RESEARCH ARTICLE

The relationships between pain beliefs and kinesiophobia and clinical parameters in Turkish patients with chronic knee osteoarthritis: a cross-sectional study

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Abstract

Objective: To investigate the relationships of pain beliefs with clinical/functional status and kinesiophobia in patients with knee osteoarthritis.

Methods: The descriptive cross-sectional study was conducted at the Department of Physical Therapy and Rehabilitation, Acibadem Hospitals Group, Istanbul, Turkey, between May 2015 and April 2016, and comprised chronic patients who were either overweight or obese. Patients were evaluated using visual analogue scale, Western Ontario and McMaster University Osteoarthritis Index, Lequesne Index (LI), Tampa Scale for Kinesiophobia and the Pain Beliefs Questionnaire. Statistical analysis was done using SPSS 15.

Results: Of the 78 patients, there were 10(13%) males, 68(87%) females with an overall mean age of 56.09±11.79 years and mean body mass index of 29.3±4.91. There were moderate positive correlations among kinesiophobia, pain and functional scores, while organic pain beliefs had a moderate positive correlation with body mass index scores and positive weak correlations with clinical/functional status scores and kinesiophobia ($p<0.05$ each). There were no associations between the organic subscale and psychological subscale of the Pain Beliefs Questionnaire ($p>0.05$).

Conclusion: Possible fear of movement and pain belief should be taken into consideration in the management of patients with knee osteoarthritis.

Keywords: Kinesiophobia, Knee, Osteoarthritis, Pain belief. (JPMA 69: 823; 2019)

Introduction

The prevalence of osteoarthritis (OA), the most common form of arthritis, increases with age. It has been reported that OA-related knee pain is the leading cause of physical disability in the elderly.[1] Pain in OA has been defined as a nociceptive pain model. OA patients experience typical neuropathic pain symptoms such as burning, tingling, and sensory abnormalities such as hyperalgesia and allodynia. Currently, the underlying mechanism of OA-related pain is considered to be peripheral and central sensitisation. When peripheral joint nociceptors continuously stimulate pain during mechanical and inflammatory processes, increased peripheral sensitivity and altered central pain modulation in the central nervous system (CNS) may result, causing sensitisation of the spinal nerves and an increased reaction to environmental stimuli. In addition, alteration in pain perception systems in the brain as well as pain inhibitory system dysfunction can ultimately lead to chronic pain.[2]

Long-term, high-intensity chronic pain may result in fear and anxiety associated with pain, avoidance of activity and depression, and, consequently, it may have a negative impact on the patient's functional/social state and quality of life.[3] Pain-related fear may cause a gradual decrease in occupational activities as well as other physical activities. It has negative consequences such as impaired physical fitness, disease behaviours, psychosocial withdrawal and ultimately chronic disability. In 1990, Kori et al.[4] used the term 'kinesiophobia' to define this situation. Kinesiophobia is defined as a fear of movement and activity stemming from the belief that one is susceptible to painful injury or repeated injuries.[5] A few studies on OA patients have reported that kinesiophobia has a negative impact on daily activities.[6] In addition, Scopaz et al.[7] reported associations between anxiety/fear, avoidance and physical function in such patients.

Significant contributors to pain control include understanding the cause of pain, knowing a patient's pain beliefs, and having knowledge about coping mechanisms for dealing with pain. Pain beliefs may directly impact the ability of a patient to adopt pain coping strategies and work through his/her disabilities.[8] Certain observations have indicated that the direct impact of such beliefs on behaviours and disability might reduce a patient's effort, resulting in an exaggerated perception of disability. People's belief in their ability to modify their own experience of pain and being free of negative pain beliefs, such as viewing pain as a permanent or as a mysterious

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condition, may help the patient to adopt more active pain coping strategies. Studies indicate that pain beliefs are learned and are potentially modifiable. Furthermore, studies have suggested that pain characteristics should be targeted by therapeutic interventions as they might be significantly associated with therapeutic outcomes.[9,10]

Pain beliefs are generated by a person's previous experiences with pain and healthcare as well as cultural and educational factors. Several classifications of pain belief have been proposed, and several tools have been developed to measure these beliefs in the population.[8-10] The Pain Beliefs Questionnaire (PBQ)[9] consists of two subscales. The organic beliefs subscale (PBQ-O) questions the user about physical injury or physiological pain that threaten wellness, while the psychological pain beliefs subscale (PBQ-P) evaluates intrinsic factors and emotions affecting the pain experience that may potentially threaten wellness. In addition, PBQ-O assesses the perceived cause of pain (pain-damage) and its management (control and training/activity issues); therefore, it can be considered a biomedical measurement. Organic pain beliefs cause patients to perceive pain as a noxious and uncontrollable condition that is associated with a catastrophising effect, which may affect functional disability. Psychological pain beliefs are related to psychological state, anxiety and depression, and patients with such beliefs must focus their attention on pain and relaxation.[8-12] There are limited studies investigating pain beliefs, and those that there are have mainly focussed on patients with chronic low back pain.[10,11] In a study[13] comprising a population of patients with arthritis, a weak correlation was found between organic pain beliefs and functional status. In addition, the study stated that the patients' pain beliefs should be assessed at earlier stages, and that further investigations were required to determine the impact of pain beliefs on functionality.

To our knowledge, no studies have investigated the impact of pain beliefs on the clinical and functional status of OA patients, and no study has determined the association between pain belief and kinesiophobia. The current study was planned to determine any association between pain beliefs and clinical/functional status, and between pain beliefs and kinesiophobia in OA patients.

Patients and Methods

The descriptive cross-sectional study was conducted at the Department of Physical Therapy and Rehabilitation, Acibadem Hospitals Group, Istanbul, Turkey, between May 2015 and April 2016, after approval was obtained from the institutional ethics committee. Those included were patients who had a ≥6-month history of knee pain, who were referred to the Department of Physical Therapy and who were diagnosed with chronic knee OA according to the American College of Rheumatology criteria and overweight or obese with body mass index (BMI) between 25 and 42 kg/m^2.[14] Those with pain for less than 6 months, corticosteroid injections within the preceding 3 months, prior surgery related to the low back, neck or knee pain, tumours and infections, severe systemic diseases, being on treatment for any psychiatric condition, or antidepressant use within the preceding 6 months were excluded.

The height in meters and weight in kilograms were measured of each subject in a standing position, and the BMI was calculated in kg/m^2. Pain severity at rest or during activity was measured by the visual analogue scale (VAS).[15] The Laquesne index (LI) was used to assess clinical parameters and functional levels, and questioned the patients about nocturnal pain, morning stiffness, pain while walking, their ability to stand up from a chair without using the arms, the maximum distance walked, and activities of daily living (e.g., stairs, crouching, walking on an irregular surface). The interpretation of the total LI score was 1-4 points = mild (1st grade), 5-7 points = moderate (2nd grade), 8-10 points = severe (3rd grade), 11-13 points = very severe (4th grade), 14 points or higher = extremely severe (5th grade).[16]

The Western Ontario McMaster's Universities Osteoarthritis (WOMAC) index was used to assess clinical parameters and functional levels. The index consists of pain (5 items), stiffness (2 items), physical function (17 items), social function (7 items), and emotional function (10 items) subscales. All of the items in these subscales are rated on a 5-point scale (1: none, 2: slight, 3: moderate, 4: very, 5: extremely).[17]

The Tampa Scale for Kinesiophobia (TSK) is a 17-item scale that is used to measure the fear of movement/re-injury.[18] The scale is used to measure injury/re-injury and fear/avoidance parameters in work-related activities. The Turkish validity and reliability of the scale was already done.[19] All items are rated on a 4-point Likert scale (1= strongly disagree, 4= strongly agree). The total score is calculated after inverting the individual scores from items 4, 8, 12, and 16. The total scores range 17-68. A high value on TSK indicates a high degree of kinesiophobia, and 37 or more is considered a high score, while scores below 37 are considered low.[17]

The validity and reliability study of the PBQ[9] has been conducted, and the questionnaire has been adapted to Turkish.[8] It includes 12 items about pain beliefs. The PBQ-O is an 8-item subscale, while PBQ-P is a 4-item subscale. The organic subscale mainly reflects the organic aspects of pain

with items such as "pain is a result of damage to the tissues of the body" or "experiencing pain is a sign that something is wrong with the body", while the psychological beliefs scale mainly reflects the effects of psychological factors on pain, with items such as "being anxious makes pain worse" or "thinking about pain makes it worse". The organic beliefs subscale consists of items no. 1, 2, 3, 5, 7, 8, 10, and 11, while the psychological beliefs subscale includes items no. 4, 6, 9, and 12. Participants receiving the questionnaire are asked to mark the most appropriate response on a 6-point response scale ranging from 'always' to 'never'.

The sum of scores obtained from each item of a subscale is divided by the number of the subscale's items to determine the total score. There is no cut-off point for subscale scores. However, higher subscale scores indicate stronger pain beliefs in that subscale, while lower scores indicate weaker pain beliefs in that subscale. The maximum total score that can be obtained from either subscale is 6, while the minimum total score is 1.[8,9]

Statistical analysis was done using SPSS 15. Data was reported as means ± standard deviation (SD). The normality of distribution of the parameters was assessed by Shapiro-Wilk test. Variables were analysed with Spearman's correlation coefficient. P<0.05 was considered significant. Observed power of the study was calculated to be adequate (0.8), with a two-tailed alpha=0.05, to test correlation of a medium effect size (0.3).

Results

Of the 78 patients, there were 10(13%) males, 68(87%) females with an overall mean age of 56.09±11.79 years and mean body mass index of 29.3±4.91. Mean LI score was 12.08±4.32. Mean TSK score was 40.25±5.66, mean PBQ-O score was 3.16±0.53 and mean PBQ-P score was 2.2±0.81 (Table-1).

Table-1: Demographics and clinic data of the participants.

Characteristics	
Gender	
Male	10 (12.8%)
Female	68 (88.2%)
Age (years)	56.09±11.79
BMI	29.3±4.91
VAS (rest)	2.35±1.28
VAS (activity)	5.75±1.81
WOMAC (pain)	8.93±3.83
WOMAC (stiffness)	3.37±1.98
WOMAC (functional)	31.88±13.11
Laquesne index (LI)	12.08±4.32
TSK	40.25±5.66
PBQ-O	3.16±0.53
PBQ-P	2.2±0.81

BMI: Body Mass Index; Western Ontario MacMaster Questionnaire; Visual Analogue Scale; TSK: Tampa Scale for Kinesiophobia; PBQ-O: Organic Pain Beliefs Questionnaire; PBQ-P: Psychological Pain Beliefs Questionnaire. Data is presented as Mean ± standard deviation (SD).

There was positive correlations among age, BMI, VAS, WOMAC and LI scores (p<0.01 each). TSK scores had a positive weak correlation with age, BMI, WOMAC, LI and PBQ-O scores (p<0.05 each), while a negative weak correlation was found with the PBQ-P scores (p<0.05). VAS rest, VAS activity and WOMAC functional scores (p<0.01 each) were moderately correlated with TSK scores (Table-2).

There were significantly weak positive correlations between PBQ-O scores and age, WOMAC stiffness (p<0.05 each), WOMAC functional, LI (p<0.01 each) and TSK (p<0.05) scores, while there was a moderate positive correlation between BMI and PBQ-O scores (p<0.01). Negative weak correlations were found between PBQ-P, VAS activity (p<0.01) and TSK (p<0.05) scores. PBQ-P scores had

Table-2: Correlation analyses.

	Age	BMI	VAS (rest)	VAS (activity)	WOMAC (pain)	WOMAC (stiffness)	WOMAC (functional)	LI	TSK	PBQ-O	PBQ-P
Age(years)		.295**	.491**	.405**	.662**	.503**	.519**	.808**	.239*	.259*	-.594**
BMI (kg/m^2)	.295**		.387**	.635**	.419**	.382**		.381**	.263*	.426**	
VAS (rest)	.491**	.387**		.688**		.329**	.349**	.305**	.415**		
VAS (activity)	.405**	.635**	.688**		.299**	.236*	.298**	.361**	.513**		-.387**
WOMAC (pain)	.662**	.419**		.299**		.795**	.759**	.880**	.291**		-.608**
WOMAC (stiffness)	.503**	.382**	.329**	.236*	.795**		.730**	.737**		.285*	-.582**
WOMAC (functional)	.519**		.349**	.298**	.759**	.730**		.824**	.432**	.301**	-.549**
LI	.808**	.381**	.305**	.361**	.880**	.737**	.824**		.283*	.379**	-.645**
TSK	.239*	.263*	.415**	.513**	.291**		.432**	.283*		.239*	-.277*
PBQ-O	.259*	.426**			.359**	.285*	.301**	.379**	.239*		
PBQ-P	-.594**			-.387**	-.608**	-.572**	-.549**	-.645**	-.277*		

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); BMI: Body Mass Index; WOMAC: Western Ontario MacMaster Questionnaire; VAS: Visual Analogue Scale; TSK: Tampa Scale for Kinesiophobia; PBQ-O: Organic Pain Beliefs Questionnaire; PBQ-P: Psychological Pain Beliefs Questionnaire.

negative moderate correlations with age, WOMAC pain, WOMAC stiffness ($p<0.01$), WOMAC functional ($p<0.01$) and LI ($p<0.01$) scores.

Discussion

The current study investigated the potential relationship of pain beliefs with functional/clinical status and with kinesiophobia in chronic knee OA patients. Results indicated that OA patients had higher levels of kinesiophobia and organic pain beliefs, but patients with weaker psychological pain beliefs had a worse functional status.

To be able to understand the role of pain cognitions in OA patients, several basic questions need to be addressed. Demographic variables (age, gender) and medical status variables (disease severity and BMI) are commonly believed to be very important factors explaining pain in OA patients.[14,20] Those who are overweight (BMI= 25-29) or obese (BMI=30) are much more likely to experience higher levels of pain.[21] In line with the current study, Somers et al.[14 reported that BMI of patients were overweight or obese (BMI: 25-42). However, in contrast to the current study, it reported that BMI did not correlate with the severity of the disease, pain catastrophising and pain-related fear.

Kinesiophobia is a significant issue that negatively impacts quality of life and leads to various levels of disability and social participation problems. TSK is one of two scales that are used to assess pain-related fear. The ability to continue performing daily living activities is critical to the management of disease-related pain and disability in OA patients, but kinesiophobic patients may be reluctant to engage in physical activity. Therefore, in addition to targeted therapy programmes, patients with a possible fear of movement should be evaluated, and this fear should be taken into consideration while planning their management.[5-7] One study on kinesiophobia[22] demonstrated that moderate kinesiophobia was associated with an increased intensity of pain and disability in patients with knee pain. Scopaz et al.[7] suggested that anxiety and fear-avoidance beliefs were associated with self-reported physical function, similar to the current study. High levels of anxiety and strong fear-avoidance beliefs have been reported to limit the activities of daily living in knee OA patients. However, in contrast to the current study, Somers et al.[19] reported that kinesiophobia did not correlate with the severity of the disease (based on Kellgren-Lawrence scores) in obese OA patients. The study also demonstrated that pain-related fear fortified psychological barriers and decreased walking speed.[19] In the current study, the level of kinesiophobia was high, and positive correlations were found between TSK and WOMAC scores. It is possible to conclude that this situation may increase the severity of the disease by limiting a patient's movements.

Pain beliefs contribute to the formation of an individual's perception of reality. In the bio-psychological model of pain, pain beliefs were defined as a research area requiring immediate attention. Pain beliefs are thoughts about one's perception of control over his/her pain experience. These perceptions include the degree to which the individuals believe that their pain is a harmful experience, any disability that is believed to be associated with the experience of pain, and any expectations for improvement.[8-12] In addition, patients' beliefs regarding the causes of pain and expectations for therapeutic outcomes affect their willingness to undergo treatment and may affect the results of treatment. Studies have shown that there are associations between the belief that pain is permanent or unchangeable and poor adherence to psychological therapies.[10-13] Patients who believe that strong figures such as physicians or family members can control pain (rather than random factors) are more likely to adhere to pain management programmes. Clinical experiences indicate that patients who suffer from pain may be very sceptical, even hostile, towards any therapeutic approach that contradicts their pain beliefs. To that end, it has been hypothesised that cultural and ethnic factors may alter pain beliefs.[23-25]

On the other hand, the ability of patients to manage their own pain experience may have favourable effects on his/her beliefs regarding pain experience. However, if patients fail to manage the pain experience, negative pain beliefs may become stronger, and they may eventually develop an extremely pessimistic pain belief and pain experience, which may cause emotional stress and catastrophic conditions.[25-27] There are limited studies on pain beliefs, and the majority of them have mainly focussed on chronic low back pain.[10,11,26,27]

A study[10] investigated how pain beliefs could be altered by multidisciplinary pain management in patients with chronic low back pain. It demonstrated that organic pain beliefs were stronger in patients with chronic low back pain, which was positively correlated with functional disability, in accordance with the results of the current study. Further, the study[10] stated that organic pain beliefs might be weakened and that psychological pain beliefs might become stronger with treatment, which may contribute to the resolution of functional disability.

A study including patients with chronic low back pain[11] observed higher PBQ-O scores and lower PBQ-P scores in patients with chronic low back pain than pain-free controls. A study[13] found that these patients had stronger organic

pain beliefs, which is in line with the results of the current study. In addition, a study[13] reported that arthritis patients with higher PBQ-O scores had a higher level of functional disability. Although that study did not reveal any associations between PBQ-P scores and functional status, it stated that psychological factors were very important in such patients, and that this area required further investigation. Interestingly, the current study found a negative correlation between PBQ-P scores and functional/clinical status, and psychological pain beliefs scores decreased as the severity of the disease increased, which was also weakly correlate with functional and clinical status.

The current study had several limitations, including the small sample size and self-reported data as the questionnaires were administered to the subjects based on the assumption that they would respond correctly.

Considering the limited number of studies on this issue and the variations in these situations depending on cultural and environmental factors, further studies with larger samples are recommended.

Conclusion

Patients with chronic knee OA had high levels of fear of movement and organic pain beliefs, while having weaker psychological pain beliefs. The situation was associated with functional and clinical status. These findings indicate that targeted therapy programmes may be advantageous to the treatment of patients with chronic knee OA.

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References

1. Peat G, McCarney R, Croft P. Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care. Ann Rheum Dis 2001;60:91-7.
2. Lluch E, Torres R, Nijs J, Van Oosterwijck J. Evidence for central sensitization in patients with osteoarthritis pain: a systematic literature review. Eur J Pain 2014;18:1367-75. doi: 10.1002/j.1532-2149.2014.499.x.
3. Baert IA, Lluch E, Mulder T, Nijs J, Noten S, Meeus M. Does pre-surgical central modulation of pain influence outcome after total knee replacement? A systematic review. Osteoarthritis Cartilage 2016;24:213-23. doi: 10.1016/j.joca.2015.09.002.
4. Kori KS, Miller RP, Todd DD. Kinesiophobia: a new view of chronic pain behavior. Pain Manag 1990;3:35–43.
5. Burwinkle T, Robinson JP, Turk DC. Fear of movement: factor structure of the tampa scale of kinesiophobia in patients with fibromyalgia syndrome. J Pain 2005;6:384-91. doi: 10.1016/j.jpain.2005.01.355
6. Özmen T, Gafuroğlu Ü, Altun Güvenir A, Ziraman İ, Özkurt B. Diz osteoartritli hastalarda kinezyofobi, kuadriseps kas kuvveti ve yaşam kalitesi arasindaki ilişki [Relationship between kinesiophobia, quadriceps muscle strength and quality of life in patients with knee osteoarthritis]. Türk Geriatri Dergisi 2017;20:38-45
7. Scopaz KA, Piva SR, Wisniewski S, Fitzgerald GK. Relationships of fear, anxiety, and depression with physical function in patients with knee osteoarthritis. Arch Phys Med Rehabil 2009;90:1866-73. doi: 10.1016/j.apmr.2009.06.012.
8. Berk HO, Bahadir G. Kronik ağrı yaflantısı ve ağrı inançları [The experience of chronic pain and pain beliefs]. Ağrı 2007;19:5-15.
9. Edwards LC, Pearce SA, Turner-Stokes L, Jones A. The pain beliefs questionnaire: an investigation of beliefs in the causes and consequences of pain. Pain 1992;51:267-72.
10. Walsh DA, Radcliffe JC. Pain beliefs and perceived physical disability of patients with chronic low back pain. Pain 2002;97:23-31.
11. Sloan TJ, Gupta R, Zhang W, Walsh DA. Beliefs about the causes and consequences of pain in patients with chronic inflammatory or noninflammatory low back pain and in pain-free individuals. Spine (Phila Pa 1976) 2008;33:966-72. doi: 10.1097/BRS.0b013e31816c8ab4.
12. Allcock N, Elkan R, Williams J. Patients referred to a pain management clinic: beliefs, expectations and priorities. J Adv Nurs 2007;60:248-56. doi: 10.1111/j.1365-2648.2007.04400.x
13. Pons T, Shipton E, Mulder R. The relationship between beliefs about pain and functioning with rheumatologic conditions. Rehabil Res Pract 2012,206263. doi: 10.1155/2012/206263.
14. Somers TJ, Keefe FJ, Pells JJ, Dixon KE, Waters SJ, Riordan PA, et al. Pain catastrophizing and pain-related fear in osteoarthritis patients: relationships to pain and disability. J Pain Symptom Manage 2009;37:863-72. doi: 10.1016/j.jpainsymman.2008.05.009.
15. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain 1983;17:45-56.
16. Lequesne MG, Samson M. Indices of severity in osteoarthritis for weight bearing joints. J Rheumatol Suppl 1991;27:16-8.
17. Stratford PW, Kennedy DM, Woodhouse LJ, Spadoni GF. Measurement properties of the WOMAC LK 3.1 pain scale. Osteoarthritis Cartilage 2007;15:266-72. doi: 10.1016/j.joca.2006.09.005
18. Vlaeyen JW, Kole-Snijders AM, Boeren RG, Van Eek H. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. Pain 1995;62:363-72.
19. Yılmaz ÖT, Yakut Y, Uygur F, Uluğ N. Tampa Kinezyofobi Ölçeği'nin Türkçe versiyonu ve test-tekrar test güvenirliği [Turkish version of the Tampa Scale for Kinesiophobia and its test-retest reliability]. Fizyoter Rehabil 2011;22:44-49.
20. Sutbeyaz ST, Sezer N, Koseoglu BF, Ibrahimoglu F, Tekin D. Influence of knee osteoarthritis on exercise capacity and quality of life in obese adults. Obesity (Silver Spring) 2007;15:2071-6. doi: 10.1038/oby.2007.246
21. Wadden TA, Foster GD. Behavioral treatment of obesity. Med Clin North Am 2000;84:441-61.
22. Domenech J, Sanchis-Alfonso V, López L, Espejo B. Influence of kinesiophobia and catastrophizing on pain and disability in anterior knee pain patients. Knee Surg Sports Traumatol Arthrosc 2013;21:1562-8. doi: 10.1007/s00167-012-2238-5.
23. Schwartz DP, DeGood DE, Shutty MS. Direct assessment of beliefs and attitudes of chronic pain patients. Arch Phys Med Rehabil 1985;66:806-9.
24. Jensen MP. Research on coping with chronic pain: the importance of active avoidance of inappropriate conclusions. Pain 2009;147:3-4. doi: 10.1016/j.pain.2009.07.036.
25. Williams DA, Thorn BE. An empirical assessment of pain beliefs. Pain 1989;36:351–8.
26. Härkäpää K, Järvikoski A, Mellin G, Hurri H, Luoma J. Health locus of control beliefs and psychological distress as predictors for treatment outcome in low-back pain patients: results of a 3-month follow-up of a controlled intervention study. Pain 1991;46:35-41.
27. Main CJ, Foster N, Buchbinder R. How important are back pain beliefs and expectations for satisfactory recovery from back pain? Best Pract Res Clin Rheumatol 2010;24:205-17. doi: 10.1016/j.berh.2009.12.012.