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ORIGINAL RESEARCH

A comparison of kinesiophobia, pain-activity patterns and fear-avoidance beliefs in patients with chronic low back pain

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Abstract

Chronic pain affects individuals' activity levels. Three activity patterns are observed among individuals with chronic pain: avoidance, overdoing, and regularization. According to fear - avoidance models, kinesiophobia is related to pain severity and disability. Kinesiophobia is a psychological factor that attracts attention in people with persistent pain, is related to the severity and persistence of pain. The aim of this study was to compare demographic and clinical characteristics of individuals with chronic inflammatory low back pain (ILBP) and mechanical low back pain (MLBP), in relation to kinesiophobia, fear-avoidance beliefs, and pain/activity patterns. A total of 89 people (45 MLBP, 44 ILBP) aged 18-65 were included in this cross-sectional study. A Visual Analog Scale (VAS) was used to inquire about for the duration of axial spondylarthritis diagnosis, duration of LBP, duration of morning stiffness, general pain, pain during movement, and night pain. Patients' fear of movement due to pain was assessed with the Tampa Kinesiophobia Scale (TKS), pattern changes in daily activities were assessed with the Pain-Activity Pattern Scale (PAPS), and fear-avoidance was assessed with the Fear-Avoidance Beliefs Questionnaire (FABQ). The scores obtained were compared. There was no statistically significant difference between the MLBP and ILBP groups in terms of age (p=0.202), BMI (p=0.124), gender (0.459), education level (p=0.082) and VAS-movement (p=0.071), FABQ score (0.277), PAPSa (p=0.454), PAPSe (0.596), PAPSs (p=0.247), and TKS score (p=0167). Whereas a statistically significant difference was found between the duration of morning stiffness (p=0.001), pain duration (p=0.018), VAS resting (p=0.001), and VAS night (p=0.001) score. It was observed that high resting and night VAS scores in the ILBP group were not associated with fear-avoidance and kinesiophobia behaviors any more than in the MLBP group. The fear- avoidance and kinesiophobia behaviors of both groups were affected to a similar extent, even though the pain type was different.

Introduction

Different musculoskeletal disorders cause pain in the spinal column. An important portion of the pain complaints occurring in the spinal column is low back pain. Statistics show that the prevalence of chronic low back pain (CLBP) has increased from 18th to 13th since 2000 (Briggs, 2018). CLBP is divided into mechanical or inflammatory origin, as in the case of axial spondyloarthritis (SpA) (Alcaraz-Clariana, 2021).

Mechanical low back pain (MLBP) is caused by damage to the anatomical structure in the lower back. Patients with MLBP usually have a good prognosis. Inflammatory low back pain (ILBP) is a pain caused by a systemic inflammatory condition, commonly referred to as spondyloarthritis. Five clinical features should be considered when evaluating patients with LBP, namely, improvement in symptoms with exercise and rest, nocturnal pain, insidious onset, and onset under 40 years of age (Ledford, 2017). ILBP is often associated with

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stiffness and inflammation in the spine and sacroiliac joints (Navarro-Compán, 2019).

Behavioral factors such as kinesiophobia, fear avoidance behaviors, and pessimistic beliefs about pain accompany chronic pain. Furthermore, lumbar and abdominal muscle activation increases during walking in CLBP patients. The demonstration of increased coactivation in these muscles in CLBP patients suggests a conservative mechanism of action. Since CLBP is a complex and multifactorial process, treatments only for medical and biomechanical factors are often not sufficient (Turhanoğlu, 2011).

SpA includes ankylosing spondylitis and axial involvement. In these individuals, LBP symptoms appear much earlier than the radiologic findings. Therefore, the diagnosis is usually delayed (Onat, 2007; Braun, 2011). The Assessment of Spondyloarthritis International Society (ASIS) has established diagnostic criteria and emphasized the importance of early diagnosis of LBP (Rudwaleit, 2006).

CLBP affects the activity levels of individuals and leads to the observation of three activity models (avoidance, overdoing, and regulating) in these individuals (Demirci, 2023). According to fear-avoidance models, kinesiophobia is related to pain severity and disability (Varallo, 2021). Kinesiophobia is a mental phenomenon related to the severity and persistent of pain, which is of great interest regarding people with CLBP (Luque-Suarez, 2019; Pazzinatto, 2022). The prevalence of kinesiophobia in individuals with CLBP is over 50% (Silva, 2022).

The bio-psycho-social approach explains that functional impairment outcomes of a combination of several elements (Varallo, 2021). Kinesiophobia and negative thoughts worsen an individual's functional status, leading to increased disability and reduced quality of life (Larsson, 2016). There are studies showing that fear-avoidance beliefs decrease with education (Godges, 2008; Tonga, 2012).

This study will aid in better understanding kinesiophobia, activity patterns developed to combat pain, and fear-avoidance beliefs in people with CLBP. It is also unique in that its sample includes individuals with CLBP, which is a very common disorder in the community. This is the first study to separately compare inflammatory and mechanical origin LBP in terms of kinesiophobia, pain activity patterns, and fear avoidance beliefs according to the available literature. The aim of this study was to compare the demographic and clinical characteristics of ILBP- MLBP patients, as well as the results of clinical evaluations of kinesiophobia, pain/activity patterns, and fear avoidance beliefs. The hypothesis of this study is that there is a difference in kinesiophobia, pain activity patterns, and fear avoidance beliefs between the inflammatory and the mechanical LBP group.

Methods

The study is a cross-sectional study and was conducted in individuals followed up in a private clinic for CLBP.

Participants

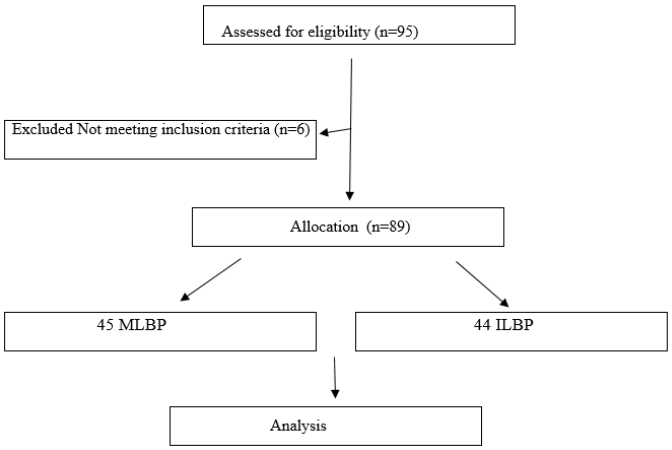

Figure 1. Study flow chart.

In this study, patients who presented with CLBP or LBP for >3 months, were aged18-65 years, were diagnosed with axial SpA according to the ASIS classification criteria, and were diagnosed with ILBP or MLBP were included. Reflected pain that could be a source of LBP was excluded. Patients who had undergone spinal surgery, hip pathology, and scoliosis were excluded from the study. In addition, patients who voluntarily withdrew from the study, who could not complete the questionnaires to be administered within the scope of the study, and who were diagnosed with an additional disease during the study were excluded from the study.

The sample size was calculated with the program G-Power 3.1.7 package with a type I error of 0.05 and a type II error of 0.2. The power was set at 0.8. For the functionality score, the minimum number of subjects required in each group for the difference of 1.37 units

between the two groups to be significant was determined to be 42 (Umay et al., 2014).The study was conducted in accordance with the tenets of the Declaration of Helsinki. Patients were informed of the purpose and content of the study and their written informed consent was obtained.

Procedure

The clinical characteristics of the patients were questioned duration of LBP (months), duration of morning stiffness (minutes), general pain, pain during movement, and night pain using the Visual Analog Scale (VAS; 0-10 cm). Patients' fear of movement due to pain was assessed using the Tampa Kinesiophobia Scale (TKS), changes in the pattern of daily activities due to pain were assessed with the Pain-Activity Pattern Scale (PAPS), and fear-avoidance due to pain was assessed with the Fear-Avoidance Beliefs Questionnaire (FABQ), and the scores obtained were compared.

Personal Information Form

In the form, sociodemographic characteristics of the participants (age, height, gender, weight, education level, medication use and history of surgery) were questioned with 15 questions.

Tampa Kinesiophobia Scale

Kinesiophobia is the fear of movement due to fear of injury or re-injury (Bilgin, 2019; Lüning Bergsten, 2012). Kinesiophobia was evaluated with the TKS, whose Turkish validity- reliability study was conducted by Yılmaz et al. (2011). The scale consists of 17 items. In answering the scale, 1 is strongly disagree and 4 is strongly agree. The score range is 17-68. TKS score ≤ 37 is called low kinesiophobia, and > 37 is called high kinesiophobia (Vlaeyen, 1995).

Pain-Activity Patterns Scale

The PAPS evaluates pain activity patterns in individuals with chronic LBP. The scale was developed by Cane et al. (2013) and the Turkish validity- reliability study was conducted by Suygun & Celenay (2022). The scale consists of 3 subgroups: overdoing, avoidance, and regulation. There are 10 items in each subscale, a total of 30 items. It's answered on a 5-point Likert scale. A scoring system of 0-40 points is used, with 0=never and 4=always. The scores in each subscale are summed and the subscale to which the respondent belongs is determined.

Fear-Avoidance Beliefs Questionnaire

The FABQ was used to assess exercise-related fear avoidance beliefs in individuals with chronic hypertension. The questionnaire was developed by Waddell et al. (1993) and its Turkish validity and reliability were conducted by Bingül et al. (2013). The questionnaire is a 7-point Likert-type scale consisting of a total of 16 items. A scoring system of 0-96 points is used, where 0=strongly disagree and 6=strongly agree. As the total score increases, it's assumed that there is an increase in fear-avoidance behavior.

Ethical Approval

Written informed consent was obtained from Malatya Private Kanalboyu Physical Therapy Center and ethical approval was granted by the Ethics Committee for Non-Interventional Clinical Research of İnönü University of Health Sciences at its 4th meeting (2020/360) on February 18, 2020. It was conducted in accordance with the tenets of the Declaration of Helsinki. Volunteers were informed about the purpose and content of the study; they signed a written informed consent.

Data Analyses

Data were evaluated using the SPSS 22.0 package program. The Kolmogorov-Smirnov test was used to test whether the data were normally distributed. Since normality assumptions were not met, the Mann Whitney U test was used for numerical data and the Chi-square test was used for categorical data comparisons. Results are presented as mean±SD and median (min-max) and percentage for categorical data. The statistical significance level was set at $p<0.05$.

Results

Statistical values of age, BMI, gender, education level, pain duration, and morning stiffness are given in Table 1.

There was no statistically significant difference between the MLBP and ILBP groups in terms of age (p=0.202), BMI (p=0.124), gender (0.459) and education level (p=0.082). A statistically significant difference was found between groups in terms of the duration of morning stiffness (p=0.001) and pain duration (p=0.018; Table 1).

Table 1

Comparison of demographic information of MLBP and ILBP group.

Variables	MLBP Group (n=45)		ILBP Group (n=44)		U	P[a] value
	Mean ± SD	Median (min-max)	Mean ± SD	Median (min-max)		
Age (Years)	38.11 ± 1.95	38 (20-65)	41.41 ± 1.91	39.0 (18-65)	834.5	0.202
BMI (kg/m^2)	25.53±0.76	24.80 (17-41)	26.80±0.65	26.80 (19-38)	802.5	0.124
Variables	n	%	n	%	Chi-Square	p[b] value
Sex						
Woman	30	66.7	26	59.09	$x^{2=}$0.547	p[b]=0.459
Man	15	33.3	18	40.9		
Education Level						
Literate, Primary School	7	15.5	11	25	$x^{2=}$8.282	p[b]=0.082
Middle School, High School	14	31.1	16	36.36		
University	24	53.4	15	34.09		
Duration of Pain						
0-2 hours	19	42.24	7	15.91	$x^{2=}$8.071	p[b]=0.018
2-8 hours, occasionally	16	35.5	19	43.18		
16-24 hours, continuous	10	22.2	18	40.9		
Morning stiffness duration (min)						
No	28	62.2	0	0	$x^{2=}$40.417	p=0.001
1-29 min	9	20.0	28	63.64		
30 minutes or more	8	17.8	16	36.36		

*n: Sample Size, %: Percentage, BMI: Body Mass Index, SD: Standard Deviation, p[a]: Mann Whitney U Test, p[b]: Chi-Ssquare Test value (χ2), *p<0.05: There is a statistically significant difference between the groups, ILBP: Inflammatory Low Back Pain, MLBP: Mechanical Low Back Pain.*

Table 2

Comparison of VAS resting, night and movement scores, FABQ score, PAPS sub-dimension scores and TKS score between MLBP and ILBP groups.

Variables	MLBP Group		ILBP Group		U	p[a] value
	Mean ± SD	Median (min-max)	Mean ± SD	Median (min-max)		
VAS-resting	2.98 ± 0.32	3 (0-10)	4.61 ± 0.28	5 (1-9)	549.0	0.001*
VAS-night	2.58±0.26	3 (0-7)	4.32±0.29	4 (0-8)	524.0	0.001*
VAS-movement	4.44±0.33	5 (0-10)	3.61±0.29	3 (1-8)	772.0	0.071
FABQ	40.04 ± 2.29	43 (11-81)	37.22 ±2.28	35 (10-81)	857.5	0.277
PAPSa	23.64±0.85	24 (12-34)	24.59±1.02	24.5 (10-36)	899.0	0.454
PAPSe	20.91 ± 1.00	20 (6-36)	21.52 ± 0.83	21 (7-34)	925.5	0.596
PAPSs	24.24±0.93	24 (13-40)	25.59±0.92	26 (13-36)	849.0	0.247
TKS	41.93 ± 0.78	42 (29-54)	43.79 ± 1.26	44 (23-63)	822	0.167

*n: Sample Size, %: Percentage, SD: Standard Deviation, p[a]: Mann Whitney U Test, *: There is a statistically significant difference between the groups (p<0.05), VAS: Visual Analog Scale, FABQ: Fear-Avoidance Beliefs Questionnaire, PAPSa: Pain-Activity Pattern Scale avoidance, PAPSe: Pain-Activity Pattern Scale exaggeration, PAPSs: Pain-Activity Pattern Scale streamlining, TKS: Tampa Kinesiophobia Scale, ILBP: Inflammatory Low Back Pain, MLBP: Mechanical Low Back Pain.*

VAS resting, VAS night, and VAS movement scores, FABQ score, PAPSa, PAPSe, PAPSs, and TKS score were calculated and statistical values are given in Table 2.

There was no difference between the MLBP and ILBP groups in terms of VAS-movement (p=0.071), FABQ score (0.277), PAPSa (p=0.454), PAPSe (0.596), PAPSs (p=0.247), and TKS score (p=0167). A statistically

significant difference was found in terms of VAS resting (p=0.001) and VAS night (p=0.001) scores (Table 2).

Discussion

This study was designed to help better understand kinesiophobia, pain-activity patterns, and fear-avoidance beliefs in individuals with MLBP and ILBP. Studies have been conducted to evaluate the effect of kinesiophobia, pain-activity patterns, fear-avoidance beliefs in individuals with CLBP. However, no studies have classified individuals with mechanical and inflammatory CLBP and evaluated these parameters. In our study, no statistically significant difference was found between the MLBP and ILBP groups in terms of age, BMI, gender, education level, VAS-movement, FABQ, PAPSa, PAPSe, PAPSs, and TKS results. A statistically significant difference was found for morning stiffness, pain duration, VAS resting, and VAS night score results. Resting and night pain were higher in the ILBP group. We think that this is due to the etiology of inflammatory pain. As a matter of fact, the study also drew attention to the fact that night pain and pain that increases with rest are common in individuals with ILBP (Soysal & Gündüz, 2011). The fact that there was no difference in terms of PAPS sub-dimensions, FABQ, and TKS suggests that individuals with CLBP adapted to living with pain over time and their tolerance increased.

A study investigated the relationship between kinesiophobia and pain intensity in people with chronic pain and reported that TKS was used to evaluate kinesiophobia especially in individuals with chronic back and neck pain (Bordeleau, 2022). In addition, it was found that kinesiophobia was associated with pain intensity (Bordeleau, 2022).

In our study, no statistically significant difference was found in terms of kinesiophobia score in individuals with CLBP and ILBP (p>0.005), while a study reported that Pilates exercise had a positive effect on kinesiophobia, pain intensity, and physical function in individuals with CLBP. They emphasized that clinicians should pay attention to components such as kinesiophobia and pain intensity while providing exercise training to individuals with CLBP (Wood, 2023).

Another study showed that kinesiophobia is a parameter that should be evaluated in the clinic for compliance with the rehabilitation program in elderly people with LBP (Ishak, 2017). However, the mechanical and inflammatory components of LBP were not evaluated separately in this study. In our study, these two parameters were evaluated separately, and the results are presented to guide clinicians.

In a study, which included elderly individuals with and without kinesiophobia, fear-avoidance beliefs were evaluated with the FABQ. As a result of the study, it was reported that kinesiophobia may affect fear-avoidance behaviors (Felício, 2021). In our study, we evaluated kinesiophobia, fear avoidance beliefs and compared the scores of mechanical and inflammatory pain components in chronic LBP individuals. However, there was no statistically significant difference in terms of these parameters in relation with pain components (p>0.005).

In a study, which included 60 individuals with CLBP, the effects of 3 different back health training programs on fear-avoidance beliefs and activity performance were examined. A statistically significant difference was found between individuals whose fear-avoidance beliefs were evaluated with the FABQ (Tonga, 2012). Pain components of individuals in the group receiving back health education were not examined separately. In this respect, our study evaluated whether there was a difference between fear-avoidance beliefs by separating pain components and no statistically significant difference was found.

A previous study included ski athletes who included three forms of activity. Activity patterns were analyzed using PAPS. Accordingly, there were three groups, namely, the avoidance (n=10), the overdoing (n=10), and the regulation (n=16). There was no significant difference in stress levels between the 3 groups. However, it was stated that anxiety levels of those in the avoidance group were higher than those of the other subgroup (Demirci, 2023). In our study, no statistically significant difference was found between the subgroup of activity patterns for the pain component in individuals with CLBP.

In a previous study, 71 patients were included and clinical characteristics of patients with MLBP or ILBP were compared. According to the study results, a significant difference was found between the two groups in terms of night pain and morning stiffness duration (Umay et al., 2014). In our study, a statistically significant difference was found between these parameters. These results were in line with literature findings in terms of clinical features of ILBP.

Conclusion

According to the results of the study, there was a difference between patients with ILBP and MLBP in terms of VAS resting and VAS night parameters, but this difference did not create a difference in terms of kinesiophobia, fear-avoidance beliefs, and pain activity patterns. Mechanical or inflammatory origin of pain may cause similar degrees of kinesiophobia, fear avoidance beliefs, pain activity patterns. Therefore, we think that different factors that may affect activities of daily living rather than the etiology of pain should be investigated in individuals with CLBP. Clinicians can approach individuals with LBP of mechanical and inflammatory origin knowing that there is no difference in terms of kinesiophobia, fear avoidance beliefs, and pain activity patterns.

The limitation of our study is that it was conducted in a single center. The strengths of our study are that there are no studies in the available literature that classify the mechanical and inflammatory components of CLBP and compare kinesiophobia, pain-activity patterns, and fear-avoidance beliefs. In this respect, our study will contribute to the literature. In addition, the results of the study should be taken into account in the rehabilitation program to minimize the complaints of individuals in the clinic. We suggest that future studies should be conducted with more participants and individuals with less age difference.

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Authors' Contribution

Study Design: BE, FK; Data Collection: BE, EK; Statistical Analysis: FK; Manuscript Preparation: BE, FK, EK, Funds Collection: No funding.

Ethical Approval

Written permission was obtained from Malatya Private Kanalboyu Physical Therapy Center, and ethical approval was received from the İnönü University Health Sciences Non-Interventional Clinical Research Ethics Committee from its 4th session (2020/360) dated 18.02.2020. The study was conducted according to the principles of the Declaration of Helsinki. Volunteers were informed about the purpose and content of the study and signed their written consent.

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Conflict of interest

There was no conflict of interest in this research.

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