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ORIGINAL RESEARCH

Can demographic and anthropometric characteristics predict clinical improvement in patients with chronic non-specific low back pain?

Q1 **Indiara Soares Oliveira*, Leonardo Oliveira Pena Costa, Alessandra Narciso Garcia, Gisela Cristiane Miyamoto, Cristina Maria Nunes Cabral, Lucíola da Cunha Menezes Costa**

Masters and Doctoral Program in Physical Therapy, Universidade Cidade de São Paulo (UNICID), São Paulo, SP, Brazil

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Abstract
Objective: To identify potential prognostic factors that may predict clinical improvement of patients treated with different physical therapy interventions in the short-term.
Methods: This is a prospective cohort study. A total of 616 patients with chronic non-specific low back pain treated with interventions commonly used by physical therapists were included. These patients were selected from five randomized controlled trials. Multivariate linear regression models were used to verify if sociodemographic characteristics (age, gender, and marital status), anthropometric variables (height, body mass, and body mass index), or duration of low back pain, pain intensity at baseline, and disability at baseline could be associated with clinical outcomes of pain intensity and disability four weeks after baseline.
Results: The predictive variables for pain intensity were age ($\beta = 0.01$ points, 95% CI = 0.00 to 0.03, $p = 0.03$) and pain intensity at baseline ($\beta = 0.23$ points, 95% CI = 0.13 to 0.33, $p = 0.00$), with an explained variability of 4.6%. Similarly, the predictive variables for disability after four weeks were age ($\beta = 0.03$ points, 95% CI = 0.00 to 0.06, $p = 0.01$) and disability at baseline ($\beta = 0.71$ points, 95% CI = 0.65 to 0.78, $p = 0.00$), with an explained variability of 42.1%.
Conclusion: Only age, pain at baseline and disability at baseline influenced the pain intensity and disability after four weeks of treatment. The beta coefficient for age was statistically significant, but the magnitude of this association was very small and not clinically important.

* Corresponding author at: Endereço:Rua Cesário Galeno 448, Tatuapé, CEP: 03071-000 São Paulo, Brazil.
E-mail: indiara.doc@gmail.com (I.S. Oliveira).

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Introduction

Low back pain is a highly prevalent condition worldwide, and in some cases, it can be severely disabling.[1] Recent studies show that this condition is associated with loss of function and often related to poorly adapted changes in how patients perceive and interpret their pain.[2] The Global Burden of Disease identified low back pain as one of the highest-ranking health conditions in terms of years lived with disability.[3] In Brazil, the National Household Sample Survey[4] pointed to low back pain as the second most prevalent health condition,[4] with the prevalence[5] of chronic low back pain (present for more than 12 weeks)[6] varying between 4.2% and 14.7%. In addition, in 2011, low back pain was listed as the main cause of disability among retirement and accident compensation recipients, with an incidence of 29.96 per 100,000 social security payers. These estimates were more frequent among men and older people.[7]

An Australian study that included patients with acute low back pain (i.e., with a pain duration of up to six weeks)[6] who sought primary health care showed that a higher pain intensity may be associated with female gender, advanced age, intake of medication, and duration of low back pain episode.[8] Other studies on prognostic factors and their influence on recovery from low back pain showed several prognostic factors related to low back pain: sociodemographic data such as educational level, age, and gender; physical factors such as pain intensity and perceived disability; psychological factors such as depression, anxiety, fear related to movement, and catastrophizing of symptoms; and occupational factors.[9–15] A systematic review that investigated the prognostic factors related to persistent disabling low back pain showed that sociodemographic data (age, gender, smoking, weight, and educational level) could not correctly predict disability in patients with low back pain.[16]

In summary, prognostic factors can be useful to provide information related to clinical decision making and understanding the process of prediction and definition of groups that may present risks of poor prognosis.[16–19] This information is especially important when modifiable prognostic factors are evident. Considering that, as aging increases in the world's population[20] and with the estimate that approximately one-third of the adult population is overweight,[21] there has been growing interest in the search for these prognostic factors and their association with the recovery in patients with low back pain.[16–19] In the same way, it is unclear whether demographic and anthropometric characteristics can influence the rate of clinical improvement in patients with chronic non-specific low back pain. Therefore, the objective of this study is to identify prognostic factors that can predict clinical improvement of pain intensity and disability of patients treated with physical therapy interventions in the short-term.

Methods

Study design

This is a prospective cohort study. Participants with chronic non-specific low back pain were selected from five randomized controlled trials,[22–26] conducted in public and private clinics in Brazil between 2011 and 2014. The studies samples ranged from 86[23,25] to 148[22,24,26] patients with chronic non-specific low back pain who received the following physical therapy interventions: Pilates,[23,25] Kinesio Taping,[22,26] McKenzie therapy,[24] exercise and manual therapy,[22] and education.[25] All patients were evaluated by a blinded assessor before and after the treatments, which lasted four weeks on average. All studies were previously approved by the Universidade Cidade de São Paulo (São Paulo/SP, Brazil) Research Ethics Committee (Process numbers: 13469394,[24] 13508130,[25] 13610106,[23] 13603502,[26] and 254063[22]). All patients signed a consent form prior to participation on these trials.

Participants

Patients with chronic non-specific low back pain (with a duration of symptoms greater than 3 months) of both genders and aged between 18 and 80 years were included. Patients with any contraindication to physical activity and/or the treatments proposed by the studies were excluded.[22–26] Pregnant patients, patients with previous spinal surgery, severe spinal pathologies, and lumbar pain due to nerve root compression were also excluded. For this study, no sample size calculation was performed, since the data were selected from the studies mentioned previously.

Data collection

The following data included at baseline assessment of all five studies[22–26] were included for analysis: (a) sociodemographic data (age, gender, and marital status); (b) anthropometric data (height, body mass, and body mass index – BMI); (c) duration of low back pain; and (d) clinical outcomes (pain intensity and disability) measured at baseline and after four weeks of intervention.

Assessment of the clinical outcomes

Pain intensity

Pain intensity was measured in all of the studies[22–26] by means of the Pain Numerical Rating Scale composed of 11 points, ranging from 0 (no pain) to 10 points (worst possible pain).[27,28] This scale has already been translated and adapted into Brazilian Portuguese and has good levels of reliability: ($ICC_{2,1}$ = 0.85, 95% CI: 0.77–0.90), internal consistency (Cronbach's alpha between 0.88 and 0.90), responsiveness (standardized effect size of 1.16), and construct validity. This scale has adequate measurement properties which is similar to the original version.[28]

Disability

The disability associated with chronic low back pain was assessed in all studies[22–26] by the Roland Morris Disability Questionnaire.[28–30] This questionnaire consists of 24 yes/no questions describing daily situations that patients have difficulty performing due to low back pain.[27,29,30] Each affirmative answer corresponds to one point.[29,30] The total score is determined by the sum of the affirmative answers and can range from 0 to 24 points, and the higher the score,

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