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ORIGINAL ARTICLE

Pain Self-Efficacy as a Predictor of Disability and Kinesiophobia in Adults with Chronic Low Back Pain: A Cross-Sectional Study

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ABSTRACT

Background: Chronic low back pain (CLBP) is the leading cause of disability among working-age adults worldwide. Psychological factors, such as pain self-efficacy, rooted in Bandura's Social Cognitive Theory, increasingly shape outcomes alongside pain intensity and pathology.

Objective: This study examined pain self-efficacy as a predictor of disability and kinesiophobia in adults with CLBP undergoing physiotherapy in Surat, Gujarat, India.

Methods: A cross-sectional, correlational design recruited 100 adults aged 18-60 years with nonspecific CLBP lasting over 12 weeks and moderate-to-severe pain intensity. Gujarati-validated versions of the Pain Self-Efficacy Questionnaire (PSEQ), Oswestry Disability Index (ODI), and Tampa Scale of Kinesiophobia (TSK-17) were used to measure self-efficacy, disability, and kinesiophobia, respectively. Pearson's correlation and simple linear regression were used to test the relationships between self-efficacy and each outcome.

Results: Self-efficacy correlated negatively with disability ($r=-0.42$, $p<0.0001$) and kinesiophobia ($r=-0.25$, $p=0.013$). In contrast, disability and kinesiophobia showed no significant correlation in this sample ($r = 0.16$, $p=0.117$). Self-efficacy significantly predicted disability, explaining 17.7% of its variance in a simple regression model ($\beta=-0.578$, $p<0.0001$). It predicted kinesiophobia more weakly, explaining 6.1% of the variance ($\beta = -0.171$, $p=0.013$).

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Conclusion: Pain self-efficacy independently predicted both disability and kinesiophobia in adults with CLBP in this sample. However, its predictive strength is much greater for disability than for fear of movement. Therefore, self-efficacy is a modifiable target that physiotherapists can screen for during assessment, supporting a more psychologically informed approach to CLBP care in India.

KEYWORDS

• Chronic Low Back Pain • Self-Efficacy • Disability • Kinesiophobia • Fear-Avoidance • Physiotherapy

INTRODUCTION

Chronic low back pain (CLBP), defined as pain persisting beyond 12 weeks between the costal margins and gluteal folds[1], dominates physiotherapy caseloads worldwide. The Global Burden of Disease study estimated 619 million cases in 2020, projecting 843 million by 2050.[2] Low back pain remained the largest contributor to years lived with disability in the 2017 cycle.[3] The global point prevalence is 15% to 30%, which is less than half of India's reported rates.[4] A 2022 review reported India's point, annual, and lifetime prevalence at 48%, 51%, and 66%.[5] The heaviest burden falls on women, rural populations, and manual workers[5], and Indian IT professionals report work-related pain linked to poor workstation ergonomics.[6]

Twentieth-century clinicians treated low back pain as a structural fault and corrected disc bulges and degenerative segments. This approach has aged poorly, since imaging findings correlate weakly with reported pain and disability in CLBP.[7] A purely biomedical model cannot explain why patients with near-identical scans follow different trajectories.[8] Engel's 1977 biopsychosocial model reframed the issue, arguing that illness must incorporate biological, psychological, and social dimensions.[9] Fear, anxiety, depression, and self-efficacy all contribute meaningfully to musculoskeletal pain and its course.[10] Self-efficacy and kinesiophobia are at the center of rehabilitation outcomes; however, researchers rarely study them together in Indian clinical populations.

Self-efficacy, as conceptualized by Bandura, is a person's belief in their capacity to execute the actions required to achieve a desired outcome requires.[11] In chronic pain, self-efficacy refers to the confidence to pursue activities and meet goals despite pain. Nicholas operationalized it with the ten-item Pain Self-Efficacy Questionnaire, now the field's standard instrument (PSEQ; Cronbach's alpha 0.92).[12] Denison found it among the strongest predictors in primary-care musculoskeletal pain, ahead of pain intensity itself.[13] Arnstein and Costa separately confirmed that it mediates disability, depression, and fear-of-movement outcomes in CLBP.[14,15]

Kinesiophobia has become a research topic in pain science over the past few decades. Kori described it as an irrational fear of movement, rooted in the belief that activity causes injury or reinjury.[16] Vlaeyen and Linton folded this idea into their influential fear-avoidance model of chronic pain. A patient interprets pain as threatening and catastrophizes it, then avoids movements seen as dangerous. This avoidance triggers a cycle of deconditioning that makes the underlying pain more difficult to resolve.[17,18] Vlaeyen *et al*. linked fear-of-movement scores directly to the behavioral deficits observed in CLBP patients.[19] Gregg and colleagues separately showed TSK scores forecasting Oswestry Disability Index outcomes at follow-up.[20]

Whether self-efficacy can clinically anticipate both outcomes remains unclear in the literature. Odole and colleagues found it negatively correlated with both disability and kinesiophobia in non-specific CLBP.[21] Varela and Van Asselt separately identified it as a significant psychosocial predictor of disability beyond biomedical variables.[22] An Indian pain education trial reported parallel gains in self-efficacy, disability, and quality of life after the intervention[23], suggesting that this relationship also holds locally. However, no Indian study

has quantified it through regression in a purpose-recruited sample, and nearly all triadic evidence comes from non-Indian settings.[21,22] Cultural, occupational, and linguistic factors shape pain responses more broadly[10], making local evidence crucial. Correlation alone would only confirm covariation already established; regression quantifies the variance self-efficency explains, enabling comparison with samples the literature still lacks.

This study directly addresses the gap in the Indian physiotherapy literature on chronic pain. This study aimed to determine the predictive role of self-efficacy in disability and fear of movement among adults with CLBP in Surat. The objectives were to assess self-efficacy, disability, and kinesiophobia using validated instruments and to test the relationship between each outcome and self-efficacy through regression. The null hypothesis stated that self-efficacy does not significantly predict disability or fear of movement in adults with CLBP.

METHODS

Study design and setting

This study used a cross-sectional, analytical design, consistent with precedent in the self-efficacy literature.[13,21,22] The design follows from the research questions, which concern the association strength at a single time point. A longitudinal design would have required repeated patient contact over months, with a meaningful attrition risk in outpatient settings. Data were collected from physiotherapy outpatient departments in and around Surat, Gujarat, over a period of six months. This setting was chosen because all three instruments had been separately validated in Gujarati in populations from the same region.

Participants

The population comprised adults with nonspecific CLBP who presented to outpatient physiotherapy departments in the study area. The inclusion criteria were age 18-60 years, moderate-to-severe CLBP persisting beyond 12 weeks, and the ability to complete the study questionnaires. The exclusion criteria were spinal surgery, neurological disorders, spinal fracture, infection, tumor, severe psychiatric disorder, and pregnancy. These criteria together isolated non-specific CLBP from presentations with confounded pain mechanisms or comorbidities.

A sample of 100 participants was targeted, informed by Portney and Watkins' guidance on regression power[24] and Green's benchmarks.[25] With one predictor, Green's formulas indicated a minimum of 58 participants for an adequate model fit. A stricter threshold of 105 participants applies for testing an individual predictor's statistical significance. The achieved sample cleared the first threshold but fell short of the second. Effect sizes in this literature run medium-to-large rather than merely medium;[13,15,21] therefore, the achieved power likely exceeds this conservative benchmark despite the shortfall.

Self-efficacy was treated as the independent variable, with disability and kinesiophobia as separate dependent variables. Two regression runs tested each relationship separately rather than combining them into a single model. This reflects Bandura Social Cognitive Theory, which treats self-efficacy as a stable belief rather than a fleeting mood state.[11] The Fear-Avoidance Model justifies treating kinesiophobia as distinct from disability, as it positions fear of movement as a consequence of pain interpretation.[17] A cross-sectional regression coefficient describes the association between variables at a single time point, not causation.

Instruments and variables

Self-efficacy was measured using the ten-item PSEQ, with a range of 0 to 60, with higher scores indicating greater confidence despite pain.[12] Disability was measured using the ODI, which uses ten domains scored 0 to 5 that yield a percentage disability score.[26] Kinesiophobia was measured using the 17-item TSK-17, with items scored 1 to 4 and higher totals indicating greater fear.[16] All three questionnaires were administered in validated Gujarati versions, each separately adapted and psychometrically validated: the Gujarati PSEQ[27], ODI[28], and TSK-17.[29] A demographic questionnaire captured age, sex, height, weight, education, occupation, and CLBP duration in months. Pain intensity was recorded separately using a standard 0-10 Numerical Pain Rating Scale for each participant.

Procedure and ethical considerations

The Institutional Ethics Committee of the Sarvajanik College of Physiotherapy approved this study prior to the recruitment of participants. Prospective participants were screened for eligibility, and the study was explained in each participant's own language. Informed consent was obtained from all participants using forms available in Gujarati language. Participants were informed of their right to withdraw at any time without affecting their clinical care. Demographic data were collected first, followed by self-administration of the three questionnaires, with investigator assistance offered where literacy was required. Identifiers were kept separate from response data, and dataset access remained restricted to the research team and was password-protected. Since data collection involved self-report only, the main risk was emotional discomfort from reflecting on pain-related beliefs.

Statistical analysis

All data were analyzed using SPSS version 20 for Windows, following a pre-specified analysis plan. Descriptive statistics, means and standard deviations for continuous variables, and frequencies and percentages for categorical variables were used to summarize the sample. Pearson's correlation was used to test the strength and direction of each pairwise relationship, with Spearman's correlation pre-specified as a fallback for non-normal data. Simple linear regression was used to test self-efficacy as a predictor of disability and kinesiophobia, matching the two research questions. Significance was set at $p<0.05$ throughout, and R^2 values were reported alongside coefficients to show effect magnitude.

RESULTS

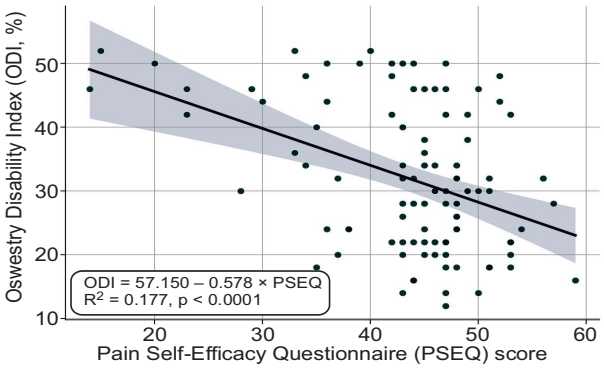
One hundred adults with nonspecific CLBP were recruited and completed all the study measures, with no missing data. The sample had a mean age of 42.19 years (SD 10.35, range 20-71), was predominantly female (79%), and married (91%). Housewives formed the largest occupational group (62%), followed by professional or office workers (17%), business owners (8%), textile workers (8%), and students (5%). Education was skewed toward primary or secondary schooling (41%), with 27% having higher secondary, 28% graduate, and 4% postgraduate degrees. The mean BMI was 26.29 kg/m² (SD 4.49), above the WHO healthy-weight threshold, and the pain intensity averaged 7.06 on the NPRS. CLBP duration was right-skewed, with a mean of 25.39 months and a median of only 10.0 months. Therefore, most participants had symptoms for less than a year, reflecting who attends an outpatient department in urban Gujarat. Table 1 reports the full demographic and clinical characteristics of the sample.

The descriptive statistics for the three primary outcomes are presented in Table 2. The mean PSEQ was 43.64 (SD 8.26, median 45.0), against a possible range of 0 to 60. This placed the sample in the upper-middle portion of the overall self-efficacy scale. Mean ODI was 31.92% (SD 11.36%, median 30.0%), within the moderate disability band on Fairbank and Pynsent's classification[26]. The mean TSK-17 was 38.37 (SD 5.72, median 38.0), against a possible range of 17 to 68, in the lower half of the scale. The mean and median together suggest a roughly symmetric distribution of kinesiophobia scores across this sample.

The bivariate correlations among the three variables are presented in Table 3. Self-efficacy correlated negatively with disability at a moderate strength ($r=-0.4207$, $p<0.0001$), the strongest association observed in the dataset. Self-efficacy also correlated negatively with kinesiophobia, although this relationship was considerably weaker ($r=-0.2475$, $p=0.0131$). In contrast, disability and kinesiophobia showed no significant correlation ($r=0.1579$, $p=0.1167$). This suggests that self-efficacy and kinesiophobia may track somewhat independent aspects of the psychological response to chronic pain.[17,18] Neither self-efficacy nor kinesiophobia, in other words, simply reflects disability severity on its own.

Two linear regression models tested self-efficacy as a predictor of each outcome, with the full statistics presented in Table 4. In Model 1, self-efficacy significantly predicted disability, $F(1,98)=21.08$, $p<0.0001$, accounting for 17.70% of the ODI variance. The unstandardized coefficient was -0.578 (SE 0.126, 95% CI -0.828 to -0.328), yielding an ODI of 57.150 minus 0.578 times PSEQ. A participant near the

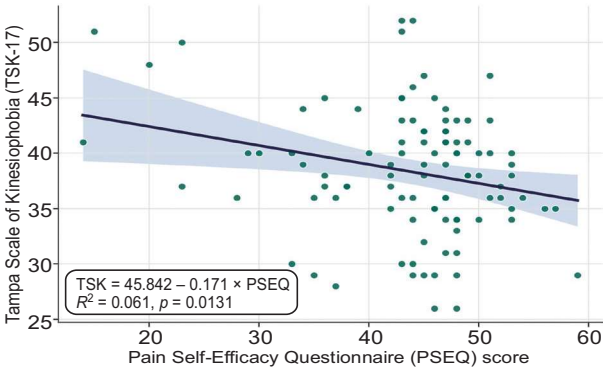
lower end (PSEQ=14) would be predicted to have an ODI near 49.1%, in the severe band. A participant near the high end (PSEQ=59) would be predicted to have roughly 23.0% in the mild band **(Graph 1).**



Graph 1: Scatter plot of PSEQ against ODI with a fitted regression line and 95% confidence band (N = 100).

In Model 2, self-efficacy significantly predicted kinesiophobia, F(1,98)=6.392, p=0.0131, although the power was considerably smaller. It accounted for only 6.13% of the TSK variance, compared to 17.70% for the disability model. The unstandardized coefficient was -0.171 (SE 0.068, 95% CI -0.306 to -0.037), giving TSK equals 45.842 minus 0.171 times the PSEQ. Each one-point PSEQ increase predicted a modest 0.171-point drop in TSK against the instrument's full range. Well over 90% of kinesiophobia variance in this sample was traced to factors this model did not measure (Graph-2).

Both models rejected the null hypothesis that self-efficacy could not predict disability or fear of movement. The direction was consistent in both cases: higher self-efficacy predicted lower disability and lower fear of movement. However, strength was not uniform, since self-efficacy predicted disability roughly three times as strongly as it predicted kinesiophobia in this sample. This asymmetry, rather than the predictive relationship itself, is discussed in detail.



Graph 2: Scatter plot of PSEQ against TSK-17 with a fitted regression line and 95% confidence band (N = 100).

Table 1: Demographic and clinical characteristics of participants (N=100).

Variable	n (%) / Mean ± SD (Range)
Age (years)	42.19 ± 10.35 (20–71)
Sex	
Female	79 (79%)
Male	21 (21%)
Marital status	
Married	91 (91%)
Unmarried	8 (8%)
Divorced / Widowed	1 (1%)
Education level	
Primary / Secondary	41 (41%)
Higher secondary	27 (27%)
Graduate	28 (28%)
Post-graduate	4 (4%)
Occupation	
Housewife	62 (62%)
Professional / Office	17 (17%)
Business	8 (8%)
Textile / Embroidery / Diamond worker	8 (8%)
Student	5 (5%)
BMI (kg/m²)	26.29 ± 4.49
Pain intensity (NPRS, 0–10)	7.06 ± 0.97 (6–9)
Duration of CLBP (months)	
Mean ± SD	25.39 ± 37.10
Median (Range)	10.0 (3–216)

BMI: Body Mass Index; NPRS: Numerical Pain Rating Scale; CLBP: chronic low back pain; SD: standard deviation.

Table 2: Descriptive statistics of the PSEQ, ODI, and TSK-17 scores (N=100)

Instrument	Possible range	Mean ± SD	Median	Observed range
PSEQ (self-efficacy)	0–60	43.64 ± 8.26	45.0	14–59
ODI (disability, %)	0–100	31.92 ± 11.36	30.0	12–52
TSK-17 (kinesiophobia)	17–68	38.37 ± 5.72	38.0	26–52

PSEQ, Pain Self-Efficacy Questionnaire; ODI, Oswestry Disability Index; TSK-17, Tampa Scale of Kinesiophobia (17-item); SD, standard deviation.

Table 3: Pearson correlation matrix among PSEQ, ODI, and TSK-17 scores (N=100)

Variable	PSEQ	ODI	TSK-17
PSEQ	1.000	−0.4207**	−0.2475*
ODI	—	1.000	0.1579
TSK-17	—	—	1.000

**p<0.05; **p<0.001. PSEQ, Pain Self-Efficacy Questionnaire; ODI, Oswestry Disability Index; TSK-17, Tampa Scale of Kinesiophobia.*

Table 4: Simple linear regression: self-efficacy (PSEQ) predicting disability (ODI) and kinesiophobia (TSK-17)

Model	Predictor	B	SE	Std. β	t	p	95% CI
Model 1: PSEQ → ODI (R^2=0.177, F(1,98)=21.08, p<0.0001)	PSEQ	−0.578	0.126	−0.421	−4.591	<0.0001	−0.828 to −0.328
Model 2: PSEQ → TSK-17 (R^2=0.061, F(1,98)=6.392, p=0.0131)	PSEQ	−0.171	0.068	−0.247	−2.528	0.0131	−0.306 to −0.037

B = unstandardized coefficient; SE = standard error; Std. β = standardized coefficient; CI = confidence interval.

DISCUSSION

This study found that pain self-efficacy independently predicted disability and kinesiophobia in adults with CLBP attending outpatient physiotherapy departments in Surat. The prediction was stronger for disability (17.7% of variance) than for fear of movement (6.1%). Both findings pointed in the same direction, yet differed sharply in magnitude across the two outcomes. This asymmetry, rather than an already well-established predictive relationship, is the main contribution of this study.

The sample was mostly female (79%) and housewives (62%), which is unusual in Western CLBP research but consistent with Indian settings. A retrospective analysis of over 16,800 Indian patients across 76 centers found that women accounted for 67.7% of cases.[30] In a Puducherry community sample, 56.8% of women with low back pain were% housewives by occupation.[31] A study conducted in Kanpur specifically treated domestic labor as an occupational exposure among rural housewives specifically.[32] This representation reflects who attends a physiotherapy OPD in urban Gujarat, tempering generalization to working-age men with physically demanding occupations.

The mean self-efficacy (PSEQ 43.64) exceeded Western tertiary pain clinic benchmarks by a wide margin. Nicholas and colleagues' dataset of 13,343 patients across 36 Australasian clinics reported a mean PSEQ of just 20.7.[33] An Italian study of 310 patients with CLBP found that 64.2% scored below the 40-point poor self-efficacy threshold.[34] Recruitment sources explain this gap better than culture, since pain clinics specifically draw treatment-refractory patients. Two Nigerian outpatient studies reported scores closer to this study's findings,[35,36] suggesting that self-efficacy tracks care pathway position more than nationality. The mean kinesiophobia matched a Nigerian outpatient sample almost exactly, with a TSK-17 score of 39.45.[36] It fell below a more treatment-resistant Tunisian sample (48.5)[37], again pointing to case-mix as the driver.

The correlation and regression findings converge with and extend prior work in the field. The self-efficacy-disability relationship (r=-0.42; R^2=0.177) closely parallels the findings from Sweden[13], the United States[14], and Australia.[15] Costa *et al*. similarly found that self-efficacy outweighs fear of movement as a mediator.[15] The weaker self-efficacy-kinesiophobia relationship (r=-0.25) matches Odole and John's Nigerian studies, where self-efficacy proved significant but non-dominant.[35,36] The PSEQ asks whether a person can function despite pain, while the TSK-17 asks whether specific movements feel dangerous at that moment. Kinesiophobia is also heavily shaped by pain catastrophizing, a factor that this study did not measure.[38] A regression missing a major driver explains less variance, regardless of the predictor's real contribution. The null disability-kinesiophobia correlation (r=0.16) contrasts with Yahia and colleagues' Tunisian finding of a strong relationship (r=0.6).[37] This aligns with Alaca *et al*. 's Turkish finding of no difference across disability subgroups.[39] Kinesiophobia and disability, in other words, are related but remain conceptually distinct constructs here.

Three separate theoretical frameworks help to interpret the observed asymmetry between the two clinical outcomes. Bandura's Social Cognitive Theory holds that self-efficacy shapes behavior by determining effort and persistence when tasks grow difficult.[11] The PSEQ-ODI relationship closely matches this, with self-efficacy driving effort rather than merely reflecting lower pain. The Fear-Avoidance Model proposes a cascade from catastrophic interpretation, through fear, to avoidance and eventual disability.[17,18] If that cascade had fully operated here, kinesiophobia would have correlated with disability, as in the chronic Tunisian cohort.[37] This sample's shorter chronicity, with a median duration of just 10 months, may sit earlier in that cascade.[38] The Biopsychosocial Model, adapted to back pain by Waddell[40], frames disability as biological, psychological, and social factors acting together.[9] No single variable examined here explained > 18% of the total observed variance.

Clinically, these findings support the use of a brief self-efficacy screen during the initial physiotherapy assessment, such as the PSEQ or its Gujarati translation. It carries more prognostic information about disability than fear of movement in this population. This fits the psychologically informed practice model, which holds that physiotherapists can screen without referring every patient to a psychologist.[41,42] Education, confidence building, and graded activity, Bandura's core sources of self-efficacy[11], may be prioritized for disability, whereas graded exposure suits fear-dominant presentations. For Indian practice, the profile observed here argues for self-management programs fitting domestic responsibilities, plus OPD-level screening before fear avoidance becomes entrenched.

Strengths include Gujarati-validated instruments rather than informal translations[27-29] and a sample meeting Green's regression-fit threshold.[25] Limitations include the cross-sectional design, which shows associations between variables rather than confirmed causation. Convenience sampling from a single city also limits the generalizability to other regions of India. Self-report measures carry recall-bias risk, and single-predictor models cannot account for confounders such as catastrophizing and depression, which are controlled elsewhere.[35,36] Future studies should pursue prospective designs, multicenter recruitment, and trials comparing self-efficacy-focused physiotherapy with usual care.

CONCLUSION

Pain self-efficacy independently predicted functional disability and kinesiophobia in adults with CLBP attending physiotherapy outpatient departments in Surat, India. The prediction was stronger for disability (17.7% of variance) than for fear of movement (6.1%). Both study objectives were met, and the null hypothesis was rejected. Higher self-efficacy was associated with lower disability and fear of movement, although the association was stronger for the former outcome. Self-efficacy emerged as a modifiable target that physiotherapists can screen using a validated questionnaire. It can be directly addressed during routine physiotherapy assessments without a formal psychology referral. Therefore, outpatient CLBP assessment in India should include self-efficacy screening alongside standard pain and disability measures. Future multivariate research should test whether directly intervening in self-efficacy changes a patient's overall disability trajectory.

DECLARATIONS

Ethics approval and consent to participate: *This study was approved by the Institutional Ethics Committee of the Sarvajanik College of Physiotherapy.*

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