Factors Associated with Low Back Pain in Coffee Pickers from Chinchiná and Palestina (Colombia)

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Abstract

Objective. The objective of the study was to determine the prevalence of low back pain and associated risk factors among coffee pickers. **Methods.** The participants completed a survey and underwent tests to determine flexibility and $\dot{V}O_{2max.}$ **Results.** Among 98 coffee pickers with an average age of 44.7 (±13.7), 58.2% had experienced low back pain. The average duration and intensity of low back pain in the patients were 6.0 ± 6.5 years and 47.1 ± 21.0 mm/100 mm respectively. The average values of body fat and $\dot{V}O_{2max}$ were $13.2 \pm 2.8\%$ y 32.5 ± 8.6 ml.kg^{-1}.min^{-1} respectively. Regression analysis showed that for a higher $\dot{V}O_{2max}$ value decreased the probability of experiencing low back pain, while a higher body fat content increased the probability of suffering from low back pain. **Conclusions.** There is a high prevalence of low back pain among coffee pickers from Chinchiná and Palestina. Higher body fat content increases the likelihood of experiencing lumbar pain, while elevated levels of $\dot{V}O_{2max}$ decrease it.

Keywords

Back Pain, Oxygen Consumption; Body composition; Musculoskeletal Pain; Farmers (*Source: DeCS*).

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Factores asociados al dolor lumbar en recolectores de café de Chinchina y Palestina (Colombia)

Resumen

Objetivo. El estudio tuvo como objetivo determinar la prevalencia del dolor lumbar y los factores de riesgo asociados entre los recolectores de café. **Métodos.** Los participantes respondieron a una encuesta y se sometieron a pruebas para determinar la flexibilidad y el $\dot{V}O_{2max}$. **Resultados.** Entre 98 recolectores de café de 44,7 años (±13,7), el 58,2% había experimentado dolor lumbar. La duración e intensidad promedio del dolor lumbar en los pacientes fue de $6,0 \pm 6,5$ años y $47,1 \pm 21,0$ mm/100 mm, respectivamente. Los valores promedio de grasa corporal y $\dot{V}O_{2max}$ fueron $13.2 \pm 2.8\%$ y 32.5 ± 8.6 ml.kg^{-1}.min^{-1} respectivamente. El análisis de regresión demostró que para un valor alto de $\dot{V}O_{2max}$ la probabilidad de padecer dolor lumbar es menor mientras que para un valor alto de contenido de grasa corporal la probabilidad de sufrir dolor lumbar es mayor. **Conclusiones.** Existe una alta prevalencia de dolor lumbar entre los recolectores de café de Chinchiná y Palestina. Un mayor contenido de grasa corporal incrementa la probabilidad de padecer lumbalgia, mientras que niveles elevados de $\dot{V}O_{2max}$ la disminuye.

Palabras clave

Dolor lumbar, Consumo de oxígeno, Composición corporal; Dolor Musculoesquelético; Agricultores (*Fuente: DeCS*).

Fatores Associados com a dor lombar e catadores de café em Chinchiná e Palestina (Colômbia)

Resumo

Objetivo. O estudo teve como objetivo determinar a prevalência da dor lombar e fatores de risco associados entre os catadores de café. **Métodos.** Os participantes responderam a uma enquete e foram submetidos a testes para determinar flexibilidade e $\dot{V}O_{2max}$. **Resultados.** Entre 98 catadores de café com 44,7 anos (±13,7), 58,2% apresentavam dor lombar. A duração média e intensidade da dor lombar nos pacientes foi de $6,0 \pm 6,5$ anos e $47,1 \pm 21,0$ mm/100 mm, respectivamente. Os valores médios de gordura corporal e $\dot{V}O_{2max}$ foram $13,2 \pm 2,8\%$ e $32,5 \pm 8,6$ ml.kg^{-1}.min^{-1} respectivamente. A análise de regressão amostrou que para um alto valor de $\dot{V}O_{2max}$ a probabilidade de sofrer lombalgia é menor enquanto que para um alto índice de gordura corporal a probabilidade de sofrer lombalgia é maior. **Conclusões.** Tem uma alta prevalência da dor lombar entre os catadores de café de Chinchiná e Palestina. Um valor mais alto de $\dot{V}O_{2max}$ diminui a probabilidade de sofrer lombalgia, enquanto um valor alto de gordura corporal a aumenta.

Palabras chave

Dor lombar, Consumo de Oxigênio; Composição Corporal; Dor Musculoesquelética; agricultores (*Fonte: DeCS*).

Introduction

Low back pain (LBP) poses a significant challenge for healthcare systems worldwide due to its high prevalence, substantial costs, and the resulting disability it causes. nearly everyone experiences at least one episode of acute LBP in their lifetime (1). LBP has been identified as a condition more commonly found in industrialized societies, where sedentary lifestyles prevail compared to developing countries (2). It is closely associated with low levels of physical activity. Furthermore, low levels of cardiorespiratory fitness ($\dot{V}O_{2max}$) (3) and high body fat content (4, 5) have been identified as risk factors for LBP and sciatica (6).

Interestingly, some studies have reported a lower prevalence of LBP in rural areas (2). While agricultural work is generally considered to be healthier than urban occupations (7), it requires significant physical conditioning to perform frequent tasks of lifting, lowering, pulling, or pushing heavy loads on irregular or slippery surfaces. Therefore, it is not surprising that farmers are more vulnerable to musculoskeletal disorders, particularly LBP, than the rest of the population. In countries like Kenya (8), the prevalence of low back pain in farm workers was 38.1% with a strong association with age and long-term employment as a farm worker. Similarly, in Sub-Saharan Africa, Kahere (9) reported a prevalence of occupation-based low back pain ranging from 30.1% to 55.5%, biomechanical factors playing a significant role as risk factors. In a study carried out on 317 rubber harvesters, Chokprasit et al (10) confirmed that low back pain is the main work-related musculoskeletal disorder, with a disease prevalence of 71.2%, with heavy workload representing a significant predictive risk factor.

To date, LBP is recognized as a multidimensional disease with a multivariate association (11). The responsibility for performing physical tasks in relation to the occurrence of LBP has become a particular focus of interest in occupational research (12). Based on a review of 36 studies published over a period of 10 years, Heneweer (13) evaluated the association between physical activity and LBP. The author found that handling heavy loads and the accumulation or frequency of load-lifting constitutes a moderate-to-strong risk factor for LBP. Specifically, the study suggests that there is a moderate risk of experiencing LBP in workers who flex their trunks at least 30 degrees for 10% of the time and those who lift 25 kg at least 15 times a day. Additionally, other factors have been reported as lumbar hazard risk factors. Various authors have consistently shown an association between lumbar pain and increased body fat content (14, 15). Finally, in a cross-sectional descriptive study on migrants from Myanmar, Soe (16) found that having more than two dependents significantly increases the risk of musculoskeletal disorders.

In Colombia, coffee is the main export product and one of the most important economic activities. Chinchiná and Palestina are two towns producing the most coffee in the Departamento de Caldas. The process of collecting coffee is a crucial phase in coffee production. In Colombia, coffee is grown in the Andean Mountains, where the topography has limited the possibilities of mechanizing coffee bean picking, making it a purely manual activity to ensure the selection of mature grains one by one. Therefore, collecting coffee is a complex and physically demanding occupation for men, often starting at an early age and lasting for many years (17). The coffee collection includes three main manual tasks. The first task is picking the beans from

the branches, which is a repetitive task of low intensity but high repetition. The picker takes the beans from the tree and deposits them into a basket fastened around their waist with a strap, When filled, the basket weighs around 10 kg. During this task, the coffee picker (CP) performs repetitive flexion, extension, rotation, and tilt movements of the spine and maintains awkward postures determined by the height of the coffee plant and the size of the branches. The size of a coffee tree ranges from 90 to 120 cm during the first harvest and can reach a height of 2 m by the third harvest. The stress on the spine during flexion movements is increased as the size of the tree decreases. The second task is filling the bags with coffee beans from the baskets. In this task, the 10 kg baskets are periodically emptied into bags that weigh up to 50 kg. The pickers then carry these bags on their shoulders over steep, irregular, and slippery surfaces to the collection points where the coffee is weighted. At the end of the workday, the CPs are responsible for loading the bags into trucks for transportation.

Given the occupational characteristics of coffee harvesting and the available scientific evidence, it is possible to hypothesize that LBP is common among CPs and that specific risk factors contribute to the development of this condition. While farm work is generally recognized as a high-risk activity for painful musculoskeletal problems, there is insufficient information on the impact of external physical loads and physical characteristics as a risk factor of LBP among farmers. Currently, only a few studies have been conducted to address this issue specifically in coffee pickers in Colombia. Garzón et al (18) reported a prevalence of 30% for low back pain among coffee pickers in a study examining working conditions, ergonomic risks and the presence of musculoskeletal disorders . Villegas (19) investigated occupational performance efficiency using an improved harvest method

based on plantation type, while Ramirez (20) reported the prevalence and associated factors of musculoskeletal disorders in this population.

Based on the aforementioned research, it is important to determine the prevalence of low back pain among coffee pickers and identify risk factors associated with this condition in order to prioritize the health and well-being of these individuals. Coffee pickers play a crucial role in the national economy of Colombia, making this information vital for ensuring their overall health and ensuring the sustainability of this important sector.

Materials and Methods

This cross-sectional study was conducted during the coffee harvesting season in the rural area of Chinchiná and Palestina in the Departamento de Caldas (Colombia). This region is known for its high coffee production, with a crop density ranging from 6,950 to 10,000 plants per hectare. The participants were informed about the research procedures and provided their informed written consent prior to participation. All the experimental procedures were carried out in accordance with the ethical standards set by the University Institutional Review Board of the University of Caldas, in compliance with Resolution 008430 that regulates health research for Colombia, as well as the 1964 Helsinki declaration and its subsequent amendments, or comparable ethical standards.

Convenience sampling was used to invite CPs to participate in the study. The inclusion criteria required that male CPs be older than 18 and have at least 6 months of experience in coffee picking at prior to the survey. Individuals underlying diseases that limit their physical exertion, such as severe orthopedic

or neurological damage, uncontrolled mental illness, respiratory distress, inflammatory disease, or a history of coronary disease, were excluded from this study. Initially, participants responded to a survey that included short-answer questions regarding demographics, occupational data, and questions about LBP. The demographic information collected included age, number of dependents, education level, habits such as smoking (number of cigarettes per day) or alcohol consumption (yes/no), and participation in sports (frequency per week). Regarding occupational characteristics, information was collected on the number of years employed as a coffee picker, number of months per year dedicated to coffee harvesting, length of the working day in hours, harvesting efficiency expressed in kilograms of coffee grains collected per day, number and duration of working breaks, height of the coffee trees during harvest (ranging from 1 to 3), and the level of physical strenuousness at work according to Borg scale (21). Finally, information related to LBP was collected as follows: CPs who reported experiencing LBP were asked about the specific location using a mannequin diagram of the low back region, the duration of pain in months, the severity of pain using a 100-mm visual analog scale (VAS) as proposed by Carlsson (22), the presence of factors that exacerbate the pain, history of receiving educational information about LBP prevention, history of seeking medical care, and the number of days off work due to LBP. The definition of low back pain used in the study was "pain or discomfort in the lower part of the back, between the 12th rib and the gluteal fold, with or without radiating pain to one or both lower extremities."

Anthropometrical characteristics. Height was measured using a Seca stadiometer (Birmingham, UK), and body mass measured on a digital scale (Seca 770®, Birmingham, UK) to the nearest 0.1 kg. To avoid the inability of body mass index to differentiate fat and lean mass, as proposed by Rothman (23), body fat content was established by using the method that involves measuring the thickness of skin folds, proposed by Faulkner (24). The skinfold measurements were taken by a researcher using a Harpenden fat caliper (British Indicators®, UK) to the nearest 0.1 mm. To percentage of body fat was calculated using the equation: % body fat $= \sum 4$ skinfolds $(tr + se + si + ab)*0.153 + 5.783$, where tr=triceps, se=subscapular, si=suprailiac and ab=abdominal.

Ergometric test. All CPs were determined to be free of cardiorespiratory disease at the time of the examination based on the survey and medical examination conducted by one of the researchers. The ergonometric test was conducted on a cycle ergometer (Monark 818E®, Monark Inc, Stockholm, Sweden) and carried out between 5 and 7 pm to eliminate any effect of the time of day. The test involved a graded effort until exhaustion, with a pedaling rate was 60 rpm. The pedaling power increased every 2 minutes, starting the test at 50 W and increasing by 25 W every two minutes for the remainder of the test. Verbal encouragement was provided through the test to encourage participants to exert maximum effort. The test was terminated when the subject voluntarily stopped due to exhaustion. Breath-by-breath expired pulmonary gases were collected and averaged over 30 seconds using a gas analyzer (Fitmate COSMED® Pulmonary Function Equipment. Italy). $\dot{V}O_{2max}$ was measured as a relative value (ml.kg^{-1}.min^{-1}). The gas analyzer was calibrated before each test, and the heart's electrical function was monitored using an electrocardiograph (Schiller® AT-101 ECG). Anthropometric and exercise test information provided by the gas analyzer were recorded in a pre-coded evaluation protocol.

Statistical analysis. Descriptive analysis of the data was performed, presenting mean values and standard deviation for continuous variables. The normal distribution of the data was verified using the Kolmogorov-Smirnov test for independent samples, a *t*-test for independent samples was conducted if the data followed a normal distribution. Otherwise, a U Mann-Whitney test was used. Odds Ratios (OR) were calculated using Cross Tabs to determine the extent to which a variable is a risk factor for LBP. Binary logistic regression was used to explore independent predictors of LBP, with only variables with a *p*-value <0.2 entered into the model. The OR indicated the magnitude of the effect. To determine the prevalence of low back pain across different age ranges, subjects were grouped into 10-year-old age groups. Statistical significance was set at a *p*-value less than 0.05. The questionnaire data and measurements were entered and analyzed using SPSS Version 18 software.

Results

In this study, a total of 108 male CPs agreed to participate. All participants identified coffee picking as their sole occupation at the time of the survey. Only 10 participants did not undergo the cardiorespiratory test and were excluded from this study. The reasons for not performing the test included disproval of the test (4), high blood pressure at rest (2), musculoskeletal pain (3), and difficulty in pedaling technique (1). Therefore, the final analysis included 98 participants with ages ranging from 19 to 79 and an average time as CP of 24.3 ± 16.0 years. Among the participants, 57 CPs (58.2% with a 95% confidence interval of 48-68) reported experiencing LBP at the time of the survey. The average duration of LBP in these patients was 6.0 ± 6.5 years, and the intensity of pain was reported as 47.1 ± 21.0 mm/100 mm.

Table 1 presents the mean values of demographic and anthropometric variables for all CPs, as well as a comparison of mean values between participants with and without LBP.

Table 1. General information of coffee pickers. Comparison between groups.

Variable	All (n=98)	With LBP (n=57)	Without LBP (n=41)
Age (years) (mean-SD)	44.7 ±13.7	45.2 ±14.5	44.1 ±12.8
Dependents (mean-SD)	1.5 ±1.6	1.8 ±1.8*	0.93 ±1.1
Education (level) Illiterate [n (%)]	10 (10.2)	4 (7.0)	6 (14.6)
Primary education [n (%)]	65 (66.3)	38 (66.7)	27 (65.7)
Secondary education [n (%)]	23 (23.5)	15 (23.6)	8 (19.5)
Smoking (Yes) [n (%)]	38 (38.8)	21 (36.8)	17 (41.5)
Cigarettes/day (mean-SD)	12.7 ±9.5	4.9 ±8.2	5.0 ±9.1
Alcohol intake (Yes) [n (%)]	38 (38.8)	25 (43.9)	13 (31.7)

Variable	All (n=98)	With LBP (n=57)	Without LBP (n=41)
Sports practice (>=3/week) (Yes) [n (%)]	24 (24.5)	15 (26.3)	9 (22.2)
Height(cm) (mean-SD)	165.5 ±7.3	165.5 ±7.3	165.3 ±7.3
Weight (Kg) (mean-SD)	62.7 ±8.3	64.1 ±7.8*	60.7 ±8.8

*=p<0.05 (Student´s *t*-test). Source: Self made

When the subjects were grouped according to age, it was found that those over 55 years of age had the highest prevalence of LBP, with a prevalence rate of 71.4% (95% confidence interval: 62 - .80). (Figure 1).
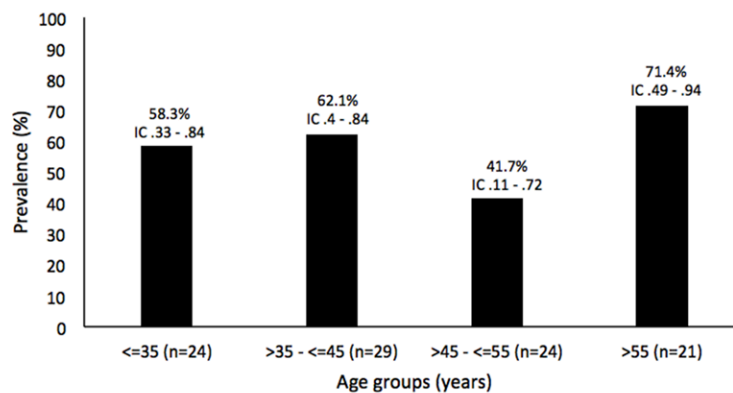

Figure 1. Reported prevalence of LBP by age ranges.
Source: Self made

CPs who experienced LBP had a significantly higher average number of dependents and a heavier body weight compared to the healthy participants (*p* <.05) (Table 1). Although both groups fell within normal ranges, CPs with LBP had a significantly higher mean percentage of body fat content. Almost all patients with LBP (98.2%) reported the presence of factors that exacerbated their pain, with 87% attributing it to the short size of the coffee trees. Furthermore, 71.9% of participants considered the trees with the first coffee grains (height 90-120 cm) as an important exacerbating factor for their pain. The analysis of cardiorespiratory fitness showed a mean value of $\dot{V}O_{2max}$ of 32.5 (± 8.6) ml.kg1.min1 with mean values of 31.6 (± 7.6) for participants with LBP and 33.9 (± 9.6) for those without LBP. No significant difference was established between the mean values measured in participants with and without LBP. It was also observed that individuals up to 55 years of age had a moderate aerobic capacity according to age categories proposed by Kaminsky, (25), while beyond that age the category was classified is poor.

Table 2 presents the mean values of occupational variables for all CPs and compares the mean values of the groups with and without LBP.

Table 2. Occupational characteristics of the coffee pickers. Comparison between groups of participants with and without LBP (*p*=NS).

Variable	All (n=98)	With LBP (n=57)	Without LBP (n=41)
Seniority in the collection (years) (mean-SD)	24.3 ±16.0	26.1 ±17.7	21.8 ±13.3
Months per year collection (months) (mean -SD)	9.4 ±3.4	9.7 ±3.2	9.1 ±3.6
Hours per day collection (hours) (mean -SD)	10.3 ±1.1	10.2 ±1.1	10.3 ±1.1
Maximum collection a day (kg) (mean -SD)	162.0 ±60.4	163.4 ±62.3	160.0 ±58.4
Maximum bags (50kg) a day (n) (mean -SD)	3.5 ±1.5	3.5 ±1.5	3.6 ±1.4
Coffee pickers with breaks (n) (n (%))	78 (79.6)	44 (77.2)	34 (82.9)
Duration of breaks (min) (mean -SD)	36.4 ±27.0	32.4 ±19.3	41.6 ±34.1
Physical strenuousness at work (Borg Scale) (Mean-SD)	12.3 ±3.3	12.5 ±3.2	12.0 ±3.5

(Student´s *t*-test). Source: Self made

A Chi2 test did not find any significant associations between the presence of LBP and the analyzed habits and the presence or absence of work breaks during the workday. To determine the factors associated with LBP, A binary logistic regression analysis was conducted. Variables with a *p*-value <0.2 were included in the regression model using the Backward Wald method to identify independent predictors. Among the quantitative variables included in the model, only the $\dot{V}O_{2max}$ showed a normal distribution (KS=0.074 *p*=0.020). In the non-linear binary logistic regression model and percentage of body fat entered as predictor variables. The regression analysis revealed that a higher value of $\dot{V}O_{2max}$ was associated with a lower probability of experiencing low back pain. Also, for a high value of body fat content, the probability of suffering low back pain is higher. Both variables significantly contributed to the model fit. The values of the variables included in the equation can be found in Table 3.

Table 3. Variables in the equation (mean - SD)

Variable	B	p	OR
Content of body fat (%)	0,160	0.048	1,190
$\dot{V}O_{2max}$ (ml.kg^{-1}.min^{-1})	-0.023	0.353	0.977
Constant	-0.996	0.493	0.369

Source: Self made

Finally, among the total of CPs who reported experiencing LBP, 38.6% had received medical care, 5.3% of participants had received physical therapy, 10.5% of participants were out of work because LBP, and only 3.5% of participants had received educational information about LBP prevention.

Discussion

This study aimed to address the knowledge gap regarding LBP in CPs in CPs in the rural areas of Chinchiná and Palestina in the Departamento de Caldas, Colombia. Previous studies on LBP in this population are limited. Vélez (26) previously focused on improving coffee handpicking techniques among CPs, while Garzón-Duque et al (18) examined ergonomic risks in CPs from another municipality in Colombia and reported a prevalence of LBP of 30%. Ramírez Jaramillo et al (20) studied postural risks associated with musculoskeletal disorders in a population of 98 CPs from a municipality in Antioquia, Colombia, and demonstrated that the potential for preventive actions to improve health conditions.

Painful musculoskeletal disorders have been understudied in the rural population of Colombia, despite the fact that farmers account for 22.9% of the total population (27). CPs are a nomadic and experienced handwork population who collects ripe crops in different farms throughout the year (17).

Manual work, heavy lifting, and frequency of loads handling have been associated with LBP among farmers (10). In the present study, a survey conducted among CPs in Chinchiná and Palestina revealed a high point prevalence of LBP, reaching 58.2% (95% CI 48-68). This prevalence is higher than the reported 8% among rice farmers in Peru (28) and the prevalence observed in farmers from other developing countries such as China (29), and Korea (30), which did not exceed 35%. However, Barrero (31) reported higher LBP prevalence among a rural rice farmers in China, with a one-year prevalence of 64% (CI 63.1-65.0) and the highest prevalence (61%) observed in male subjects aged 45 and 55. Similarly, rubber harvesters, in Thailand, showed a prevalence of 711.2% (95% CI 0.716-1.900) (10).

When CPs were classified into age groups, the prevalence increased to 71.4% (95% CI 62-80) among individuals over 55 years old (Fig. 1), following a similar trend observed in the study by Barrero (31) among rice farmers. This suggests that older CPs are more susceptible to experiencing LBP. The survey in this study was conducted during the harvest season, which is known to be associated with higher prevalence values of LBP (31). These

prevalence values confirm that LBP is a common and concerning problem among CPs. Another study of Keawduangdee (32) among rice farmers reported an even higher prevalence of LBP than the current study. This could be attributed to the greater spinal flexion and longer duration of sustained flexed postures involved in rice farming compared to coffee picking. The work postures of CPs, along with prolonged static muscle contractions during long work hours (10.3 ± 1.1 h / day) and relatively short breaks (36.4 ± 27.0 min), may contribute to muscle metabolism shifting towards the lactic pathway. High lactate levels in muscles can interfere with enzyme function (33), impair oxygenation, and contribute to the onset of pain (34).

The study explored several risk factors associated with LBP among CPs. While previous studies have suggested associations between smoking and alcohol intake and the presence of LBP (35), the odds ratio analysis in this study did not find a significant influence of these factors on the probability of suffering from LBP. Similarly, no association was found between work breaks throughout the day and the presence of LBP. However, CPs in this study reported a higher prevalence of smoking (38.8 vs 18.6%) and lower rates of regular sports practice (75.5 vs 49.3%) compared to rice growers (32). Regular physical exercise has been associated with a lower prevalence of LBP (36). The comparison of mean values revealed significant differences in the number of dependents, body weight, and body fat percentages between participants with and without LBP, with higher values observed in subjects with LBP. This finding aligns with previous research by Ucar (5), who reported that LBP prevalence increases with higher Body Mass Index (BMI). However, BMI has limitations as an indirect measure of obesity regarding sensitivity and specificity, and does not capture changes muscle and fat contents that occur with age (23). In this study, body fat content expressed as a percentage of body weight was measured using the equation proposed by Faulkner (24). Binary logistic regression analysis showed that a higher percentage of body fat content increases the probability of suffering from LBP by 1.2 times. These results support the claim by Ucar (5) w that individuals with higher body fat content are more likely to experience LBP. The number of dependents also a significant association with LBP, consistent with the findings of Soe (16), who reported that having more than two dependents significantly increases the risk of musculoskeletal disorders, particularly LBP, among migrant workers in Myanmar.

Cardiorespiratory fitness, as indicated by $\dot{V}O_{2max}$, has been linked to physical work capacity, and a higher $\dot{V}O_{2max}$ value has been shown to have a protective role against LBP (37). In a previous study Duque (3), showed that patients with LBP in an urban area in France and an average age of 38.9 (± 7.8) years, had a mean $\dot{V}O_{2max}$ value of 33.9 (± 6.75) ml.kg^{-1}·min^{1}, comparable to that of healthy subjects with poor aerobic capacity according to the categories proposed by Kaminsky et al (25). In the current study, CPs with a mean age of 44.7 (± 13.7) years had a mean $\dot{V}O_{2max}$ value of 32.5 (± 8.6) ml.kg1.min1, indicating a poor category of cardiorespiratory fitness. It is surprising that the $\dot{V}O_{2max}$ values of the farming population were similar to those of an urban population. One possible explanation is the insufficient intensity of the coffee picking task, as exercise intensity should correspond to 70-80% of the maximal heart rate to stimulate aerobic metabolism (38). Additionally, CPs showed low $\dot{V}O_{2max}$ values that could be partially responsible for the high prevalence of LBP. Low cardio-respiratory fitness has been associated with LBP and, to date, this parameter has been considered both a cause and a consequence of LBP (39).

The binary logistic regression analysis in this study demonstrated that higher $\dot{V}O_{2max}$ values decrease the probability of suffering from LBP in CPs. This suggests that regardless of the level of aerobic fitness, maintaining good aerobic capacity plays a crucial role in preventing LBP. Moreover, the high prevalence of LBP among CPs challenges the notion that LBP is less common in physically active individuals and support the hypothesis that this occupation poses a significant risk for developing LBP. Finally, the results of this study revealed that most of the CPs (98.2%) identified the size of the tree as the most significant trigger of LBP. More than three-quarters of the participants reported that the shortest size tree (1st harvest) was a trigger of LBP. In this sense, this study aligns with previous research that has demonstrated a link between flexed postures of the lumbar spine and an increased risk of LBP (40).

The inability to identify specific risk factors for LBP in CPs suggests that the nature of their occupation may provide some protection against risks associated with heavy load accumulation and mobilization. It is possible that the continuous physical tasks throughout the day, even if it involves low-density tasks, plays a protective role against the repetitive mobilization of heavy loads, which is a known risk factor for LBP. Additionally, CPs reported low work disability due to LBP, and only two individuals (2%) reported receiving information about LBP prevention.

This study is one of the few that specifically focuses on risk factors for LBP in CPs in Colombia. It is important to compare the findings with populations engaged in similar agricultural occupations to gain a better understanding of the specific risks faced by CPs. While the sample size of this study was small, the results justify further research on a larger scale to explore this important area of health. The random selection of farms for the study adds to its validity. Future studies should aim to establish causal relations and quantify the impact of LBP in CPs.

Conclusion

According to the literature review and the results of this study, there is evidence of a high prevalence of LBP in CPs in the towns of Chinchiná and Palestina. It also provides evidence that higher body fat content increases the probability of suffering from LBP, while a high level of cardiorespiratory fitness decreases the probability. However, the generalizability of the findings is limited to the specific towns and context of the study. Further research on a larger scale is a warranted to expand our understanding of LBP in CPs.

Acknowledgments

Declaration of Interest Statement

There are no conflicts or financial assistance related to this project.

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