Systematic Review

Prevalence of Low Back Pain in Latin America: A Systematic Literature Review

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Background: Chronic low back pain is considered as a high-impact condition that affects the working population of Latin America, with long reaching social and economic repercussions. Its true frequency is unknown due to the absence of well-designed clinical trials that use standardized definitions and criteria.

Objectives: To evaluate the prevalence of chronic non-specific low back pain among the Latin American population.

Study Design: A systematic review of chronic non-specific low back pain in Latin America.

Setting: Meeting of Change Pain Latin America, Mexico.

Methods: Data sources included relevant literature identified through searches of published studies between August 30, 2002, and August 30, 2012, in 7 electronic databases: Cochrane BVS, Pubmed, Medline, Lilacs, Scielo, Hinari, and MedCarib. Publications dealing with low back pain of a post-traumatic, infectious, or malignant origin were excluded. Two reviewers selected in an independent manner all eligible studies using the MOOSE checklist and extracted data on both prevalence and risk factors associated with low back pain. A narrative synthesis of the results was drafted, which was later validated by a panel of clinical experts on pain.

Results: Twenty-eight studies were included in the review, comprising a total of 20,559 subjects from 7 countries in the region. Four of these studies, with significant methodological differences between them, measured the frequency of chronic low back pain with results that varied from 4.2% to 10.1%. Four studies are part of the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) program reports, and were pooled and analyzed separately because of their particular design. Their prevalence estimations varied between 1.8% and 11.3%. The remaining 20 studies evaluated a total population of 6,992 subjects, and found a prevalence of low back pain of 31.3%. Based on an epidemiological model constructed on both times to resolution and low back pain recurrence rates, the prevalence of chronic low back pain in Latin America was estimated to be around 10.5%. Some risk factors reported by the authors are long working hours with the worker in the sitting position, obesity and overweight, pregnancy, smoking, advanced age, lifting and carrying heavy loads, domestic work, sedentary lifestyles, and duration of current employment. A subgroup analysis of the population under study yielded an estimated prevalence of low back pain of 16.7% for the population exposed to a lower number of risk factors and 65% for the higher risk subgroup. In this review, we made an exhaustive search of studies evaluating the epidemiology of chronic low back pain in the Latin America region.

Limitations: The large topographic and chronologic variability in definitions of low back pain, interviewer bias, and subject selection bias.

Conclusions: Despite the sparse information and the methodological heterogeneity of the studies, pooled results allowed for an indirect estimation of the prevalence of low back pain in the region that was pretty consistent with the published results obtained from other settings. New studies need to be carried out to supplement and overcome the methodological weaknesses of those previously conducted.

Key words: Prevalence, epidemiology, low back pain, Latin America, chronic pain

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Although there are many publications concerning the incidence and prevalence of chronic low back pain (CLBP), this information is difficult to interpret because of the different definitions used to outline the symptoms and their duration (1). CLBP is sometimes defined as low back pain (LBP) that lasts for more than 7 – 12 weeks (1). Other authors define it as pain that outlasts the expected healing period, and acknowledge that chronic pain may have several ill-defined pathological causes (2). According to the American Society of Interventional Pain Physicians (ASIPP), chronic pain is a pain that persists 6 months after an injury and beyond the usual course of an acute disease or a reasonable time for a comparable injury to heal, that is associated with chronic pathologic processes that cause continuous or intermittent pain for months or years, that may continue in the presence or absence of demonstrable pathologies; may not be amenable to routine pain control methods; and healing may never occur. This is a combination definition considering that chronic pain is a complex phenomenon and multifactorial (3). Databases pertaining to insurers and health care systems only include those cases for which the symptoms result in the loss of working days or on some other kind of disability; therefore, very little is known on the epidemiology of CLBP that is not associated with labor absenteeism or with employment benefits (1).

The most relevant symptoms of LBP are pain and disability (2). General practitioners are expected to see at least a one patient with LBP per week in their practices (4).

Most human beings are expected to experience at least one episode of LBP during their lifetime because lifetime prevalence varies between 49% and 70% (2). In high income countries, back pain is a medical diagnosis commonly associated with work. In the United Kingdom, for example, it is one of the most common causes of labor absenteeism, accounting for 12.5% of all sick leaves (5). CLBP is the most common cause of physical limitation in adults 45 years of age and younger (1) and is the second cause of sick leaves (3). Every year between 2% and 4% of the whole labor force of the United States receives medical compensations related to LBP (1). In a prospective, observational study (6) of patients who had sciatica and who had been receiving Workers' Compensation at baseline, patients were more likely to be receiving disability benefits and were less likely to report relief from symptoms and improvement in quality of life at the time of the 4-year follow-up than patients who had not been receiving Workers' Compensation at baseline, which configures an additional problem in cases of LBP.

The prevalence of CLBP seems to be increasing of late. A crossover study (7) based on telephone surveys including a representative sample of households in North Carolina (US) was conducted in 1992 and then repeated in 2006. A total of 4,437 households were contacted in 1992 and 5,357 in 2006 to identify non-institutionalized adults 21 years of age and older with chronic cervical or lumbar pain (> 3 months) limiting daily life activities. The prevalence of LBP increased significantly during this 14-year interval, from 3.9% in 1992 to 10.2% in 2006. Increases were observed in all adult age strata, in both men and women, and in all ethnic groups (7).

Low back pain is considered as a high-impact condition that affects the working population of Latin America, with far reaching social and economic repercussions. For example, official figures from the Mexican government show that between 10% and 15% of all disability claims are due to CLBP (8). In Argentina LBP is third among the most common causes of employment-associated disability, with a relevant contribution to labor absenteeism (9). In Brazil, LBP was the diagnosis used to grant 3,102 retirement pensions in account of permanent disability, in 2007 alone (10).

Due to the evident effect of CLBP on the health and wellbeing of the Latin American population, it is mandatory to estimate its true frequency in order to design public policies and interventions more in keeping with the real magnitude of the problem. However, the lack of well-designed clinical trials aimed at assessing the epidemiology of CLBP with standardized definitions and criteria, as well as the difficulties in both sampling and quality of the observational studies available thus far, make this task even more daunting. Thus, a more expedient alternative was pursued in the present work, consisting of estimating the prevalence of CLBP from an epidemiological model constructed with data on the overall frequency of LBP published in the literature.

Additionally, with this study we intended to categorize the available publications, identifying those that, due to their design, could become useful references for clinicians and investigators of the region.

Methods

Definitions

For the purposes of the present study, LBP was defined as pain localized below the lower edge of the last

rib and above the lower gluteal folds, with or without a neuropathic component.

In medical literature, LBP is usually classified as acute, subacute, and chronic, according to its duration (11,12). LBP is said to be acute when it persists for less than 6 weeks, subacute when it persists from 6 weeks to 3 months, and chronic when it persists for more than 3 months (2).

Data search was restricted to the following CIE-10 codes: M544 (low back pain with a neuropathic component) and M545 (non-specified LBP).

Inclusion Criteria

Studies included in this review were crossover trials, systematic literature reviews, or meta-analyses, published in biomedical journals of any country of the world in English, Spanish, or Portuguese. Their main goal needed to be the evaluation of the prevalence of LBP and/or CLBP, either alone or with some other epidemiological measures (incidence, risk factors, and/or burden of disease). Only studies conducted with the population of Latin American countries were included.

Exclusion Criteria

Studies conducted or published before August 30, 2002, studies including patients with LBP of a post-traumatic or infectious origin, or those with a prior history of a known or suspected malignancy were excluded from the review.

Search Strategy

Since the information was to be obtained specifically from the Latin American population, a systematic search was carried out in the following electronic databases:

Cochrane BVS, Pubmed, Medline, Lilacs, Scielo, Hinari, MedCarib.

The following search criteria were used:

Publication period: Between August 30, 2002, and August 30, 2012.

English MeSH terms: "Low Back Pain" [Majr]) AND "Epidemiology" [Mesh]) OR "Prevalence" [Mesh]) AND "Latin America" [Majr] OR "Brazil" [Majr] OR "Mexico" [Majr] OR "Cuba" [Mesh]) OR "Costa Rica" [Mesh]) OR "Dominican Republic" [Majr]) OR "El Salvador" [Majr]) OR "Honduras" [Mesh]) OR "Panama" [Mesh]) OR "Colombia" [Majr] OR "Paraguay" [Majr]) OR "Uruguay" [Majr]) OR "Venezuela" [Majr]) OR "Bolivia" [Majr]) OR "Ecuador" [Majr]) OR "Argentina" [Majr] OR "Chile" [Majr] OR "Guatemala" [Majr]) OR "Nicaragua" [Majr]) OR "Peru" [Mesh]

Spanish MeSH Terms: "Low back pain" [Majr]) AND "Epidemiology" [Mesh]) OR "Prevalence" [Mesh]) AND "Latin America" [Majr] OR "Brazil" [Majr] OR "Mexico" [Majr] OR "Cuba" [Mesh]) OR "Costa Rica" [Mesh]) OR "República Dominicana" [Majr]) OR "El Salvador" [Majr]) OR "Honduras" [Mesh]) OR "Panamá" [Mesh]) OR "Colombia" [Majr] OR "Paraguay" [Majr]) OR "Uruguay" [Majr]) OR "Venezuela" [Majr]) OR "Bolivia" [Majr]) OR "Ecuador" [Majr]) OR "Argentina" [Majr] OR "Chile" [Majr] OR "Guatemala" [Majr]) OR "Nicaragua" [Majr]) OR "Peru" [Mesh]

Quality Assessment of the Included Publications

Although systematic literature reviews and meta-analyses of controlled clinical trials are considered as very useful tools to synthesize the best available evidence, systematic reviews of epidemiological studies have major limitations and methodological particularities, owing to the observational studies from which they originate (13). For this reason, the Meta-Analysis of Observational Studies in Epidemiology (MOOSE) checklist was selected for this review (14). The items of this checklist were used as part of the prior quality assessment of the studies to be included in the review. The verification process included aspects related to the quality of the antecedents, the description of the methodology used, the presentation and discussion of the results, as well as of the final conclusions drawn by the authors.

Synthesis

Since the studies included are extremely heterogeneous, a narrative synthesis was used for most studies, and the analyses of the pooled results were only carried out in those cases where it was necessary to facilitate data presentation and analysis.

Expert Panel

In order to validate the consistency of the findings of the present review, an expert panel composed of clinical specialists in CLBP and public health was convened, with the objective that the synthesis and conclusions of the work were as objective as possible.

Results

As a result of the systematic search, and once admission and quality criteria had been applied, 28 studies were included in the review, with a total of 20,559 subjects from 7 countries of the region (Table 1).

Of the 28 studies reviewed only 4 evaluated the

prevalence of CLBP, 3 of them conducted in Brazil and one in Colombia (15,20,24,29), with the remaining 24 measuring the frequency of LBP making no distinction as to the cases found by duration of the symptoms, that is, their measurements combine both acute and CLBP cases in the same figure.

Table 1. *Studies included in the review, categorized by country of origin.*

Country	No. of studies	Total patients	References
Brazil	14	11,998	(15-28)
Colombia	5	1,050	(29-33)
Cuba	1	300	(34)
Ecuador	1	83	(35)
Mexico	3	3,361	(36-38)
Peru	3	3,465	(39-41)
Venezuela	1	302	(42)
Total	28	20,559	

Three Brazilian studies measured the prevalence of LBP at specific times of life: adolescents, pregnant women, and the elderly (21,25,28).

Four studies included in the review form part of the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) program reports (34,36,37,40). This program is aimed at determining the prevalence of diverse classes of musculoskeletal pain and rheumatologic diseases in different adult populations. Due to the homogeneous and particular design of these studies, their results were pooled and analyzed separately from all other studies.

Seventeen studies assessed the prevalence of LBP in different populations, including miners, oil workers, sawyers, homemakers, nurses, seamstresses, and drivers (Fig. 1).

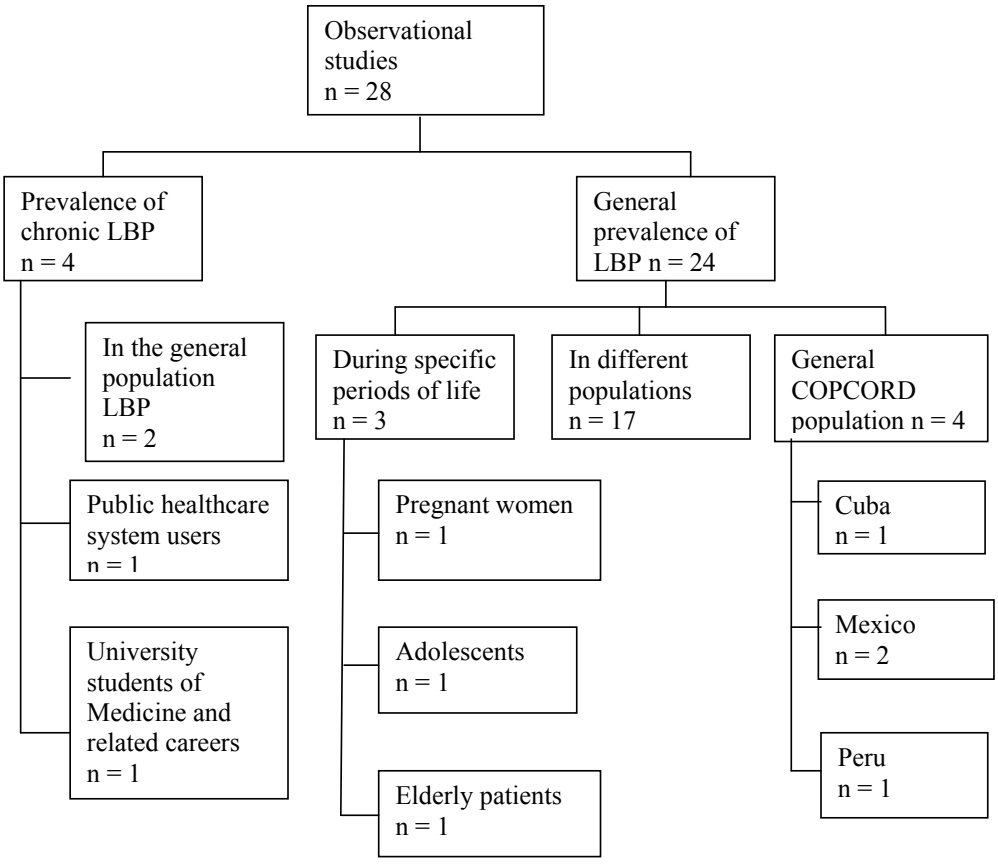

Fig. 1. *Type of population included in the studies reviewed.*

Studies Conducted Using the COPCORD Methodology and Questionnaire

All 4 COPCORD studies used a standardized methodology: The patient completed a questionnaire on health and musculoskeletal disturbances and in case of any affirmative answer, a specialized assessment was made by a rheumatologist, who finally decided the diagnosis to be recorded.

Although the same methodology was utilized for all 4 studies, there is significant heterogeneity in both size and type of the populations selected, as well as in the wide differences in the results reported, even between studies conducted in the same country (Table 2).

A remarkable finding was the large number of subjects enrolled in these 4 studies, equivalent to one fourth of all subjects included for this whole review. Unfortunately, the results reported from the COPCORD studies can be neither compared with nor interpreted as the other prevalence studies because the reported numbers do not necessarily correspond to the prevalence of LBP in the population observed, but to the frequency with which participating rheumatologists made this particular diagnosis in their patients (Fig. 2).

Observational Studies Evaluating the Prevalence of Chronic Low Back Pain

Four studies reported the prevalence of CLBP; 3 of them were conducted in Brazil and one in Colombia. The significant differences between them in crucial aspects such as the time definition of CLBP and the type of population observed could explain the heterogeneity of their results (Table 3).

The study conducted by Silva et al (24) was a cross-over population study with 3,182 patients (1,374 men and 1,808 women), all of them 20 years of age and older, residing in urban areas in the south of Brazil. CLBP was defined as pain lasting 7 weeks or more; the patients had to indicate the site of pain on a human figure depicting in different colors the cervical, thoracic, and lumbar regions of the spine. The mean age of the patients was 44 years (SD ± 16.3 years). The reported prevalence of CLBP was 4.2%. The study included a representative sample of the city population, with a low percentage of lost and withdrawn subjects (5.6%). In general the study had a good methodological design

Table 2. *Subjects in the studies conducted using the COPCORD methodology and questionnaire.*

Study population	Patients	Prevalence	Author
Cuba	300	11.3%	Reyes Llerena et al, 2000 (34)
Peru	1,965	7.1%	Gamboa et al, 2009 (40)
Mexico 1	2,500	6.3%	Cardiel and Rojas-Serrano, 2002 (37)
Mexico 2	761	1.8%	Álvarezet al, 2005 (36)
Pooled results	5,526	6.2%	

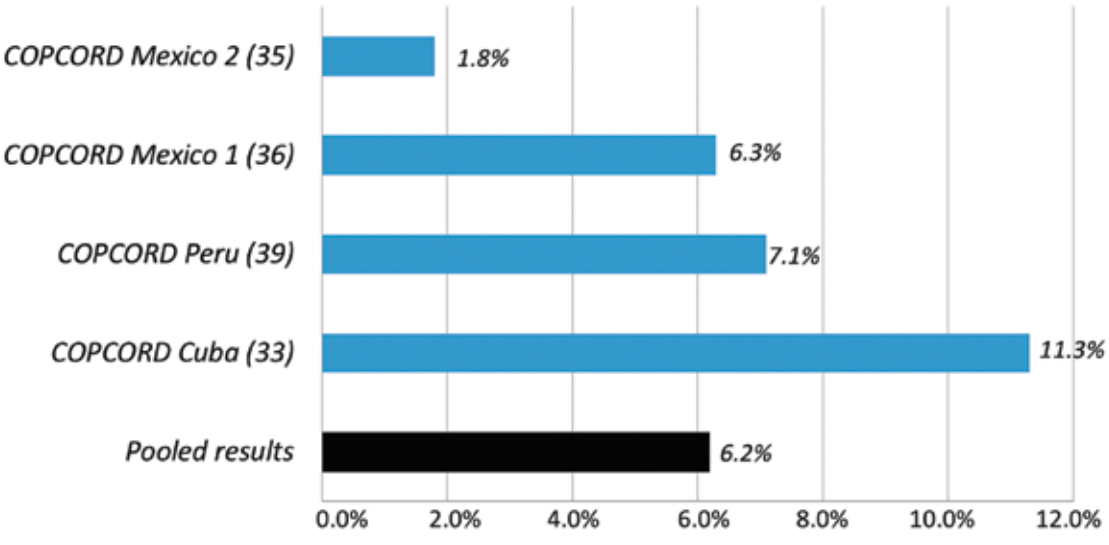

Fig. 2. *Prevalence of low back pain in the studies conducted with the COPCORD methodology and questionnaire.*

Table 3. *Observational studies on the prevalence of chronic low back pain.*

Author	Patients	Prevalence	Mean age (DE)	Country
Silva et al (24)	3,182	4.2%	44 years (16.3 years)	Brazil
Almeida et al (15)	2,281	7.1%	40.9 years (14.7 years)	Brazil
Cordeiro et al (20)	2,341	5.12%	30 years (ND)	Brazil
Camargo et al (29)	237	10.12%	20.6 years (2.2 years)	Colombia
Total	8,041			

and its setbacks are mostly related to the definition of CLBP that could be overestimated, and to a reverse causality bias potentially incurred by attempting to establish risk factors for CLBP with the use of a crossover study.

Almeida et al (15) conducted a crossover observational study with a representative sample of the adult population residing in urban areas of Brazil. The study enrolled 2,281 patients (1,016 men and 1,265 women), between 20 and 94 years of age. The mean age was 40.9 years (SD ± 14.7 years). The prevalence reported for CLBP was 17.4%. Six months or more duration was set forth as a cutting point to establish the chronicity of LBP, which reflects an underestimation of the condition in view of the usually accepted definition of CLBP (3).

The study published by Cordeiro et al (20) corresponds to a joint initiative of 2 universities, the Brazilian Ministry of Health, and Maranhão State Government, aimed at determining the prevalence of CLBP and chronic headache among the users of the public health care system. The study included 2,341 patients (829 men and 1,512 women), between 16 and 98 years of age. The mean age was 30 years. Around 50% of the patients were residents of urban areas and the remaining were residents of the rural area of the state. The prevalence reported for CLBP was 5.12%. These results could be explained by the inclusion of a significantly younger population, a substantial percentage of which resides in rural areas.

One of the Colombian studies evaluated the prevalence of CLBP. Camargo et al (29) conducted a crossover study to characterize the frequency and location of chronic back pain among students of medicine and related careers, namely graduate students of physical therapy, medicine, nutrition, nursing, and bacteriology. The study included 237 students (88 men and 149 women), with a mean age of 20.6 years (SD ± 2.2 years), all of whom were at the first 10 semesters of their academic programs. CLBP was reported by 24 of the 237 patients (10.12%) and was associated with the number of years the student had been at the university, with the hours of low physical activity, and with the female gender.

A statistically significant association between smoking and CLBP was found in the studies carried out by Almeida et al (15) and Silva et al (24). Both studies demonstrated a higher frequency of CLBP among smokers. For Almeida, the odds ratio (OR) was 1.47 (95% confidence interval [CI] 1.11 – 1.96) and for Silva 1.78 (95% CI 1.15 – 2.75).

One difference between the results reported by these studies is that for Almeida, the association between tobacco and CLBP was also a significant finding among former smokers, that is, those who had quit smoking one year or more ago, OR 1.59 (95% CI 1.17 – 2.17), whereas for Silva this association had no statistical significance among former smokers, OR 1.58 (95% CI 0.92 – 2.72). The studies conducted by Camargo et al (29) and Cordeiro et al (20) did not include the association of smoking and CLBP in their analyses.

Observational Studies Assessing the Prevalence of Non-specified Low Back Pain

A total 20 publications assessed the prevalence of LBP in different types of populations. Most of them (17 studies) were focused on the occurrence of LBP in different types of jobs, whereas the other 3 reported the frequency of LBP in adolescents, (21), the elderly (28), and pregnant women (25), respectively. Table 4 and Fig. 3 describe the most important aspects of these studies.

Fig. 3 summarizes the results reported by 20 observational crossover studies that evaluated the prevalence of LBP in Latin America. In order to facilitate the presentation of the studies and the analysis of their results, they have been subdivided into 3 strata, with this division not reflecting a probabilistic criterion but an intuitive classification to facilitate the presentation of the results:

Stratum 1 (Low Risk)

This stratum includes populations at a low risk of LBP. The prevalence of LBP is in the range of 9.1% to 20.3%. This stratum includes adolescents (21), miners, and

Table 4. *Observational studies on the prevalence of non-specified low back pain.*

Study	Population	N. of cases	Prevalence
Bazán et al, 2007 (39)	260	210	80.8%
Duque Vera et al, 2011 (30)	233	158	67.8%
Guzmán et al, 2007 (32)	114	75	65.8%
Martins and Silva, 2005 (25)	203	130	64.0%
Zavala-González et al, 2010 (38)	100	63	63.0%
Barros et al, 2011 (17)	239	146	61.1%
Mayworm et al, 2008 (26)	200	122	61.0%
Andrusaitis et al, 2006 (16)	410	242	59.0%
Pereira et al, 2007 (27)	12	6	50.0%
Neil et al, 2004 (42)	302	85	28.0%
Reis et al, 2008 (28)	203	68	33.6%
Ferreira et al, 2006 (23)	78	26	33.4%
Brito and Bezerre, 2010 (18)	264	88	33.3%
Silva et al, 2007 (19)	180	59	33.0%
Loyola, 2010 (35)	83	23	27.7%
Pinto and Frias, 2010 (33)	346	70	20.3%
De Vitta et al, 2011 (21)	1,236	241	19.5%
Palomino et al, 2005 (41)	1,240	205	16.5%
El Khouri et al, 2008 (22)	1,169	160	13.7%
Gómez Ramirez, 2012 (31)	120	11	9.1%
Total	6,992	2,188	

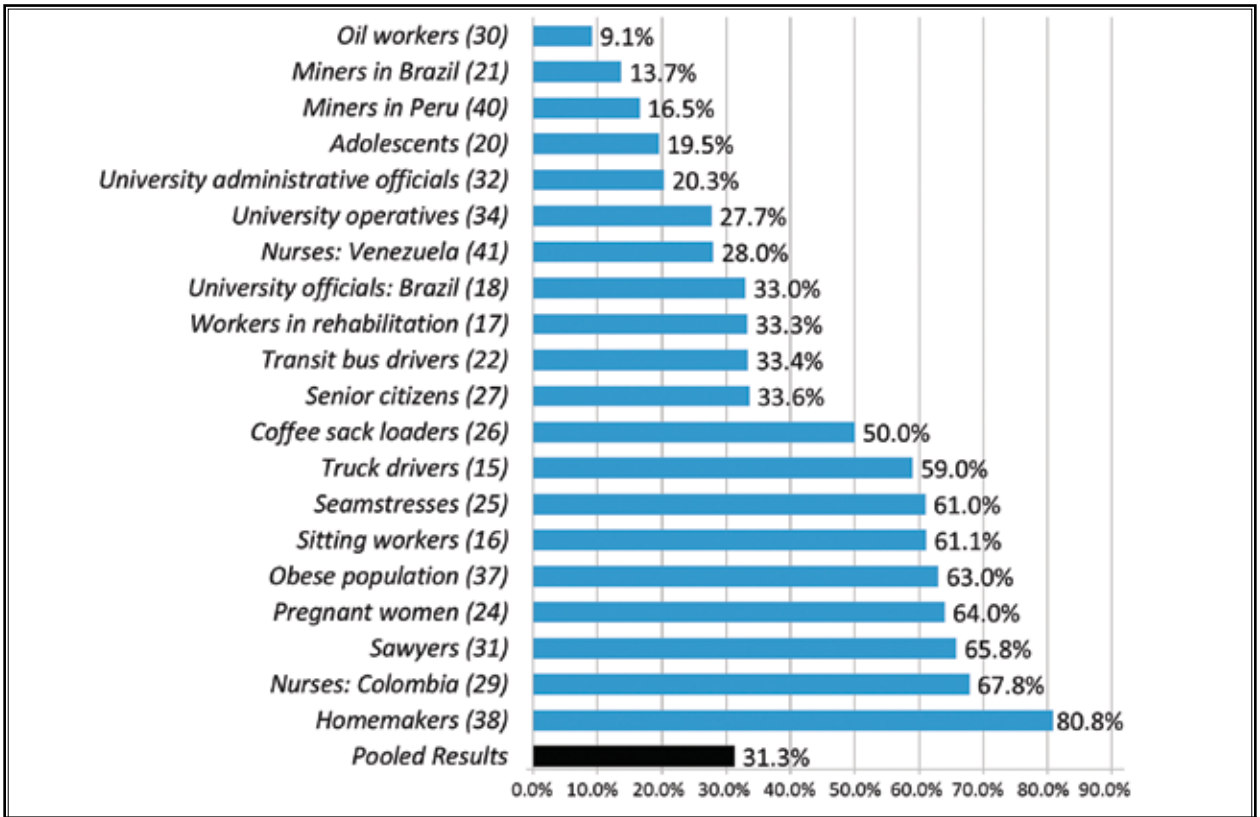

Fig. 3. *Prevalence of non-specified low back pain reported in observational studies from different types of populations.*

oil workers (22,31,41) (possibly working for companies having a well-designed program to prevent professional diseases), and university administrative officials (33).

The studies pooled in this stratum included 4,111 patients among which 687 cases of LBP were reported. A pooled analysis of all the studies in this stratum yielded a prevalence of 16.7% (Fig. 4).

Stratum 2 (Medium or "Usual" Risk)

The prevalence reported by these studies varies between 27.7% and 36.3%%, i.e., pretty close to the figures reported in most studies for the general population. This stratum includes the results of studies conducted with the employees of a university (drivers, janitors, and other similar employments) (35), transit bus drivers (23), senior citizens (28), nurses (mostly registered nurses) (30), and workers enrolled in a physical rehabilitation program (18). The pooled studies in this stratum included 1,110 patients among which 349 cases of LBP were reported. The pooled results of the studies in this stratum yielded a prevalence of LBP of 31.5% (Fig. 5).

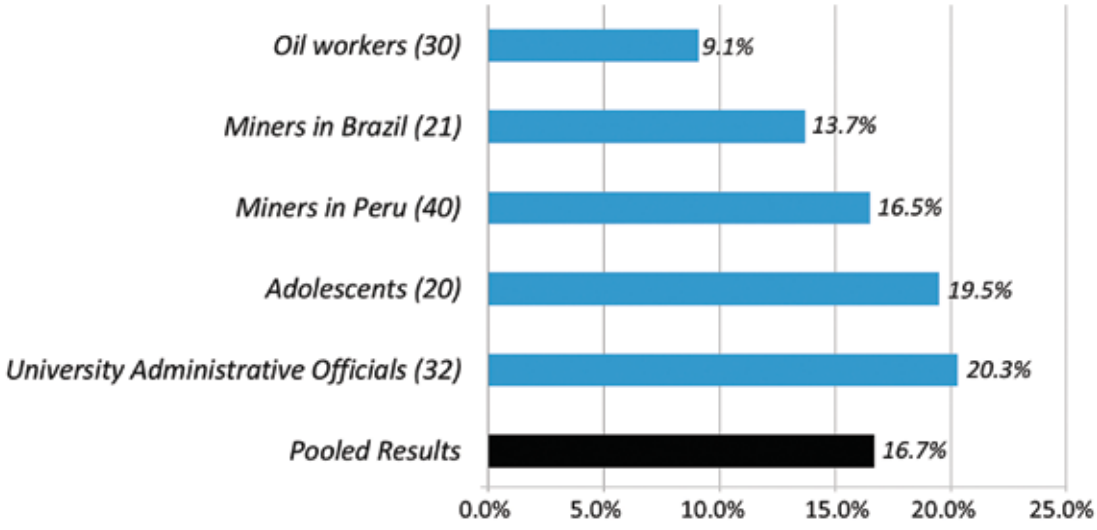

Fig. 4. *Prevalence of non-specified low back pain in the studies of the stratum 1.*

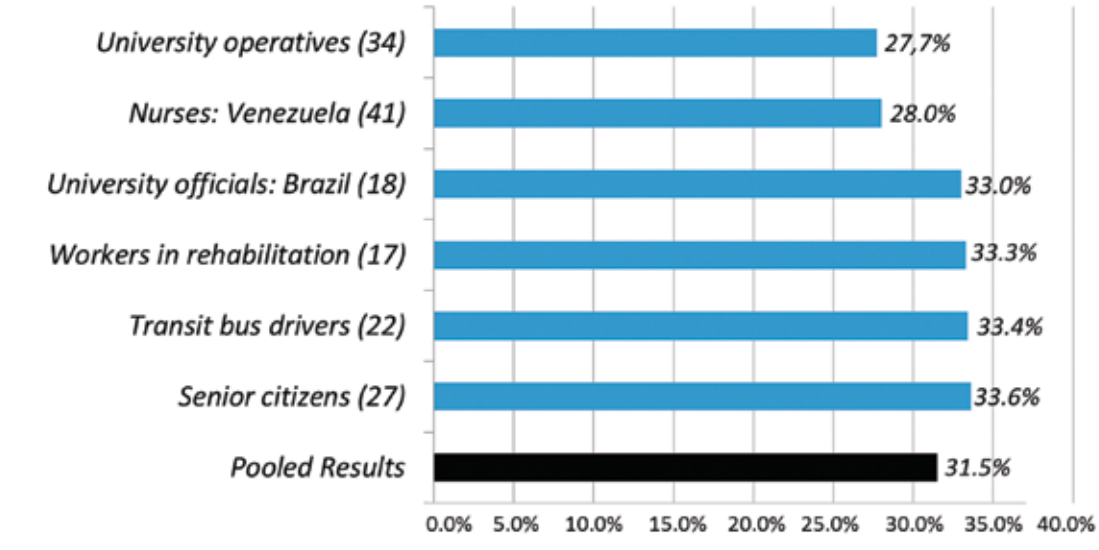

Fig. 5. *Prevalence of non-specified low back pain in the studies of the stratum 2.*

Stratum 3 (High Risk)

This stratum includes the studies conducted with populations at high risk of LBP, that is, people working long hours in the sitting position (truckers, seamstresses, and technicians) (16,17,26), jobs that require lifting and/or carrying heavy loads (sawyers, truck loaders, homemakers, and assistant nurses) (27,30,32,39), and people carrying physical overloads such as pregnant women (25) and people who are overweight or obese (38) (Fig. 6).

This category grouped 9 studies, with a total of 1,771 patients and 1,152 cases of LBP reported. The pooled results of the 9 studies in this stratum yielded a prevalence of LBP of 65%.

Discussion

None of the COPCORD studies seems to report an LBP prevalence figure consistent with what has been previously reported either on a global or a regional basis. The pooled results of the 4 studies (34,36,37,40) yield a figure pretty removed from the expected prevalence of LBP in the general population (Table 2).

Only 4 of the 28 studies in the review evaluated the prevalence of CLBP in the Latin American population (15,20,24,29). In spite of the large number of patients (8,041), the results cannot be combined to obtain a pooled result due to the large heterogeneity of their designs, the different definitions of chronicity used, and the intriguing differences in their results. These difficulties in estimating the prevalence of CLBP are not exclusive of our region. Rather, the comparison of the results obtained from different populations or at different times from the same population has posed a true methodological challenge due to the lack of information, the marked methodological heterogeneity, differences in the temporal definitions of chronicity, and the difficulty in obtaining reliable estimations as references (1,43-45).

The most immediate alternative to estimate the prevalence of CLBP is a statistic approach encompassed within the frame of the prevalence of LBP in general (1). Methodologically sound estimations of the prevalence of LBP in other regions yield figures very close to 30% (1,46-48).

Although separately none of the 20 observational studies included in the review could, due to the specifics of their populations, provide a reliable estimation of the prevalence of LBP in the general Latin American population, and although the aggregation of epidemiological studies is not often recommended due to the lack of thoroughness of these studies, it is evident that the pooled results of the 20 studies that measured the prevalence of LBP provide a privileged point of view on the frequency of the condition in the region.

These pooled results comprise 6,992 patients that include homemakers, adolescents, pregnant women,

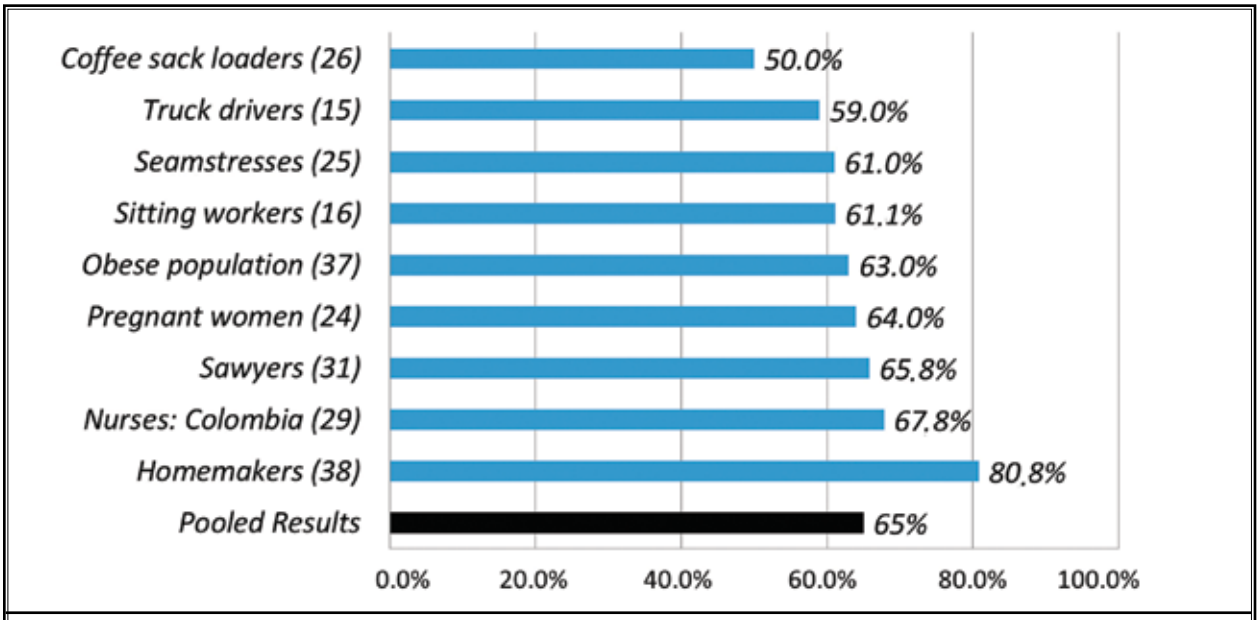

Fig. 6. *Prevalence of non-specified low back pain in the studies of the stratum 3.*

seniors, workers and operators, administrative officials, seamstresses, truckers, transit bus drivers, miners, obese subjects, and others. This consideration is confirmed by the pooled result of prevalence of 31.3%, a figure pretty close to the expected prevalence of LBP in the general population.

Additionally, the analysis of these studies by risk strata showed that the 6 studies categorized in stratum 2, where the medium or "usual" risk of the general population is located, yield a pooled prevalence rate of 31.5%. This means that, in spite of the theoretical difficulties surrounding the aggregation of the results of these studies, the pooled analysis provides very consistent estimations, close to 31%.

Notwithstanding the undeniable limitations of the available evidence on the epidemiology of CLBP at the global level, several findings can be drawn: The studies show that the majority of the episodes of LBP are mild in severity and rarely disabling, and that only a few of the affected individuals go to the doctor (45). It is known that 90% of the cases of LBP will resolve within the first 90 days after their onset, that is, only 10% of all new cases of LBP go on to enlarge the prevalence rate of CLBP (1,49), a percentage that should be added to the 24% of expected annual recurrence for the cases initially resolved (1,45). This means that up to 34% of the prevalence observed of LBP could be expected to correspond to cases of CLBP. By applying these assumptions to our observations (31% * 0.34), an indirect estimation of 10.54% is obtained as an approximate prevalence of CLBP in the region.

Many biases and methodological limitations affect the validity of these results. One of them is the potentially large topographic and chronologic variability (most of which has not been described in an explicit manner) in the definitions of LBP used in each one of the studies included. Multiple factors that affect the prevalence of LBP have been identified (ethnicity, educational level, urban vs. rural living, body weight, job satisfaction, wage issues, type of employment contract, stress management, secondary income, and under-registration), most of which are absent from the considerations of the reviewed studies. The vast majority of the studies were conducted with the patients at their work places, which generates a "healthy worker" bias, even with the possibility that the interviewed population is the less affected one because people with disabling LBP may be absent from work, and those with CLBP may have been moved to other worksites with lower risk activities. Most studies included in this review could have been affected by both interviewer bias and subject selection bias.

Another noteworthy finding is the difference in the prevalence of LBP reported in 2 different studies conducted with nurses (30,42). Both studies coincide in indicating that LBP is strongly associated with the efforts made when bathing and mobilizing patients, a fact that could explain the differences reported because the study conducted by Neil et al (42), where the prevalence of LBP was of only 28%, just 49% of the patients were assistant nurses whereas in the study performed by Duque et al (30), with a reported prevalence of 67.8%, the percentage of assistant nurses was of 85.4%.

Importantly, the number of continuous hours a patient remains in the sitting position is a common determinant of the prevalence of LBP in several of the reviewed publications (16,17,23,26). This could explain why transit bus drivers, who often have resting periods between their daily route assignments, have a prevalence of LBP far lower than truck drivers, who often drive longer periods of time and have less resting periods during their working day (16,23).

A remarkable finding is the high impact of LBP among women (21,25,28,39). This could be attributed not only to differences in musculoskeletal constitution between men and women, but also to differences in both roles and tasks women undertake on a daily basis. It is not a coincidence that the higher prevalence of LBP observed in this review was found in a group of homemakers (39) because it is at their own home where women are more exposed to long working hours that include caring for young children, frequent lifting and carrying of heavy loads, performing tasks in uncomfortable postures, and the use of inadequate tools. Additionally, homemakers' work may be poorly recognized or rewarded, which generates an environment laden with frustration and complex emotional states.

LBP also affected significantly older workers, or people who perform the same activity for longer periods of time (31,33,35), a finding that should call the attention of interdisciplinary work groups interested in the prevention and timely management of LBP, for the design of programs specifically targeted to this particular population.

A strong association was reported between LBP and obesity, overweight, and sedentary lifestyles (17, 26, 38). This brings to light a true time bomb, given the growing epidemics of overweight and obesity currently plaguing the Western world.

LBP and its employment, social, and economic consequences could complicate the already worrisome picture of cardiovascular risk in the region.

The high prevalence of LBP reported among pregnant women (25) is explained, among other causes, by the mechanical overload women bear during pregnancy, hormonal changes, body water redistribution, increased blood viscosity due to a deficit in fibrinolysis, relative ischemia of spinal structures, changes in body posture, and the occurrence of compartment syndromes (50-52). The fact that doctors and registered nurses rarely, if ever, ask pregnant women about their musculoskeletal system during prenatal visits is troublesome. It is also important to highlight the few pharmacological alternatives there are for the management of LBP during pregnancy.

The association reported between smoking and CLBP suggests that the use of tobacco contributes to the development of CLBP (15,24), even among those who have quit smoking more than one year ago (15). Although the literature has confirmed the association between smoking and CLBP, the causal mechanism has not been completely elucidated (16). Some explanations described in the literature state that smoking produces changes in the pH and perfusion of intervertebral discs, while debilitating the paravertebral muscles that provide support to the spine, which may lead to a decreased resistance to tension and delayed healing processes. Nicotine can also impact the central nervous system with a change in the perception of pain, which could explain musculoskeletal pains in other regions of the body (15). Some other factors associated with the smoker could involve, for example, the fact that smokers tend to be more sedentary or less concerned with their own health than non-smokers (16).

Conclusions

This systematic literature review allowed us to find and process valuable information on the behavior of LBP in the Latin American region. In spite of the paucity of data and of the methodological heterogeneity of the studies, the pooled results of 20 carefully selected studies provided a significant sample of 6,992 patients, pertaining to a wide variety of occupations and age groups, which allows for an indirect estimation of the approximate prevalence of LBP in the Latin American region that is pretty consistent with what has been reported in other regions of the world.

The present work confirms the need to undertake crossover studies that overcome the methodological deficiencies previously discussed. Some recommendations to attain this goal would be: to include representative samples of the general population, more particularly in countries where this type of study has never been conducted; to develop a harmonized measurement instrument; to publish the results in indexed journals; and to use indicators and variables previously agreed upon that allow for reliable comparisons being made between the different countries of the region, between Latin America and other regions of the world, or between the results of the same region in the course of time.

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