



Effect of Psychosocial Measures on Lower Extremity Functioning in Patients with Knee Osteoarthritis: An Exploratory Cross-Sectional Survey

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Abstract

Osteoarthritis (OA), commonly referred to as degenerative joint disease, primarily affects the articular cartilage, leading to pain and stiffness. Among the joints affected by OA, the knee and hip joints are frequently involved. Age is a significant predictor of OA development. Psychosocial factors such as self-efficacy, resilience, and social support play crucial roles and may influence lower extremity function, particularly in patients with knee OA. This study aimed to investigate the relationship between psychosocial factors, including self-efficacy, resilience, and social support, and their impact on lower extremity functioning among patients with knee OA. In this quantitative cross-sectional survey, 52 patients diagnosed with OA who met the specified selection criteria were included. Data were collected, using the Arthritis Self-Efficacy Scale (ASES), Pain Resilience Scale (PRS), Multidimensional Scale of Perceived Social Support (MSPSS), and Lower Extremity Function Scale (LEFS) for the analysis of psychosocial factors and lower extremity functioning among the patients diagnosed with OA. After the data was collected, a statistical analysis was conducted to examine the associations between these psychosocial factors and lower extremity functioning. Specifically, ASES demonstrated a very strong positive correlation with PRS ($p = 0.000$; $r = 0.946$), a weak positive correlation with MSPSS ($p = 0.032$; $r = 0.298$), and a strong positive correlation with LEFS ($p = 0.000$; $r = 0.771$). PRS showed a weak positive correlation with MSPSS ($p = 0.005$; $r = 0.384$) and a very strong positive correlation with LEFS ($p = 0.000$; $r = 0.818$). MSPSS exhibited a moderate positive correlation with LEFS ($p = 0.000$; $r = 0.599$). To conclude, this study provides valuable insights into the effectiveness of considering the psychosocial variables in lower extremity functions among patients with knee OA. This underscores the importance of considering psychosocial factors in the management and treatment of knee OA to enhance patient outcomes and overall well-being.

Keywords: Arthritis Self-Efficacy; Knee Osteoarthritis; Lower Extremity Functions; Pain Resilience; Perceived Social Support

Abbreviations

OA: Osteoarthritis; BPI: Brief pain inventory; ASES: Arthritis Self-Efficacy Scale; PRS: Pain Resilience Scale; MSPSS: Multidimensional Scale of Perceived Social Support; LEFS: Lower Extremity Function Scale

Introduction

Osteoarthritis (OA) is characterized by the degeneration of joint cartilage, primarily affecting the knee. In India, the prevalence of knee OA is reported to be 64.3%. Pain is the leading symptom of

OA, resulting in significant challenges. Chronic pain adversely affects physical capabilities, engagement in daily activities, mental well-being, and overall self-perceived quality of life for individuals with Osteoarthritis [1-3].

The models proposed by Lazarus and Folkman on stress and coping, the Fear-avoidance model, and the Biopsychosocial model of healthcare are instrumental in understanding the role of psychosocial factors concerning pain and lower extremity functioning. Various research studies have consistently demonstrated the significant influence of psychosocial variables on pain perception and related outcomes, such as pain-related interference and quality of life. Furthermore, some investigations have revealed that psychological factors, in addition to disease activity, objective disease markers, and articular and kinesiological factors, can predict impairment. However, investigations into the predictive role of psychological aspects in the progression of pain and disability among patients with Knee OA have been limited [4,5].

The current study considers several psychosocial variables, including Self-efficacy, Resilience, and Social Support. Self-efficacy, as conceptualized by Albert Bandura, refers to “the belief in one’s capabilities to organize and execute the courses of action required to manage prospective situations [6]. Resilience in the context of pain can be understood as the ability to restore and lead a fulfilling life despite the presence of pain [7,8]. Social Support is defined as the presence or availability of individuals who care about an individual and whom one can rely on when needed [9]. Lower Extremity Function refers to the functional activities performed with the assistance of the lower extremities. While the symptoms of OA primarily manifest physically, considering psychological variables can aid patients in improving their lower extremity function, thereby enhancing their overall quality of life [10].

Aim

The study aimed to evaluate the effect of psychosocial factors on the lower extremities and physical functioning of patients with knee OA.

Objectives

- To identify the level of psychosocial factors among patients with knee OA.
- To identify the level of lower extremity functioning among patients with knee OA.

- To determine the association between the psychosocial factors among patients with knee OA.
- To examine the relationship between psychosocial factors and lower extremity functioning among patients with knee OA.

Materials and Methods

Study design and patients

A Quantitative Cross-Sectional Survey Study design was employed to investigate the relationship between psychosocial factors and their impact on lower extremity functioning among knee OA patients. The study included 52 patients selected from both community and hospital settings in and around Coimbatore. Participants were recruited using a convenient sampling technique.

Selection criteria

Inclusion criteria

- Patients diagnosed with knee OA by an Orthopaedician.
- Both male and female participants.
- Adults aged between 41 and 60 years.
- Patients experiencing moderate pain, as assessed by the Brief Pain Inventory.
- Patients with both bilateral and unilateral knee OA were included. In the case of bilateral knee OA, patients were required to have mild pain according to the Brief Pain Inventory in at least one knee.

Exclusion criteria

- History of any trauma or surgical procedure in the knee joint.
- Presence of other neurological, orthopedic, or joint diseases.
- Patients with any psychological disturbances.
- Patients who were not willing to participate in the study.

Screening Tool

Brief pain inventory (BPI)-short form

The Brief Pain Inventory (BPI) - Short Form is a widely used measurement tool for assessing clinical pain. It utilizes a numerical rating scale ranging from 0 to 10. The Pain Interference Score is computed by adding the scores of interference items and then dividing by 7, yielding an interference score out of 10. Interpretation, a total score of 1 - 4 indicates Mild Pain, 5 - 6 Moderate Pain, and 7 - 10 Severe Pain. The BPI has demonstrated

good internal consistency, with coefficients ranging from 0.80 to 0.87 for pain severity items and 0.89 to 0.92 for pain interference items. Additionally, test-retest reliabilities for pain severity between daily administrations over a week showed correlations ranging from 0.83 to 0.88 for pain severity and 0.83 to 0.93 for pain interference [11,12].

Assessment tools

The Arthritis Self-Efficacy Scale-8 (ASES-8) is a disease-specific questionnaire designed for self-administration, aimed at assessing the self-efficacy of individuals with knee osteoarthritis (OA). It consists of 8 questions from all the subscales - physical function, other symptoms, and pain. The total score is calculated by adding up the individual scores of all 8 items. A higher score indicates higher self-efficacy among the individuals. The Internal consistency reliability of ASES-8 ranged between 0.90 – 0.94, the Test-retest reliability was 0.51 and also showed a good construct validity [13].

The Pain Resilience Scale (PRS) was employed to evaluate pain-specific resilience in patients with knee OA. PRS is a 14-item measure divided into two subscales, Cognitive/affective positivity (6-14 items) and Behavioral perseverance (1-5 items), and rated on a 5-point Likert scale. The total score is calculated by adding up the scores of individual items. A higher score indicates a higher degree of resilience to pain. The pain resilience scale demonstrated a strong Internal consistency within the sample (Cronbach α = 0.90) and has an acceptable test-retest reliability over 1-month intervals [14].

The Multidimensional Scale of Perceived Social Support (MSPSS) was utilized to determine the level of social support perceived by the participants. It is a self-report measure and contains 12 items, rated on a 7-point Likert scale. It has three subscales - family, friends, and significant others, with each subscale consisting of 4 items. Total score is calculated and a score ranging from 1 to 2.9 indicates low support, while a score of 3 to 5 indicates moderate support. High support is indicated by a score from 5.1 to 7 [15]. The Internal consistency of the scale was found to be 0.84 (0.83-0.86) and the Construct validity of the scale was also confirmed [16].

The **Lower Extremity Functional Scale (LEFS)** is a patient-reported tool used to assess functional status in the context of lower extremity musculoskeletal issues. The LEFS consists of 20 items, rated on a 5-point Likert scale with scores ranging from 0 (extreme difficulty/unable to perform the activity) to 4 (no difficulty). The total score is obtained by summing the scores [17]. Interpretation are as follows,

- 0-20 - Physiological exercise only ambulator
- 21-35 - Household ambulator
- 36-48 - Limited community ambulator
- 49-61 - Independent community ambulator
- 62-80 - Active community ambulator [18].

The internal consistency was high with Cronbach alpha values greater than 0.92 and ICC values between 0.89 and 0.99 [19].

Procedure

Verbal consent was obtained from patients diagnosed with knee OA and recruited from Kovai Medical Centre and Hospital. Baseline screening was conducted for a total of 80 patients with knee OA using the Brief Pain Inventory (BPI), and 52 patients who met the selection criteria were enrolled in the study after being informed about its purpose. Data collection involved administering the Arthritis Self-Efficacy Scale (ASES), Pain Resilience Scale (PRS), Multidimensional Scale of Perceived Social Support (MSPSS), and Lower Extremity Function Scale (LEFS) to participants through both face-to-face and telephonic interviews.

Data Analysis and Results

The statistical analysis was done using IBM SPSS Version 20. Descriptive statistics was used to find out the mean, median, range and standard deviation and Pearson correlation coefficient analysis was done to find out the strength and direction of the relationship between the variables.

Discussion

In the present study, a total of 80 clients with knee OA were screened using the Brief Pain Inventory (BPI), and only 52 of

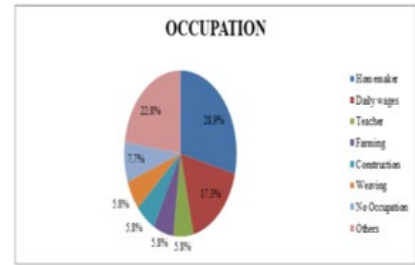
Demographic Characteristics		Values (%)
Age	(Mean ± SD)	53.96 ± 5.82
	Range	20
	Minimum	40 years
	Maximum	60 years
Working hours per day	Average	6.52 hours
	Minimum	2 hours
	Maximum	12 hours
Working days per week	Average	6.56 days
Gender	Male	28 (53.8)
	Female	24 (46.2)
Family	Nuclear	30 (57.7)
	Joint	22 (42.3)
Body built	Thin	12 (23.1)
	Moderate	24 (46.2)
	Thick	16 (30.8)
Diagnosis	Unilateral	29 (55.8)
	Bilateral	23 (44.2)
History of Knee OA (Family heredity or background)	Yes	34 (65.4)
	No	18 (34.6)
Medications for pain	Yes	37 (71.2)
	No	15 (28.8)
Stress	Yes	11 (21.2)
	No	41 (78.8)

Table 1: Socio-demographic Details of Knee OA Patients.

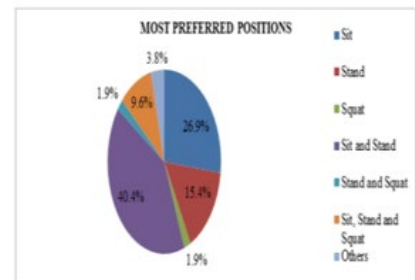
S No.	Variables	Mean	Standard Deviation
1	ASES	6.58	2.45
2	PRS	2.55	0.96
3	MSPSS	5.08	1.59
4	LEFS	48.00	13.06

Table 2: Descriptive Statistics Of ASES, PRS, MSPSS And LEFS Among Knee OA Patients.

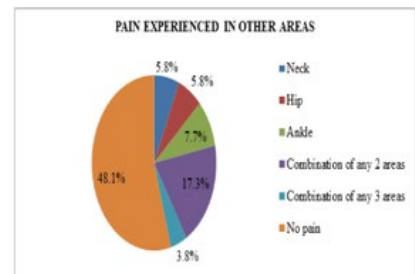
Pie chart 1: Daily occupations among knee OA patients.



Pie chart 2: Most preferred occupational position among knee OA patients



Pie chart 3: Pain experienced in areas other than the knee.



S. No.	Scales	Interpretation	Frequency	Percentage
1	ASES	Low self-efficacy	17	32.7
		High self-efficacy	35	67.3
2	PRS	Low pain resilience	17	32.7
		High pain resilience	35	67.3
3	MSPSS	Low Support	5	9.6
		Moderate Support	18	34.6
		High Support	29	55.8

Table 3: Categorical Percentage Obtained In ASES, PRS MSPSS and LEFS Among Knee OA Patients.

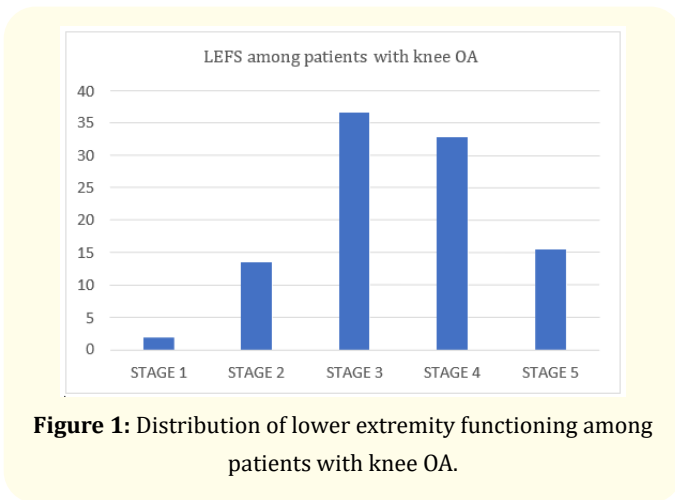


Figure 1: Distribution of lower extremity functioning among patients with knee OA.

them who met the selection criteria were enrolled for the study. This study utilized a cross-sectional study design with one-on-one interviews and a telephone survey, and it was conducted in both in community and hospital settings. The main objective of this study was to determine the level of self-efficacy, pain resilience, and social support among patients with knee OA. The mean value of self-efficacy was 6.58 indicating high self- efficacy, pain resilience was 2.55 denoting high pain resilience, and social support was 5.08 showing moderate support (Table 2, and Table 3). The second objective of this study was to evaluate the participants level of lower extremity function. Lower extremity function had a mean value of 48.00 which means stage 3 (limited community ambulator) (figure 1). The third objective of this study was to identify the relationship between self- efficacy, pain resilience, and social support, as well as to comprehend its impact on the lower extremity function in patients with knee OA. Statistical analysis revealed that there was a significant positive correlation between self-efficacy, pain resilience, social support, and lower extremity function. A significantly very strong positive correlation was identified between ASES and PRS, as well as PRS and LEFS. Conversely, a mild positive correlation was noted between ASES and MSPSS, and between PRS and MSPSS. Moreover, a significant positive correlation emerged between ASES and LEFS, while a moderate positive correlation was evident between MSPSS and LEFS (Table 4 and Figure 2).

S. No.	Scales	"r" Value*	"p" Value**	
1	ASES	PRS	0.946	0.000
		MSPSS	0.298	0.032
		LEFS	0.771	0.000
2	PRS	MSPSS	0.384	0.005
		LEFS	0.818	0.000
3	MSPSS	LEFS	0.599	0.000

Table 4: Correlation Between ASES, PRS, MSPSS And LEFS Among Knee OA Patients.

*'r' value represents Pearson correlation coefficient

**p value represents Significance value (p < 0.05).

This study was conducted to identify the relationship between self-efficacy, pain resilience, and social support, as well as to comprehend its impact on the lower extremity function in

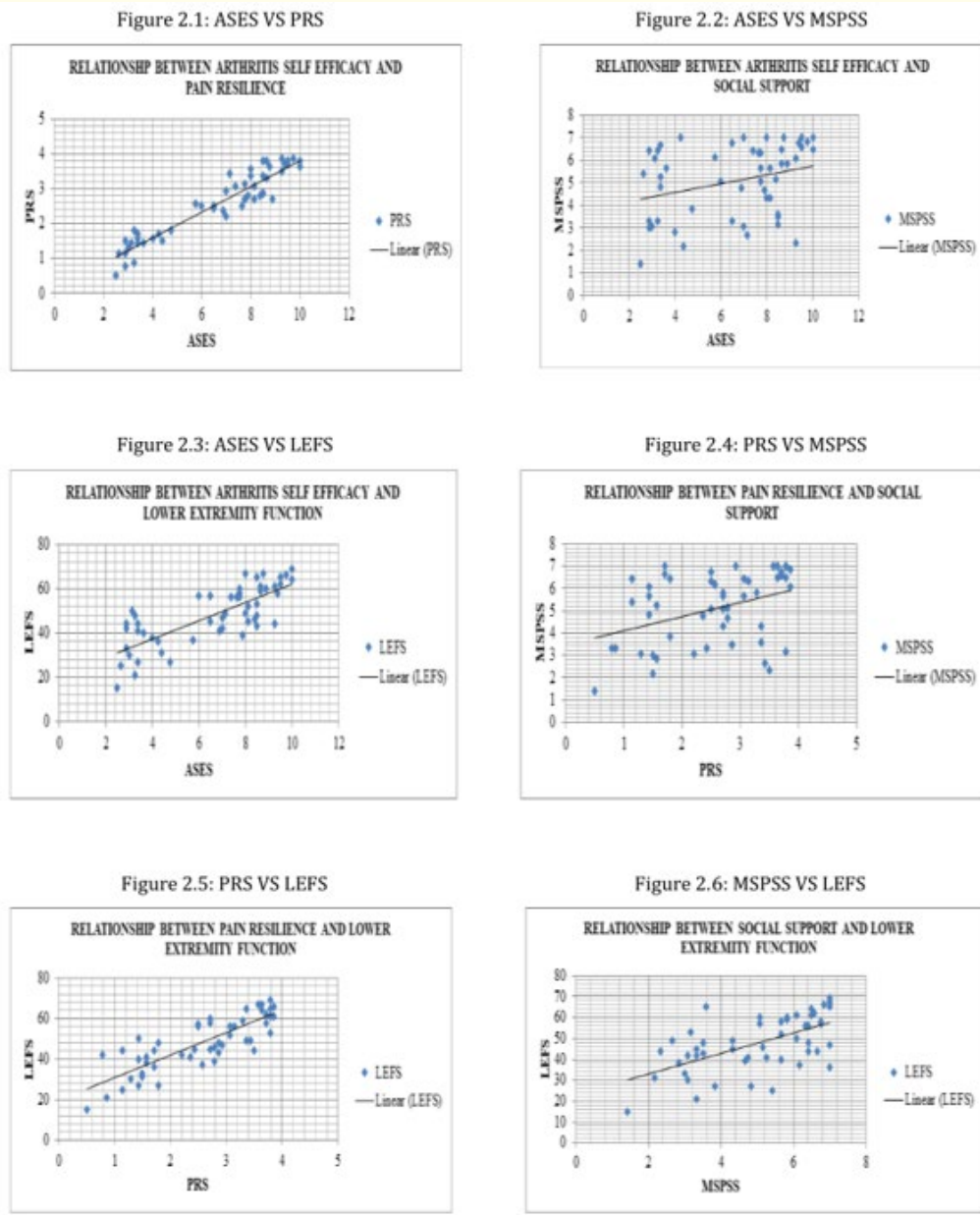


Figure 2: Correlation graphs Between ASES, PRS, MSPSS And LEFS Among Knee OA Patients.

patients with knee OA. Statistical analysis revealed that there was a significant positive correlation between self-efficacy, pain resilience, social support, and lower extremity function.

The findings from Lisa Johnson Wright, *et al.* study on, Adaptation to Early Knee Osteoarthritis: The Role of Risk, resilience, and Disease Severity on Pain and Physical Functioning, support the results of our study, indicating a significant and very high positive correlation between self-efficacy and resilience among knee OA patients. This suggests that individuals with higher levels of self-efficacy are also likely to exhibit greater resilience in coping with knee OA-related challenges [4].

Additionally, research by O. Ethgen, *et al.* study on social support and health-related quality of life in hip and knee osteoarthritis highlights the significant impact of social support components on health-related quality of life in OA patients. Their findings suggest that receiving substantial social support may contribute positively to individuals with knee OA's overall well-being and functioning [9].

Overall, these studies collectively underscore the importance of psychosocial factors, including self-efficacy, resilience, and social support, in influencing pain, physical functioning, and health-related quality of life among individuals with knee OA. Integrating strategies to enhance these psychosocial factors may lead to improved outcomes and better management of knee OA.

The current study aligns with previous research, highlighting the interconnectedness of self-efficacy, resilience, and social support, and their impact on physical functioning within the biopsychosocial model of knee pain. Self-efficacy, pain resilience, and social support emerge as crucial components in understanding knee OA, suggesting that addressing these psychosocial factors could lead to more effective management of knee pain and improved lower extremity function. Integrating these psychosocial parameters into intervention plans may enhance lower extremity functionality and occupational performance. Therefore, treatment planning should consider these psychosocial measures with other clinical components. Furthermore, psychosocial interventions such as cognitive behavioral therapy, family therapy, and mindfulness-based stress reduction have demonstrated moderate benefits for a subset of patients with knee pain.

However, it's important to acknowledge the limitations of the study, including the small sample size limited to individuals in and

around Coimbatore. Additionally, gender and occupational analyses were not conducted, potentially impacting the comprehensiveness of the results. Despite these limitations, the study provides a strong foundation for utilizing psychosocial factors as interventional strategies for knee OA patients. Future research endeavors could expand the sample to include diverse geographical regions and analyze the influence of socio-demographic factors on psychosocial variables. Additionally, incorporating a broader range of psychosocial factors such as psychological flexibility, cognitive fusion, rumination, occupational income, and other population-related characteristics could enrich future research in this field.

Conclusion

The Current study findings indicate a significant interdependence between psychosocial variables and lower extremity functions, suggesting that higher levels of psychosocial variables directly influence one's lower extremity function. This insight can provide valuable knowledge for patients with knee OA and their caregivers, enabling them to better understand the impact of psychosocial factors on lower extremity functioning. Moreover, this study has practical implications for Occupational Therapists by highlighting the importance of considering psychosocial aspects also when developing intervention strategies, enhancing client functioning and ultimately improving overall outcomes for individuals with knee Osteoarthritis.

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