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Effect of informal employment on the relationship between psychosocial work risk factors and musculoskeletal pain in Central American workers

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Abstract

Introduction—The constant increase on the psychosocial demands experienced at work seems to contribute to the increase in health problems such as musculoskeletal pain (MSP). This association may be especially important in low-income and middle-income countries, where there is a large proportion of informal workers among whom there is little research. We analysed the association between psychosocial work risk factors and MSP among formal and informal workers using the First Central American Survey of Working Conditions and Health.

Methods—This is a representative sample (n=12 024) of the economically active population of the six Spanish-speaking countries of Central America. Prevalence ratios (PR) and corresponding 95% CIs from Poisson regression models were used to estimate the association between psychosocial work risk factors and the MSP.

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Contributors MRG, DGRP and FGB conceptualised the study. MRG and DGRP performed all the analyses. MRG wrote the first draft. All the authors contributed to the manuscript revision.

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Results—Compared with formal workers, informal workers reported higher prevalence of MPS in the body regions analysed (ie, cervicodorsal, lumbosacral, upper extremities) and higher exposure to psychosocial work risk factors. However, on the whole, the associations between the exposure to psychosocial work risk factors and the prevalence of MSP were similar for both formal and informal workers. Only the association between exposure to high demands and MSP in the upper extremities was higher (p=0.012) among formal (PR=1.69, 95% CI 1.46 to 1.96) than among informal workers (PR=1.40; 95% CI 1.30 to 1.51).

Conclusion—Exposure to adverse levels of psychosocial work risk factors is associated with higher prevalence of MPS among both formal and informal workers. However, the role of employment informality in this association is complex and requires further examination.

INTRODUCTION

Musculoskeletal conditions and their associated pain (musculoskeletal pain (MSP)) are the most common work-related pathologies in the world.[1] This is particularly true in low-income and middle-income countries (LMICs), where low back pain (LBP) and neck pain are among the top 10 non-communicable diseases in terms of disability, cost and quality-of-life loss.[2] Despite this burden, only a few studies have examined MSP in Central and Latin America, which is surprising considering this region has one of the world's largest and fastest growing workforces.[3] Also, the region suffers from low awareness of the importance of safe work, absence of infrastructure to sustain safe workplaces, lack of competent occupational health services, deficient laws and regulations enforcement, and data sparsity and unreliability.[4] All of these are critical to hazard identification and control, as well as in prioritising interventions, but obtaining representative and reliable data is a first step.

Most general population estimates for Latin America come from the Community-Oriented Program for Control of Rheumatic Diseases (COPCORD) effort, which has a focus on LMICs countries,[5–7] including Argentina, Cuba, Ecuador, Mexico and Venezuela. The most commonly reported condition is LBP, varying from 14% in Cuba to 19% in Argentina. Guatemala is the only Central American country included in COPCORD,[8] with reported MSP prevalence of 44% in the shoulders, 21% in the elbows and 32% in the wrists. Still, COPCORD mostly uses non-random samples, which are representative neither of a country's general population nor of the working population. And workers have a higher prevalence of MSP than the general population (eg, 44% vs 18%, respectively, for LBP),[9] suggesting the importance of working conditions in the origin of MSP.

Most of the Latin American working population MSP studies come from Brazil,[10–26] with a few others from Mexico,[27–29] Colombia,[30 31] Peru[32] and Venezuela.[33] Many used either statistically unreliable small samples (n<50)[10–15] or had larger samples (n>1500) but solely reported overall estimates[16]. Other studies had samples between a few hundred[18–21 27–31 33] up to about 1000 individuals[22 24 32] on a diversity of occupations (eg, agricultural,[20 30] extraction/manufacturing,[24 27 31 33] factory workers,[18 25 29] healthcare,[19 34] education,[26] craft workers,[21] office workers[28] or mixed[22]). In these studies, the highest MSP prevalence is reported for LBP (be that 7-day estimates: 17%[25] and 18%[26]; or 12-month estimates:

18%,[26] 30%,[25] 44%[22] and 57%[33]) and the upper extremities (19% for 7-day estimates[23] and 32% for 12-month estimates[24]).

As noted, the Latin American research on work-related MSP largely comes from South America, with only a few from Central America. One is the Cultural and Psychosocial Influences in Disability (CUPID) study, an 18-country study with over 12 000 workers. CUPID reported 1-month prevalence estimates of LBP[35] and generalised neck and shoulder pain[36] for Costa Rica (38% and 58%, respectively) and Nicaragua (43% and 40%, respectively). Further research on office workers reported 1-month and 12-month LBP prevalence (Costa Rica: 46% and 68%, respectively; Nicaragua: 44% and 61%, respectively),[37] as well as corresponding prevalence of upper limbs MSP (Costa Rica: 54% and 67%, respectively; Nicaragua: 52% and 68%, respectively).[38] CUPID, however, only recruited among office-based and nursing occupations in formal employment (ie, covered by social security/protection systems).

The little knowledge on MSP in informal workers is a key gap in Central America, which has 70% of its workforce in large unregulated informal employment.[39] A unique research source is the First Central American Survey of Working Conditions and Health (ECCTS for its Spanish acronym),[40] the only national representative sample of the economically active population of the six Spanish-speaking Central American countries (North to South: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama). The ECCTS found higher prevalence of MSP in informal workers than in formal workers (eg, average prevalence, respectively, 35% vs 32% in the cervicodorsal region, or 23% vs 19% in the lumbar region[41]).

Although the aetiology of MSP is multifactorial,[42] when work-related MSP is considered, prominent risk factors are exposure to hazardous ergonomic factors (ie, handling heavy load and repetitive movements[43]) but also work organisation features (ie, psychosocial work factors), typically characterised as an imbalance between the demands and the resources (eg, control, support) in the job.[44] These factors may lead to MSP by inducing muscle tension and deteriorating work-related biomechanics.[45–47] And informal work often combines less favourable ergonomic and psychosocial conditions.[48] The existing psychosocial work models, however, were developed in and for high-income economies with stable employment conditions and strong social protection networks,[44 49] where work for survival is not such a determining aspect as it may be in LMICs and for informal workers. Yet no research exists on the possible differential impact of these factors among formal and informal workers and certainly none in Central America. Thus, we tested the hypothesis that, compared with workers in formal jobs, the association of psychosocial work factors with MSP is greater in workers in informal jobs.

METHODS

Study design and participants

Data from the I ECCTS[40] were used. The target population, drawn from each country's most recent census, was men and women older than 18 years old who declared working or having worked for at least 1 hour during the week prior to the interview. In total, 12 024 (2004

per country) working people were interviewed in 2011 in their homes. Response rates prior to replacement was 80% except in Costa Rica (50%) and Honduras (60%). To adjust for differences with the target population, samples were weighted according to sex, age (18–30, 31–50 and 51–65 years old), economic sector (agricultural, manufacturing and construction, and services) and country. Details on the sample selection and collection procedures are available elsewhere.[40] The ethics and human subjects committees of the National University, Heredia, Costa Rica, and The University of Texas Health Science Center at Houston, Texas, USA, approved the study.

The final sample (n=10 443; 87%) omitted participants with missing data. Compared with the final sample, the excluded had an average of three percentage points difference for most characteristics. The excluded had fewer younger workers (35% vs 39%), more manual workers (56% vs 52%), less people working between 40 and 48 hours per week (39% vs 44%) and more workers exposed to ergonomic hazards (ie, heavy loads (17% vs 13%), repetitive movements (57% vs 53%) and extreme forces (15% vs 12%)). MSP prevalence was also slightly lower in the excluded sample: 33% vs 36% in the cervicodorsal region, 19% vs 22% in the lumbosacral region, and 27% vs 31% in the upper extremities. However, there were far fewer workers reporting low control over work pace (36% vs 50%) and many more informal workers (83% vs 73%).

Musculoskeletal pain

MSP was measured with two questions referring to the last 4 weeks: (1) *Have you felt pain on your back?* and (2) *Have you felt pain in any limb?* Participants could answer yes or no to upper middle or low back in response to the first question, and shoulder, elbow or wrist in response to the second. Answers were grouped by body area as follows: cervicodorsal (upper and middle back), lumbar (lower back) and upper extremities (shoulder, elbow, wrist). Subjects declaring they had not felt pain in both questions were placed in the ‘no pain’ category.

Psychosocial risk factors at work

Exposure to psychosocial work risk factors was based on the dimensions of the demand-control-support model (DCS)[44] identified on an earlier factor analysis.[50] Five dimensions were selected: psychological demands (7 items), control over the work pace (6 items), influence at work (4 items), possibilities for development in the job (3 items), and job social support (3 items). Workers were asked about their frequency of exposure to psychosocial work factors on a typical day of work; all questions had the same answer options (‘always’=1, ‘often’, ‘sometimes’, ‘seldom’ and ‘never’=5). The possibility of ‘does not apply’ could be selected for possibilities for development by independent, autonomous/self-employees and job social support by workers without coworkers/superiors. The non-applicable answers were coded as missing, restricting the analyses of those two factors to a smaller sample (n=4056). All items were scored in the same direction, with higher scores indicating a less favourable working situation. Each participant was assigned the average of the items’ scores of the corresponding factor if at least 80% of the factor’s items were non-missing, and missing otherwise. Exposure to each factor was dichotomised into the less favourable category (ie, high for demands and low for control and support) (reference) if

the average was equal or higher than the median, or into the more favourable category if otherwise.

Covariates

Following previous work,[48] participants were coded as formal or informal workers according to their social security coverage (yes/no, respectively). Also, to control for potential confounders, the following variables were considered in the analyses: gender (male as reference), age (<30, 30–50 (reference), >50 years), occupation (manual vs non-manual (reference)), hours worked per week (<40, 40–48 (reference) and >48 hours) and ergonomic working conditions (ie, handling heavy loads, carrying out repetitive movements, performing extreme forces and working in uncomfortable postures). The ergonomic questions asked workers their frequency of exposure on a typical work day. Workers were categorised as exposed (ie, exposed more than never but less than a quarter of the time, between a quarter and half of the time, or more than half to all the time) and unexposed (ie, those responding never (reference)).

Statistical analysis

First, prevalence of MSP was calculated stratifying by formal and informal employment, for each psychosocial work factor and by body region. Poisson regression models for the association of psychosocial work factors with MSP were used to compute prevalence ratios (PR) and corresponding 95% CIs.[51] Multivariate models were built following Hosmer and Lemeshow's recommendations for covariate selection.[52] Thus, initially, covariates with a value $p<0.20$ in bivariate analyses with MSP were introduced into a multivariate model. Covariates with values $p>0.05$ in the initial multivariate model were ruled out one by one, beginning with the one that had the highest p value, until a reduced model was obtained. All final models were adjusted for gender, age, occupation, repetitive movements and uncomfortable postures, which, although had $p>0.05$ in some models, was included in all models for consistency.

We also calculated p values for interaction to compare the PRs between formal and informal workers; $p<0.05$ were considered as suggestive of interaction. Initially, the data were analysed by gender and country separately, but no differences between the stratified and the pooled results were observed. Therefore, the analyses presented were carried out using the combined weighted sample of the six countries and both genders. All the analyses were carried out with the statistical software package Stata/MP v.13.

RESULTS

Table 1 shows the distribution of the sample characteristics for formal (27%) and informal workers (73%). Between both types of workers, there were more men than women, although the percentage of men was much higher among informal workers (60% vs 55%). Between both types of workers, the middle-age group was the most frequent (44% vs 41%), but there were many more older workers among the informal workers (21% vs 14%). Non-manual occupations were the most frequent in formal workers while manual occupations were more common among the informal (37% vs 57%). Working between 40 and 48 hours per

week was the most common for both types of workers (57% vs 39%), but there was a higher percentage of informal workers working either less (25% vs 14%) or more (37% vs 30%) hours. Overall, workers exposed to ergonomic conditions did not exceed the 15% among either formal or informal workers, except for repetitive movements which was rather frequent in formal (43%) and even more frequent in informal workers (48%). Regarding psychosocial factors, at least 50% of all workers reported exposure to less favourable levels of psychosocial factors, except for low influence at work among formal workers (37%) and for low control over the work pace among the informal workers (45%). Among informal workers, 69% had low possibilities of development in the job, while 63% of formal workers reported low control over the work pace. The proportion of workers reporting MSP in the last 4 weeks was highest for MSP in the cervicodorsal region, then for MSP in the upper extremities and lastly in the lumbosacral region. The corresponding figures for each location were higher among informal (39%, 33% and 23%) than among formal workers (30%, 26% and 19%). The unadjusted PRs of MSP for informal versus formal workers (data not shown) were 1.29 in the cervicodorsal region, 1.20 for lumbosacral MSP and 1.26 in the upper extremities; corresponding adjusted PRs were 1.19, 1.07 and 1.15. The prevalence of MSP in relation to psychosocial work factors is presented in table 2. Overall, the prevalence of MSP in the three body locations examined was higher among informal than formal workers, in both the high and low levels of exposure to psychosocial work factors. For instance, among formal workers, the prevalence of cervicodorsal MSP was 22% for participants reporting low psychological job demands and 37% for those reporting high demands. Among informal workers the corresponding prevalence estimates were 29% and 48%. The adjusted PRs for the association between each psychosocial work factor and each MSP location showed that among both formal and informal workers, workers reporting high demands had higher prevalence of MSP in all locations than workers with low demands. No other psychosocial factor showed associations in all locations. The magnitude of the PRs was a bit different between informal (PR=1.59 for cervicodorsal MSP, PR=1.21 for MSP lumbosacral and PR=1.69 for upper extremity MSP) and formal workers (corresponding PRs were 1.53, 1.28 and 1.40). But differences were only evident (p for interaction=0.012) for MSP in the upper extremities.

Workers reporting low control over the work pace had a higher MSP prevalence in two locations compared with those with high control. But there were no differences (all p>0.30) between formal (PR=1.27 for MSP cervicodorsal and PR=1.29 for upper extremity MSP) and informal workers (corresponding PRs were 1.21 and 1.21). Further, workers with low possibilities for development in their job had higher prevalence of upper extremity MSP both in formal (PR=1.46) and informal workers (PR=1.21). Similar associations were observed for workers reporting low social support. For neither of these two factors, however, there was evidence of differences between formal and informal workers (p for interaction >0.05). The remaining psychosocial factors showed unclear or inconsistent associations with MSP.

DISCUSSION

As far as we know, this is the first study examining the association of psychosocial work risk factors with MSP in Central America and the only one analysing separately formal and informal workers. Overall, we found a higher prevalence of MSP among workers reporting

exposure to adverse levels of psychosocial work risk factors compared with workers exposed to more favourable levels. We also found that the prevalence of MSP was higher among informal than among formal workers in both, adverse and favourable, levels of exposure to psychosocial work factors. Largely, however, the relative differences in the prevalence of MSP between psychosocial exposure levels were similar among both formal and informal workers.

The association of psychosocial working conditions with MSP is consistent with the DCS model,[44] which hypothesises that exposure to adverse levels of psychosocial work factors predicts poor health, including MSP, via elevated stress-related physiological responses that, in turn, help the development of musculoskeletal symptoms. These findings are also in agreement with prior research in both developed countries[53] and LMICs,[54] showing that high psychological job demands and low job control are associated with higher MSP in the upper extremities and in the cervicodorsal region.[55 56] Although the DCS model does not hypothesise a relationship with any specific body region, we found that, while the three body locations examined showed positive associations, MSP in the upper extremities was associated with the largest number of psychosocial factors. This is consistent with prior research which concluded the importance of psychosocial work conditions as risk factors for musculoskeletal health problems, predominantly upper limbs problems.[57]

Our study provides new evidence about the potential harmful health effect of informal work related to musculoskeletal problems. Whereas research on formal workers is frequent, research on informal workers is rather scarce, and more so in LMICs. The little amount of evidence that exists on informal workers relates to poor employment and working conditions, as well as to poor general health status.[55 58] Only one study, also using the ECCTS, has previously analysed formal and informal workers separately,[41] finding a general pattern of higher prevalence of MSP among informal than among formal workers. This finding is consistent with our results. Potential explanations of these findings could be the lack of social protection benefits (eg, labour rights and healthcare) for informal workers who also typically work longer days, with lower salaries and less flexible schedules than formal workers. These already bad working conditions may have worsened as a result of the macro-socioeconomic changes linked to the economic crisis and, overall, to globalisation.[59]

Given the worse overall working conditions informal workers are exposed to, a bigger effect of the psychosocial work risk factors in informal than in formal workers was anticipated. However, we observed a similar magnitude of the association between exposure to psychosocial factors and MSP between formal and informal workers. Two complementary phenomena may be occurring. On the one hand, in a changing and uncertain labour market context, it may be reasonable for formal workers to perceive their jobs as more stressful than they may have initially been.[59] On the other hand, our findings may suggest that, in itself, the detrimental health effect of informal work may be strong enough for other unfavourable working conditions to show an added effect. Future research is needed to shed light on these issues.

Our study has several strengths. First, this is a study of firsts: the first study in the Central American region examining the association between psychosocial work factors and the

prevalence of MSP in various body regions; and the first study providing data on the above association separately for both formal and informal workers. Second, our study is based on a large and nationally representative sample of the Central American adult workforce, and as such our findings are generalisable to the general adult working population of the region and, potentially, to other similar LMICs. Third, our use of the I ECCTS demonstrates that it can be a key source for the development of occupational health statistics that would otherwise not be available. To fulfil this role, periodical repetition of the ECCTS will be crucial.

Our study also has several limitations. First, because the participation was voluntary, selection bias is possible. However, when comparing our sample with available census data according to gender, age and sector of economic activity, no relevant differences were found.[40] Second, our results could have been affected by a healthy worker effect, particularly if informal workers, who may be working at more hazardous workplaces, performing riskier jobs and lacking access to subsidised healthcare, had left the workforce earlier than formal workers. Third, informal workers may be more prone to work while ill as they lack the social protection benefits that, supposedly, formal workers have. Fourth, we classified participants into formal and informal based on the existence of a social protection coverage. However, informal workers may be less homogeneous regarding other employment characteristics. Thus, the exposure to psychosocial work factors as well as the prevalence of MSP may vary according to the workers' specific conditions of the employment informality. More conceptual and methodological studies are needed to disentangle the intricacies and heterogeneity of informal workers. Fifth, although there were some differences between the included and excluded sample, most differences may just be inconsequential given our sample size. There were larger differences for the percent of informal workers and of low control over work pace, which were lower in the final sample, so our reported associations could be underestimated. However, because the characteristics of the included sample were largely similar to the excluded, generalisability would not be affected.

There are other limitations in our study. First, due to the cross-sectional nature of our study, we cannot establish directionality and temporality between exposure and outcome. Future studies should consider the use of prospective longitudinal designs. Second, our study is based on self-reports, so recall as well as information bias may be present regarding the participants' attitudes and expectations. Third, we cannot categorically discount between-country differences in the interpretation of the questions. But the development of the I ECCTS included a pilot testing to ensure questions were properly understood in an analogous way by respondents from all the countries. Fourth, measurement error in the assessment of both MSP and the psychosocial factors may have led to inaccurate associations. The MSP questions used had high face validity but have not been validated against a clinical assessment, and poor symptom identification might be possible. The questions on psychosocial work factors were identified with a sequence of exploratory and confirmatory factor analyses of the questions available at the I ECCTS,[50] which were conceptually based on a solid theoretical model.[44] However, the questions have not been tested previously and more research is warranted to confirm their value. Fifth, the reported associations were independent of conditions known to contribute to MSP (ie, age, ergonomic

factors and occupation, as a proxy of those jobs that may have higher physical demands), but residual confounding may still be present as we could only adjust for conditions that were available in the ECCTS. Overall, though, given that our findings are consistent with prior research, all these limitations might not have had a large impact on our findings.

In summary, our findings contribute to the debate on the health consequences of informal employment in LMICs, where most jobs are informal.[60] These jobs are characterised by low job security, adverse working conditions, low incomes, lack of access to social benefits and healthcare services, and limited opportunities to participate in education and training programmes, and as we suggest here high prevalence of MSP. Further research is needed to disentangle this complex myriad of factors and to elucidate the mechanisms by which informality affects health.

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What this paper adds

- Exposure to adverse levels of psychosocial work risk factors has been related to musculoskeletal pain, but research on that topic in Central America is scarce. In addition, whether or not the association of psychosocial work risk factors with musculoskeletal pain varies between informal and formal workers is unknown.
- Compared with formal workers, informal workers report higher prevalence of both musculoskeletal pain and exposure to adverse levels of psychosocial work risk factors. But the magnitude of the association between psychosocial work factors and the prevalence of musculoskeletal pain was similar between formal and informal workers.
- These findings contribute to the debate on the consequences of informal employment in low-income and middle-income countries, but more research is needed to disentangle the mechanisms by which informality affects health.

Table 1

Sample characteristics in formal and informal workers from the six Spanish-speaking countries of Central America[*] (n=10 443)

Characteristics	Formal workers n (%)[†]	Informal workers n %[†]
Gender		
Men	2176 (55.1)	4922 (60.4)
Women	1157 (44.9)	2188 (39.6)
Age (in years)		
18–30	1078 (42.0)	2151 (37.8)
31–50	1731 (44.2)	3430 (41.4)
51 and more	524 (13.7)	1529 (20.8)
Occupation		
Non-manual	1861 (63.0)	2444 (42.6)
Manual	1472 (37.0)	4666 (57.4)
Hours worked per week		
<40	388 (13.6)	1718 (24.9)
40–48	1987 (56.9)	2992 (38.5)
>48	958 (29.5)	2400 (36.6)
Exposure to ergonomic working conditions		
Handling heavy loads	297 (8.0)	1096 (15.3)
Carrying out repetitive movements	1398 (43.3)	3469 (48.2)
Performing extreme forces	259 (7.0)	965 (13.5)
Working in uncomfortable postures	196 (6.2)	523 (7.3)
Exposure to psychosocial work risk factors		
High psychological job demand	1658 (53.0)	3538 (51.1)
Low influence at work	1288 (37.4)	3971 (56.7)
Low control over the work pace	2046 (63.3)	3083 (45.3)
Small possibilities for development in the job[‡]	1626 (60.0)	919 (68.6)
Low work social support[‡]	1387 (49.7)	801 (58.7)
Prevalence of musculoskeletal pain		
Cervicodorsal region	917 (30.2)	2767 (38.8)
Lumbosacral region	647 (18.8)	1782 (22.6)
Upper extremity region	814 (26.4)	2518 (33.2)
Total sample	3333 (27.4)	7110 (72.6)

First Central American Survey of Working Conditions and Health, 2011.

[*] Guatemala, El Salvador, Honduras Nicaragua, Costa Rica and Panama.

[†] n = unweighted frequency; % = weighted percentage.

[‡] From a smaller sample (n=4056; 2704 formal and 1352 informal) due to the percentage of 'does not apply' answers to the corresponding questions. See the Methods section for a more detailed explanation.

Table 2

Unadjusted prevalence (%) and adjusted prevalence ratios (PR)[*] of musculoskeletal pain according to the exposure to psychosocial work risk factors in male and female formal and informal workers among the working population of the six Spanish-speaking countries of Central America[†] (n=10 443)

	Formal workers		Informal workers		
	n (%)[‡]	PR (95% CI)	n (%)[‡]	PR (95% CI)	p Value for interaction[§]
Cervicodorsal					
Psychological job demands					
Low	339 (22.3)	1	1031 (29.2)	1	0.481
High	578 (37.1)	1.59 (1.39 to 1.81)	1736 (47.9)	1.53 (1.43 to 1.64)	
Influence at work					
High	595 (32.2)	1	1287 (41.6)	1	0.446
Low	322 (26.8)	0.88 (0.77 to 1.01)	1480 (36.6)	0.92 (0.86 to 0.99)	
Control over the work pace					
High	303 (26.1)	1	1458 (36.9)	1	0.301
Low	614 (32.5)	1.27 (1.12 to 1.46)	1309 (41.1)	1.21 (1.13 to 1.29)	
Possibilities for development in the job					
High	276 (28.0)	1	140 (33.0)	1	0.443
Low	462 (31.6)	1.12 (0.98 to 1.29)	317 (32.8)	1.02 (0.85 to 1.22)	
Job social support					
High	360 (29.0)	1	182 (33.2)	1	0.414
Low	378 (31.4)	1.12 (0.97 to 1.26)	275 (32.6)	1.00 (0.84 to 1.18)	
Lumbosacral					
Psychological job demands					
Low	275 (16.2)	1	751 (18.6)	1	0.965
High	372 (21.1)	1.21 (1.03 to 1.43)	1031 (26.4)	1.28 (1.16 to 1.41)	
Influence at work					
High	407 (19.4)	1	849 (24.8)	1	0.397
Low	240 (17.8)	1.05 (0.89 to 1.25)	933 (20.9)	0.90 (0.82 to 0.99)	
Control over the work pace					
High	267 (19.4)	1	1073 (23.4)	1	0.862
Low	380 (18.5)	0.97 (0.83 to 1.14)	709 (21.6)	1.01 (0.78 to 1.31)	

	Formal workers		Informal workers		
	n (%)‡	PR (95% CI)	n (%)‡	PR (95% CI)	p Value for interaction§
Possibilities for development in the job					
High	200 (17.6)	1	93 (19.5)	1	0.772
Low	310 (19.2)	1.08 (0.90 to 1.30)	208 (19.7)	1.00 (0.78 to 1.30)	
Job social support					
High	275 (19.8)	1	107 (17.7)	1	0.053
Low	235 (17.4)	0.92 (0.77 to 1.10)	194 (21.0)	1.20 (0.98 to 1.54)	
Upper extremities					
Psychological job demands					
Low	287 (18.7)	1	990 (26.0)	1	0.012
High	527 (33.3)	1.69 (1.46 to 1.96)	1528 (40.1)	1.40 (1.30 to 1.51)	
Influence at work					
High	571 (30.4)	1	1141 (35.1)	1	<0.001
Low	243 (19.7)	0.69 (0.60 to 0.81)	1377 (31.8)	0.98 (0.91 to 1.05)	
Control over the work pace					
High	263 (22.7)	1	1383 (31.6)	1	0.364
Low	551 (28.6)	1.29 (1.12 to 1.49)	1135 (35.2)	1.21 (1.13 to 1.31)	
Possibilities for development in the job					
High	224 (21.4)	1	124 (26.6)	1	0.111
Low	459 (31.3)	1.46 (1.25 to 1.70)	289 (30.4)	1.21 (1.00 to 1.48)	
Job social support					
High	324 (25.5)	1	153 (26.9)	1	0.997
Low	359 (29.2)	1.18 (1.03 to 1.36)	260 (30.9)	1.20 (0.99 to 1.45)	

First Central American Survey of Working Conditions and Health, 2011.

*Adjusted for gender, age, occupation, repetitive movements and uncomfortable postures.

†Guatemala, El Salvador, Honduras Nicaragua, Costa Rica and Panama.

‡n = unweighted frequency; % = weighted percentage.

§p Value of the interaction between the psychosocial risk factor and the informality indicator. PR, prevalence ratio.