RESEARCH ARTICLE

PREVALENCE OF PSYCHOSOCIAL YELLOW FLAGS IN ACUTE AND SUBACUTE LOW BACK PAIN: A CROSS-SECTIONAL STUDY

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Submitted: 5th October, 2026; **Accepted:** 24th October, 2026; **Published:** 27th October, 2026

Short title: Yellow Flags in Acute and Subacute Low Back Pain

ABSTRACT

Background: Low back pain (LBP) is a leading cause of disability worldwide. While mechanical factors contribute to LBP, psychosocial factors, termed 'yellow flags', significantly influence pain perception, functional recovery and the risk of chronicity. Identifying yellow flags in the acute and subacute stages may facilitate early clinical decision-making and targeted physiotherapy management.

Objective: To assess the prevalence and stratification of psychosocial yellow flags, using the Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) and the Pain Catastrophizing Scale (PCS), in acute and subacute LBP, and to evaluate their correlation with pain intensity on the Numerical Pain Rating Scale (NPRS).

Methods: An observational cross-sectional study was conducted among 302 participants with non-specific LBP (161 acute [<6 weeks] and 141 subacute [6–12 weeks]). Psychosocial risk was evaluated with the OMPSQ (elevated risk: score ≥ 90), pain catastrophizing with the PCS (high catastrophizing: score ≥ 30) and pain intensity with the NPRS (0–10). Statistical analyses included independent t-tests, Mann–Whitney U tests, Pearson and Spearman correlations and Chi-square tests ($\alpha = 0.05$).

Results: Overall, 49.7% (n=150) of participants presented with at least one psychosocial yellow flag. Elevated psychosocial risk (OMPSQ ≥ 90) was identified in 39.40% (n=119) of participants (40.37% acute vs. 38.30% subacute; χ^2=0.063, p=0.803), and high pain catastrophizing (PCS ≥ 30) in 36.42% (n=110) (37.89% acute vs. 34.75% subacute; χ^2=0.198, p=0.656). Concomitant yellow flags (OMPSQ ≥ 90 and PCS ≥ 30) occurred in 26.16% (n=79). Significant positive correlations were found between OMPSQ and PCS (r=0.681, p<0.0001), OMPSQ and NPRS (r=0.638, p<0.0001), and PCS and NPRS (r=0.609, p<0.0001). Age showed no significant correlation with pain intensity or psychosocial risk.

Conclusion: Psychosocial yellow flags are highly prevalent in both acute and subacute LBP, affecting approximately half of the study population. The strong positive associations between psychosocial risk, pain catastrophizing and pain severity emphasize the need for routine early psychosocial screening in physiotherapy to prevent chronic disability.

Keywords: Low back pain, Yellow flags, Acute low back pain, Subacute low back pain, Örebro Musculoskeletal Pain Screening Questionnaire, Pain Catastrophizing Scale, Numerical Pain Rating Scale, Psychosocial factors.

How to cite this article: Singh KK, Sonwane SR, Sharma NS, Dsouza PB, Pandav S, Syed MR. Prevalence of Psychosocial Yellow Flags in Acute and Subacute Low Back Pain: A Cross-Sectional Study. International Journal of Drug Delivery Technology. 2026;16(87s): 955-959; DOI: 10.25258/ijddt.16.87s.98

Source of support: Nil. **Conflict of interest:** None.

INTRODUCTION

Low back pain (LBP) is among the most widespread musculoskeletal disorders globally and is the primary contributor to years lived with disability across diverse age groups.[1] Its lifetime prevalence is estimated at between 60% and 85%.[1] Acute LBP refers to symptoms persisting for less than 6 weeks, whereas subacute LBP spans 6 to 12 weeks.[2] These early phases are a pivotal window that determines either full functional recovery or transition to chronic, disabling pain. Approximately 10% to 20% of acute LBP cases progress to chronicity, a process driven largely by psychosocial factors rather than by structural pathology alone.[3-9]

The traditional biomedical model, which attributes pain strictly to anatomical variations such as disc degeneration or spinal alignment, fails to explain discrepancies between physical findings and reported disability. Consequently, the biopsychosocial framework, which recognizes the interplay between biological, psychological and social factors, has gained prominence.[10]

Within this framework, 'yellow flags' denote psychological and behavioural risk factors indicative of long-term disability and chronicity.[11] Key yellow flags include fear-avoidance beliefs, pain catastrophizing, anxiety, emotional distress, low self-efficacy and occupational dissatisfaction.[12-19] Unaddressed yellow flags can alter central pain processing (central sensitization), promote physical deconditioning through activity avoidance and increase healthcare utilization.[10,19,20]

While psychosocial factors are widely studied in chronic LBP populations, screening during the acute and subacute stages remains underused in clinical practice.[21-23] This study therefore aimed to quantify the prevalence of yellow flags in acute and subacute LBP and to examine the relationships between psychosocial risk, pain catastrophizing and pain intensity.

MATERIALS AND METHODS

Study Design and Setting

An observational cross-sectional study was conducted in the Department of Musculoskeletal Physiotherapy, Ojas College of Physiotherapy, Jalna, Maharashtra, India. Ethical approval (committee name and approval number) and institutional permission were obtained before the study commenced.

Sample Size and Participant Selection

The sample size of 302 participants was calculated using the standard epidemiological formula for a population proportion, based on an estimated yellow flag prevalence of 73% (add reference), a 5% margin of error and a 95% confidence level. Participants were recruited by convenience sampling.

Inclusion criteria: (1) age ≥ 18 years; (2) non-specific LBP lasting between 2 and 12 weeks (acute: <6 weeks; subacute: 6–12 weeks); (3) ability to understand and complete the self-report questionnaires independently; and (4) provision of written informed consent.

Exclusion criteria: (1) chronic LBP (>12 weeks' duration); (2) specific underlying spinal pathology (fracture, tumour, infection or inflammatory spondyloarthropathy); (3) neurological deficits (sciatica, radiculopathy or cauda equina syndrome); (4) history of spinal surgery; (5) pregnancy; and (6) cognitive impairment or language barriers.

Outcome Measures

Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ): The OMPSQ evaluates overall psychosocial risk and prognostic indicators for disability. A score of ≥ 90 indicates elevated psychosocial risk (90–105: moderate risk; >105: high risk). Its test–retest reliability (ICC 0.82–0.93) and internal consistency (Cronbach's α 0.82–0.94) are well established.[24-32]

Pain Catastrophizing Scale (PCS): The PCS is a 13-item scale assessing rumination, magnification and helplessness associated with pain. Total scores range from 0 to 52, with a score of ≥ 30 representing clinically significant (high) catastrophizing (<20: mild/low; 20–29: moderate). It has high internal consistency (Cronbach's α 0.92) and test–retest reliability (Spearman's ρ 0.88).[33,34]

Numerical Pain Rating Scale (NPRS): The NPRS is a 0–10 point scale measuring pain intensity over the preceding 24 hours (test–retest r 0.63; internal consistency α approximately 0.84).

Statistical Analysis

Data were analysed using (name and version of statistical software). Normality was evaluated using the Shapiro–Wilk test. Continuous variables were presented as mean ± standard deviation (SD) and median [interquartile range, IQR], and categorical variables as counts and percentages. Between-group comparisons (acute vs. subacute) were made using independent samples t-tests, Mann–Whitney U tests and Pearson's Chi-square tests. Bivariate relationships were assessed using Pearson's r and Spearman's ρ correlation coefficients. Statistical significance was set at $p<0.05$.

RESULTS

Baseline Demographic and Clinical Characteristics

The cohort comprised 302 participants: 161 with acute LBP (53.3%) and 141 with subacute LBP (46.7%). The sample included 155 males (51.3%) and 147 females (48.7%). Age, pain intensity, OMPSQ scores and PCS scores did not differ significantly between the acute and subacute groups ($p>0.05$) (Table 1).

Table 1: Baseline demographics and group comparisons

Clinical metric	Total cohort (N=302)	Acute LBP (n=161)	Subacute LBP (n=141)	Test statistic	p-value
Age (years)	33.44 ± 8.05 [32.0, 11.0]	33.55 ± 8.28 [32.0, 13.0]	33.31 ± 7.80 [32.0, 10.0]	t = 0.259 (U = 11326.5)	0.796
Pain intensity (NPRS)	6.37 ± 0.98 [6.0, 1.0]	6.41 ± 0.98 [6.0, 1.0]	6.33 ± 0.99 [6.0, 1.0]	t = 0.738 (U = 11848.5)	0.461
Örebro score (OMPSQ)	86.98 ± 6.96 [88.0, 8.8]	87.39 ± 7.27 [88.0, 9.0]	86.50 ± 6.58 [88.0, 9.0]	t = 1.107 (U = 12040.0)	0.269
Catastrophizing (PCS)	28.12 ± 4.72 [29.0, 5.0]	28.07 ± 4.87 [29.0, 5.0]	28.17 ± 4.57 [28.0, 4.0]	t = −0.175 (U = 11355.5)	0.861
Sex (male/female)	155 (51.3%) / 147 (48.7%)	87 (54.0%) / 74 (46.0%)	68 (48.2%) / 73 (51.8%)	χ^2 = 0.797 (df = 1)	0.372

Values are mean ± SD [median, IQR] or n (%). LBP: low back pain; NPRS: Numerical Pain Rating Scale; OMPSQ: Örebro Musculoskeletal Pain Screening Questionnaire; PCS: Pain Catastrophizing Scale.

Prevalence and Stratification of Psychosocial Yellow Flags

Elevated psychosocial risk (OMPSQ ≥ 90) was observed in 39.40% (n=119) of the total population, and high pain catastrophizing (PCS ≥ 30) in 36.42% (n=110). Concomitant yellow flags (OMPSQ ≥ 90 and PCS ≥ 30) were identified in 26.16% (n=79). Overall, 49.67% (n=150) of the cohort demonstrated at least one psychosocial yellow flag. Flag prevalence did not differ significantly between the acute and subacute groups (p>0.05) (Table 2).

Table 2: Prevalence and stratification of psychosocial yellow flags

Clinical classification	Cut-off criteria	Total cohort (N=302)	Acute LBP (n=161)	Subacute LBP (n=141)	χ^2 (df = 1)	p-value
OMPSQ psychosocial flag	**Score ≥ 90**	**119 (39.40%)**	**65 (40.37%)**	**54 (38.30%)**	**0.063**	**0.803**
Low risk	Score < 90	183 (60.60%)	96 (59.63%)	87 (61.70%)	–	–
Moderate risk	Score 90–105	118 (39.07%)	64 (39.75%)	54 (38.30%)	–	–
High risk	Score > 105	1 (0.33%)	1 (0.62%)	0 (0.00%)	–	–
PCS high catastrophizing	**Score ≥ 30**	**110 (36.42%)**	**61 (37.89%)**	**49 (34.75%)**	**0.198**	**0.656**
Low/mild	Score < 20	11 (3.64%)	7 (4.35%)	4 (2.84%)	–	–
Moderate	Score 20–29	181 (59.93%)	93 (57.76%)	88 (62.41%)	–	–
High/severe	Score ≥ 30	110 (36.42%)	61 (37.89%)	49 (34.75%)	–	–
Concomitant yellow flags	**OMPSQ ≥ 90 and PCS ≥ 30**	**79 (26.16%)**	**43 (26.71%)**	**36 (25.53%)**	**0.057**	**0.812**
Any yellow flag	**OMPSQ ≥ 90 or PCS ≥ 30**	**150 (49.67%)**	**83 (51.55%)**	**67 (47.52%)**	**0.488**	**0.485**

Values are n (%). Chi-square tests compare the acute and subacute groups.

Correlation Analysis

Strong, statistically significant positive correlations were found between overall psychosocial risk (OMPSQ), pain catastrophizing (PCS) and reported pain intensity (NPRS) (p<0.0001). Age showed no statistically significant correlation with pain severity or the psychosocial measures (Table 3).

Table 3: Bivariate correlation analysis

Variable pair	Pearson's r	95% CI	t-statistic	Spearman's rho	p-value
OMPSQ vs. PCS	+0.681	+0.613 to +0.738	16.14	+0.684	<0.0001***
OMPSQ vs. NPRS	+0.638	+0.564 to +0.701	14.39	+0.648	<0.0001***
PCS vs. NPRS	+0.609	+0.531 to +0.676	13.33	+0.578	<0.0001***
Age vs. NPRS	+0.097	−0.016 to +0.208	1.69	+0.087	0.091 (NS)
Age vs. PCS	+0.034	−0.079 to +0.147	0.60	+0.080	0.551 (NS)
Age vs. OMPSQ	−0.004	−0.117 to +0.109	−0.07	+0.021	0.948 (NS)

*CI: confidence interval; NS: not significant. ***p<0.0001.*

DISCUSSION

The present study investigated the prevalence and stratification of yellow flags in individuals with acute (<6 weeks) and subacute (6–12 weeks) low back pain. The key findings demonstrate that psychosocial risk factors are present early in the course of LBP, with approximately half (49.67%) of the participants presenting with at least one yellow flag. Elevated overall psychosocial risk (OMPSQ ≥ 90) was observed in 39.40% of participants, and high pain catastrophizing (PCS ≥ 30) in 36.42%.

Importantly, yellow flag prevalence did not differ significantly between the acute and subacute groups. This indicates that psychological risk is not confined to chronic or prolonged subacute stages; rather, maladaptive pain beliefs and cognitive distress appear early in the acute episode. These findings align with prospective work by George et al.[35] and Nicholas et al.,[11] who emphasized that psychological distress, fear-avoidance beliefs and pain catastrophizing emerge at early presentation and predict future disability.

The strong positive correlations between OMPSQ, PCS and NPRS scores ($r>0.60$, $p<0.0001$) reflect the interdependence of psychological processing and sensory pain perception. Elevated pain catastrophizing involves rumination and perceived helplessness, which can heighten nervous system reactivity (central sensitization) and amplify pain perception. This creates a self-reinforcing fear-avoidance cycle in which greater perceived threat leads to activity avoidance, muscular deconditioning, functional decline and persistent pain.[19,20]

Clinical Implications

The substantial prevalence of yellow flags in acute and subacute LBP underscores the need to move beyond a purely structural, biomedical framework in early clinical practice. Integrating screening tools such as the OMPSQ and PCS into standard intake evaluations allows physiotherapists to identify high-risk individuals early. Early identification supports the application of psychologically informed physical therapy (PIPT), which combines graded activity, posture re-education and structured exercise with cognitive-behavioural strategies such as education, reassurance and de-catastrophizing.[11,36]

Limitations

This study has several limitations. First, the cross-sectional design precludes establishing causal relationships between psychosocial yellow flags, pain intensity and disability progression. Second, there was no longitudinal follow-up, so long-term conversion from the acute or subacute stage to chronic disability was not tracked. Third, convenience sampling from a single institution may limit generalizability to broader socio-demographic populations. Fourth, the data relied on self-administered questionnaires, which are subject to individual perception and reporting bias. Fifth, specific domains such as clinical depression, generalized anxiety, direct fear-avoidance measures (FABQ/TSK) and sleep quality were not evaluated as separate variables.[12,37,38]

Recommendations and Future Directions

Prospective longitudinal cohort studies are recommended to determine whether early OMPSQ and PCS thresholds predict progression to chronicity. Randomized clinical trials should investigate the efficacy of early PIPT compared with traditional physiotherapy in patients presenting with yellow flags in the acute stage. Future screening should also incorporate additional domain-specific tools, such as the Tampa Scale for Kinesiophobia, the Fear-Avoidance Beliefs Questionnaire and sleep and stress inventories, to characterize psychosocial profiles more fully.

CONCLUSION

Psychosocial yellow flags are highly prevalent in patients with acute and subacute low back pain, affecting nearly half of all presenting individuals. The prevalence of elevated psychosocial risk and pain catastrophizing was comparable in the acute and subacute stages. The strong positive correlation between yellow flags and pain intensity underscores the need for early routine screening and for biopsychosocially informed management strategies in physiotherapy practice.

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