Relationship between seeking health care and expansion of pain in patients with non-specific chronic low back pain.

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Abstract

Objectives: Low back pain (LBP) is considered the most prevalent musculoskeletal problem, which implies a high rate of chronicity. The chronicity of symptoms can lead to a high expansion of pain. The main objective of this study was to assess whether there were differences between patients with non-specific chronic LBP (CLBP) who sought healthcare compared to those who did not seek healthcare in terms of the expansion of their pain.

Methods: Ninety subjects participated in the study divided into three groups (30 patients who sought help, 30 patients who did not seek help and 30 asymptomatic subjects). We analyzed somatosensory variables (two-point discrimination and expansion of pain), psychological variables (anxiety, depression, fear of movement and disability) and functional variables (range of motion, dynamic balance).

Results: Patients who sought help showed significant differences in pain expansion and pain intensity with respect to the group who did not seek help with a medium effect size (0.50-0.79). The regression model for the care seekers group showed that the dynamic balance with the left leg and depression were predictors for the percentage pain surface area (34.6%). The combination of dynamic balance, range of movement in flexo-extension and depression were predictors for the widespread pain (48.5%).

Discussion: Patients who sought care presented greater pain expansion than patients who did not seek care. The combination of functional and psychological variables can significantly predict the expansion of pain in non-specific CLBP patients who seek help.

Key Words: Chronic pain, Pain expansion, Psychosocial factors

Introduction

Low back pain (LBP) is considered the most prevalent musculoskeletal problem and the fourth leading pathological cause of disability, which implies a high rate of chronicity and absenteeism (Hoy et al., 2012). Around 20–25% of the world's population experience chronic pain, which is characterized by needing a longer time period for tissue healing and involving a series of plastic maladaptive changes at the medullary and supramedullary levels (Hashmi et al., 2013). In addition it is~~´s~~ observed that subjects with chronic LBP (CLBP) can present an alteration in the functionality, affecting not only physical variables but dynamic stability or range of movement. A ~~R~~recent meta-analysis showed differences in lumbar pain patients related to range of motion and function. Sadler et al. analyzed data of 5459 participants (Sadler, Spink, Ho, De Jonge, & Chuter, 2017) and found that lateral flexion and hamstring range of motion were associated with an increased risk of pain in the lumbar region. Also, others found differences to the same degree and proprioception alterations related to chronic pain (Laird, Gilbert, Kent, & Keating, 2014; Tong et al., 2017). All of these~~is~~, might contribute to the development of central sensitization processes due to sustained nociceptive input (Calvo-Lobo et al., 2017; Cameron, Kool, Estévez-López, López-Chicheri, & Geenen, 2018; Ferreira-Valente, País-Ribeiro, & Jensen, 2014; López-López et al., 2017). ~~This process can be determined by the possible presence of~~As such, the pain can be classified as nociplastic pain. Such pain is defined, on the basis of literature, as a pain that arises from an alteration of the nociceptive function in the ~~presence~~ absence?? of a real injury or threat, thus affecting the somatosensory system, and generating adaptive neuroplastic changes at the cortical and medullary levels. This results in an exacerbation and a recurrence of pain (Hashmi et al., 2013; Zusman, 2002).

Met opmerkingen [MM1]: What is meant?

Met opmerkingen [MM2]: Increased? Does it concern a positive correlation?

It has been observed that the presence of LBP is an important public health problem as it has a high impact on the quality of life of patients. This is why there are numerous studies that aim to evaluate what factors lead a patient to seek professional help. (Buchan, Duggan, Hargreaves, Scott, & Slawomirski, 2016; IJzelenberg & Burdorf, 2004; Traeger, Buchbinder, Elshaug, Croft, & Maher, 2019). A systematic review shows that the prevalence of use of the health system in Europe for LBP is 48% (Beyera, Brien, & Campbell, 2019). Research studies show that this search for help influences sociodemographic variables such as age, then other variables related to pain experience like pain intensity, frequency of pain episodes, disability, and chronicity of symptoms and finally cognitive variables (Jacob, Zeev, & Epstein, 2003; Mannion, Wieser, & Elfering, 2013; Szpalski, Nordin, Skovron, Melot, & Cukier., 1995).

There is a clinical problem and in turn a lack of evidence regarding what the search for help influences the pain experience. There is a clinical problem and in turn, a lack of evidence regarding how the search for help influences the pain experience. Research studies show that patients seeking health help may develop external control locus, high disability and influence of psychological factors, but in no case has it been studied how this can influence the search for help on the expansion of pain (Ferreira et al., 2010; Rollman, A., Visscher, C. M., Gorter, R. C., & Naeije, 2012; Rollman, A., Gorter, R.C., Visscher, C.M., & Naeije, M.M, 2013).

The expansion of pain is an important clinical variable as it gives us a lot of information. Reis et al., showed that regions related to emotions and cognition have been studied previously in patients with chronic pain. They cause changes in brain function and are related to the expansion of pain in various body regions (Reis et al., 2018). In particular, more widespread pain (WP) is associated with high rates of anxiety and depression but still evidence is scarce (Hagen, Linde, Heuch, Stovner, & Zwart, 2011; Ris et al., 2019)

Met opmerkingen [MM3]: Abrupt transition

Met opmerkingen [MM4]: Correct sentence?

Met opmerkingen [MM5]: How?

Met opmerkingen [MM6]: repetition

Met opmerkingen [MM7]: do they develop this?

Met opmerkingen [MM8]: Rewrite: language and message not clear

There is still a lack of evidence of how the search for help influences the expansion of pain and that other types of physical and somatosensory variables maintain a relationship with the expansion of pain. The main objective of this study was to assess whether there were differences between patients with non-specific CLBP who sought health care compared to those who did not seek healthcare in terms of the expansion of their pain. The secondary objective was to determine what factors predictive of greater pain expansion are present in patients with non-specific CLBP based on their search for help.

Met opmerkingen [MM9]: Again repetition

Met opmerkingen [MM10]: which

Material & Methods

The methods used are partially similar to those described by Grande-Alonso et al., 2019 (Grande-Alonso et al., 2019).

Design and Sample

The study is a cross-sectional study design with a non-probabilistically sample was used to assess somatosensory, physical and psychosocial variables in patients with non-specific CLBP that seek or do not seek care and asymptomatic subjects. The trial was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (von Elm et al., 2008). Following the Helsinki Declaration, Ethics Committee approved (PI-2567) our study for Clinical Research of a public reference hospital in Madrid (Spain) and written informed consent was obtained from all participants.

The participants were recruited between April 2017 and January 2018. The sample was recruited from our university campus and the local community through flyers, posters, and social media and outpatients of a primary health care center in Madrid, Spain.

A consecutive non-probabilistic convenience sample of 90 subjects was recruited. Participants were classified as: group 1 was composed of 30 patients with non-specific

CLBP who do not seek care, group 2 was composed of 30 patients with non-specific CLBP who sought health care and group 3 was composed of 30 asymptomatic subjects. Symptomatic subjects were assigned in one group or another according to ~~seek or not seek care~~their care-seeking behavior from health professional for their musculoskeletal condition. Those patients who at no time went to any health professional for their problem were classified in the non-care seekers group. Flyers were placed at the university center and also at the local community, and those patients with CLBP who were not seeking treatment, were recruited. On the other hand, those patients who have gone to a primary care doctor due to the presence of CLBP were classified in the care seekers group. It is therefore, these patients had an intention to be treated.

Patients with non-specific CLBP were selected if they met the inclusion criteria defined by NICE in the LBP Guidelines defines the nature of LBP as a "Tension, soreness and / or stiffness in the lower back region for which it is not possible to identify a specific cause of the pain. Several structures in the back, including the joints, discs and connective tissues, may contribute to symptoms" (Savigny, Watson, & Underwood, 2009), The following criteria were also taken into account on the basis of a previous investigation (Grande-Alonso et al., 2019): (a)time with pain: LBP for at least the prior 3 months; (b) LBP of a nonspecific nature; (c) age: men and women aged 18 to 65 years (Carmona, Ballina, Gabriel, & Laffon, 2001); (d) frequency of pain: LBP for at least 10 days per month (Goubert, Danneels, & Graven-nielsen, 2017); the time between seeking care and recruitment was between 5-7 days and (e) an intensity of pain of between 3 and 10 on the Visual Analogue Scale (VAS).

Subjects were excluded if they met one of the following exclusion criteria: (a) comorbidities: the presence of neurological signs (such as weakness perceived in the lower limbs), systemic rheumatic disease (including fibromyalgia) or central nervous

system disease; (b) the presence of psychiatric diagnosis or severe cognitive impairment; (c) illiteracy; (d) understanding or communication difficulties; and (e) insufficient Spanish language comprehension to follow measurement instructions.

Finally, asymptomatic subjects were excluded if they had a history of spinal pain, or another condition of chronic pain or they had a diagnosis of any systemic disease.

Procedure

The procedure was similar to that described by Muñoz-García et al., 2016 and Grande-Alonso et al. 2019 (Grande-Alonso et al., 2019; Muñoz-García, Lopez-Uralde-Villanueva, Beltrán-Alacreu, La Touche, & Fernández-Carnero, 2016). After consenting to participation, all the recruited participants received a sociodemographic questionnaire to complete on the day of the measurement, which collected gender, date of birth and educational level. Next, each participant had to complete a set of self-report measures and we evaluated the pain drawings in the seek care group and do not seek care group.

Met opmerkingen [MM11]: care-seeking

Met opmerkingen [MM12]: non care-seeking?

Next, the evaluator conducted a semi-structured interview with each of the patients in which questions were asked about their symptomatology (e.g., intensity, frequency or severity of symptoms), demographic questions and certain questions to determine if they were in search of treatment or not, based on previous literature (Macfarlane, TV; Blinkhorn, AS; Davies, RM; Kincey, J; Worthington, 2003; Rollman, A., Gorter, R.C., Visscher, C.M., & Naeije, M.M, 2013). Finally, a physiotherapist instructed the patients in the physical test to be performed and they were supervised during the session. The first test that was performed was the evaluation of the two-point discrimination based on the protocol and then, the physiotherapist evaluated the range of movement in flexoextension and lateral flexion movements.

Measures Outcomes

Primary variable

Pain drawings

To measure the extent of ongoing pain spatially, each participant was asked to fill in a body pain diagram. Patients had to mark all areas in which they experienced pain. Later, according to Dos Reis et al, we use an electronically scanned version of the body diagram and open-source software to calculate the total body area in each pain diagram (F. J. Dos Reis, de Barros E Silva, de Lucena, Mendes Cardoso, & Nogueira, 2016). Based on the literature, we decided to calculate the percentage pain surface area (PPSA) and also the count for the number of pain sites in order to evaluate WP (Dragioti, Larsson, Bernfort, Levin, & Gerdle, 2017; Hägg et al., 2003; Persson, Garametsos, & Pedersen, 2011; Visser, Ramachenderan, Davies, & Parsons, 2014). Previous study with chronic pain patients (Muñoz-García et al., 2016) showed that both PPSA and WP measures could be helpful when assessing pain behavior. Firstly, PPSA show the percentage of pain drawing and secondly the WP calculates how spread is that magnitude along the body surface area.

It has shown to have good intrarater reliability with intraclass correlation coefficient (ICC) = 0.99; 95% confidence interval (CI) = 0.98 to 0.99; P < 0.001. The inter-rater reliability for the measurement was ICC = 0.989; 95% CI = 0.980 to 0.994; P < 0.001 (Dos Reis et al., 2016).

Secondary variables

Pain intensity

Self- reported pain was assessed using Spanish version of the Visual Analogue Scale (VAS). The VAS is a 100 mm line with 2 endpoints representing the extreme states “no

198 pain" and "pain as bad as it could be". It has shown to have good re-test reliability (r=0.94,
199 p>.001) (Bijur, Silver, & Gallagher, 2001).

200 *Frequency of pain*

201 The frequency of pain was evaluated by counting the days with pain during last
202 month(Grande-Alonso et al., 2019).

203 *Frequency of medication*

204 The frequency of medication was evaluated by counting the days that the patient had
205 taken medication for LBP in the last month (Grande-Alonso et al., 2019).

206 *Level of physical activity*

207 It was measured using the International Physical Activity Questionnaire in its short
208 version (IPAQ-SF). It consists of 9 items that quantify the time that the subject devotes
209 to perform any physical activity (PA) of vigorous or moderate intensity. This
210 questionnaire presents an ICC of 0.76 (95% confidence interval) (Craig et al., 2003).

211 *Two-Point discrimination*

212 Two-point discrimination test was evaluated with an aesthesiometer, presenting the test
213 an ICC of 0.81 (95% CI). Participants were positioned in prone decubitus. The evaluator
214 marked at 1 cm lateral of the spinous apophysis of L3 towards the dominant side of the
215 patient (Nolan, 1985). Testing was commenced with calipers set at 70 mm and the
216 evaluator was based on a protocol. The distance between the points was decreased in 10
217 mm until the patient was able to perceive only one point instead of two. The patients were
218 instructed to say "one" when they felt one point or "two" when they felt two points
219 (Catley, Tabor, Wand, & Moseley, 2013).

220 *Range of motion*

Range of motion was evaluated with a digital inclinometer based on the mobile application called iHandy®. It has shown to have good intrarater and interrater reliability with ICC over 0.80 (95% confidence interval) (Kolber et al., 2013). The protocol consisted of the following process; the patient was placed in standing with arms along the body; the physiotherapist had to mark the spinous process of T12 and S2 to place the mobile device; then the patient had to do a maximum trunk flexion (Bedekar, Suryawanshi, Rairikar, Sancheti, & Shyam, 2014). Next, the patient had to do a maximum trunk extension. Three measurements were made, and the average of the differences presented between the two reference points was calculated. Then, the physiotherapist added degrees of flexion and extension movements. Finally, the patient was placed in the same position with the mobile device placed on T12, being evaluated the movement of the complete lateral flexion (Bedekar et al., 2014).

Dynamic balance

Dynamic balance was measured using Y-Balance Test (YBT). This test is carried out with a single limb stance while simultaneously moving the nonstance limb in three different directions: anterior, postero-medial and postero-lateral (Plisky et al., 2009; Teyhen et al., 2014). The composite reach distance (%) is calculated by the sum of the 3 reach directions divided by 3 times the limb length per 100 (Shaffer et al., 2013). The YBT shows from a good to excellent intrarater (0.85-0.91) and inter-rater (0.99-1.00) reliability (Plisky et al., 2009).

Anxiety and depression

The anxiety and depression state were assessed with the Anxiety and Depression Scale (HADS). The scale has two subscales of 7 items each that measure anxiety and depression (De Las Cuevas-Castresana, García-Estrada Pérez, & Gónzalez de Rivera, 1995). The

HADS presented an internal consistency (Cronbach´s Alpha) at 0.80 to 0.93 for the anxiety and 0.81 to 0.90 for the depression subscales (Herrmann, 1997).

Fear of movement

Fear of movement was assessed using the 11-item Spanish version of the Tampa Scale of Kinesiophobia (TSK-11), it has a Cronbach's Alpha of 0.78 (Gómez-Pérez, López-Martínez, & Ruiz-Párraga, 2011). The final score can range between 11 and 44 points, with higher scores indicating greater perceived fear of movement.

Low back disability

Physical disability due to LBP was assessed using the Spanish version of the Roland-Morris Disability Questionnaire (RMDQ), it presented an internal consistency (Cronbach´s Alpha) at 0.84 to 0.93 and test–retest reliability ranging between 0.72 and 0.91 (Kovacs et al., 2002; Roland & Fairbank, 2000).

Sample Size

We conducted a pilot study to determine the effect size between non-care seekers non-specific CLBP and care seekers non-specific CLBP using pain drawing. The pilot study included 15 patients from each group and obtained an effect size (Cohen`s *d*) of 0.66. The sample size was estimated with G*Power 3.1.7 for Windows (G*Power© from University of Dusseldorf, Germany) (Faul, Erdfelder, Lang, & Buchner, 2007). We opted to use an independent t test in order to detect differences between both symptomatic groups for WP. Moreover, we used an alpha error level of 0.05, a statistical power of 80% (1-B error), and an effect size of 0.66. A total sample size of 60 patients (30 non-care seekers non-specific CLBP and 30-care seekers non-specific CLBP) was estimated to ensure reliability.

Data Analysis

The sociodemographic and clinical variables of the participants were analysed. The data were summarized using frequency counts, descriptive statistics, summary tables and figures.

The data analysis was performed using the Statistics Package for Social Science (SPSS 20.00, IBM Inc., USA). The categorical variables are shown as frequency and percentage. The quantitative results of the study are represented by descriptive statistics (confidence interval [CI], mean, and standard deviation [SD]). For all variables, the z-score was assumed to follow a normal distribution based on the central limit theorem since the groups had more than 30 participants (Kwak & Kim, 2017; Mouri, 2013; Nixon, Wonderling, & Grieve, 2010). The Student T-test was used for the non-specific CLBP group comparisons (months of pain, pain intensity, days of pain/month, days of medication/month, PPSA, WP and RMDQ). Cohen's *d* effect sizes were calculated for post hoc analysis of the outcome variables. According to Cohen's method, the magnitude of the effect was classified as small (0.20-0.49), medium (0.50-0.79), or large (0.80).

A one-way analysis of variance (ANOVA) was used to analyse numerical variables among asymptomatic subjects, seek care group and not seek care group (sociodemographic variables, TPD, ROMFE, ROMLF, CRDL, CRD R, HAD_D, HAD_A and TSK-11). Being the group the factor analysed. Significant ANOVA findings were followed up using a post hoc test and Bonferroni correction. We calculated the partial eta-squared (η_p^2) as a measurement of the effect size for each main effect and interaction in the ANOVAS. For this analysis, 0.010-0.059, 0.060-0.139, and > 0.14 represented small, medium and large effects, respectively (J Cohen, 1988; Jacob Cohen, 1973).

We examined the relationships between PPSA and WP with psychological, functional and somatosensory measures, being used Pearson correlation coefficients. A Pearson correlation coefficient >0.60, between 0.30 and 0.60, <0.30 indicated high, medium and low correlations, respectively (Hinkle, Wiersma, & Jurs, 1990).

A multiple linear regression analysis was performed to estimate the strength of the associations between the results of PPSA and WP. PPSA and WP variables were used as predictors. Considering the variables more strongly correlated with PPSA and WP, we performed the linear regression analysis. The strength of the association was examined using regression coefficients (B), P values and adjusted R^2. Standardized beta coefficients were reported for each predictor variable; included the final reduced models, in order to allow a direct comparison between the predictor variable and the criterion variable, which were studied. For data analysis, we used a confidence interval of 95% and a *p* value of less than 0.05.

Results

A total of 90 participants completed the investigation (30 patients with non-specific CLBP who seek care, 30 patients with non-specific CLBP who do not seek care and 30 asymptomatic controls). Table 1 shows sociodemographic characteristics of the study participants.

Primary variable

Pain expansion

Statistically significant differences have been observed in the pain drawing, being higher in care seekers (Figure 1 and Figure 2). One-way ANOVA revealed significant differences for pain drawings (F=14.49, p < .001, η p 2=.250). The post hoc analysis

showed statistically significant inter-group differences between patients with non-specific CLBP who do not seek care and patients with non-specific CLBP who seek care with a medium effect size (p = .009, d=-0.64). As well as, between asymptomatic controls and patients with non-specific CLBP who seek care with a large effect size (p < .001, d=-1.19).

Secondary variables

Pain intensity

The characteristics related to pain between patients with non-specific CLBP who seek care and patients with non-specific CLBP who do not seek care are shown in Table 2. One-way ANOVA revealed significant differences for pain drawings (F=156.67, p < .001, η p 2=.783). The post hoc analysis showed statistically significant inter-group differences between patients with non-specific CLBP who do not seek care and patients with non-specific CLBP who seek care with a medium effect size (p = .015, d=-0.60). Furthermore, the post hoc analysis showed significant differences between asymptomatic controls and both, patients with non-specific CLBP who seek, and who do not seek care with a large effect size (p < .001, d=-4.90, ad p < .001, d=-4.12, respectively).

Physical and somatosensory variables

One-way ANOVA revealed significant differences for two point discrimination (F=42.96, p < .01, η p 2=.506) flexo-extension movement (F=26.83, p < .01, η p 2=.390), movement in lateral flexion (F=13.51, p < .01, η p 2=.243), the composite reach distance with right leg (F=25.08, p < .01, η p 2=.374) and the composite reach distance with left leg (F=24.78, p < .01, η p 2=.371). For these variables, the post hoc analysis showed statistically significant differences between all the groups in two-point discrimination and

range of movement in flexo-extension. Being the most significant difference between care seekers and asymptomatic subjects ($F=41.54$, $p < .01$; $F=27.24$, $p < .01$) with a large effect size ($d=-1.06$). For range of movement in lateral flexion we found significant difference between care seekers and asymptomatic subjects with large effect size ($F=12.72$, $p < .01$, $d=-1.67$); as well as between care seekers and non-care seekers with medium effect size ($F=12.72$, $p < .01$, $d=.66$). Finally, we did not find significant difference for this variable between non-care seekers and asymptomatic subjects with medium effect size ($F=12.72$, $p < .01$, $d=-.52$) (Table 2).

For dynamic balance, we only found significant differences between care seekers with asymptomatic group with large effect ($d=-1.86$; $d=-1.83$) and non-care seekers with asymptomatic group with large effect size ($d=-1.35$; $d=-1.36$) for the right and left leg, respectively ($F=23.80$, $p < .01$; $F=23.59$, $p < .01$).

Psychological variables

One- way ANOVA revealed significant differences for Kinesiophobia ($F=17.10$, $p < .01$, $\eta p 2=.289$), anxiety ($F=5.09$, $p < .01$, $\eta p 2=.108$), and depression ($F=8.24$, $p < .01$, $\eta p 2=.164$). The post hoc analysis showed statistically significant differences between all the groups in Kinesiophobia, being the most significant difference between care seekers and asymptomatic subjects ($F=17.19$, $p < .01$) with a large effect size ($d=1.50$). For anxiety and depression variables, we found significant difference between care seekers and asymptomatic subjects with medium and large effect size ($F=5.37$, $p < .01$; and $F=8.65$, $p < .01$). There were no significant differences for these variables between non-care seekers and asymptomatic subjects (Table 3).

Correlation and regression analyses

Pearson correlation analysis showed only moderate correlation. It was observed between functional and psychological variables with the pain drawing in the care seekers group of patients with non-specific CLBP. The most significant correlations in this group were the relationship between the right and left dynamic stability with the number of pain sites ($r = -.540$, $p < 0.01$, $r = -.564$, $p < 0.01$), the relationship between depression and the number of pain sites ($r = .436$, $p < 0.05$) and the relation of the same variable to the PPSA ($r = .428$, $p < 0.05$). Finally, a negative correlation was also established between the flexo-extension range of motion and the PPSA ($r = -.391$, $p < 0.05$) and between the days of medication intake and the number of pain sites ($r = .393$, $p < 0.05$) (Table 4).

In contrast, in the group of patients with non-specific CLBP who did not seek help, we did not find any correlation between the main variable of the study and variables of a functional or psychological nature (Table 4).

The regression models for criteria variables (PPSA and WP) are presented in Table 5. The regression model for the non-specific CLBP care seekers group showed that a combination of composite reach distance with the left leg (%) and depression were predictors for the PPSA (34.6% of variance). The variables of composite reach distance with the right leg (%) and days of medication per month were excluded from the analysis. Instead of the combination of composite reach distance with the left leg, range of movement in flexo-extension and depression were predictors for the WP (48.5% of variance). The variable of composite reach distance with the right leg (%) was excluded from the analysis. For the non-care seekers group with non-specific CLBP, the regression analysis was not performed because no significant correlation was found with the main study variable.

Discussion

Expansion of pain and seek care

The main differences between patient's groups analyzed in this study ~~were in~~concerned the expansion of pain. Individuals who sought care had almost double the number of regions affected by pain than those who did not seek care. Those who sought care also had significantly higher anxiety than patients who did not seek health care, as well as those who were asymptomatic, with a medium effect size. In addition, a moderate positive correlation between the expansion of pain and depression, it was observed in individuals with non-specific CLBP who sought help.

The body pain diagram is a tool that provides relevant information. Its use has also been considered for assessing the psychological state of patients, due to, the greater the number of areas of pain, the greater impact psychological factors exert on the clinical condition (Haefeli & Elfering, 2006). In our study, individuals with greater pain expansion sought help and presented significantly greater anxiety and depression. These data agree with previous studies, in which patients with chronic pain in several body regions at the same time, had anxiety levels that were considered pathological, if they are compared to patients with more localized pain. Moreover they have greater depression and feelings of distress (Abbott, Foster, Hamilton, Ravenwood, & Tan, 2015; Muñoz-García et al., 2016). The evidence shows that pain expansion not only correlates with psychological variables but also correlates with somatosensory variables, such as the severity of symptoms or mechanical hyperalgesia (Ferrer-Peña, Muñoz-García, Calvo-Lobo, & Fernández-Carnero, 2018). Along these lines, our results have also shown that patients with a greater expansion of pain and who were in search of help, presented a greater alteration in the two-point discrimination, in the intensity of pain, the duration of symptoms and in the intake of medication per month. The expansion of pain and the presence of generalized allodynia include as an underlying neurophysiological

Met opmerkingen [MM13]: Care-seeking?

Met opmerkingen [MM14]: Strange sentence

mechanism a possible central sensitization process (Lluch-Girbés et al., 2016). This process might a reason why in our patients seeking help had a greater expansion of pain and so, they had greater pain intensity, a longer duration of symptoms and a greater involvement of psychological variables.

Functional and psychological variables and seek care

Met opmerkingen [MM15]: idem?

Individuals suffering from chronic pain might have difficulty performing activities of daily living which correlates with the intensity of their pain and disability (Esteve, Ramírez-Maestre, & López-Martínez, 2007; Ramírez-Maestre, Esteve, & López, 2008). Therefore, taking into account the studies on patients with temporomandibular dysfunction, seeking help could imply the presence of passive coping strategies, and these strategies have shown a correlation with a greater intensity of pain, less functionality and higher rates of disability (Alhowimel, Alotaibi, Radford, & Coulson, 2018; Du et al., 2017; Jackson, Wang, Wang, & Fan, 2014; Knittle et al., 2011). On the other hand, other studies have shown that among the most influential factors in the search for help are the intensity of the pain, the duration of the symptoms and the level of disability (Ferreira et al., 2010). This outcome concurs with our results. Given these variables, IT has shown significant differences based on the search for care, which leads to poorer results in all of these variables.

Psychological factors have a great influence on patients with chronic pain; the most influential ones are fear of movement, anxiety and depression. The results of this study showed significant differences between all study groups; presenting fear of movement it was the most notable difference between individuals with CLBP seeking help and asymptomatic individuals, with a large effect size. In relation to our results, one study showed that in patients with temporomandibular dysfunction, the decision to seek care

was correlated with a higher intensity of pain and with greater fear of movement (Rollman, A., Visscher, C.M., Gorter, R.C., & Naeije, M.M, 2012). This outcome is related to our results given, the patients with non-specific CLBP who sought health care, had higher rates of fear of movement than those who did not seek help, with a large effect size.

Our study showed that not only psychological variables influenced the search or not searching for treatment, but seeking help displayed a less discriminative capacity, with an average effect size, compared to those who did not seek help. Previous studies on CLBP without assessing care seeking behavior, observed a lower ability of patients when they discriminate between two points(Adamczyk, Luedtke, & Saulicz, 2017; Adamczyk, Luedtke, & Szikszay, 2018; Goubert et al., 2017). Preceding studies have observed that a non-specific CLBP status, without differentiating between seeking and not seeking an intervention, implies a lower two-point discrimination capacity. There were also no differences in this variable, when it is considered the pain component as nociceptive or neuropathic. Therefore, according with our results, it is essential to consider the search for help or lack of it, more than other types of classification that have already shown that there are not significant differences observed in functional and somatosensory variables.

Our study also revealed differences in the range of movement between all three groups, except lateral flexion between asymptomatic subjects and CLBP patients who did not seek help. Along these lines, a systematic review showed that subjects with LBP had a restriction of movement in lateral flexion (Sadler et al., 2017). Previously, a meta-analysis had showed that individuals with LBP, had a lower range of motion and a slower speed of execution compared to asymptomatic individuals (Laird, Gilbert, Kent, & Keating, 2014). This decrease in range of motion and speed of execution are correlated with

variables of a psychological nature, such as fear of movement (Thomas, France, Lavender, & Johnson, 2008).

Finally, in terms of dynamic stability, our results demonstrated significant differences between both symptomatic groups with respect to the asymptomatic group. Moreover, there were no differences based on their search for help. Throughout these lines, a recent study on patients with chronic hip pain, also showed that the dynamic stability in this population was altered and correlated with cognitive and sensory variables (Ferrer-Peña, Moreno-López, Calvo-Lobo, & López-de-Uralde-Villanueva & Fernández-Carnero, 2018). In addition, Hooper et al. also found that dynamic balance is reduced in patients with LBP (Hooper et al., 2016).

These results may also be due to a statistically significant difference in the level of PA between groups, which can contribute to generate an alteration of the pain inhibitory system but on the other hand it has also been observed that performing PA in patients with chronic pain can improve their symptomatology and physical function (Geneen et al., 2017). Even so, there are studies that show a non-existent direct relationship between PA levels and pain intensity, instead the level of PA can be correlated with the functionality (Griffin, Harmon, & Kennedy, 2012; Hendrick et al., 2011). In the same line, a recent study in patients with non-specific CLBP, who performed PA despite their pain, show that, despite their condition of chronic pain, they showed no differences in range of motion and dynamic stability compared to asymptomatic subjects. Therefore, this may be one of the reasons why those who seek help and also have a lower level of PA have statistically significant differences with greater effect size, compared to asymptomatic subjects in those functional variables (Nieto-Garcia, Suso-Marti, La Touche, & Grande-Alonso, 2019).

In contrast, the combination of psychological variables such as fear of movement and disability as well as the intensity of pain could predict dynamic stability in 43.8% of the individuals with chronic hip pain. These data is important given the relationship between CLBP and hip pain, especially considering that in our study, dynamic stability together with depression and/or range of motion in flexion-extension were variables predictive of pain expansion (Ferrer-Peña et al., 2018).

Finally, taking into account the prognostic factors in CLBP, the presence of depression and anxiety involve the maintenance and recurrence of symptoms (Castro et al., 2011; Croft, Dunn, & Raspe, 2006). A study by Hung et al. found that depression was the most powerful psychological factor related to disability (Hung, Liu, & Fu, 2015). On the other hand, there is little evidence on possible predictors of pain expansion. Our study shows that variables such as dynamic stability in combination with depression and/or range of motion in flexion and extension can predict pain expansion in 34.6% and 48.5% (PPSA and WP) of those who sought care. It is important to note that the expansion of pain is a powerful predictor of an alteration in the modulation of pain, in addition to the influence of variables such as anxiety, low expectations of recovery and hypersensitivity in various musculoskeletal pain conditions (Clark, Yeowell, Nijs, & Goodwin, 2017; Smart, Blake, Staines, & Doody, 2010). On the other hand, among the predictors of pain expansion in patients with CLBP are the presence of psychosomatic symptoms, the female sex and a long duration of symptoms (Viniol et al., 2015).

Study limitations

This study has several limitations that must be considered. First, in this study the patients seeking help presented a lower level of PA compared to asymptomatic individuals and compared to patients with non-specific CLBP who did not seek help. Even so, research

studies have shown that there is no direct correlation between PA and pain perception (ref), but ~~instead~~ howeever there is a direct relation between functionality and PA (ref), so it would be interesting in future research to evaluate the modulation of pain to observe the reason for this situation (Geneen et al., 2017). Another important limitation is age, since there are significant differences between groups. Even so, research studies have shown that there is a positive correlation between age and the search for healthcare (Beyera et al., 2019). In addition, previous research on the expansion of pain found that there were also statistically significant differences in terms of the age variable, but this difference, which was 6 points, was not considered clinically relevant (Muñoz-García et al., 2016).

On the other hand, we recommend for future research to carry out a more thorough evaluation based on the somatosensory variables to determine the presence of allodynia, since it correlates directly with central sensitization processes, thus including variables such as pressure pain thresholds, thermal thresholds and temporal summation of stimuli. Finally, the results of the present study should be interpreted with caution, ~~given~~ because it is a cross-sectional study, thus, causal relationships cannot be established.

Met opmerkingen [MM16]: What do you mean?

Met opmerkingen [MM17]: Long sentence

Met opmerkingen [MM18]: Why only allodynia? Because 2 lines further you mention other signs as well?

Met opmerkingen [MM19]: Long sentence

Conclusions

The results of this study show that patients who sought care presented greater WP than patients who did not seek care. In addition, patients with non-specific CLBP who seek care have a greater influence of psychological and disability factors on their experience of pain, as well as a lower range of motion and a lesser ability to discriminate two points. Composite reach distance percentage of the left leg, depression and days of medication per month were covariates of PPSA (34.6% of variance) and composite reach distance percentage of the left leg, depression and range of movement in flexoextension were

covariates of WP (48.5% of variance) for patients with non-specific CLBP who sought care.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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FIGURES

FIGURE 1. Expansion of pain in patients who sought care.

851 **FIGURE 2. Expansion of pain in patients who did not seek care.**