The Annals of the "Ştefan cel Mare" University of Suceava.
Physical Education and Sport Section. The Science and Art of Movement
eISSN 2601 - 341X, ISSN 1844-9131

THE FLAG SYSTEM IN PHYSIOTHERAPY: A BIOPSYCHOSOCIAL APPROACH TO PAIN ASSESSMENT

Gabriela Iuliana Cazac[1]
Ștefan cel Mare University of Suceava, Romania[1]
gabriela.cazac@usm.ro[1]

Keywords: musculoskeletal pain, biopsychosocial model, flag system

Abstract

Musculoskeletal pain is a major contributor to disability and reduced quality of life, requiring assessment strategies that extend beyond a purely biomedical perspective. Contemporary physiotherapy practice increasingly emphasizes the biopsychosocial model, which considers biological, psychological, and social factors influencing pain and functional outcomes. Within this framework, the flag system represents a structured approach for identifying risk factors associated with serious pathology, psychosocial distress, occupational challenges, and systemic barriers that may affect recovery.

The aim of this article is to present and synthesize the flag system, including red, yellow, orange, blue, and black flags, and to underline its relevance in physiotherapy clinical reasoning and decision-making. A narrative literature review approach was employed, including relevant scientific articles and clinical guidelines, with the aim of analyzing key concepts related to pain screening, risk stratification, and interdisciplinary collaboration in physiotherapy practice.

The findings highlight the importance of early recognition of red flags that require urgent medical referral, as well as the identification of psychosocial and occupational factors that contribute to pain chronicity. Screening tools such as the Örebro Musculoskeletal Pain Questionnaire and the STarT Back Tool support individualized treatment planning. Integrating the flag system into physiotherapy assessment enhances patient-centered care, promotes multidisciplinary collaboration, and contributes to more effective and personalized therapeutic interventions.

Introduction

Musculoskeletal pain is recognized as one of the leading causes of disability worldwide, with low back pain exerting a substantial impact on individual functioning, work participation, and healthcare systems. During the 1980s and 1990s, the growing socioeconomic burden associated with musculoskeletal disorders revealed the limitations of traditional biomedical approaches focused exclusively on structural pathology and symptom reduction. Clinical evidence demonstrated that similar tissue findings could be associated with markedly different pain experiences

and recovery trajectories, highlighting the need for a broader evaluative framework capable of addressing the complexity of pain and disability [1,2].

In response to these challenges, increasing attention was directed toward the role of psychological, social, and occupational factors in the development and persistence of musculoskeletal pain. Research consistently showed that fear of movement, maladaptive beliefs, emotional distress, workplace perceptions, and organizational barriers significantly influence functional outcomes and contribute to pain chronicity, regardless of physical findings [3–5]. These observations underscored the necessity of assessment models that extend beyond biomedical diagnosis and incorporate contextual determinants of health [6].

The biopsychosocial model, originally proposed by Engel, provided the theoretical foundation for this paradigm shift by conceptualizing pain as the result of dynamic interactions between biological, psychological, and social dimensions. Within this framework, effective rehabilitation requires not only the management of physical impairments but also the identification of cognitive, emotional, behavioral, and environmental factors that shape the patient's experience of pain. This multidimensional understanding of health has been further reinforced by the World Health Organization's International Classification of Functioning, Disability and Health (ICF), which emphasizes functioning, participation, and contextual influences as core components of health assessment [7–9].

To illustrate the practical application of the biopsychosocial model and the flag system in physiotherapy, a typical clinical scenario can be considered. A 50-year-old factory worker with chronic low back pain presents with imaging-confirmed disc degeneration, in the absence of red flags such as malignancy or fracture. Psychological assessment reveals fear of movement and maladaptive beliefs regarding physical activity, consistent with yellow flags. From a social and occupational perspective, the patient perceives work as harmful and reports limited employer support, corresponding to blue flags.

This example highlights that functional disability cannot be attributed solely to biological factors, but rather results from the interaction between psychological and social influences. A biopsychosocial, flag-informed intervention would therefore include pain education, graded exercise, and collaboration with occupational health services to facilitate workplace adaptation.

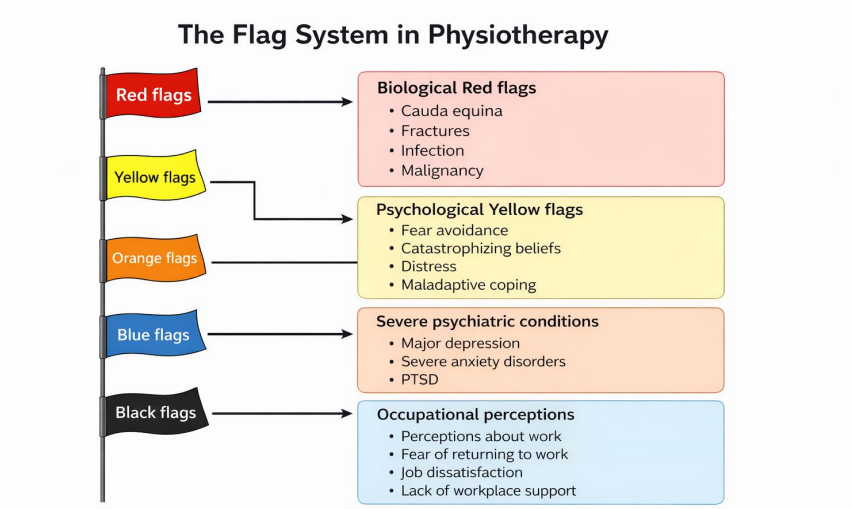

Fig. 1. Conceptual framework adapted and synthesized by the author from classical biopsychosocial literature on the flag system. [1–5, 9, 12].

Building upon this conceptual foundation, the flag system was developed as a practical clinical tool designed to operationalize the biopsychosocial model in musculoskeletal care. Initially introduced in the United Kingdom in the mid-1990s through guidelines for low back pain management, the concept of yellow flags aimed to identify psychosocial risk factors associated with delayed recovery and chronic disability. The system was subsequently expanded and consolidated in New Zealand through the Accident Compensation Corporation (ACC) guidelines, which highlighted the importance of early screening and prevention of long-term work absence [10–12].

Over time, the flag system evolved into a comprehensive framework encompassing five distinct categories of risk factors. Red flags were defined to signal potential serious pathology requiring urgent medical referral, ensuring patient safety and delineating the limits of physiotherapy intervention. Yellow flags addressed psychological and behavioral factors, such as fear avoidance and catastrophizing, associated with pain persistence. Orange flags were introduced to identify severe psychiatric conditions requiring specialist referral. Blue flags focused on patients' perceptions of work and its relationship to their symptoms, while black flags captured broader socio-occupational, organizational, and policy-related barriers that may hinder recovery and return to work [3,13–16].

In contemporary physiotherapy practice, the flag system represents a cornerstone of biopsychosocial assessment and clinical decision-making. By enabling structured screening across biological, psychological, occupational, and social domains, it supports individualized treatment planning, interdisciplinary collaboration, and the prevention of pain chronicity. Integrating all categories of the

flag system into routine assessment aligns physiotherapy practice with modern evidence-informed, patient-centered care models and reinforces its role within comprehensive musculoskeletal rehabilitation [1,17].

Material-method

The aim of this study was to analyze and synthesize the flag system as a clinical framework for pain assessment in physiotherapy, within the context of the biopsychosocial model, and to highlight its relevance for clinical reasoning, risk stratification, and decision-making in musculoskeletal rehabilitation.

A narrative literature review methodology was adopted, focusing on published scientific literature addressing musculoskeletal pain, psychosocial and occupational risk factors, and systemic influences on health outcomes. The reviewed sources included textbooks, clinical guidelines, and peer-reviewed articles that describe the conceptual development and clinical application of the flag system in healthcare practice.

The selected literature was examined to identify key concepts related to red, yellow, orange, blue, and black flags, including their definitions, clinical significance, and implications for physiotherapy assessment and management. Foundational theoretical frameworks, such as the biopsychosocial model and the International Classification of Functioning, Disability and Health (ICF), were used to contextualize the multidimensional nature of pain and disability.

The methodological approach involved qualitative synthesis of the literature, emphasizing the integration of biological, psychological, occupational, and social determinants of health into a structured assessment framework. Screening instruments commonly reported in the literature, such as the Örebro Musculoskeletal Pain Questionnaire and the STarT Back Tool, were considered as examples of tools that support risk stratification and individualized treatment planning in physiotherapy practice.

No human participants were directly involved in this study, and no experimental interventions were conducted. Data analysis consisted of thematic organization and conceptual integration of the reviewed evidence, with the objective of providing a coherent overview of the flag system and its relevance to patient-centered, interdisciplinary physiotherapy care.

Results

The synthesis of the reviewed literature highlights the flag system as a comprehensive clinical framework for identifying multidimensional risk factors associated with musculoskeletal pain and its progression toward chronicity. The analyzed sources consistently emphasize that effective physiotherapy assessment requires simultaneous consideration of biomedical, psychological, occupational, and social determinants of health [1,4,7,9].

Red flags were identified as indicators of serious underlying pathology, such as infection, fracture, malignancy, or severe neurological compromise, requiring urgent medical referral. The literature consistently reports that early recognition of red flags plays a critical role in patient safety and appropriate clinical decision-making, preventing delays in diagnosis and management [2,11,17].

The reviewed literature consistently emphasizes the importance of early identification of red flags in patients presenting with musculoskeletal pain, as these signs may indicate serious underlying pathology and require immediate medical referral. Illustrative clinical situations include patients presenting with low back pain accompanied by fever, raising suspicion of infectious conditions such as spondylodiscitis. Similarly, the presence of cervical pain associated with neurological symptoms such as diplopia may suggest vascular pathology, including arterial dissection, necessitating urgent neurological evaluation. Sudden onset of urinary or fecal incontinence in patients with spinal pain represents another critical red flag, suggestive of cauda equina syndrome, and requires immediate neurosurgical assessment.

In such circumstances, physiotherapy intervention is contraindicated, and prompt referral for medical investigations, including diagnostic imaging and laboratory tests, is essential to ensure patient safety and appropriate management.

Yellow flags emerged as significant predictors of pain chronicity and disability. Psychological factors such as fear of movement, catastrophizing, maladaptive beliefs, emotional distress, and passive coping strategies were repeatedly associated with poorer functional outcomes and prolonged recovery. Studies included in the review underline the strong relationship between these factors and increased healthcare utilization, reduced treatment adherence, and delayed return to activity [5,6,8,15].

Orange flags were described as indicators of severe mental health conditions, including major depression, anxiety disorders, post-traumatic stress, and other psychiatric disorders, which may interfere with rehabilitation processes. The literature supports the need for interdisciplinary collaboration and referral to mental health specialists when such factors are identified [6,14]. Clinical expressions such as hopelessness, suicidal ideation, or statements indicating loss of purpose represent urgent warning signs requiring immediate action. Additional examples include patients with a history of suicide attempts, active psychotic symptoms, or severe substance abuse disorders. In these cases, the literature supports rapid referral to mental health services, including emergency psychiatric care when indicated, and close interdisciplinary collaboration to manage risk and support patient safety.

Blue flags were associated with negative perceptions related to work, including beliefs that work is harmful, fear of reinjury, low job satisfaction, and low expectations of return to work. These factors were frequently linked to prolonged

work absence, delayed vocational reintegration, and reduced occupational participation [4,13].

Black flags reflected external and systemic barriers, such as organizational policies, compensation systems, legal constraints, and workplace conditions, which may limit recovery regardless of clinical improvement. The reviewed literature emphasizes that these factors can significantly influence rehabilitation outcomes and require coordinated organizational and policy-level interventions [10,16].

Screening tools such as the Örebro Musculoskeletal Pain Questionnaire and the STarT Back Tool were consistently reported as effective instruments for identifying psychosocial risk profiles and supporting stratified care approaches in physiotherapy practice [6,8].

Discussions

The findings of this review support existing evidence emphasizing the importance of a biopsychosocial approach in the assessment of musculoskeletal pain. The flag system emerges as a practical and structured framework that enables physiotherapists to identify biological, psychological, occupational, and social risk factors associated with pain chronicity, in line with previous research [1,4,7].

Consistent with earlier studies, red flag screening remains essential for patient safety and appropriate referral, while yellow flags are strongly associated with prolonged recovery, disability, and increased healthcare utilization [2,5,6,15]. The inclusion of orange flags highlights the need for interdisciplinary collaboration in cases involving severe psychological conditions [6,14].

Blue and black flags further extend the assessment beyond the individual, emphasizing the influence of work-related perceptions and systemic barriers on rehabilitation outcomes. These findings align with previous literature demonstrating that occupational and policy-level factors can significantly delay recovery and return to work.

Blue flags reflect patients' perceptions and beliefs related to work and its relationship with pain and disability. The reviewed literature highlights that negative beliefs such as perceiving work as harmful, fear of reinjury, low job satisfaction, and lack of perceived employer support can significantly influence recovery trajectories, independent of physical findings [4,13,16].

For example, patients with chronic musculoskeletal pain may present with near-normal physical function, yet express strong reluctance to return to work due to beliefs that occupational activities will worsen their condition. Such perceptions can lead to prolonged work absence, reduced motivation for rehabilitation, and delayed vocational reintegration. Addressing blue flags requires not only physical rehabilitation but also education regarding safe activity, reassurance, and collaboration with occupational health professionals to facilitate workplace adaptation and graded return-to-work strategies.

Black flags refer to external and systemic factors that may hinder recovery regardless of clinical improvement. These include organizational policies, compensation and insurance systems, legal constraints, limited access to vocational rehabilitation programs, and broader socio-economic barriers [10,16].

In clinical practice, physiotherapists may encounter patients whose recovery is negatively influenced by the absence of institutional support or rigid workplace regulations. Although such barriers often lie beyond the direct control of healthcare professionals, recognizing black flags is essential to avoid inappropriate attribution of disability solely to patient-related factors. Acknowledging these systemic constraints allows clinicians to adopt realistic goals, validate patient concerns, and guide individuals toward appropriate occupational medicine services or social support resources.

The reviewed evidence supports the integration of interdisciplinary collaboration as a key component of effective flag-based management. Complex cases involving overlapping yellow, orange, blue, and black flags often require coordinated input from physiotherapists, physicians, psychologists, psychiatrists, occupational health specialists, and social workers [6,14].

An interdisciplinary approach enables comprehensive management of physical symptoms, psychological distress, occupational challenges, and social barriers. Such collaboration enhances patient safety, reduces the risk of pain chronicity, and supports functional recovery and social participation. By facilitating communication across disciplines, the flag system contributes to a holistic, patient-centered model of care aligned with contemporary biopsychosocial rehabilitation principles.

Overall, the results confirm the hypothesis that the flag system effectively operationalizes the biopsychosocial model in physiotherapy practice. The main limitation of this review is its narrative design, which does not allow quantitative synthesis or causal inference. Nevertheless, the consistency of findings across multiple sources supports the clinical relevance of the flag system as a comprehensive assessment tool.

Conclusions

This review highlights the flag system as a valuable clinical framework for the assessment of musculoskeletal pain within physiotherapy practice. By integrating biological, psychological, occupational, and social dimensions, the system supports a comprehensive understanding of pain and its potential progression toward chronicity.

The findings emphasize the importance of early identification of red flags to ensure patient safety, as well as the recognition of psychosocial, occupational, and systemic factors that influence rehabilitation outcomes. Incorporating yellow, orange, blue, and black flags into routine assessment enhances clinical reasoning, promotes individualized treatment planning, and facilitates interdisciplinary collaboration.

Future research should focus on quantitative studies evaluating the effectiveness of flag-based screening in improving clinical outcomes and reducing long-term disability. Additionally, further investigation into standardized implementation strategies and training for physiotherapists may strengthen the integration of the flag system into everyday clinical practice.

References

[1] Waddell G. *The Back Pain Revolution*. 2nd ed. Edinburgh: Churchill Livingstone; 2004.
[2] Henschke N, Maher CG, Refshauge KM, et al. Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. *BMJ*. 2007;337:a171.
[3] O'Sullivan P. It's time for change with the management of non-specific chronic low back pain. *British Journal of Sports Medicine*. 2012;46(4):224–227.
[4] Main CJ, Foster N, Buchbinder R. How important are "yellow flags", "blue flags" and "black flags" in patients with low back pain? *Best Practice & Research Clinical Rheumatology*. 2010;24(2):203–217.
[5] Linton SJ, Shaw WS. Impact of psychological factors in the experience of pain. *Physical Therapy*. 2011;91(5):700–711.
[6] Nicholas MK, Linton SJ, Watson PJ, Main CJ. Early identification and management of psychological risk factors ("yellow flags") in patients with low back pain: a reappraisal. *Physical Therapy*. 2011;91(5):737–753.
[7] Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129–136.
[8] Kendall NAS, Linton SJ, Main CJ. *Guide to assessing psychosocial yellow flags in acute low back pain: Risk factors for long-term disability and work loss*. Wellington: Accident Rehabilitation & Compensation Insurance Corporation of New Zealand; 1997.
[9] World Health Organization. *International Classification of Functioning, Disability and Health (ICF)*. Geneva: WHO; 2001.
[10] Kendall NAS, Burton AK, Main CJ, Watson PJ. *Tackling musculoskeletal problems: A guide for the clinic and workplace*. London: TSO; 2009.
[11] Royal College of General Practitioners. *Clinical guidelines for the management of acute low back pain*. London: RCGP; 1994.
[12] Accident Compensation Corporation (ACC). *New Zealand Acute Low Back Pain Guide: Incorporating the Guide to Assessing Psychosocial Yellow Flags*. Wellington: ACC; 1997.
[13] Main CJ, Burton AK. Economic and occupational influences on pain and disability. In: Main CJ, Sullivan MJL, Watson PJ, editors. *Pain Management: Practical Applications of the Biopsychosocial Perspective*. Edinburgh: Churchill Livingstone; 2000. p. 63–84.

[14] Nicholas MK, Main CJ. Psychological risk factors in low back pain. In: Main CJ, Sullivan MJL, Watson PJ, editors. *Pain Management: Practical Applications of the Biopsychosocial Perspective*. Edinburgh: Churchill Livingstone; 2000. p. 89–104.
[15] Linton SJ. A review of psychological risk factors in back and neck pain. *Spine*. 2000;25(9):1148–1156.
[16] Kendall NAS, Burton AK, Main CJ, Watson PJ. Workplace, organizational and policy-related barriers to recovery. In: *Tackling musculoskeletal problems: A guide for the clinic and workplace*. London: The Stationery Office; 2009. p. 121–145.
[17] Downie, A., Williams, C.M., Henschke, N., et al. Red flags to screen for malignancy in patients with low-back pain. Cochrane Database of Systematic Reviews, 2, CD008686, 2013