 (31.3)	2 (0.5)
Anxiety	86 (13.0)	73 (24.0)	13 (3.6)
Dyslipidemia	76 (11.5)	54 (8.1)	22 (6.1)
Heart disease	24 (3.6)	18 (5.9)	6 (1.6)
Alcoholism	36 (5.4)	23 (7.5)	13 (3.6)

* $p < 0.01$ in all comparisons.

Table 4. Demographic and clinical features in individuals with and without nontraumatic back pain (BP) in the last 7 days. Values are number (%) unless otherwise indicated.

Characteristic	With BP, n = 660	Without BP, n = 7499	p
Male	409 (61.9)	4629 (61.7)	0.9
Female	251 (38)	2870 (38.2)	0.9
Age, yrs, mean (SD, range)	42.7 (15.5, 18–91)	43.8 (16.9, 18–98)	<0.01
Paid job	572 (86.6)	5897 (78.6)	< 0.01
Past physical limitation	111 (16.8)	937 (12.4)	0.004
Current physical limitation	54 (8.1)	424 (5.6)	0.01
Never had physical limitation	495 (74.3)	6138 (81.8)	0.08
Pain intensity, VAS (SD, range)	6.8 (2.2, 0–10)	3.2 (3.1, 0–10)	< 0.01
Difficulty adjusting to discomfort	392 (59.3)	2256 (30.0)	< 0.01
HAQ-DI ≥ 0.8 , score, n (%)	70 (10.6)	603 (8.0)	0.02
Received medication	365 (55.3)	2620 (34.9)	< 0.01
Complementary/alternative medicine	57 (8.6)	230 (3.0)	< 0.01

VAS: visual analog scale; HAQ-DI: Health Assessment Questionnaire-Disability Index.

Table 5. Logistic regression analysis with nontraumatic back pain in the last 7 days as dependent variable.

Variable	OR (95% CI)	p
Living in Mexico City	1.18 (1.00, 1.38)	0.04
Having a paid job	1.76 (1.40, 2.22)	< 0.01
Having obesity*	1.39 (1.11, 1.75)	0.04
Having depression*	1.57 (1.25, 1.97)	< 0.01
Having anxiety*	1.76 (1.38, 2.24)	< 0.01
Pain intensity (VAS)	1.28 (1.25, 1.31)	< 0.01
Having treatment	2.3 (1.96, 2.70)	< 0.01
Having complementary/alternative medicine	2.98 (2.20, 4.03)	< 0.01
Having low HAQ-DI	1.35 (1.04, 1.76)	0.02
Coping with MSK pain	1.27 (1.06, 1.52)	< 0.01

* Self-reported. MSK: musculoskeletal; VAS: visual analog scale; HAQ-DI: Health Assessment Questionnaire-Disability Index.

that those in México City were more subject to chronic social stress than in the state of Nuevo León. Interestingly, most indicators of severity, including the consequences of BP, were significantly higher in México City. There were also significant differences between the 2 cities in regard to

the frequency and rank order of comorbidity. These differences could also be explained by demographic features.

There were differences between individuals with and without BP, which in logistic regression analysis appeared to be positively associated with the presence of BP. These included pain intensity, markers of disease severity, and having a paid job. Interestingly, 16% to 25% of the compensation paid because of disease in the United States was for BP, and 52% of all BP cases were work-related²³.

More men than women had BP (15.4% vs 13%, respectively), which contrasts with most COPCORD studies. In Thailand, 9.9% to 17.3% were women and 4% to 11% men⁹; in China, 4.7% were male and 7% female¹³; and in India, 7.3% were male and 15.4% female¹⁰. The relationship between BP and work includes farming activities and activities within the informal employment sector. Similar results were found in our study (data not shown).

One-third of individuals with BP in our study had IBP, with an overall prevalence in the community of 3.0%. The identification of IBP was based on identification of specific symptoms, including age at onset and duration of BP, as well as pain and stiffness triggered by bed rest that improves

with movement. Although no other COPCORD study approached IBP, it is known that around 5% of individuals with BP have IBP²⁴.

One of the limitations of our study was the over-representation of women and a lower response rate in México City, which could account for some of the differences between the 2 cities. Another limitation was the difference between cities in the methodology for case ascertainment, particularly for individuals with IBP. Lastly, we have to consider that there could be some representative limitations in our study, although sampling was very carefully done.

Nevertheless, we may conclude from this study that BP is a common MSK disorder in the Mexican population, where 8.0% of individuals included in this study complained of nontraumatic BP in the last 7 days. BP predominantly affects middle-aged individuals, who, interestingly, rarely have limited function or inability to work as a consequence of BP. Finally, we found a relatively low prevalence of IBP, but importantly, this finding may indicate the need for study of spondyloarthropathies. Differences between communities suggest a role for local factors in the prevalence and consequences of BP.

ACKNOWLEDGMENT

For their help in the study, we are deeply grateful to Gerlinde Schlang, Nadia Saavedra-Cervantes, Diana Anaya, Everardo Alvarez, Bernardo Julian, Ivonne Arena, Adalberto Loyola, Veronica Linares, Nidya Cordero-Maldonado, Denisse Alvarez, Nancy García, Guillermo Perez, and Sara Marín. We also thank all individuals from Santa Lucía, Cuajimalpa III, and Corpus Christi community who participated in the study.

REFERENCES

1. Walker BF. The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. *J Spinal Disord* 2000;13:205-17.
2. Waxman R, Tennant A, Helliwell P. A prospective follow-up study of low back pain in the community. *Spine* 2000;25:2085-90.
3. Elders LA, Burdorf A. Prevalence, incidence, and recurrence of low back pain in scaffolders during a 3-year follow-up study. *Spine* 1976;2004;29:E101-6.
4. Andersson GB. Epidemiological features of chronic low-back pain. *Lancet* 1999;354:581-5.
5. Kent PM, Keating JL. The epidemiology of low back pain in primary care. *Chiropr Osteopat* 2005;13:13.
6. Cardiel MH, Rojas-Serrano J. Community based study to estimate prevalence, burden of illness and help seeking behavior in rheumatic diseases in Mexico City. A COPCORD study. *Clin Exp Rheumatol* 2002;20:617-24.
7. Reyes Llerena GA, Guibert Toledano M, Hernández Martínez AA, González Otero ZA, Alcocer Varela J, Cardiel MH; Community Oriented Programme for the Control of Rheumatic Diseases. Prevalence of musculoskeletal complaints and disability in Cuba. A community-based study using the COPCORD core questionnaire. *Clin Exp Rheumatol* 2000;18:739-42.
8. Darmawan J, Valkenburg HA, Muirden KD, Wigley RD. Epidemiology of rheumatic diseases in rural and urban populations in Indonesia: a World Health Organisation International League Against Rheumatism COPCORD study, stage I, phase 2. *Ann Rheum Dis* 1992;51:525-8.
9. Chaiamnuay P, Darmawan J, Muirden KD, Assawanabodee P. Epidemiology of rheumatic disease in rural Thailand: a WHO-ILAR COPCORD study. Community Oriented Programme for the Control of Rheumatic Disease. *J Rheumatol* 1998;25:1382-7.
10. Chopra A, Saluja M, Patil J, Tandale HS. Pain and disability, perceptions and beliefs of a rural Indian population: A WHO-ILAR COPCORD study. *J Rheumatol* 2002;29:614-21.
11. Minh Hoa TT, Darmawan J, Chen SL, Van Hung N, Thi Nhi C, Ngoc An T. Prevalence of the rheumatic diseases in urban Vietnam: a WHO-ILAR COPCORD study. *J Rheumatol* 2003;30:2252-6.
12. Haq SA, Darmawan J, Islam MN, Uddin MZ, Das BB, Rahman F, et al. Prevalence of rheumatic diseases and associated outcomes in rural and urban communities in Bangladesh: a COPCORD study. *J Rheumatol* 2005;32:348-53.
13. Zeng QY, Darmawan J, Xiao ZY, Chen SB, Chen R, Lin K, et al. Risk factors associated with rheumatic complaints: a WHO-ILAR COPCORD study in Shantou, Southeast China. *J Rheumatol* 2005;32:920-7.
14. Minaur N, Sawyers S, Parker J, Darmawan J. Rheumatic disease in an Australian Aboriginal community in North Queensland, Australia. A WHO-ILAR COPCORD survey. *J Rheumatol* 2004;31:965-72.
15. WHO Scientific Group on the Burden of Musculoskeletal Conditions at the Start of the New Millennium. The burden of musculoskeletal conditions at the start of the new millennium. *World Health Organ Tech Rep Ser* 2003;919:i-x, 1-218.
16. Daniel WW. *Bioestadística. Base para el análisis de las ciencias de la salud*. 3rd ed. México: Uteha Noriega editores; 1997.
17. Instituto Nacional de Estadística, Geografía e Informática (INEGI) Perfil sociodemográfico. II conteo de Población y Vivienda 2005 [Internet. Accessed September 29, 2010]. México Participación sectorial por entidad federativa. Available from: <http://www.inegi.org.mx>
18. StataCorp LP Stata Statistical Software STATA/SE for Windows; Release 9.0, Special ed. College Station, TX: Stata Corp.; 2005.
19. Gamboa R, Medina M, Acevedo E, Pastor C, Cucho J, Gutiérrez J, et al. Prevalencia de enfermedades reumatológicas y discapacidad en una comunidad urbano-marginal: resultados del primer estudio Copcord en el Perú. *Revista Peruana de Reumatología* 2009;15:40-6.
20. Joshi VL, Chopra A. Is there an urban-rural divide? Population surveys of rheumatic musculoskeletal disorders in the Pune region of India using the COPCORD Bhigwan model. *J Rheumatol* 2009;36:614-22.
21. Davatchi F, Jamshidi AR, Banhashemi AT, Gholami J, Forouzanfar MH, Akhlaghi M, et al. WHO-ILAR COPCORD Study (Stage 1, Urban Study) in Iran. *J Rheumatol* 2008;35:1384-90.
22. Veerapen K, Wigley RD, Valkenburg H. Musculoskeletal pain in Malaysia: a COPCORD survey. *J Rheumatol* 2007;34:207-13.
23. Naidoo RN, Haq SA. Occupational use syndromes. *Best Pract Res Clin Rheumatol* 2008;22:677-91.
24. Rudwaleit M, van der Heijde D, Khan MA, Braun J, Sieper J. How to diagnose axial spondyloarthritis early. *Ann Rheum Dis* 2004;63:535-43.