ORIGINAL ARTICLE

Comparison of psychosocial and functional performance variables in a group of chronic low back pain patients*

Comparação entre variáveis psicossociais e de desempenho funcional em um grupo de pacientes com lombalgia crônica

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a major musculoskeletal system problem and generates high costs for the health system. Regardless of etiology, chronic low back pain patients tend to decrease their physical activities routine, thus impairing fitness and mood. So, it is necessary to establish the relationship among variables involved in the etiology of low back pain, which are noxious for patients' performance. This study aimed at comparing the distance covered during a six-minute walk test (6MWT) and the following psychosocial variables: mood perception and level of disability between chronic low back pain and healthy individuals.
METHOD: This was an observational transversal study with volunteers of both genders, sedentary, aged between 30 and 58 years, who were divided in control group (CG) and low back pain group (LG). Volunteers answered a battery of questionnaires, as follows: Oswestry Disability Index and Brunel Mood Scale to determine the level of disability and mood perception, respectively. Then, volunteers made the 6MWT.
RESULTS: LG (25.44 ± 14.3%) had significantly higher levels of disability as compared to CG (1.25 ± 2.1%). It was also observed that LG had significantly higher levels of stress, fatigue and mental confusion as compared to CG.
CONCLUSION: Low back pain patients were no different from their pain-free peers in six-minute walk test performance, depression, anger and vigor mood state. However, they presented higher levels of disability and poorer indices of fatigue, stress and mental confusion mood states.
Keywords: Disability and health, International Functional Classification, Low back pain, Mood disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um dos principais problemas do aparelho musculoesquelético e gera alto custo para o sistema de saúde. Independente da etiologia, os portadores de dor lombar crônica tendem a reduzir sua rotina de atividades físicas, o que compromete o condicionamento físico e o estado de humor. Portanto, estabelecer a relação entre as variáveis envolvidas na etiologia da lombalgia prejudiciais ao desempenho entre os seus portadores se faz necessário. O objetivo deste estudo foi comparar a distância percorrida no teste de caminhada de seis minutos (TC6) e as variáveis psicossociais: percepção de humor e nível de incapacidade entre portadores de dor lombar crônica e sujeitos saudáveis.
MÉTODO: Estudo observacional transversal cuja amostra foi composta por voluntários de ambos os sexos, sedentários, com idade entre 30 e 58 anos, dividida em grupo controle (GC) e grupo lombar (GL). Os voluntários responderam a uma bateria de questionários: a saber, o Índice de Incapacidade de Oswestry e a Escala de Humor de Brunel para determinação do nível de incapacidade e da percepção de humor, respectivamente. Em seguida, realizaram o TC6.
RESULTADOS: O GL (25,44 ± 14,3%) apresentou níveis de incapacidade significativamente maiores que o GC (1,25 ± 2,1%). Também se observou que o GL apresentou níveis de tensão, fadiga e confusão mental significativamente mais alto que o GC.
CONCLUSÃO: Portadores de dor lombar crônica não apresentaram diferença, em relação aos seus pares livres de dor, no desempenho do TC6, no estado de humor de depressão, de raiva e de vigor. Contudo, apresentaram maiores níveis de incapacidade e piores índices no estado de humor de fadiga, de tensão e de confusão mental.
Descritores: Classificação Internacional de Funcionalidade, Dor lombar, Incapacidade e saúde, Transtornos de humor.

INTRODUCTION

Low back pain is irregular and intermittent, generating different functional limitation levels and impairing daily activities.

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In addition, chronic low back pain patients tend to feel unable to carry out their daily activities and often have a strong belief that any functional activity will worsen pain or cause some physical impairment or limitation. This leads individuals to refuse to perform their common activities, leading to pain, immobilization and pain vicious circle[1].

From the psychosocial point of view, it is observed that individuals with musculoskeletal pain develop the chronic pain syndrome, which is related to fear of performing activities triggering pain and/or generating disease recurrence. This behavior brings physical and psychological disorders which contribute to disease chronicity[3].

Health professionals dealing with chronic low back pain patients should be concerned not only with motor manifestations of such disorder, but also with psychosocial relationships, which involve patients' emotional conditions, characterized by major mood state oscillations, with a feeling of hostility with regard to others and themselves[4].

As from already described data, it seems justifiable to ask whether there are differences between healthy and chronic low back pain individuals with regard to functional tests performance and psychosocial variables which may influence such performance. Answers to these questions would be an important step toward orienting evaluation routines and the development of therapeutic goals in the rehabilitation field.

Primary hypothesis raised by this study is that chronic low back pain patients have poorer functional tests performance as compared to their pain-free peers and also that some psychosocial indicators, such as level of disability and mood states, are worsened in such subjects.

So, this study aimed at comparing the distance covered in the six-minute walk test (6MWT) and the following psychosocial variables: mood perception and disability level between low back pain patients and pain-free individuals.

METHOD

This was an observational transversal study carried out after sample calculation determined by the variable "distance covered in 6MWT", normalized by the predicted distance for the same test according to age, gender, height and body mass of volunteers (WinPepi software version 11.18; power = 0.18; significance level 5%; DC control group (CG) = 0.12; DC low back pain group (LG) = 0.18; difference to be detected = 0.8; n = 9 for each group) with chronic low back pain, of both genders, aged between 25 and 59 years, from the Physical Rehabilitation Center, State University of Western Paraná (UNIOESTE).

Patients were recruited in an intentional and non probabilistic manner to compose LG. CG was made up of individuals without systemic or musculoskeletal, chronic or acute disorders in lower limbs or spine and were paired by age, weight and height with regard to LG. Volunteers from both groups could not be smokers or former smokers for a period less than five years; should not practice systematized and routine physical exercises two or more times a week for at least 30 minutes; should not have visible postural misalignments.

After explaining the objectives and procedures of the study to volunteers, participants were submitted to a screening evaluation to collect anthropometric data and to identify possible non inclusion or exclusion criteria.

For CG, inclusion criterion was availability to participate in evaluations and tests in predetermined days and times.

For LG, inclusion criteria were: individuals with specific low back pain persisting for more than three months, the clinical and physical characteristics of whom would be compatible with evaluation and treatment guidelines proposed by the American College of Physicians and by the American Pain Society, in category 2 (low back pain potentially associated to radiculopathy or spinal stenosis)[5].

Non inclusion and exclusion criteria specific for LG were: individuals with low back pain and history suggesting classification in categories 1 (nonspecific low back pain) and 3 (low back pain potentially associated to other specific spinal cause) of the evaluation and treatment guidelines proposed by the American College of Physicians and by the American Pain Society, which include a small number of patients with severe or progressive neurological deficits or conditions requiring immediate evaluation (such as tumor, infection or cauda equina syndrome), patients with other conditions which may respond to specific treatments (such as ankylosing spondylitis and other rheumatic diseases and/or compression vertebral fractures)[5], as well as patients with acute pain or worsened presentation equal to or above seven by the visual analog scale (VAS).

Non inclusion and exclusion criteria common to both groups were: patients with history of spinal surgery; volunteers with cognitive deficits; pregnant volunteers or individuals with cardiovascular diseases where exercises were contraindicated; volunteers without hemodynamic conditions favorable to perform 6MWT, decompensated hypertensive subjects, history of cardiopathy, pneumopathy and/or neuropathy.

Once the sample was selected, questionnaires were applied to determine the level of disability, mood perception and kinesiophobia, being the latter applied only to LG and used just to characterize this group.

Disability level was determined by the Brazilian Version of Oswestry Disability Index adapted from the original – version 2.0, with recognized reliability (α Cronbach = 0.87; CCI = 0.99)[6]. This is a questionnaire with 10 questions, each one with six possible answers, which reflect the impact of low back pain on individuals' daily and social activities. Volunteers were scored (in absolute values) from zero to five according to the answers given to each question. The first option corresponded to zero and the last to five. So, five was the maximum score for each question and 50 was the maximum score for the questionnaire as a whole. If any question was not answered, total score obtained by the questionnaire was divided by the maximum possible total for the questionnaire, without considering the score of the excluded question. Scores are shown in percentages.

Mood perception was obtained by Brunel Mood Scale

(BRUMS) in a version translated and validated for the Portuguese language[7]. Its validation had good internal consistency with alpha Cronbach values above 0.70, thus being a reliable tool to measure Brazilian mood. This scale provides a fast measurement of mood state through six markers (subscales), as follows: tension (musculoskeletal tension), depression (depressive mood state), anger (hostility), vigor (state of energy, enthusiasm and activity), fatigue (exhaustion, apathy and low level of energy), and mental confusion (stunning).

The higher the score of each subscale, the higher the representation of the evaluated item. Each subscale has four items and each item receives a score varying in integers from zero to four. So, the score of each subscale goes from zero to 16. The scale was delivered in printed sheets to volunteers who checked, for all 24 items of the scale (4 items x 6 subscales), the score that better described what they were feeling at that exact moment with regard to the item: 0 (nothing), 1 (a little), 2 (moderately), 3 (a lot), 4 (extremely). This scale was reapplied in two other moments. Scores of each subscale were individualized for statistical analysis.

Kinesiophobia index for LG, expressed in points, was 41.4 ± 8.9. Kinesiophobia was evaluated by the Brazilian Version of the Tampa Kinesiophobia Scale[3]. This is a self-applicable questionnaire made up of 17 questions addressing pain and intensity of symptoms. Scores vary from one to four being that "totally disagree" corresponds to one point, "partially disagree" corresponds to two points, "partially agree" to three points, and "totally agree" to four points. To obtain the final score, it is necessary to invert the scores of questions 4, 8, 12 and 16. Final score may be at least 17 and at the utmost 68 points, being that the higher the score, the higher the level of kinesiophobia.

Functional capacity was measured by the six-minute walk test (6MWT)[8]. Initially, volunteers remained at rest for five minutes before the test for hemodynamic normalization and then vital signs were collected: heart rate (HR), respiratory rate (RR) and blood pressure (BP). Those with BP above 150/100 mmHg or HR above 110 bpm were excluded from the study. 6MWT was applied in a 30-meter length corridor delimited by a metrically marked strip, in flat surface where volunteers would walk outward and back, many times as necessary, within the time limit of 6 minutes, with standardized verbal stimuli. Volunteers mean HR was monitored by a frequency counter.

Participants were oriented to walk as fast as possible, however without running, until the investigator would request them to stop after six minutes of data collection. They were also asked to slow down or even to stop the test in case of chest pain, respiratory difficulty and discomfort, severe muscle pain, dizziness or nausea. Vital signs were again measured immediately after the test and the distance covered by each one was recorded.

Figure 1 shows the sequence of methodological procedures.

As from anthropometric data collected during screening, predictive distances for volunteers age, gender, height and body mass were calculated and considered as reference values by equations proposed by the literature[9]: males – predicted distance (m) = 7.57 x height [m] – (5.02 x age [years]) – (1.76 x body mass [kg]) – 309 m; females – predicted distance (m) = (2.11 x height [m]) – 5.78 x age [years]) – 2.29 x weight [kg] + 667 m.

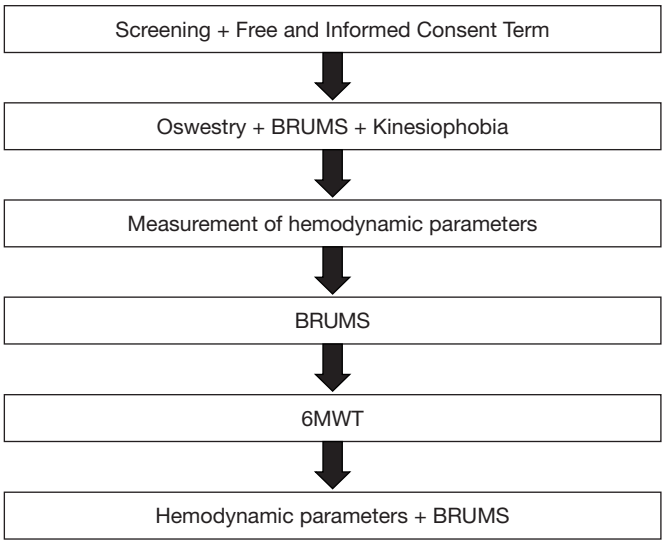


Figure 1 – Sequence of methodological procedures.
Oswestry Disability Index and Brunel Mood Scale.

Statistical analysis

6MWT data were normalized dividing the test value by the predicted value (covered/predicted distances ratio). Normalization has helped seeing how much the test value got close to predicted value, so that: ratio >1 individual did not reach the predicted value; ratio = 1 test value was equal to predicted value; and ratio > 1 test value was higher than predicted value. The SPSS 15.0 software was used for statistical analysis. Mann-Whitney U test was used for comparisons, with α = 0.05.

The size of the effect for each variable considering power of effect as low (r value from 0.10 to 0.29), medium (r value from 0.30 to 0.49) and high (r value > 0.50) was calculated. The size of the effect is an objective and standardized measure of the magnitude of a given observed effect regardless of statistical significance.

This study was approved by the Human Research Ethics Committee, UNIOESTE, opinion 015/2012.

RESULTS

Final sample was: CG (n = 8) and LG (n = 9). There has been no difference in anthropometric data and age between groups. Table 1 shows mean values with their respective standard deviations and comparative statistics. Mean duration of pain chronicity, in months, for LG was 101.3 ± 99.4, with minimum of 12 and maximum of 348 months.

Although without significant differences in walking ratio

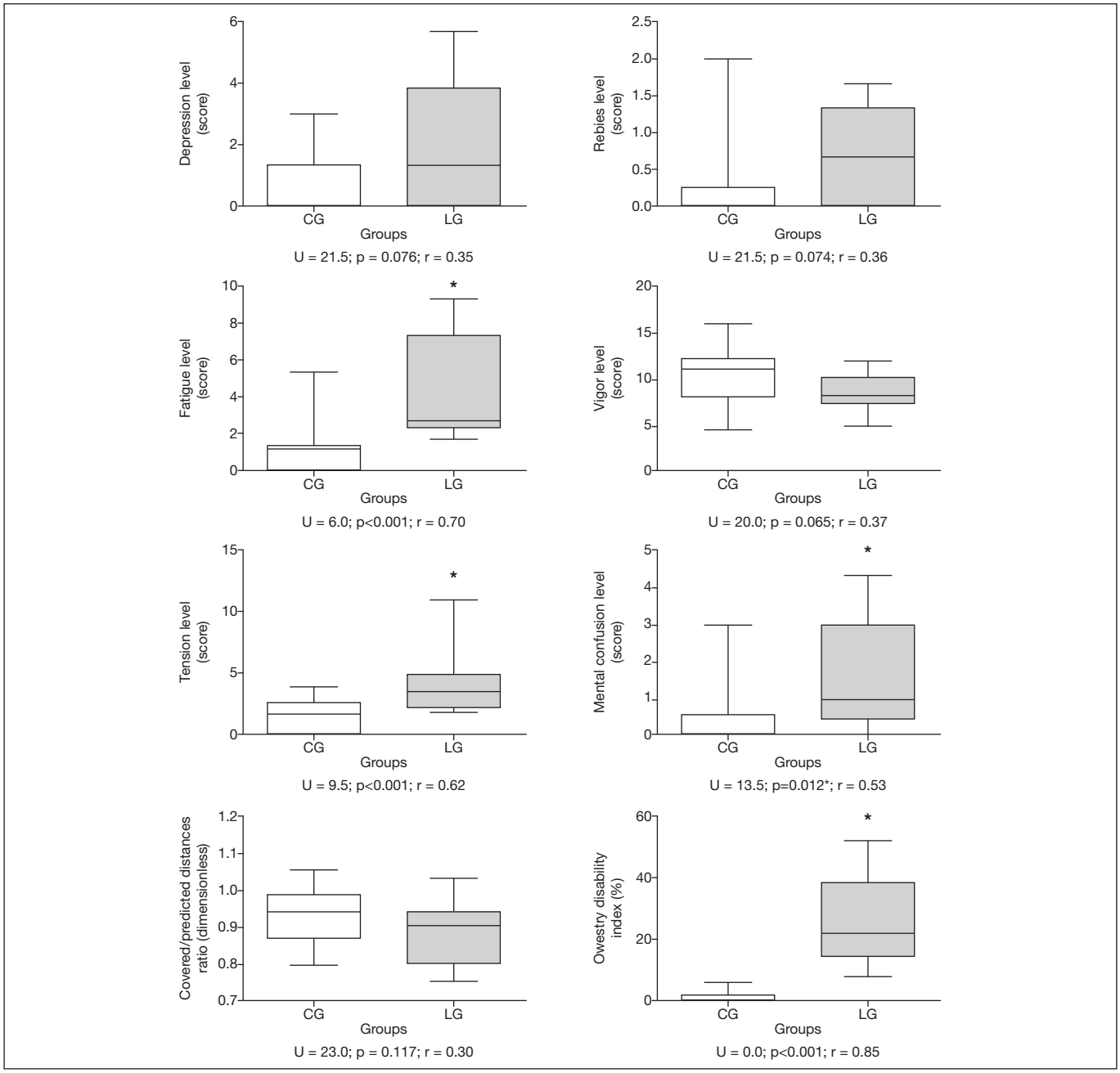
Table 1 – Intergroup descriptive and comparative statistics among variables characterizing the sample.

Variables Comparative Statistics	Groups	Mean	Standard Deviation
Height (cm) T(15) = 0.893; p = 0.385	Control	170.0	8.0
	Low back pain	166.5	7.9
Age (years) T(11.8) = 0.338; p = 0.741	Control	41.5	5.3
	Low back pain	40.1	10.9
Body mass (kg) T(15) = 1.295; p = 0.214	Control	79.7	10.6
	Low back pain	72.1	13.4
Body mass index (kg/m^2) T(15) = 0.763; p = 0.457	Control	27.4	3.4
	Low back pain	25.7	5.5

(predicted/covered), LG volunteers had disability levels significantly higher as compared to CG.

It was also observed that LG had significantly higher levels of tension, fatigue and mental confusion as compared to CG. Graph 1 shows descriptive and inferential statistics for all variables (depression, anger, fatigue, vigor, tension, mental confusion indices, in addition to covered/predicted distances and Oswestry Disability Index).

For all comparisons, the size of the effect (r value) has varied from moderate to high, being high for all significant comparisons and moderate for those without statistical significance.



Graph 1 – Descriptive and inferential statistic of intergroup comparisons for mood state, capacity level and covered/predicted distances ratio variables, as well as size of the effect (r value) for each comparison.

*Statistical difference for LG as compared to CG.

DISCUSSION

The hypothesis of this study was only partially confirmed, since there was no difference between CG and LG in 6MWT performance and in some psychosocial variables (depression, anger and vigor); however, there have been significant differences in other psychosocial variables (disability level, fatigue, tension and mental confusion).

It was expected that LG volunteers would perform 6MWT with poorer results as compared to CG, even because the former had high kinesiophobia scores. Some authors suggest that the fear of feeling pain is significantly related to poor functional performance of chronic low back pain individuals[10]. Another important observation of this study was that, in addition to high kinesiophobia scores, LG had disability levels significantly higher as compared to CG.

A possible explanation for the lack of difference in 6MWT performance between groups is given by Lee et al.[11], who have reported that chronic low back pain individuals tend to walk slower, however, when stimulated, as it is the case with 6MWT, they are able to walk as fast as their pain-free peers.

Although tests to measure low back pain impact on the performance and life of people are important guides for the clinical approach, such tests not always reflect the multiplicity of influencing factors affecting pain. Disability level in our study was measured by a self-reported assessment tool. Wand et al.[12] state that, in spite of self-reported disability and functional capacity measurements based on performance tests being moderately related, they are influenced by different patient characteristics. Self-reported measurements are more influenced by psychological conditions than those based on performance.

When mood and chronic low back pain factors were analyzed, LG participants had more depression, anger, fatigue, tension and mental confusion and less vigor as compared to CG, although only tension, fatigue and mental confusion had statistically significant values. With this, one may infer that symptoms related to chronic low back pain are related to poorer mental health of LG participants, while CG was closer to a positive mental health model. For Sardá Jr., Kupek and Cruz[13], symptoms related to low back pain and to lumbosciatic pain have linear correlation with patients' psychological changes.

Fatigue, one statistically significant sub-item, represents a state of exhaustion, apathy and low level of energy, and may induce attention, concentration, sleep and memory disorders, in addition to irritability. This affects the process of beginning of psychosomatic, physiological and psychic problems[14].

Both tension and mental confusion were significantly higher for LG indicating mood states impairment. It is suggested that chronic low back pain patients have discrepancies among their current condition (as they are at that moment), their ideal condition (how they would like to be), their necessary condition (the one they believe they are forced to be) and their feared condition (the one they are afraid to be).

So, self-discrepancies are understood as differences between the way someone sees himself and how he would like to see himself. These self-discrepancies have been shown to be associated to high levels of depression, anxiety, stress and pain. However, it is believed that each type of self-discrepancy is associated to different physical and behavioral characteristics. Self-discrepancy with regard to feared condition seems to be the most important to determine mood state[15]. Nevertheless, our study has not investigated self-discrepancy characteristics of the sample.

In evaluating sub-item depression, this study has not found a significant result when comparing LG and CG. This result is different from other studies[13,15], which have obtained a relationship between chronic low back pain and depression. A possible theory to explain this result is that Brunel Mood Scale might not identify depression per se, but rather a depressive mood state. It is possible that increasing the frequency of data collection could be a strategy to make the tool sensitive to capture depressive mood state oscillations in a more consistent way.

This study was limited because pain duration was not controlled in the statistical analysis since, as observed from standard-deviation, there has been a high amplitude between the volunteer with the shortest pain duration and the volunteer with the longest pain duration. The primary contribution of this study, which comes only to reinforce what is recommended by other investigators, is that, in the clinical practice, it is necessary a biopsychosocial approach for the treatment of chronic low back pain patients since they present not only physical health, but also mental health weakness, showing that mind and body are inextricably interlinked.

CONCLUSION

Chronic low back pain patients participating in this study were no different from their pain-free peers, in the 6MWT performance, in depression, anger and vigor mood states. However, they had higher levels of disability and poorer fatigue, tension and mental confusion states indices.

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